

OFFICE OF THE TEXTILE COMMISSIONER

Baseline survey of the Technical Textile industry in India



ICRA Management Consulting Services Limited

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Glossary:

AAMI- Association for the Advancement of Medical Instrumentation	IS – Indian Standard
ABS - Acrylonitrile-Butadiene-Styrene	ITTA – Indian Technical Textile Association
ACRS - Australasian College of Road Safety	JV - Joint Venture
AGM – Absorbent Glass Mat	KVK- Krishi Vigyan Kendra
AHU – Air Handling Unit	LCV – Light Commercial Vehicle
AIFTMA - All India Flat Tape Manufacturers association	LDPE - Low Density Polyethylene
ANFA – Asia Nonwoven Fabric Association	LLDPE - Linear Low Density Polyethylene
ASD – Atrial Septal Defect	MEIS - Merchandise Exports from India Scheme
BIS – Bureau of Indian Standards	MLFPS - Market Linked Focus Product Scheme
BRO – Border Roads Organisation	MoRTH – Ministry of Road Transport and Highways
CAGR – Compounded Annual Growth Rate	MoT – Ministry of Textiles
CBC – Carpet backing cloth	MSME- Micro, Small and Medium Enterprises
CoE – Centre for Excellence	MT – Metric Tonnes
CPC – Chemical Protective Clothing	NABARD - National Bank For Agriculture And Rural Development
CPWD - Central Public Works Department	NBC – Nuclear and Biological Clothing
CSIR – Council of Scientific & Industrial Research	NCR – National Capital Region
CVD – Countervailing Duty	NHAI – National Highways Authority of India
DG- CIS – Director General of Commercial Intelligence and Statistics	NHB – National Horticultural Board
DG- SND – Director General – Supplies and Deposals	NHM – National Horticultural Mission

DGCA – Director general Civil Aviation	NHTSA- National Highway Traffic Safety Administration, US
DGFT- Director General of Foreign Trade	NSDC- National Skill Development Council
DRDO – Defence Research and Development Organisation	NVH – Noise, Vibration and Harshness
DSIR – Department for Scientific & Industrial Research	OHSA- Occupational Health and Safety Act
DST – Department of Science and Technology	OOH – Out of Home
EBITDA – Earnings Before Interest Taxes Depreciation and Amortisation	OTxC – Office of Textile Commissioner
EDANA - European Disposables and Nonwovens Association	PBI – Polybenzimidazole
EOU – Export Oriented Unit	PCB – Printed Circuit Board
EPCG- Export Promotion Capital Goods	PE – Polyethylene
ETP – Effluent Treatment Plant	PP – Poly propylene
EWCS – Extreme Weather Clothing	PPP – Public Private Partnership
FDI – Foreign Direct Investment	PSF – Polyester Staple Fibre
FIBC- Flexible Intermediate Bulk Containers	PTFE – Polytetrafluoroethylene
FIC – Focussed Incubation Centre	PU – Polyurethane
FICCI - Federation of Indian Chambers of Commerce & Industry	PVC - Poly Vinyl Chloride
FIFA - The Fédération Internationale de Football Association	PVDs – Pre-fabricated drains
FR – Fire retardant	PWD – Public Works Department
FTA – Foreign Trade Agreement	R&D – Research and Development
GSM – Grams per Square Metre	SAD - Special Additional Duty
GST – Goods and Services Tax	SAIL – Steel Authority of India Limited
H&L – Hook and Loop	SF – Safe factor
HAL – High Altitude Clothing	SGDTT - Scheme for Growth and Development of Technical Textiles
HCV –Heavy Commercial Vehicle	SGEPC - Sports Goods Export Promotion Council
HDPE - - High Density Polyethylene	SITP - Scheme for Integrated Textiles Park
HEPA filters - High Efficiency Particulate Air filters	SMS – Spunbond +Meltblown + Spunbond
HSN – Harmonised System of Nomenclature	SWL – Safe working Load
HVAC – Heating, Ventilation and Air conditioning	TMTT – Technology Mission in Technical Textiles
HVC – High Visibility Clothing	TSC- Textile Sector Skill Council
IAHCMM- International Association of Healthcare Central Service Material Management	TT- Technical Textiles
IATA - International Air Transport Association	TUFS – Technology Up gradation Financial Support Scheme
ICC – International Cricket Committee	UHMW-PE - Ultra high molecular weight-polyethylene
INDA - International Nonwoven and Disposables Association	ULPA filters - Ultra Low Penetration Air filter
IPR – Intellectual Property Rights	VAT – Value Added Tax
	VSD – Ventricular Septal Defect

EXECUTIVE SUMMARY

1. INTRODUCTION

The Ministry of Textiles (MoT) is responsible for policy formulation, planning, development, export promotion and trade regulation in respect to the textile industry. In line with this agenda, the Ministry of Textiles has undertaken several developmental activities that are oriented towards providing necessary support to promote growth of Technical Textile industry in India.

Technical Textiles are textile materials and products used for their technical performance and functional properties. The market for Technical Textiles is expanding as the products are being put to use by an ever-increasing number of end users in various industries such as agriculture, clothing, construction, health care, transportation, packaging, sports, environmental protection, protective wear, and more. The global market for Technical Textiles is expected to grow, driven by the increasing use of these products particularly non woven in emerging markets like Asia, because of increased levels of consumption and production, availability of skilled labour, and developing infrastructure facilities. The global Technical Textile industry is currently dominated by products from China and the European Union. Developing countries in Asia have the advantage of becoming production centres for Technical Textiles due to their factor cost advantages. The given cost advantage like cheap labour and abundance of natural fibres as well as manmade fibres, India has a high potential to become a significant global player in Technical Textiles.

A baseline survey that provides comprehensive information on all aspects of the Technical Textile industry in India is imperative for understanding the past developments and progress in the sector and for identifying key challenges, growth potential and opportunities. Under the 12th five year plan scheme of the Government, MoT through the Office of the Textile Commissioner has planned to carry out an updating exercise of the baseline survey for the Technical Textile Industry to estimate all information on the Technical Textile industry in India like market size, consumption, trade trends, number of units, type of units, type of products produced, investment, turnover, employment, etc.

In this regard MoT has appointed ICRA Management Consulting Services (IMaCS) to do a baseline survey of the Technical Textile industry of India.

IMaCS did a detailed analysis of different Technical Textile products on aspects of domestic and exports market size, domestic production, imports, institutional consumption, identifying key drivers and challenges, identifying key players and analysing different factors of production.

2. MARKET SUMMARY

Technical Textiles are used because of their specific physical and functional properties by several user industries. Depending on the product characteristics, functional requirements and end-user applications the highly diversified range of Technical Textile products have been currently grouped into 12 categories based on application:

- Agrotech (Agriculture, horticulture and forestry)
- Buildtech (building and construction)
- Clothtech (technical components of footwear and clothing)
- Geotech (geotextiles, civil engineering)
- Hometech (components of furniture, household textiles and floor coverings)
- Indutech (filtration, cleaning and other industrial usage)
- Meditech (hygiene and medical)
- Mobiltech (automobiles, shipping, railways and aerospace)
- Oekotech (environmental protection)
- Packtech (packaging)
- Protech (personal and property protection)
- Sportech (sport and leisure)

The Technical Textile industry has immense potential in the developing countries. Asia is a power house of both production and consumption of Technical Textiles. China is the market leader in Technical Textiles. Korea, Japan, India and Taiwan are the other key players of Technical Textiles in Asia. Currently India caters to 3% of the global Technical Textile industry. Easy availability of labour along with availability of a wide range of fibre and fibre products in India are the key reasons for the growth of Technical Textile sector in India.

The Technical Textile industry in India is estimated to be valued at Rs. 73,688 crore in 2013-14 and is projected to grow to Rs. 92,499 crore by 2015-16 and Rs. 1,16,217 crore by 2017-18. The industry has witnessed a growth of 12.4% over the last five years

driven mainly by the growth witnessed in Packtech, Meditech and Indutech segments. 89% of the industry caters to domestic demand where as exports amount

to 11% of the market. Close to 90% of the supply is from domestic production with imports accounting for 10% of the total market.

The Technical Textile market across the 12 key segments is as shown as follows:

Market summary of Technical Textiles

Sl. No.	Segment	Market size 2007-08 (in Rs. crore)	Market size 2012-13 (in Rs. crore)	Growth (2008-13) CAGR	Projected growth (2013-16)	Market size (E) 2013-14 (in Rs. crore)	Market size (P) 2015-16 (in Rs. crore)	Market size (P) 2017-18 (in Rs. Crore)
1	Agrotech	553	826	~ 8%	~12%	929	1,191	1,614
2	Meditech	1,669	3,321	~ 15%	~9%	3,622	4,281	5,142
3	Mobiltech	3,183	6,607	~ 16%	~12%	7,370	9,173	11,433
4	Packtech	14,630	28,020	~ 14%	~11%	31,181	38,733	48,318
5	Sportech	2,851	4,132	~8%	~12%	4,645	5,877	7,111
6	Buildtech*	1,317	2,514	~14%	~12%	2,819	3,577	4,587
7	Clothtech [#]	3,466	4,835	~ 7%	~11%	5,357	6,591	8,133
8	Homotech [§]	4,345	6,249	~ 7.5%	~14%	7,119	9,274	12,145
9	Protech	1,302	1,988	~ 9%	~9%	2,176	2,722	3,139
10	Geotech	185	683	~30%	~13%	772	991	1,275
11	Oekotech	68	120	~12%	~10%	132	160	193
11	Indutech	3,206	6,625	~16%	~14%	7,567	9,929	13,127
	Total Technical Textile market	36,775	65,920	~12.4%	~11.8%	73,688	92,499	1,16,217

Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

*Buildtech market size for 2007-08 and onwards excludes market of floor and wall covering

§ Homotech market for 2007-08 includes plush fabric for soft toys instead of total soft toys and Technical Textile furniture fabrics only

#Clothtech market includes only specialised sewing threads

Packtech is the segment of Technical Textiles which has a share of 43% of the entire Technical Textile market. Homotech, Clothtech, Mobiltech and Indutech are the other key segments of Technical Textiles with each segment accounting between 8% and 10% of total market. In addition to these the other segments which includes Agrotech, Meditech, Protech, Sportech, Geotech, Oekotech and Buildtech are in their growing phase and are expected to be the key drivers in the future.

New Technical Textile products

New Technical Textile products have been segregated from traditional products based on the parameters such as

- Current usage level and prospects for growth in future
- New Technical Textile products that have emerged in last 2 years
- Technical Textile products where the consumption market is expected to have a significant growth prospect in near future
- Technical Textile products that have seen high level of value addition in recent past.
- Technical Textiles, where Government policies would significantly impact the market demand in a positive manner

The total new Technical Textile market in India is estimated to be Rs. 14,855 crore for 2012-13 and is expected to reach Rs. 23,944 crore by 2015-16 growing at 16% CAGR and Rs. 30,402 crore. It constitutes of 51 new products accounting for 23% of the total Technical Textile industry in 2012-13. Indutech, Homotech and Packtech are the key new Technical Textile segments accounting for 37%, 18% and 12% respectively. The segment wise summary of new Technical Textiles is shown in the following table.

Market summary of new Technical Textiles

Sl. No.	Segment	Total Tech Tex Market size 2012-13 (in Rs. crore)	New Tech Tex market share 2012-13	New Tech Tex Projected CAGR (2013-16)	New tech tex. Market size (E) 2013-14 (in Rs. crore)	New tech tex. Market size (P) 2015-16 (in Rs. crore)	New tech tex. Market size (P) 2017-18 (in Rs. crore)
1	Agrotech	826	21%	~23%	212	321	361
2	Meditech	3,321	19%	~15%	752	973	1,317
3	Mobiltech	6,607	1.7%	~12%	276	346	447
4	Packtech	28,020	7%	~18%	2,164	3,000	4,171
5	Sportech	4,132	14%	~16%	662	884	851
6	Buildtech	2,514	26%	~14%	757	987	1,296
7	Clothtech	4,835	16%	~12%	852	1,079	1,367
8	Homitech	6,249	42%	~17%	3,112	4,295	5,946
9	Protech	1,988	54%	~14%	1,225	1,583	1,814
10	Geotech	683	100%	~13%	772	991	1,275
11	Oekotech	120	-	-	-	-	-
11	Indutech	6,625	84%	~16%	6,042	8,585	11,557
	Total Technical Textile market	65,920	23%	~16%	16,826	23,044	30,402

Source: IMAcS analysis

3. SEGMENT WISE MARKET

Segment wise market summary for the 12 key segments of Technical Textiles is detailed below:

3.1 Agrotech

Agrotech includes Technical Textile products used in agriculture, horticulture (incl. Floriculture), fisheries, animal husbandry and forestry. The key Technical Textile products under the segment are as follows:

- Shade-nets
- Mulch-mats
- Crop-covers
- Anti-hail nets and bird protection nets
- Fishing nets
- Plant nets and other nettings for agriculture

The total estimated market size of Agrotech is estimated to be Rs. 929 crore in 2013-14. Close to 97% of the entire market is catered by domestic supply. The market is driven by both domestic consumption and exports, with exports contributing to 23% of the total market. Agrotech is projected to grow to Rs. 1,191 crore in 2015-16 at 12% CAGR and to Rs. 1,614 crore by 2017-18, driven primarily by domestic market growth of Shade nets and export market growth of fishing net. The consumption of agro-textiles is driven by the subsidy and incentives provided by NHM and NHB for different agricultural products. With increased focus on promoting protective textiles for agriculture under NHM, the market for Agrotech is expected to grow at 10% per annum driven by Shade nets which are expected to grow at 25% per annum. Exports from the segment would be driven by fishing nets which has witnessed a growth of 35% during the last five years

and is expected to grow at the rate of 12% during the next three to five years.

3.2 Meditech

Medical Textiles are those textiles that incorporate at least one of the following in their structure – fibre, filament, yarn or fabric, and which involve one or more of the following processes - extrusion, spinning, weaving, knitting, non-woven, braiding and bonding are applied for human hygiene, healthcare and/or medical practice

The key Technical Textile products under the Meditech segment sub categorised as Hygiene and Healthcare are as follows:

- Hygiene products: Baby Diapers, Incontinence Diapers, Sanitary Napkins, Wipes, Ear Buds, Under pads
- Healthcare products
 - Surgical Disposables: Caps, Masks, Gowns, Drapes and Shoe Covers, Disposable Bed sheets, Curtains and Pillow covers
 - Surgical Dressings: Bandages, Wound Care(Wadding, Gauzes, Cotton Lint and Surgical Cotton)
 - Eye Pads
 - Dental Floss
- Compression Stockings and Garments
- Surgical Sutures
- Others like Artificial Heart Valves and Heart Patches, Artificial Vascular Grafts, Artificial Tendon/Mesh and Artificial Ligaments

- Extra Corporeal products like Orthotics and Prosthetics, Artificial Kidney, Artificial Joints, Artificial Liver and Artificial Lungs

The total market size of medical textiles is estimated to be Rs. 3,622 crore in 2013-14. Surgical disposables and surgical sutures are the key products in the segment accounting for close to 70% of the total market. Close to 71% of the market is catered by domestic supply. 79% of the market is driven by the domestic industry. With a key section of our population entering into the age of over 50 years, the demand for healthcare services and medical textiles have witnessed a surge in the previous years. Within the industry, due to growing awareness regarding hygiene and increasing purchasing power of the society, the demand for hygiene products like diapers and wipes has grown over four folds in last five years and are expected to grow at 15% to 20% in the coming three to five years. On the other hand, with the growth of organised healthcare and hospitality, the demand for healthcare products such as surgical disposables and dressings has witnessed a CAGR growth of 10% to 15% during the last five years. With surgical disposables and sutures reaching a size of over Rs. 1000 crore, the market is expect to grow at a slower pace of close to 10% in the coming years. Over all the market for Meditech is in its growing phase and is projected to reach Rs. 4,281 crore by 2015-16 growing at 9% CAGR and further to Rs. 5,142 crore by 2017-18.

3.3 Mobiltech

Mobiltech segment of Technical Textiles includes applications in automotive and automotive components (including aircrafts and railways). The key Technical Textile products covered under Mobiltech are as given below:-

- Nylon tyre cord
- Seat belt webbing
- Airbags
- Car body covers
- Seat upholstery/fabric
- Automotive carpets
- Headliners
- Insulation felts (NVH components)
- Sun visors / sun blinds
- Helmets
- Airline disposables
- Webbing for aircrafts
- Aircraft upholstery
- Railways seating fabrics

The total estimated market size of Mobiltech segment is estimated to be Rs. 7,730 crore in 2013-14 with nylon tyre cord being the largest with 60% share in the

segment. Other key product is helmets that has over 15% share of the market. Seat covers and Technical Textiles used in interiors upholstery constitutes about 12% of the Mobiltech segment by value. The demand in this segment is directly fuelled by the growth of automotive industry. Particularly the demand for Mobiltech textiles is completely driven by the indigenous production of vehicles in India. This industry is projected to grow at a rate of 12% reaching Rs. 9,173 crore by 2015-16 and Rs. 11,433 crore by 2017-18. The key products that would be driving the growth and show high potential are:

- Seat covers fabric/upholstery
- Seat belt/webbing
- Automotive interior carpets
- Headliners (TT component)
- Insulation felts
- Sunvisors/sunblinds

3.4 Packtech

Packtech, is the segment of Technical Textiles that includes various packaging materials ranging from polymer based bags used for industrial packing to jute based sacks used for packaging food grains and packaging used for tea. The Technical Textile products covered under Packtech are as give below:-

- Polyolefin Woven Sacks (excluding FIBC)
- FIBC(Flexible Intermediate Bulk Container)
- Leno bags
- Wrapping fabric
- Jute Hessian and Sacks (including Food grade jute bags)
- Soft luggage products (TT component)
- Tea-bags (filter paper)
- Non-woven shopping bags

Technical Textiles market size under Packtech is estimated at around Rs 31,180 crore in 2013-14 driven primarily by the domestic consumption which accounts for 88% of the market. 98% of current market is catered via domestic production. Jute hessian and sacks (including Food grade jute bags) has the largest share within the segment accounting for around 38% of the segment size, followed by PP Woven sacks (excluding FIBC) with around 32% share. FIBC and wrapping fabrics account for around 19% of the total usage. Usage of Technical Textiles in soft luggage products, leno bags, tea-bags and shopping bags is little more than 10% of the total usage in Packtech.

The Packtech segment has witnessed a growth of 14% during the last five years mainly due to inflationary rise of materials and export oriented growth in the key segments of jute and hessian bags and PP olefin bags. The demand for the majority of Packtech products

comes for food grain, cement, chemical and fertilizer packing which are matured industries in India growing at a pace along the GDP. The segment is a matured segment of the Technical Textile industry with no large capacity addition expected in near future. The market for Packtech is projected to reach Rs. 38,833 crore by 2015-16, growing at 11% CAGR and further to Rs. 48,318 crore by 2017-18.

3.5 Sportech

Sportech includes all types of fabrics that are used for development of sport related clothing or sporting goods like high performance swim wears, parachute fabrics or fabrics used for making of inflatable balls, sleeping bags and shoe components. The products under the segment are

- Sport composites
- Artificial turf
- Parachute fabrics
- Ballooning fabric
- Sail cloth
- Sleeping bags
- Sport nets
- Sport shoe components
- Laminated tents
- High performance swimwear and sportswear
- Sport strings

The total estimated market size of Sportech is estimated to be Rs. 4,645 crore in 2013-14. Close to 97% of the entire market is catered by domestic supply. The market is mostly dependent on the domestic consumption with exports limited to just 8% of the total market. Sport shoe components having 80% share in the segment. Other key product is sport composites that has 8% share. Rest of the products have very limited market in India. Sportech has grown at 8% during the last five years driven primarily by the growing demand for sport shoes and sport composites primarily cricket protective gear. The development of sporting facilities at clubs, schools, residential societies and the growing preference for fitness exercises and sports amongst the youth has been a key driver for the industry. In future, the market is expected to grow at 12% driven by the changing consumer lifestyle wherein the preference for high quality sports accessories and infrastructure is expected to get a boost. The key products that are expected to show high growth are sport composites (14% CAGR) and sports nettings (25% CAGR) and high performance swim wears and sports wears (35% CAGR). Artificial turf is also expected to grow at 15% owing to increasing preferences for golf, cricket wickets and increased focus of the Government on development of world class Infrastructure. The segment is projected to reach Rs. 5,877 crore by 2015-

16 growing at 12% CAGR and further to Rs. 7,111 crore by 2017-18.

3.6 Buildtech

The textile components and fabrics used in building and construction industry are called as building Technical Textiles or Buildtech. The major products under the segment are as follows:

- Architectural Membranes
- Hoarding and signage
- Tarpaulins – Canvas & HDPE
- Awning and canopies
- Scaffolding nets
- Wall coverings
- Acoustic fabrics

The total estimated market size of Buildtech segment is Rs. 2,819 crore in 2013-14 with domestic market valued at Rs. 2,794 crore accounting for 99% of the market. Domestic production caters to 89% of the market with imports catering to the other 11%. The product which has the highest market share in Buildtech segment is HDPE tarpaulin (57%) followed by hoarding and signages (19%) and canvas tarpaulins (17%). Products like Architectural membranes and scaffolding nets are still in their nascent stage in the industry and are expected to grow rapidly in coming years. The segment has witnessed a 14% growth during the last five years driven by the increased market for flex fabrics which has grown at 23% and HDPE tarpaulins which saw a growth of 17%, which grew because of their usability in many different applications. For instance, flex fabrics have been used in India not only for OOH media promotion but also as banners for local demonstrations, advertising, by un-organised street food industry and many small applications. In the coming years, the segment is expected to grow at 12% reaching 3,577 crore by 2015-16 and Rs. 4,587 crore by 2017-18. While and flex fabric and HDPE tarpaulins are expected to have a steady moderate growth of 12% and 10% respectively, the high potential products would be architectural membranes (20% CAGR) and awing and canopies (30% CAGR), scaffolding nets(15% CAGR) and Acoustic fabrics (15% CAGR).

3.7 Clothtech

The technical components of garments, made out of fabric or yarn, which are there to cater to specific functional needs of the garment are termed as cloth Technical Textiles or Clothtech. The key products under Clothtech segment are as follows:

- Laces and tapes
- Interlinings

- Zip fasteners
- Elastic Narrow fabric.
- Hook and Loop fastener
- labels and badges
- Umbrella cloth
- Sewing threads

The total estimated market size of Clothtech is around Rs. 5,357 crore in 2013-14 with domestic market valued at Rs. 5,163 crore constituting 96% of the total market. Domestic production caters to 89% of the market with imports catering to the other 11%. The market is well distributed across segments, with labels and elastic narrow fabrics having the maximum share of 34% and 18% of entire Clothtech segment. The segment is entirely driven by the textile and clothing manufacturing industry in India. The market is projected to grow to Rs. 6,591 by 2015-16 at 11% CAGR and further to Rs. 8,133 crore on account of growing organised retail, wherein the consumption norm for Technical Textile products like labels, elastic narrow fabrics and interlinings is expected to increase leading to overall growth in excess of the growth of clothing industry. The most promising product in the segment is laces and tapes which is expected to grow at 12% driven primarily by the use of shoe laces in footwear industry, which is growing at 12.5% with branded footwear sales growing at 20%.

3.8 Hometech

The Hometech segment comprises of Technical Textile components used in household applications like filter fabrics for ACs, blinds, non woven wipes, etc. The key products are:

- Fiberfil
- Mattress and pillow components
- Carpet backing Cloth (Jute & Synthetic)
- Stuff Toys
- Blinds
- Filter fabrics for HVAC and Vacuum cleaner
- Nonwoven wipes
- Mosquito nets
- Furniture fabrics and other coated fabrics

The total estimated market size of Hometech is estimated to be Rs. 7,119 crore by 2013-14. 88% of the total market is dependent on the domestic consumption with exports accounting for other 12% of the market. 93% of the market is catered by domestic production with imports catering to only 7% of the market. The key products are coated and furniture fabrics having 32% share and fibre-fill having 27% share and ticking fabrics having 14% share, with other products having less than 10% of the total segment size. Hometech a matured segment of the Technical Textile has witnessed a growth of 8% during the last

five years driven by the growth in lifestyle products like stuff toys, blinds and increased consumption of fibrefill instead of cotton in mattresses and pillows. The same drivers are expected to fuel the growth in the future, wherein the segment is projected to grow to Rs. 9,274 crore in 2015-16 growing at 14% CAGR and further to Rs. 12,145 crore by 2017-18, with high growth in fibrefill due to increasing export potential as well as domestic consumption and consumption in stuff toys. In addition to these, the demand for products used in household items like blind fabrics and filter fabrics for ACs is also expected to grow at a rate of 12%. Non woven home use dry wipes in this segment is a high potential product, which has witnessed a growth of 26% in the last five years

3.9 Protech

Protective Technical Textiles are speciality textiles that provide protection to the wearer in hazardous situations like fire, chemical exposure, protection from bullets and explosions and extreme temperatures and other extreme atmospheric conditions. The key products under the segment are as follows:

- Bullet Proof Jackets
- Fire retardant(FR) Apparels
- Fire retardant(FR) Fabrics
- Nuclear and Biological Suits(NBC)
- Chemical Protective Clothing
- High visibility clothing
- Industrial gloves
- High Altitude Clothing
- Other Protective clothing – Wind cheater and rain coat

The total estimated market size of Protech is estimated to be Rs. 2,176 crore in 2013-14 with exports catering to 12% of the market. 89% of market is catered by domestic production with imports limited to just 11%. High altitude clothing (31%), Bullet proof jackets (26%), fire retardant apparels and fabrics (19%) and industrial gloves (9%) and are key products within the segment. The segment has grown at 7% in the last five years due to increased exports of industrial gloves and bullet proof jackets, the demand for which has witnessed a surge in the last few years with institutional demand for the procurement of bullet proof jackets. The segment is projected to reach Rs. 2,722 crore by 2015-16 growing at 9% CAGR and further to Rs. 3,139 crore by 2017-18, driven by the increased consumption of protective work wear such as fire retardant clothing, high visibility clothing and industrial gloves each of which are expected to grow in the range of 12% to 15%. The new amendment proposed in the factories act, which makes it mandatory for an employer to provide good condition

protective work wear to the employees is expected to drive the industry on this front. Fire retardant apparels and bullet proof jackets are the two high potential segments in Protech having expected to grow at 14% and 12% respectively. The attractiveness of fire retardant apparels is dependent on the new factories act.

3.10 Geotech

Geotech segment comprises of Technical Textile products used in Geotechnical applications pertaining to soil, rock, earth etc. Geo-textiles specifically refer to permeable fabric or synthetic material, woven or non-woven, which can be used with Geotechnical engineering material. The key products are:

- Woven geo textiles
- Non woven geo textiles
- Geo grids
- Geo membranes
- Geo cells
- Geo tubes
- Geo nets
- Pre-fabricated drains – PVDs
- Geo bags

The total Geo-textiles Market in India including exports is still in its very nascent stage at just Rs. 772 crore for 2013-14, 75% of which is mainly on account of demand from exports. The market is mainly constituted by woven and non –woven geo-textiles, which make up for 85% of the market. Other key products are geo-grids which make up for 15% of the market. The market for geo textiles have grown at a significant rate of 30% during the last five years, from a smaller base in 2007-08. The last five years have seen many new players entering into the industry and addition of capacities by large players. While the domestic market is yet to take off, due to the extended trails of different organisation like roadways, railways, ports and shipping, exports have grown annually at over 41% during the last five years. The market is projected to grow to Rs. 991 crore by 205-16 at 13% CAGR and further to Rs. 1,275 crore by 2017-18, driven primarily by the exports demand.

3.11 Oekotech

Oekotech segment refers to use of Technical Textiles in Environmental Engineering. The primary segment in this is Landfill waste management. This refers to the use of Geo-synthetic products to secure landfills against leakage of municipal or hazardous waste.

In India, Oekotech is constituted by geo –membranes, which are primarily used for landfills. The Oekotech market is currently of 11,000 MT worth Rs. 132 crore in

2013-14. Oekotech segment has grown at 8% during the last five years. The entire market is dependent on domestic consumption. The market is dependent on development of waste disposal centres and is projected to grow to Rs. 160 crore by 2015-16 at 10% CAGR and further to Rs. 193 crore by 2017-18, driven entirely by domestic consumption.

3.12 Indutech

Indutech includes Technical Textile products used in the manufacturing sector. The Technical Textile products covered under Indutech are given below:-

- Conveyor belts (TT component)
- Drive belts (TT component)
- Cigarette filter rods
- Decatising cloth
- Bolting cloth
- AGM glass battery separators
- Coated abrasives (TT component)
- Ropes & cordages
- Composites (Technical Textiles component)
- Printed circuit boards (TT component)
- Computer printer ribbon
- Paper making fabrics
- Filtration Products
- Industrial slings and webbings
- Acoustic textile used in cell phones
- Industrial hoses and pipes (TT component)

Technical Textiles consumption under Indutech in India is estimated at Rs 7,567 crore in 2013-14 with domestic consumption accounting for 84% of the market and exports the rest 16%. The largest product within the segment is the ropes and cordages (26%) followed by glass fabrics (22%) and coated abrasives (12%). Indutech segment has grown at 16% during the last five years, with most of the products growing at a significant rate of over 15%. The key products driving the markets were coated abrasives and AGM battery separators each clocking an annual growth of over 40%. The segment is projected to grow to Rs. 9,929 crore by 2015-16 at 14% CAGR and further to Rs. 13,127 crore by 2017-18, driven by the demand of infrastructure products in manufacturing sectors like drive and transmission belts, filter fabrics for industrial applications, composites and the growing demand of ropes in freight and transport industry. The high potential products are AGM battery separators (20% CAR), coated abrasives (20% CAGR), filtration products (15% CAGR) and glass fibre composites (14% CAGR).

3.13 Non- Woven

Nonwoven fabrics are broadly defined as sheet or web structures bonded together by entangling fibre or filaments (and by perforating films) mechanically,

thermally or chemically. They are flat, porous sheets made directly from separate fibres or from molten plastic or plastic film. They are not made by weaving or knitting and do not require converting the fibres to yarn. The production of nonwovens takes place in three stages (Some stages may be overlapping or run simultaneously). The three stages are:

- Web Formation
- Web Bonding
- Finishing Treatments

The domestic production of non-woven in India is estimated to be around 2.52 lakh MT for 2012-13 worth approximately Rs. 3,200 crore. The production of non woven in India has been growing at 13% over the last five years and is expected to grow in a similar fashion to reach 3.54 lakh MT by 2015-16. Over 54% of non-woven capacity in India is of Spun-bond non-woven followed by needle –punched non woven which account for 34% production. Amongst other spun lace accounts for 9% of the production.

The key application of non woven is in Packtech (42%) particularly in shopping bags and food grade poly-olefin bags, in Sportech (15%) mostly in shoe components, in Meditech (7%) where non woven is used in hygiene products like diapers, under pads as well as surgical disposables and gowns and in geotextiles and oekotextiles.

There are over 60 manufacturers of non-woven fabric in India currently The last five years have seen rapid capacity expansions and new entries into the segment.

3.14 Speciality fibres

Speciality fibres are used as raw material for development of Technical Textile products for industrial, medical and protective usage like carbon composites, bullet proof jackets, fire retardant clothing and anti microbial fabrics. Speciality fibres is developed through special chemical coating of a general yarn or made from a specialised fibre. There are 23 types of speciality fibres in Technical Textiles. However, in India the usage of speciality fibres is mainly concentrated on the following few fibres:

- **Aramid Fibres:** These are aromatic polyamides available in different grades with properties to suit various applications. The typical properties of Aramid fibre are low density, high strength, good impact resistance, good abrasion resistance, good chemical resistance, good resistance to thermal degradation and compressive strength. The total import of Aramid in India is 1110 MT worth Rs. 90 crore. Close to 90% of it is imported by DuPont India. The key brands for aramid fibres are Nomex and Kevlar by DuPont and Spectra by Honeywell.

- **Fire retardant fibres:** Fire or flame retardancy is the characteristic of a fibre wherein the fibre does not melt during fire and high temperatures and is self-exhausting once the flame is removed. The commonly used FR fibres are mod –acrylic fibre, FR viscose and FR polyester fibre. The total demand for Fire retardant fibres excluding Nomex is estimated to be of 1615 MT.
- **Glass Fibre:** fibreglass yarn is encapsulated by chemical PTFE to provide it high resistance to acids and alkali, increase flexibility of the fibreglass yarn and increase heat resistance. Glass Fibre as reinforcement dominates the sector of composites material with a share of 85-90%. The total estimated manufacturing of glass fibres in India is 114,751 MT.
- **Carbon fibre:** Carbon fibre is a high-tensile fibre or whisker made by heating rayon or poly-acrylo-nitrile fibres or petroleum residues to appropriate temperature. The market for Carbon fibres in India is around 518 MT worth Rs. 129 crore.
- **High Tenacity Fibres and super high tenacity fibres:** High tenacity fibres are special fibres having a tensile strength of 6 to 9 gpd as compared to the normal textile fibres which have a tensile strength of around 3 gpd. These are meant for industrial use like in industrial work wear, conveyor belts, tyre cords, sail cloth, high tensile sewing threads, etc. The total market size of these fibres is estimated to be 58,000 MT with 95% of the market being driven by domestic demand.

Other speciality fibres commonly used in India include super absorbent fibres, ceramic fibres, conductive fibres, PTFE fibres, PBI fibres, PBO fibres, anti microbial fibres, phenolic fibres, alginate fibres and fibres for re-inforced concrete. The usage of these fibres is very limited in India.

3.15 Composites

Composites are produced by reinforcing a resin matrix (thermoplastic/thermoset) with fibres like glass fibre, aramid, carbon fibre and/or natural fibres. Composites can be segmented by strength bearing potential into:

- low performance (using chopped glass or glass mats as reinforcement) and
- high performance (using fabrics or prepregs of Glass, Polyester, Aramid or Carbon fibre)

The distribution of composites across key user industries is shown as below:

The cumulative market size of composites is estimated to be 128,861 MT and INR 1,551 crore. Imports for composites stand at a total of Rs 507 crore and almost 46,599 MT. Exports for composites contribute Rs. 207 crore and 14,365 MT of the total market size. The

composites market has grown at a CAGR of 7.4% from Rs 1,085 crore in 2007-08 to Rs 1,551 crore in 2012-13. Indian composites market is mainly catered by glass fibre based composites and carbon fibre based composites with glass fibre based composites accounting for over 80% of the market.

The key usage of composites in India is in transport (16%), wind energy (12%) and building and construction (15%) industry. Other major industries where composites find considerable usage in India are Chemical and corrosion (15%), electronics (14%) and Infrastructure (13%).

In case of glass fabric composites, India has a well-established manufacturing hub with few key players having a key share in the market. With the growing awareness of Technical Textile and its benefits in industrial application, the demand for carbon composites is expected to grow. However, the growth of hi-tech industrial manufacturing would be the key driver for the use of composites in India.

4. MACRO ECONOMIC SCENARIO FOR TECHNICAL TEXTILES

4.1 Investment in Technical Textiles

Domestic Investment A cumulative investment of Rs. 34,390 crore has been made through TUFs in the sector of Technical Textiles. However, the average annual investment reached its peak in 2006-07 with an investment of Rs. 9,469 crore occurring during the year. With changing world economic scenario and recession affecting different countries, the investments in India have also gone down over the years reaching its bottom in 2011-12. The cumulative investments have grown at 5.3% in the last five years.

The investments have been mostly in few key locations. 69% of the investments during the last five years occurred in Maharashtra.

FDI in Technical Textiles The FDI in textiles sector of India is less than 1% of the total FDI inflow into India for last five years. While the textile sector has suffered on the front with FDI growing at just 10% over the last five years, that also because of a surge in 2013-14, the Technical Textile sector has witnessed a much higher growth of 23% in FDI. However, the FDI in Technical Textile in India is still at a very nascent stage with annual FDI of less than Rs. 100 crore over the last five years.

Possibilities for existing textile business to enter Technical Textiles

The following segments offer a significant potential for traditional textile players to enter into Technical Textiles:

1. **WOVEN AND PRINTED SHOPPING BAGS:** The industry setup required for shopping bags is mostly shuttle looms, which hence an existing textile composite mill or MSME player can transit to becoming a Technical Textile manufacturer for woven shopping bags and poly-olefin bags.
2. **HIGH PERFORMANCE SPORTSWEAR:** The sportswear industry in India is growing at 14% per annum. There are many MSME players which have a significant role to play in the mass market sportswear products. These players can easily shift to manufacturing Technical Textiles- high performance sportswear by using speciality fabrics and fibres like water repellent fabrics, breathable fabrics and other coated fabrics, with little change in machinery and technology.
3. **INDUSTRIAL SEWING THREADS AND SPECIALITY YARN:** With the technology and machinery requirement remaining the same, many traditional textile spinning mills can transit into making of speciality fibres and industrial sewing threads by using the appropriate fibres and raw materials. Vardhman mills having a product of around 500 MT of threads annually also manufactures industrial threads for special applications in footwear, leather garments, Automotive seating, luggage, compressor windings and book winding among others.
4. **FIRE RETARDANT APPARELS AND FABRICS:** Fire retardant apparels and fabrics is a segment with high potential for new players coming from traditional textile industry. The segment has witnessed many such transitions where in a traditional textile player has dedicated some of its infrastructure for manufacturing FR fabrics and apparels, as the installation for apparel manufacturing works for FR apparel production also.
5. **TRANSMISSION BELTS:** Transmission belt production involves production of fabric and then applying rubber coating on it through dipping in rubber. Many of the industry players such as Habasit Iakoka Pvt. Ltd., engage outside players for purchase of fabric before dipping. This is a good prospect wherein, a traditional textile player can tie up with a Technical Textile player for supply of fabric for transmission belting

Key pockets of Technical Textiles

The Technical Textile industry in India is concentrated in few key pockets across the country. While Gujarat is the hub for segments such as Homotech, Packtech, Agrotech and Non-woven fabrics, Maharashtra is the hub for most of Clothtech and Indutech production. The advantage of locally available raw materials and suitable infrastructure in these locations has been the key driver for the Technical Textile industry.

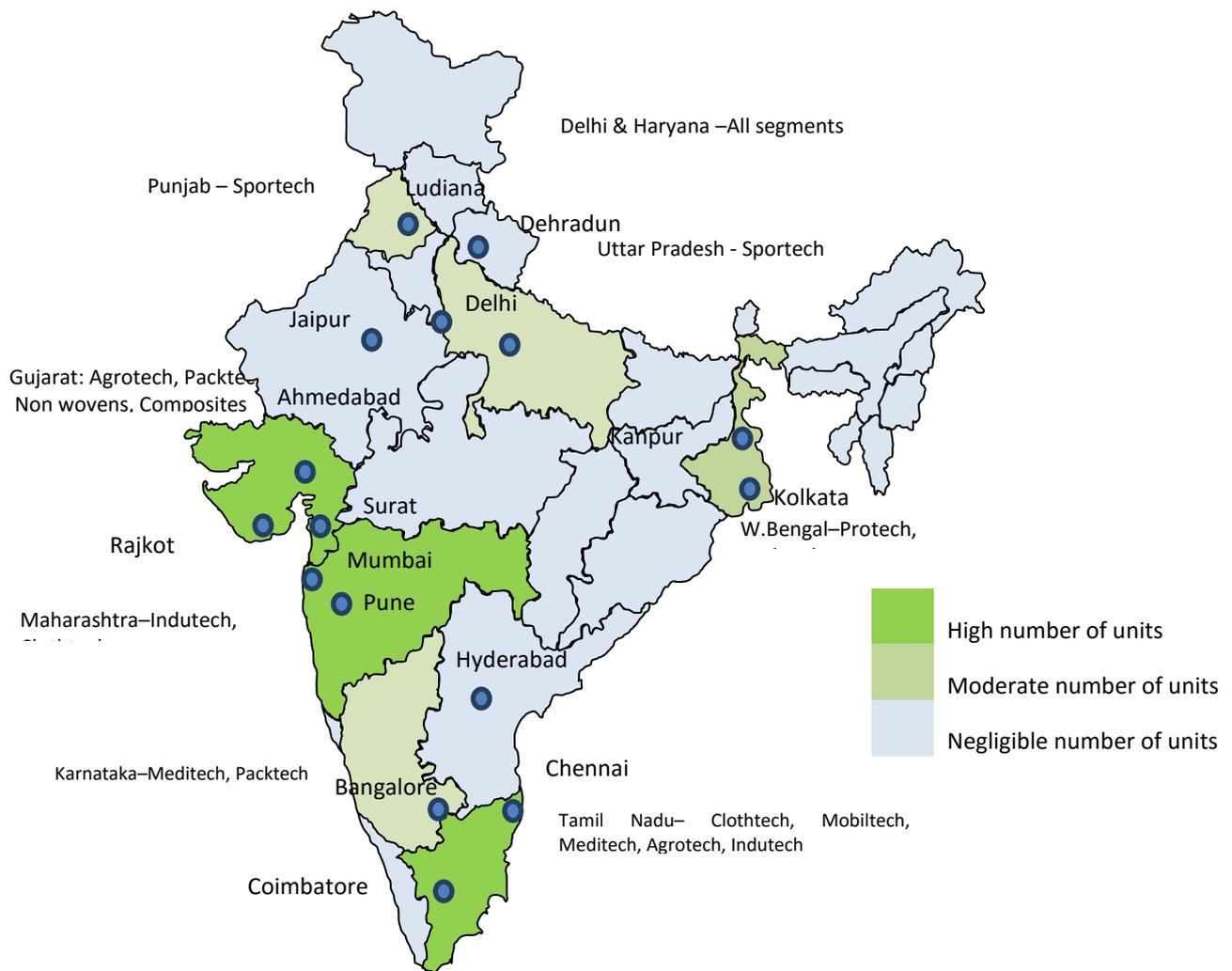
The key clusters for Technical Textiles are:

- Surat and Ahmedabad – Key centre for Packtech, Agrotech and non woven
- Mumbai and Pune - Key production hub of Indutech and Clothtech

- National Capital region- Key centre for Mobiltech, Homotech, Protech and Sportech
- Jalandhar & Meerut – Key manufacturing centres for sport composites
- Kanpur – Centre for Sportech goods – tents, sleeping bags, key ordinance factory supplier
- Kolkata - Centre for Industrial gloves, jute/hessians and industrial work wear
- Bangalore – Key production centre for Meditech/ Packtech products
- Chennai and Coimbatore – Key manufacturer of fish nets and Clothtech

The key clusters for Technical Textiles are as shown in the following exhibit

Geographical distribution of key Technical Textile industries



Source: IMaCS analysis

Standards & policies for Technical Textiles

Standard for Technical Textiles

There are currently 184 standards for Technical Textiles listed under Bureau of Indian Standards (BIS). In addition to these, 21 new standards have been finalised which are under print and 11 where final drafts have been approved. In addition to these, different COEs and research institutes across India are currently in process of formulating a total of 69 new standards for different Technical Textile products.

In recent years the focus on having adequate standards for different Technical Textile products has increased substantially and many of the TRAs are actively involved in finalisation of different standards. 145 new standards are being developed or are envisaged for the next three to five years which is a 78% increase over currently existing number of standards. Development of standards is expected to promote high quality manufacturing as well as institutional purchasing.

Policy benefits for Technical Textiles

CENTRAL GOVERNMENT POLICIES

The Ministry of Textiles runs four key schemes that promote Technical Textiles industry. The brief of these schemes is as shown below:

- **TECHNOLOGY UP-GRADATION FINANCIAL SUPPORT SCHEME (TUFS):** Provides interest subsidy of up to 5% of the interest charged by financial institutions towards loan for installation of new and upgraded textile machinery. Aimed at developing a world class manufacturing infrastructure for textiles and Technical Textiles in India.
- **TECHNOLOGY MISSION ON TECHNICAL TEXTILES:** It has two scheme components and is aimed at improvement of basic infrastructure in terms of testing facilities, lack of market development support, skilled manpower, R&D, improved regulatory measures, preparation of specifications and standards for Technical Textiles, etc. It includes setting up of centre for excellences for research, testing and technical support for Technical Textiles and promotion of entrepreneurship, contract research and increasing awareness about Technical Textiles and research going on.
- **MEIS:** The scheme aims at promoting Technical Textile exports by providing a duty credit scrip equivalent to 2% of FOB value of exports.
- **PROMOTION OF AGRO-TEXTILES IN NORTH EAST:** The scheme aims at increasing the consumption of agro textiles in the North East by creating awareness through various demonstration

centres and distribution of agro textile kits in the North East region with involvement of local agriculture offices, KVKs and NABARD.

- **PROMOTION OF GEOTEXTILES IN NORTH EASTERN STATES:** Scheme for usage of geotextiles in North-eastern region was proposed in the 12th plan by the Ministry with total outlay of Rs. 427 crore. It aims at promoting and utilizing the use of geotextile in development of infrastructure in the North East. The scheme has two major components – funding for use of geotextiles in construction of roads, hill and river embankments and funding would be used for sensitization activities, market studies, on site testing, sensitization activities, training and capacity building for skilling of workers in geotextiles.
- **FOCUS INCUBATION CENTRES:** Ministry of Textiles has set up six focus incubation centres at a cost of Rs 17.4 crore. These centres would help budding entrepreneurs build innovative Technical Textile products in a "plug and play" model, and would help promote Make in India in textiles.

In addition to these, concessional custom duty to the tune of 5% is also provided for select Technical Textile machinery imports.

STATE GOVERNMENT POLICIES

In addition to the central government, many state governments also provide specific benefits for Technical Textile industry, incentivising manufacturing. The key states offering policy benefits for Technical Textile industry are Gujarat, Karnataka, Rajasthan, Maharashtra and Andhra Pradesh. The key benefits offered by these states are indicated as follows:

Gujarat –

It has seven schemes for textiles promotion with a specific scheme targeted at Technical Textiles– “Assistance for Technical Textiles”. It provides 6% interest subsidy for capital expansion and new projects in Technical Textiles, capital subsidy up to Rs. 25 lakh or 25% for setting up of new plant and provides re-imbursment over VAT at 10%.

Karnataka

It has six schemes for textile industry infrastructure development. It has earmarked Rs. 1,700 crore for promotion of Technical Textiles. The key benefits offered are capital subsidy up to 20% of the cost, 50% subsidy for development of common infrastructure and stamp duty re-imbursment up to 50%. It also provides interest linked subsidy.

Rajasthan –

It has a Special customised package for textile sector. It aims at providing Interest subsidy for Technical Textile units at 7%, which is 1% higher than other

textile units for five years and Re-imburement of up to 60% of VAT on yarn purchase for five years.

Maharashtra

It offers Equity support of up to 5% for spinning units in backward regions of Vidharba, Matharwada and North Maharashtra and Capital Subsidy up to 10% for installing shuttle less looms and modernisation of power looms.

Andhra Pradesh

It focuses on promotion of common infrastructure, spinning and garmenting with incentive of up to Rs. 5000 for training of workers, power subsidy of Rs. 0.25 per unit and 100% re-imburement of stamp duty.

In addition to these few states, all other states provide policy benefit for setting up of industries within the state like credit linked capital subsidy and interest subsidy, benefits of common infrastructure development and re-imburement of costs related to taxes and municipal costs.

This section provides the details of various fiscal benefits for Technical Textile, textiles and industry by the central government and various state governments.

4.3 Competitive Assessment of India vis-a-vis other countries

India accounts for 3% of the world Technical Textile production producing roughly 90,000 MT of Technical Textiles in 2013. China and Europe are the leading manufacturers accounting for over 75% of Technical Textile production. While Europe and China are the largest exporters of Technical Textiles, U.S and Europe are the largest importers of Technical Textiles. India accounts for 4% of global Technical Textile exports and 3% of global imports.

In global non woven production China is the leader with close to 70% of global production growing at 13% during the last five years. India on the other hand accounts for 2% of global non woven production but has witnessed a high growth rate of 13% over the last five years. However compared to the global average per capita consumption of 1.1 kg of non woven, India consumes only 200 gm of non woven per capita, indicating the high potential of non woven usage that can be achieved in India in future.

India has a distinct advantage over many other Technical Textile countries when it comes to different factors of production. India has an advantageous stand when it comes to the raw material availability and labour cost which are the key input costs for production. Lack of adequate domestic manufacturing technology is a major hindrance, however through various schemes like TUFs and concessional import duty, MoT is trying to promote setting up of up-to-date manufacturing technology in India.

5. FACTOR ANALYSIS

5.1 Raw Material Availability

India is one of the leading producers of both natural and man-made fibres in the world. Easy availability of fibres at a cheaper rate has been a key factor behind the success of Indian textile as well as Technical Textile industry.

A. NATURAL FIBRES

COTTON: India produces approximately 6.4 million MT of cotton in 2012-13, which accounted for 82% of India's fibre production. India produces 23% of world's cotton.

JUTE: India is the second largest producer of jute in the world with a production of 2,053 MT in 2012-13, growing at 2.4% per annum. It's mainly used in Packtech and jute geotextiles.

SILK: Silk is used in some specialised application of Meditech particularly sutures and in blinds and sewing threads. India produced 23,690 MT of silk in 2012-13 contributing to 15% of world's production.

COIR: With a production of 6.1 lakh MT in 2012-13, India is world's largest producer of coir accounting for 60% of total production.

MANMADE FIBRES

Along with natural fibres India is also a key manufacturer for manmade fibres, with polyester taking lead with close to 3300 MT of capacity. India is also a key manufacturer of viscose and acrylic. India is a key manufacturer of both natural and manmade fibres and is not dependent on imports for both natural as well as manmade fibres.

POLYMERS

Polyethylene (PE) is the most widely used polymer. It has three different varieties depending on the density - High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE) and Linear Low Density Polyethylene (LLDPE). Different types of PE and Poly Vinyl Chloride (PVC) are the key polymers that find application in Technical Textile. HDPE/LDPE tapes are used in manufacture of variety of Technical Textile products. The total capacity of polymer production for textile related actions are Rs. 8.3 million MT with capacity utilization of 93%.

India has sufficient production of HDPE and PP which are key ingredients in Technical Textiles. However, despite having a significant domestic production, India is dependent on imports for PVC and LDPE.

required for DREF spinning and Warp spinning, Weaving (Projectile, Rapier, Air-jet, Water-jet, circular,), knitting – circular, flat and warp knitting and braiding, is usually imported from Germany, Italy, Austria and other European countries. The machinery for non-woven lines is also imported from European countries and China. Most of these machines are manufactured based on the spun bonding technology developed by Lurgi. So India is mostly import dependent in case of Technical Textile machinery and there is a need to develop indigenous capacities. This section provides an overview of technology used for manufacture of Technical Textiles and non woven stating the key manufacturers.

Testing and R&D Infrastructure

A. TESTING INFRASTRUCTURE

In India, the testing facilities for Technical Textiles are predominantly set up by the Textile Research Associations (TRAs). These facilities are supported via TMTT scheme for setting up of centre of excellences (COEs) for different Technical Textile segments having p to date modern testing and research infrastructure for development of Technical Textiles. The CoEs with their relevant specialization and research and development activities are as follows:

COEs present in India

Sl. No.	Centre of excellences	District	Specialisation
1	The Synthetic and Art Silk Mills' Research Association (SASMIRA),	Mumbai	Agrotech & Packtech
2	Bombay Textile Research Association (BTRA)	Mumbai	Geotech & Oekotech
3	Northern India Textile Research Association (NITRA)	Ghaziabad	Protech & Mobiltech
4	South India Textile Research Association (SITRA)	Coimbatore	Meditech
5	PSG College of Technology, Coimbatore	Coimbatore	Indutech & Homotech
6	DKTE Society's Textile & Engineering Institute (DKTE)	Kolhapur	Non woven & Clothtech
7	Ahmedabad Textile Industry's Research Association (ATIRA)	Ahmedabad	Composites & Buildtech
8	Wool Research Association (WRA)	Thane	Sportech
9	Manmade Textile Research Association (MANTRA)	Surat	Coating & lamination, Agrotech

These COEs have up to date testing infrastructure that are accredited by NABL and ASTM standards. A significant effort has been made towards research and development and development of prototypes in the field of Technical Textiles. However, a majority of these researches are still not in the phase of commercial production. This section provides the details of various testing infrastructure and the research being done at these centre of excellences.

Manpower availability

A. EMPLOYMENT

The Indian Technical Textile industry employed 9.89 lakh people in 2012-13. The employment in the industry has witnessed a growth rate of 3% per annum during the last five years. The growth of man-power employed in Technical Textile sector has been steady at 3% and is expected to reach 10.8 lakh by 2015-16.

Skilled manpower composes approximately 43% of the total manpower employed in Technical Textile industry. Due to high requirement of skilled work force in Technical Textile applications like coating, lamination, etc, the demand for skilled workforce is very high. The dearth of skilled manpower is further aggravated by lesser number of institutions at diploma, graduate and post graduate levels targeting Technical Textile courses. This has led to high employee turnover in the industry as after acquiring a certain skill there are plethora of options for the worker to move offering significant jump in salaries. This has been a key challenge for the industry, effecting not just the production but also taking the overall cost of production to a higher level.

Skill development Infrastructure

There are a total of 11 textile based institutions and 29 other institutions across India that provide facilities for high level Technical Textile education and research at graduate, post graduate and doctorate levels. A majority of these colleges are located in Maharashtra, Tamil Nadu and Gujarat. For development of skilled work force and training of the labourers, there are 68 polytechnics and ITIs across India that provide textile and textile related courses. However none of these polytechnics offer specialised courses for Technical Textiles, making it very difficult for the industry to acquire fresh talent which is adequately trained. Many of the employers are hence forced to provide initial on job training to the new employees. The section provides the information regarding employment and skill set in Technical Textile industry along with details of various courses and institutions offering courses in Technical Textiles and textiles

6. RECOMMENDATIONS FOR TECHNICAL TEXTILES

Since 2008, the global economy has witnessed a slow down leading to production and consumption slow down. The impact of this slow down has trickled down to Technical Textiles as the industry is driven by demand from several end user industries. However, during the last five years several trends have been witnessed in India, which would include

- Increase in exports across products such as fishnets and other nets, ropes & cordages, conveyor belts, geo textiles, surgical disposables, protective textiles, surgical sutures etc.
- Increase in domestic consumption across several products including shade nets, scaffolding nets, hygiene and surgical products, etc.
- Institutional consumption has also increased across several segments including Geotech, Meditech, Protech, etc.
- Import substitution has also improved in some of the products such as diapers

With Indian economy expected to witness stronger growth, these trends are expected to drive further the Technical Textile production and exports during this decade fueled by strong consumer and institutional demand coupled with manufacturing competitiveness. With the increasing manufacturing cost in China, India is expected to emerge stronger in case of exports of several products.

However, there are still several challenges in the growth of Technical Textile industry in India

1. Raw material availability
2. Norms for TT products
3. Lack of Domestic Technical Textile Machinery Manufacturers
4. Research and Development capability
5. Lack of awareness
6. Lack of skilled work force

In addition to these, there are structural issues such as availability of infrastructure, quality power, anomalies in taxation, labour policies, etc.

With due consideration to the above findings, the following vision is being proposed for Technical Textiles sector in India:

“To increase our Technical Textile manufacturing to Rs. 5.2 lakh crore by 2025 targeting exports of Rs. 1.3 lakh crore by 2025 by becoming the preferred global Technical Textile manufacturing destination with focus on export oriented manufacturing specializing in high value added Technical Textile manufacturing targeting the industrial and end user consumer segments”

iMaCS ‘recommendations for achieving this vision and facilitating the growth of Technical Textiles in India are primarily targeted at resolving the impediments to growth discussed above. The key recommendations are:

FISCAL

Reduce import duty on specialty fibres

Specialized fibres and yarn required for manufacturing of some of high-end Technical Textiles products. Some of these specialty fibres are not produced indigenously and are often imported from other countries. The import duty on such fibres and yarn is a very high in the range of 23-26 %. Thus the landed cost becomes very high making the Technical Textile products uncompetitive against the imported TT products. The import duties on such products, which are not produced in India, have to be rationalized towards increasing the manufacturing by adding value. The net import duty rates are subject to change with the introduction of GST (Goods and Services Tax). Basic Custom Duty will continue to be there under GST system. However, the additional custom duty in lieu of CVD /Excise and the Special Additional Duty (SAD) in lieu of sales tax/VAT will be subsumed in the GST.

Remove VAT levied on non-woven fabric

In certain states, VAT levied on non-woven fabrics is higher than that on other textile fabrics e.g. in case of Tamil Nadu, VAT on non woven fabric and its product is 5% where as the woven and knitted fabrics of cotton, artificial fibres/filaments, etc are exempted from VAT. VAT on non-woven fabric should be removed to promote its consumption.

RESEARCH AND DEVELOPMENT

Pushing PPP in R&D with the existing COEs

Under TMTT, Government has set up eight centres of excellence for providing infrastructure support to the industry in terms of testing facilities, incubation centres, facilities for product development etc. There is a need to leverage this R&D infrastructure towards development of new products. Therefore, the existing manufacturing units should be incentivized to utilize the infrastructure and R&D capability of CoEs to produce new value added products, which can be commercialized. Research and development activities by private organizations, can be dovetailed with Central Government schemes that promote R&D under the departments of DST, DSIR and CSIR. Soft loans available for R&D under different Central and State schemes can also be used for R&D in Technical Textiles sector. In case of R&D investments are entirely from Gol incase of PPP projects, IPR may remain with CoEs.

- **PROMOTION OF IN-HOUSE R&D:**

Technical Textiles industry is continuously evolving with several of the Traditional materials being substituted by Technical Textiles due to advantages such as cost and performance. The TT industry is R&D intensive. Strong R&D capability is often a competitive advantage. Setting up of R&D infrastructure at individual manufacturing units may be supported by way of capital subsidy and tax incentives. Procurement of testing equipment, prototyping, hiring R&D personnel can be included in the scheme. The projects may be approved by a technical committee, which would include CoEs, and subsequently CoEs can certify facilities and projects undertaken

HUMAN RESOURCE DEVELOPMENT

Lack of skilled labour is one of the major constraints in Technical Textile industry. Government should take the following measures in this regard:

- Ensure inclusion of Geotech in Civil Engineering curriculum of various engineering colleges like IITs with specialized masters programmes for Geotech, Buildtech and Oekotech
- Introduce focused courses on non-woven, composites, coated and laminated fabrics covering it's applications in addition to technical information.
- Introduce courses at Masters level of textiles engineering for Technical Textiles
- Conduct joint promotion and training with institutions involved in extension activities for farmers like agricultural universities, co-operatives, agrochemical and fertilizer manufacturers, financial institutions/banks, on usage of Agro-textiles
- Increased focus of Textile Sector Skill Council (TSC) under NSDC towards training on Technical Textiles and related segments could provide a significant boost in making skilled workforce available in the sector. Courses may be identified in the area of woven (Technical Textile), non-wovens, composites, coated & laminated fabrics, etc., covering all the 12 segments and training may be provided under PPP basis at various clusters/locations where the units exist or training may be conducted with the assistance of CoEs.
- Facility for industrial visits to Technical Textile plants should be included in the course curriculum for graduation and post graduation courses related to textiles and Technical Textiles, to provide a firsthand experience to the students who would soon be making a debut into the industry. These industrial visits should be complemented with detailed presentation on the high potential of Technical

Textile industry and various segments in it so as to attract young work force to the industry.

- An option of undertaking case studies and projects related to Technical Textiles should be made available to the students undergoing graduate and post graduate courses related to textiles. Tie ups with CoEs and textile institutions should be made to facilitate such studies. In addition, case studies related to Technical Textiles should be inculcated in curriculum of Post graduation and Management courses. Students should be provided with facility to conduct case studies on Technical Textile sector to attract young Managerial and business oriented students to the industry.

EXPORT PROMOTION

Identification of HSN codes for Technical Textiles

- It is important to identify and distinguish Technical Textiles items from the conventional textiles to implement schemes related to exports. Wherever the HSN code does not exist for key products, such codes have to be created.

Export promotion assistance

- Since major consumers of Technical Textile products are developed countries, it is recommended to grant the benefit of Market Linked Focus Product Scheme (MLFPS) when exported to European Union (EU) and USA.
- Increase the coverage of products under Focus Product Scheme.
- Increase incentive/entitlement to 5% from existing 2% for exports under MIES scheme.
- Increase in duty draw back and caps for Technical Textile products.
- Continuation of incremental export scheme for Technical Textiles
- Coverage of pre used Technical Textile machinery under EPCG scheme.
- Extend the benefit of 3 % rate of Interest Subvention Scheme on Pre and Post shipment Rupee Export Credit to Technical Textiles.
- Focus on Technical Textiles should be maintained while negotiating FTAs with key importing countries to promote Indian Technical Textile exports especially in the emerging markets of Asia, Africa and South America

The duty drawback provided for export promotion for Technical Textiles should be well illustrated and easy for new entrepreneurs to identify. Increased focus should be provided to newer segments of specialty fibres, industrial fibres and composites.

Setting up of an export promotion council

- During the last five years, the exports of Technical Textiles across several segments have witnessed high growth owing improved competitiveness. There is a need to leverage this momentum and position India as a key Technical Textile Manufacturer. Technical Textile export promotion council may be set up to promote Indian TT products across the globe. The council may focus on identification of market opportunities and promotion of Indian Technical Textiles across the globe by conducting/facilitating Buyer Seller Meets, Conferences, Exhibitions, Workshops, etc.

PROMOTION OF INVESTMENT IN TECHNICAL TEXTILES:

Promotion of FDI in Technical Textiles

Technology is a key source of competitiveness in Technical Textile industry. Foreign players, which have technology and expertise, can set up manufacturing and R&D units in India to cater to Indian and Global markets. To attract FDI, it is necessary to communicate competitive strengths of India across the globe.

So it is recommended to identify countries that have technology and expertise which would include US, European countries, Japan, Taiwan, Korea, etc. Decision makers of top Technical Textile companies may be invited and workshops/road shows may be conducted in each of the country highlighting advantages of investing in India.

It is recommended to have provisions for promotion of joint ventures in Technical Textiles. Special focus should be provided to upcoming and high value segments of specialized fibres and yarn and composite to attract top firms across the world to have a set up in India. To incentivize these global organizations, facilities like protection of IPRs can be ensured, along with support for acquisition of machinery and R&D. This would also help in technology transfer to India.

Separate allocation to RRTUFS

The investments in Technical Textile via TUFS have seen limited growth since 2007-08. Separate allocation of funds for Technical Textiles under TUFS would help the sector to attract more Investments.

Special focus on certain products to promote investment

Technical Textile industry in India is in its growth stage and many high value-added products and strategic products are yet to take off in a big way in the

domestic and export markets. In light of this, additional policy support should be extended to upcoming sectors and high potential sectors to attract investments. These policy supports could include incentivizing via tax rebates, preferential land allocation and reimbursement or exemption of municipal tax and stamp duty.

Creation of Focus Incubation Centres (FICs)

Incubation centres with focus on providing a first-hand experience in Technical Textiles, should be promoted at CoEs, Large institutions, SITPs and major clusters. These Incubation centres would provide a plug and play infrastructure available on rental basis to entrepreneurs for a specified period to try their hand at Technical Textile businesses. These incubation centres can also be developed in partnership with Private Technical Textile organisations, which would provide a dedicated space and machinery for the incubation centre along with a dedicated work force on a rental basis. This would help in encouraging entrepreneurs to invest in Technical Textile sector.

Cost effective business model for MSMEs available on public website of Ministry of Textiles

A sample business model for starting an MSME for major Technical Textile products having high potential should be developed and made available on the website of Ministry of Textiles, Office of Textile Commission and Ministry of MSME. This would have details of the machinery and manpower requirement along with details of land required and finances required. The Business model can also list out methods of financing providing snapshots of different schemes of Govt. of India that can be used for funding of the same. Such a business model would help entrepreneurs and businessmen who intend to get into the sector but have little knowledge or awareness regarding the industry and the requirements for setting up units.

In addition dedicated training programmes for development of entrepreneurial skills in Technical Textiles for the SME sector is recommended for increased participation of the SME sector in the industry.

Consultancy services by CoEs to Businessmen and Entrepreneurs

Globally CoEs are involved in not just research and development activities but also in providing consultancy and complete implementation support to organisations entering their domain of expertise. CoEs in India may also offer consultancy support to

entrepreneurs and businessmen for setting new unit, upgrading old machinery, identifying market potential and developing newer products in their domain of Technical Textiles. This coupled with R&D support and easy availability of business model for MSMEs would create a fertile environment for smaller businesses to diversify into Technical Textiles. It would also be beneficial for the CoEs which would have additional channels for revenue generation via consulting along with R&D support.

It is recommended that in order to develop consultancy services and commercialise other Research activities by CoEs appropriate National or International body of repute like Industry associations, Reputed Institutions, Consulting organisations should be involved so as to identify the key strategies and requirements of foreign CoEs and replicate the same in India to bring Indian CoEs to the same level of commercialisation.

Import Substitution to attract new investments

Across several segments of fibres, rolled goods and converted product there is import dependency. Over the last five years improvement has been witnessed with some of the products being manufactured in India. Still import substitution presents an opportunity for new investment areas where import substitution opportunities exist have to be communicated to the investors in Technical Textile space to promote investments. Items like airbags and automotive textiles which are largely imported should be promoted for domestic production through replication of production processes.

PROPOSED REGULATORY MECHANISM FOR PROMOTION OF USAGE OF TECHNICAL TEXTILES

The key recommendations around policy and regulatory changes that can boost the market for Technical Textiles in India are:

- Increasing subsidy through NHM to 70% from current 50% with higher inclusiveness of products like crop covers and non-woven textile based products.
- Promotion of agro-textile in Himalayan region and North East should be implemented.
- Usage of seat belts may be made mandatory in all buses, LCVs and M & HCVs and in all cars on long-distance roads.
- Installation of airbags may be made mandatory in automobiles
- Usage of geosynthetics may be made mandatory for erosion control

- Strict implementation of usage of helmets for riders and pillions
- Mandatory usage of medical disposables in all government / government-aided hospitals; Treatment under all emergency cases to be mandatorily considered as HIV positive thereby necessitating mandatory usage of medical disposables. This should be coupled with promotional activities aimed at creating awareness about reduction in HAIs using disposables.
- Standard product norms and regulations should be implemented for food packaging and sacks. This would standardize the product in the segment, reducing the risk associated with acceptance of the product, while easing the work of procurement department.
- The usage of fire-retardant textiles should be made mandatory at all public places like theatres, auditoriums, trains (curtains, seat-covers, etc), hotels, hospitals & restaurants. These are currently suggested in the National Building Code but are not mandatory. Necessary regulatory amendments should be effected to the municipal and town planning acts to ensure compliance. *The legislation for mandatory usage of fire retardant textiles should be implemented immediately for any new constructions. For the old constructions, the government can provide incentives to shift to fire-retardant textiles.*
- The usage of fire-retardant textiles should be made mandatory in all railway coaches. The Indian Railways in this regard can implement the regulation.

OTHERS

Formulation of standards

- Technical Textiles are functional in nature, meeting specific performance requirements of the users. The specifications/ standards therefore assume critical importance. In India, standardization process is in progress, though at a very slow pace. The consumption of non-standardized product does not meet the requirement of the consumers, gives the bad reputation to the product, and affects negatively on the consumption. Thus there is need to expedite the standardization process.
- Standards have been formulated for many products. There is need to formulate a mechanism to encourage users to take cognizance of the standards and while issuing tenders where in only standardized products may only be made eligible for supply. The Government subsidies may also be restricted to standardized products, for which standards are available.
- BIS standards are particularly important for Geotech, Oekotech, Protech, Meditech and Buildtech as the

standards for other segments can be defined by end-user industries as per requirements. Therefore, Government may take up with BIS to streamline the system of formulation of standards for expediting the process.

- The standards should provide level playing field for Indian and International players, and hence, should be based on specifications and not on any patented technologies
- Government may formulate a mechanism to encourage institutional users to consume standardized products.
- Norms for medical waste management are required for increasing adoption of medical disposables in India. These standards can be developed in consultation with the Ministry of Health.

Formulation of standards for waste management of non-woven products

- To enable effective recycling of non-woven Ministry of Textiles should liaise with the Ministry of Environment and Ministry of Urban Development to devise policies and mechanisms, which enable management of waste and suitable changes, should be incorporated in the *Municipal Solid Wastes (Management and Handling) Rules, 2000* in order to promote the usage of nonwoven products.

Proposed Regulatory mechanism to increase consumption of Technical Textiles

- Usage of seat belts may be made mandatory in all buses, LCVs and M & HCVs and in all cars on long-distance roads.
- Installation of airbags may be made mandatory in automobiles
- Usage of geosynthetics may be made mandatory for erosion control
- Strict implementation of usage of helmets for riders and pillions
- Mandatory usage of medical disposables in all government / government-aided hospitals; treatment under all emergency cases to be mandatorily considered as HIV positive thereby necessitating mandatory usage of medical disposables
- The usage of fire-retardant textiles should be made mandatory at all public places like theatres, auditoriums, trains (curtains, seat-covers, etc), hotels, hospitals & restaurants. These are currently suggested in the National Building Code but are not mandatory. Necessary regulatory amendments should be effected to the municipal and town planning acts to ensure compliance. *The legislation for mandatory usage of fire retardant textiles should*

be implemented immediately for any new constructions. For the old constructions, the government can provide incentives to shift to fire-retardant textiles.

- The usage of fire-retardant textiles should be made mandatory in all railway coaches. The Indian Railways in this regard can implement the regulation.

Promotion of consumption of Technical Textiles among institutional users

- Inter-ministerial committees or councils may be set up with different end-user ministries and industry as members to sort out issues related to institutional consumption of Technical Textiles and removal of any bottlenecks in the consumption of Technical Textiles. These committees would have representation from Ministry of Textiles, End user Ministries, Technical and Market consultants and people from industry and should work in tandem for promotion of Technical Textiles in the country.
- Refresher courses should be arranged for Officials, scientists and doctors in different Central and State Government departments and agencies that are involved in institutional purchase of Technical Textiles like CPWD and State PWDs, Ministry of Ports and Shipping, NHAI, BRO, etc so as to keep them appraised of the latest developments in Technical Textiles and also spread the awareness regarding benefits of Technical Textiles
- As the State Government often governs many of the institutional government purchases of Technical Textiles, there should be stronger involvement and participation of State governments in spreading the awareness and promoting Technical Textiles within the state. Ministry of Textiles may liaise with state government/departments to promote Technical Textile consumption.
- Sector specific seminars and awareness programs and workshops should be conducted on a regular basis advocating the benefits and use of Technical Textiles to institutional buyers. These should be followed by Buyer seller meets, business-to-business meetings with involvement of Industrialists, industry associations, institutional buyers and nodal officers of user Ministries.

Inclusion of non-woven products under NHM for subsidy

- Plastic mulching is included under NHM Support. Similarly, non-woven mulching has to be included under NHM towards increasing the usage of non-woven mulch mats.
- Non-woven crop-covers are not included under NHM resulting in almost negligible domestic usage of these products. Almost 100% of the crop-covers

manufactured in India are exported. In order to develop the demand for crop-covers in India, the crop covers should be included under NHM. NHM should also help in creating the awareness and benefits of these products.

- Facilitation should be provided to the farmers for availing NHM subsidy in shorter.

Focus on use of recycled material for Technical Textiles

Clothing and textile requirement across the world has been growing at a steady rate and the resultant pressure on the raw materials is steadily growing. Along with it, the disposal of waste textiles and old textiles is a key issue that has to be resolved. These textiles are not suitable for dumping in landfills, as the manmade fibres are not biodegradable. In light of this, it is imperative that many of the textile waste be recycled and used for the clothing and Technical Textile industry. Therefore, use of Technical Textiles from recycled polyester and recycled PET bottles should be advised.

Promotion of coir and Jute Technical Textiles

India is a major producer for coir and jute fibres in the world with abundant supply and limited use of the same. While Jute finds a significant usage in Packtech, coir can be used for developing Geotextiles. Currently pilot projects of Jute and coir Geotextiles are underway by regional railways. A stronger policy support and push for usage of these by user Ministries is recommended.

Registration of Technical Textile units for availing TUFs subsidy

- It is recommended that Technical Textile units going for TUFs subsidy should be registered with Office of the Textile Commissioner. This would enable easy tracking of progress as well as strengthening of the Technical Textile database within the country.

Development of clusters

- Unlike traditional textiles, the technologies involved in Technical Textiles are many. There is a need for focused development on existing and new clusters across different technologies. For the existing clusters such as fish net manufacturing, medical textile clusters in Tamil Nadu, Sportech clusters in Punjab, Packtech clusters in Gujarat, etc., the focus of the development programmes may be tailored as per the current capability of the each cluster. A diagnostic study may be conducted and interventions may be planned to improve the cluster capability through better market linkages, product

development and R&D, common facility centres, quality improvement, skill development, incubation etc. These clusters can be developed into organized Technical Textile parks with provision of subsidized centrally managed services regarding R&D facilities, Incubation centres, Common facilities like ETPs and skill development.

- Dedicated Technical Textile parks should be promoted under the SITP scheme. Over 80% units in these parks would be of Technical Textiles. Additional benefits can be provided to units coming in newer segments like carbon composites.
- New clusters may be formed across various products such as nonwovens, composites, coated and laminated fabrics, etc, where incentives may be provided to set up multiple units and Technical Textile park may be formed.

Promotion of Technical Textile Machinery Manufacturing

Most of the Technical Textile machinery is not produced indigenously. Most of the state-of-the-art Technical Textile machinery are very expensive and high rate of duty makes imports of such machinery cost prohibitive, restricting the investments in such plants. CoEs for textiles machinery were set up in China for reverse engineering of the advanced machinery so that the technology could be replicated and manufactured locally at a much lower price. Thus, over a period these CoEs were able to fulfill their purpose and manufacturing of technology intensive machinery started at a lower price in China. In similar lines, machinery development through reverse engineering may also be encouraged. This can also be done on a Public Private Partnership Basis.

Dedicated support for promotion of indigenous development and manufacturing of high quality and modern machinery can be provided through a separate scheme. This scheme could provide capital subsidy for plant setup re-imbursment of input VATs and interest subsidies to manufacturers setting up modern Technical Textile machinery units.

In addition, collaboration between Ministry of Textiles and The Department of Heavy Industries is suggested for developing a road map of development of Indigenous Technical Textile machinery industry.

International Collaboration of CoEs

In lines with Global CoEs, Indian CoEs should also aim at developing international collaboration with industries, academic bodies and global CoEs for the purpose of knowledge sharing related to newer and modern technologies, market demand, new

researches, etc. The collaboration should aim at benefitting the local manufacturers in India and their International counterparts through technology transfer, identifying prospects of joint ventures and potential entry strategy into newer global markets.

Formulation of Standing Committee for promotion of new Technical Textile products:

It is recommended to formulate a standing committee for promotion of high potential fast growing Technical Textile emerging products. This committee would be responsible for devising promotion strategies specific to key emerging products and monitor the growth of the industry to devise the right interventions as and when required for promotion of these Technical Textile products.

Scheme for promoting Technical Textiles

Indian Technical Textile is still in a growing phase with a vast potential. The SGDTT scheme till 2011 and TMTT scheme of the 11th plan has helped in a significant manner in developing up to date testing and research infrastructure, mapping of Technical Textile units in India and creating awareness regarding the use of

different Technical Textile products. However, there is still a lot of progress that needs to be done in terms of further strengthening of the CoEs into newer more advanced CoEs for emerging products, promotion of R&D and quality production in PPP and private sector.

Along with it there is a need to going beyond general awareness about products and inculcate the benefits and usability and of Technical Textiles amongst users and informing them about how to use Technical Textiles. To cater to these industry requirements, it is recommended that a new scheme of five years should be run by the Ministry in line with the TMTT, which would focus on developing knowledge base, R&D support, incubation and entrepreneurship development, marketing, export promotion, awareness creation and new product introduction.

Continuous monitoring of Industry

The government already has a system of compiling statistics of conventional textile industry, on continued basis. A similar system with respect to Technical Textile industry may be introduced.

Project Background

1. Introduction

The Ministry of Textiles (MoT) is responsible for policy formulation, planning, development, export promotion and trade regulation in respect of the textile industry. In line with this agenda, the Ministry of Textiles has undertaken several developmental activities that are oriented towards providing necessary support to promote growth of Technical Textile industry in India.

Technical Textiles are textile materials and products used for their technical performance and functional properties. Unlike conventional textiles used traditionally for clothing or furnishing, Technical Textiles are used basically on account of their specific physical and functional properties and mostly by other user industries. The market for Technical Textiles is expanding as the products are being put to use by an ever-increasing number of end users in various industries such as agriculture, clothing, construction, health care, transportation, packaging, sports, environmental protection, protective wear, and more. The global market for Technical Textiles is expected to continue its growth, driven by the expanding use of these products particularly non woven in emerging markets like Asia, because of increased levels of

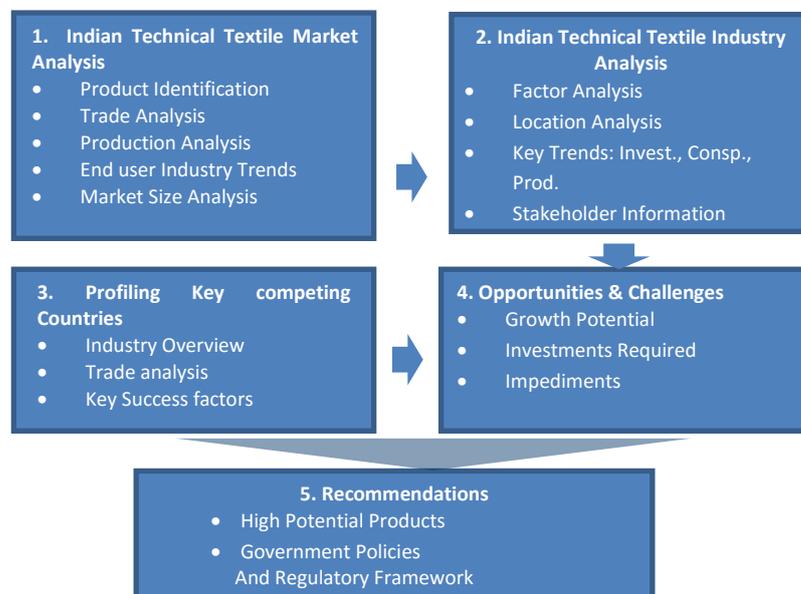
consumption and production, availability of skilled labour, and developing infrastructure facilities. The global Technical Textile industry is currently dominated by products from China and the European Union. Developing countries in Asia have the advantage of becoming production centres for Technical Textiles due to their cost advantages.

A baseline survey that provides comprehensive information on all aspects of the Technical Textile industry in India is imperative for understanding the past developments and progress in the sector and for identifying key challenges, growth potential and opportunities. Under the 12th five year plan scheme of the Government, MoT through the Office of the Textile Commissioner has planned to carry out an updating exercise of the baseline survey for the Technical Textile Industry to estimate all information on the Technical Textile industry in India like market size, consumption, trade trends, number of units, type of units, type of products produced, investment, turnover, employment, etc.

In this regard MoT has appointed ICRA Management Consulting Services (IMaCS) to do a baseline survey of the Technical Textile industry of India.

2. IMaCS' Approach

Exhibit 1: Summary of IMaCS Approach



IMaCS' approach towards comprehensively addressing all the aspects as spelt out in the Terms of Reference has been structured under five (5) distinct modules, as explained in detail:

Module 1: Indian Technical Textile Market Analysis

In this module, the Indian Technical Textile market is being mapped covering structure, products, trade, production, and market size by way of a market survey and trade analysis. This is being done under separate work streams as detailed below:

Work stream 1: Product Identification: A comprehensive list of Technical Textile products was prepared and HS codes are mapped for the identified list of Technical Textile products. This list forms the base for the import, export analysis and market sizing.

Work stream-2. Trade Analysis: For the identified Technical Textile products, the Indian trade data has been extracted from DGCIS, DGFT and any other reliable sources. The extracted data was analyzed to understand the following:

- Export volume and value across each product/segment
- Export trends during last five years (2007-2012)
- Import volume and value across each product/segment
- Import trends during last five years (2007-2012)
- Key export markets for India Key countries where India is importing from

Based on this analysis, the trends in trade of Technical Textile products in India was established

Work Stream 3-Manufacturing Analysis: Based on the data collected from the primary survey, the manufacturing of Technical Textile products is being analysed on the following lines on best effort basis :

- Type of manufacturer - MSME/ Non-MSME
- Product wise manufacturing capacity, including roll goods and conversion
- Domestic consumption versus Exports
- Key manufacturing clusters

Work Stream 4- End User Industry Trends: The demand for Technical Textile products is derived demand and dependent on the growth of end user industries. As part of this analysis, we have studied the key end-user industries in India to understand the growth in these industries, trends in consumption of Technical Textile products by these end user industries and its impact on growth of Technical Textile manufacturing and trade.

Work Stream 5- Market size Analysis: Based on the analysis of imports, exports, manufacturing and end user industries, IMaCS has arrived at the market size across each segment of Technical Textiles. Market size as defined in the terms of reference will be the sum of indigenous production and imports. The growth rate across each segment was analysed and based on the past trends, and end-user industry/macro economic trends the market size forecasting is being done for 3 years from 2013 to 2016. In addition to the market size, exports market growth, imports market growth, manufacturing growth forecast is being done for the next three years.

Module 2: Indian Technical Textile Industry Analysis

Under this module, we analysed various dimensions of Indian Technical Textile Industry in terms of factor endowments and policy framework. We conducted this module under the following work streams:

Work Stream 1-Factor Analysis

The key factors driving the industry were analysed. It covered:

- Raw materials: Key raw materials used in Technical Textile Industry have been identified and their availability and ease of access was analysed. We also mapped the composition of raw materials on the lines of domestic versus imports.
- Manpower: IMaCS assessed the availability of manpower to the Technical Textile industry, which include managerial, technical, skilled and unskilled manpower. IMaCS would provide detail the employment status in Technical Textile Industry during the last three years and employment potential for the next three years will be projected, across, various segments, which include SME, Non-SME, skilled, semi skilled and unskilled segments. We assessed Institutional support in developing the human resources for the industry.
- Technology: IMaCS assessed the technology across the industry.
- Support Facilities: The support available for the industry including Testing and Research & Development has been assessed
- Policy & Regulatory Framework: The Policy governing the industry and regulations, standards, which helps the industry growth was analysed.

Work Stream 2-Location Analysis

IMaCS did a detail state wise location advantages within India for setting up of Technical Textile manufacturing units, based multiple dimensions, which include, access to raw materials, institutional support, and the incentives offered by the government.

Work Stream 3- Key Trends: Investment, Consumption, Production

IMaCS studied the key trends in consumer usage of Technical Textiles to assess the impact on the overall market. Industry trends across various end-user segments will be studied which has an impact on the consumption of Technical Textiles. We studied recent investments in Technical Textile industry in India to understand investment trends, both by Indian entrepreneurs and foreign investors. Profiles of major FDIs were tabulated. Case studies on investments through JV and collaborations by the Indian Technical Textile units have been highlighted.

Work Stream 4: Stakeholder Information

Based on the primary survey done across all the units, exhaustive list of all the stakeholders in Technical Textiles is being compiled which includes manufacturers, traders (importers/ exporters), consultants, government bodies, user organisations (government/ private), Technical Textile machinery manufacturers, testing and research organizations, colleges, polytechnics, textile institutes, engineering institutions relevant to Technical Textile Industry. Based on the information, IMaCS has prepared a directory covering name & address contact details, products produced/imported/exported, segment, capacity, turnover, SME/Non SME, Country of import/export.

Top 10 manufacturers in each segment of Technical Textiles in India were further profiled. The profile includes structure and type of units i.e., SSI/non-SSI, 100% EOU, type of products produced, application areas of such products, installed capacity, type of machinery in the facility with break-up of imported and indigenous, capacity utilization per year, domestic and export turnover, major raw material used with break-up of imported and indigenous, investment, profitability position, market share, turn over, no. of persons employed with breakup of technical, non-technical and contact details like telephone no., fax, e-mail, website & name of contact person etc which was collected on best effort basis.

Work Stream 5-Sector Information

A detailed report of special sectors including non-woven, composites and speciality yarns is being prepared. Key information covered includes; current applications, market size across key applications, technology, and manufacturer distribution across geographies. The detail on strength and weakness of Indian Technical Textile Industry is also being assessed.

Module 3: Profiling Key Competing Countries

In this module IMaCS assessed key countries where Technical Textile industry is thriving, which can provide direction for the Indian Technical Textile Industry. The assessment was done under three work streams to cover, export performance, key success factors and key players.

Work Stream 1-Industry Overview:

Countries which thrive across different Technical Textile segment were identified and industry/segment overview was detailed mentioning industry structure, availability of input materials, support infrastructure, key markets on best effort basis thorough secondary research.

Work Stream 2-Trade analysis:

For the identified countries, international trade data was analyzed

Work Stream 3-Key Success factors

Across each country key success factors were identified after analyzing various parameters including proximity to the end user market, R&D capability, institutional support, government incentives and regulatory framework, etc.,

Work Stream 4-Player Profiles

Top players in Technical Textiles across the globe were identified and ranked based on their sales turnover. Based on the inputs received in this module, IMaCS did a comparative assessment of Technical Textile Industry with key countries where the industry is thriving.

Module 4: Opportunities and challenges for Indian Technical Textile Industry

Based on the strength and weaknesses of the Indian Technical Textile industry and comparative performance of the key countries, IMaCS identified opportunities and challenges for the industry.

Work Stream 1-Future Growth Potential

The growth potential across each segment was assessed, based on the past trend, end-user industry trends, macro economic trends and the market size has been forecasted up until 2015-16). In addition to the market size, exports market growth, manufacturing growth has been forecasted for the next three years. The inputs from industry players were considered towards projecting the growth in the manufacturing sector. The manpower requirement to meet the projected growth has been derived. The opportunities for creating employment and human resource development in the Technical Textile sector were highlighted.

Work Stream 2-Investments Required

To meet the growth potential, investment required in manufacturing Technical Textile products and input materials was assessed. The institutional support required for meeting, human resources, testing and R&D demand has been projected.

Work Stream 3-Key Impediments: The key impediments for the growth of industry were analyzed, which may include, input materials, human resources, institutional support, government policies, fiscal duties, Inadequate Demand and Inadequate information/awareness.

Module 5: Recommendations

Further, in discussions with the stakeholders the final recommendations have been formulated.

Work Stream 1-High Potential Products

Technical Textile products with high market potential were identified to assist existing and new players to invest in these segments. The drivers for the growth have also been detailed, which includes both end-user industry and consumer demand.

Work Stream 2- Government Policies & Regulatory Framework

To meet the projected growth, government can play significant role, through awareness, incentivizing new investments, creating institutional support to the industry and export incentives. The institutional support in R&D, Human resources development can help industry to foster. Creation of standards and regulations can also push the consumption of the Technical Textile products creating further demand. Based on the industry inputs and growth projections, IMaCS has recommended key initiatives on which government may focus to meet the growth projections in the Technical Textile industry. The recommendations also include the human resource development through creation of institutions and courses/curriculum contents specific to Technical Textile industry.

Methodology

We have carried out this engagement through a mix of primary and secondary research.

Primary research

Baseline Survey: IMaCS has prepared a detailed questionnaire covering the details mentioned under stakeholder information part of TOR. Approval will be sought from OTXC on the questionnaire, which was used as the research instrument towards collecting information from the stakeholders.

The list of stakeholders was prepared using secondary resources and subsequently snowballing exercise was done during to survey to get additional referrals. The few secondary sources IMaCS referred to were:

- Stakeholders list from previous baseline survey
- Members list from ITTA
- TUFS Beneficiary list under Technical Textiles
- Stakeholders associated with COEs for availing their services
- B2B Trade websites such as Alibaba, global sources, fibre2fashion, etc.,

The data collected has been appropriately entered into excel format for analysis and cleaned.

Interactions with COEs, associations, key industry players in the Technical Textile industry in India

As a part of the exercise we have met the following stakeholders and interacted extensively with them.

- Centres Of Excellence/associations such as ITTA, All India Flat Tape Manufacturers association (AIFTMA), FRP Institute, Mosquito Net Manufacturers' Association, Indian Fishnet Manufacturers Association, Zipper Association of India, / Industry players and also getting their responses through a structured questionnaire to understand Indian Technical Textile Industry, the effect of various scheme interventions, issues being faced, need for modifications in policy and regulatory framework.

Secondary Research

IMaCS has done extensive secondary research and analysis for the engagement. For this purpose, we reviewed information available in the public domain – industry information from various associations of user industries, research reports of reliable agencies, databases and other reliable sources. It has taken data/information from the Office of Textile Commissioner regarding the database of stakeholders including TUFS beneficiary list under Technical Textiles. Structure of report

IMaCS has developed this report in four sections. In Part A, IMaCS has given details about the project background and its approach towards completion of the project. In the second section – Part B, an overview of the Technical Textile industry of India is presented which includes details about the current market size, location advantages and the information about various investments in the Technical Textile domain. The third section – Part C involves detailed reports of each product considered as Technical Textiles segregated under the 12 Technical Textile segments. Each product

has been analyzed on the aspects of product characteristics, application, market size, major manufacturers, export and import scenario, key machineries required for the product manufacturing and the quality standards available for the product

The fourth part – Part D involves analysis of Indian Technical Textile industry on different factors of production involving raw material availability, different technologies used, policies and incentives available from both central and state governments for promotion Technical Textile industry. It analysis of work force available in the industry and prospects of

skill development for Technical Textiles across India though various courses available. IMaCS has also done a comparison of Indian Technical Textile industry vis-à-vis other key global players of Technical Textile on various parameters under this section.

Product coverage with respect to Baseline study 2008-09

The following exhibit illustrates the products that have been modified/omitted or included in the current baseline study with respect to the baseline study on Technical Textiles done in 2008-09

SL. No.	Segment	Products	Covered in BSTT 2008	Covered in BSTT 2013	Remarks
1	Agrotech	Mulch Mats	Plastic much mats also covered	Only woven and non woven mulching considered	Re-sizing of market indicated a visible decline in product market size compared to 2008 report
2	Agrotech	Crop covers	Plastic crop covers also covered	Only woven and non crop covers considered	Re-sizing of market indicated a visible decline in product market size compared to 2008 report
3	Agrotech	Other Plant & protective nettings	No	Covered along with fish nets	Includes pallet nets, turf protection nets, root ball nets, harvesting nets, etc
4	Meditech	Contact lenses	Yes	No	
5	Packtech	Non woven shopping bags	No	Yes	
6	Sportech	Sports strings	No	Yes	
7	Sportech	Snooker & Pool table cloth	No	Yes	
8	Buildtech	Floor coverings	Yes	No	Only wall covering have been covered within other products
9	Buildtech	Acoustic fabrics	No	Yes	Acoustic textile fabrics used in Multiplexes and construction to minimise echoes
10	Clothtech	Sewing threads	Yes	Only Specialised sewing threads	This has led to re sizing of the Clothtech segment and hence lower growth numbers for the segment and the product.
11	Homotech	Ticking fabrics	Yes	Only the organised sector ticking fabric market has been captured	The ticking fabric market for only the organised mattress industry has been captured as most of the demand in the un-organised sector is catered via cotton stuffing and traditional textile and clothing.
12	Homotech	Furniture fabrics & other coated fabrics	Only furniture fabric was considered	Other coated fabrics used for book covers, paintings, etc have also been considered	
13	Protech	Outer protective clothing	No	Yes	Outer protective clothing like Technical Textile rain coats, wind cheaters, etc have been considered as Technical Textiles

SL. No.	Segment	Products	Covered in BSTT 2008	Covered in BSTT 2013	Remarks
14	Indutech	Industrial webbings and slings	No	Yes	
15	Indutech	Acoustic textiles used in cell phones	No	Yes	
16	Indutech	Industrial hoses (Technical Textile component)	No	Yes	

Part A. Overview Of Technical Textiles In India

3. Introduction

Technical Textiles are defined as textile materials and products manufactured primarily for their technical and performance properties rather than their aesthetic and decorative characteristics. Technical Textiles are different from the conventional textiles. Unlike conventional textiles used traditionally for clothing or furnishing, Technical Textiles are used basically on account of their specific physical and functional properties and mostly by other user industries. Depending on the product characteristics, functional requirements and end-user applications the highly diversified range of Technical Textile products have been currently grouped into 12 categories based on application:

- Agrotech (agriculture, horticulture and forestry)
- Buildtech (building and construction)
- Clothtech (technical components of shoes and clothing)
- Geotech (geotextiles, civil engineering)
- Hometech (components of furniture, household textiles and floor coverings)
- Indutech (filtration, cleaning and other industrial usage)
- Meditech (hygiene and medical)
- Mobiltech (automobiles, shipping, railways and aerospace)
- Oekotech (environmental protection)
- Packtech (packaging)
- Protech (personal and property protection)

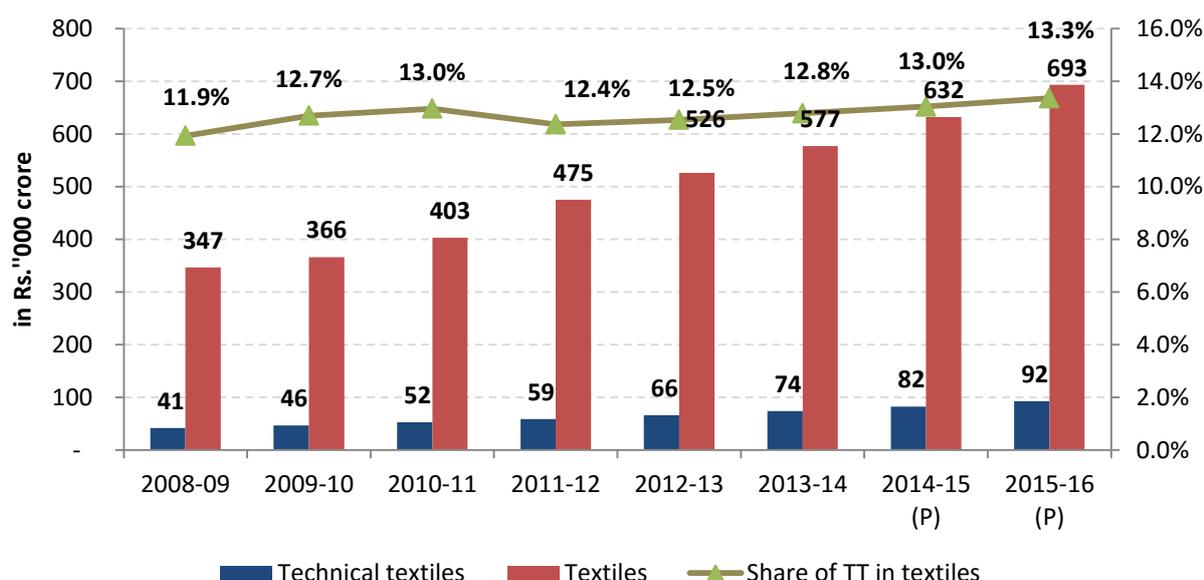
- Sportech (sport and leisure)

The Technical Textile industry has immense potential in the developing countries. Asia is a power house of both production and consumption of Technical Textiles. China is the market leader in Technical Textiles. Korea, Japan, India and Taiwan are the other key players of Technical Textiles in Asia. Easy availability of labour along with availability of a wide range of fibre and fibre products in India is the key reason for the growth of Technical Textile sector in India.

Domestic market of Technical Textiles

Indian Technical Textile market is spread across all the 12 segments with Mobiltech, Packtech, Clothtech and Hometech having the major share in the market. The domestic consumption has seen high growth of over 15% per annum in the segments of Mobiltech, Geotech and Indutech while the key segments of Packtech, Sportech, Meditech and Buildtech grew at over 10% per annum. However, the demand for specialised Technical Textile products is still in a very nascent stage and is expected to be the driver in the future. The Technical Textile industry currently contributes to just around 0.75% of the total GDP of India at current prices. The Technical Textile industry contributes to roughly 12% of Indian textile Industry at present which is very less compared to other developing countries like China where Technical Textile Industry accounts for around 20% of the textile sector. The Technical Textile industry size with respect to the textile industry of India is shown in the following exhibit.

Exhibit 2: Indian Technical Textile Industry w.r.t textile sector



Source: Ministry of Textiles,

4. Market Summary

The Technical Textile market across the 12 key segments is as shown in the Exhibit 3:

Exhibit 3: Market summary of Technical Textiles

Sl. No.	Segment	Market size 2007-08 (in Rs. Crore)	Market size 2012-13 (in Rs. Crore)	Market size (E) 2013-14 (in Rs. Crore)	Growth (2008-13) CAGR	Projected growth (2013-16)	Market size (P) 2014-15 (in Rs. Crore)	Market size (P) 2015-16 (in Rs. Crore)	Market size (P) 2017-18 (in Rs. Crore)
1	Agrotech	553	826	929	~8%	~12%	1,043	1,191	1,614
2	Meditech	1,669	3,321	3,622	~15%	~9%	3,950	4,281	5,142
3	Mobiltech	3,183	6,607	7,370	~16%	~12%	8,221	9,173	11,433
4	Packtech	14,630	28,020	31,181	~14%	~11%	34,698	38,733	48,318
5	Sportech	2,851	4,132	4,645	~8%	~12%	5,222	5,877	7,111
6	Buildtech*	1,317	2,514	2,819	~14%	~12%	3,162	3,577	4,587
7	Clothtech#	3,466	4,835	5,357	~7%	~11%	5,935	6,591	8,133
8	Homotech\$	4,345	6,249	7,119	~8%	~14%	8,110	9,274	12,145
9	Protech	1,302	1,988	2,176	~9%	~9%	2,382	2,722	3,139
10	Geotech	185	683	772	~30%	~13%	873	991	1,275
11	Oekotech	68	120	132	~12%	~10%	145	160	193
11	Indutech	3,206	6,625	7,567	~16%	~14%	8,642	9,929	13,127
	Total market	36,775	65,920	73,688	~12.4%	~11.8%	82,384	92,499	1,16,217

Source: Annual reports, websites, secondary reports, ITTA, IMAcS analysis

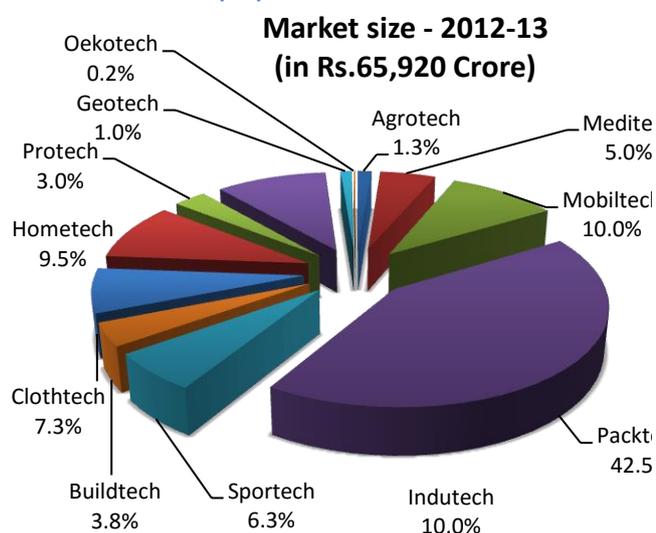
*Buildtech market size for 2007-08 and onwards excludes market of floor and wall covering

\$ Homotech market for 2007-08 and onwards includes plush fabric for soft toys instead of total soft toys and only Technical Textile furniture fabrics

#Clothtech market includes only specialised sewing threads

The share of different segments in the total market is as shown in Exhibit 4

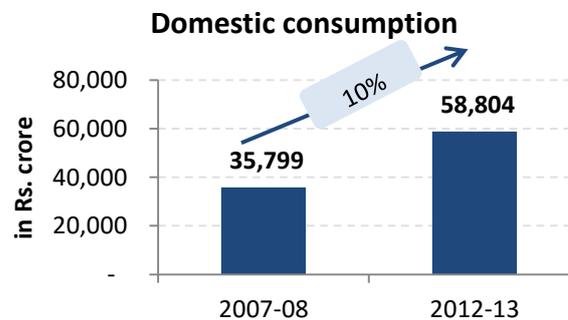
Exhibit 4: Market size pie product wise



Source: IMAcS analysis

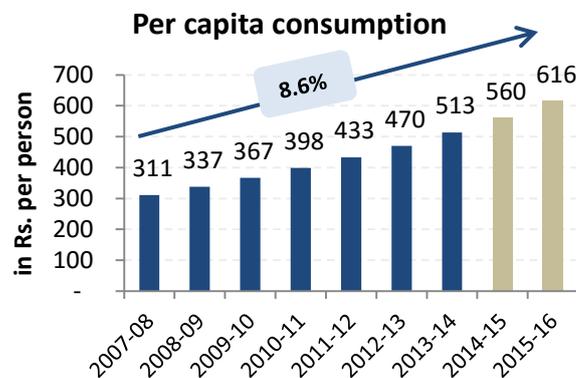
Out of the total market, domestic consumption accounts for significant share at close to 90% of all Technical Textile supplies. The trends of domestic production and exports and imports are shown further

Exhibit 5: Domestic market trend



Source: IMAcS analysis, DGFT, DGCIS

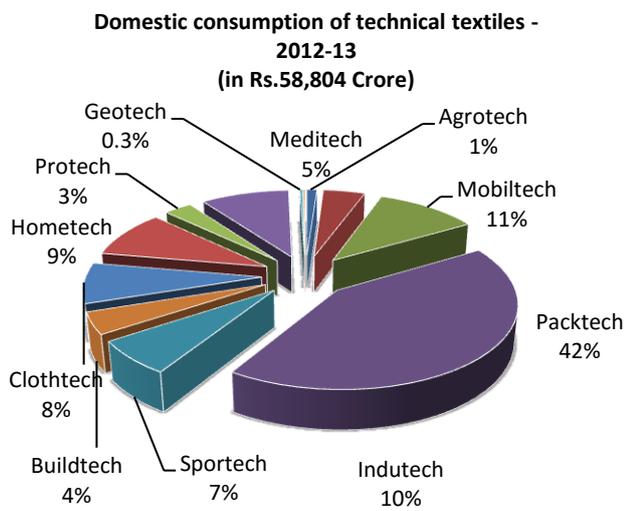
Exhibit 6: Per capita consumption of Technical Textiles in India



Source: IMAcS analysis

The segment wise domestic consumption is shown in the Exhibit 7:

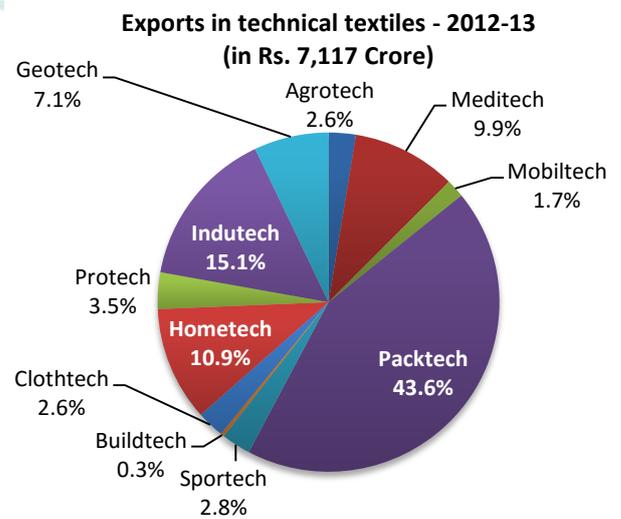
Exhibit 7: Domestic Consumption for Technical Textiles



Source: IMAcS analysis

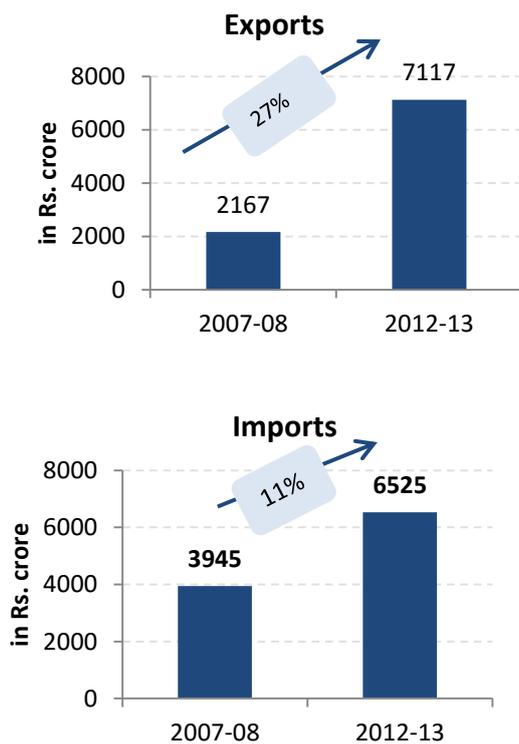
The segment wise share of exports and imports is as shown in Exhibit 9 and Exhibit 10 respectively.

Exhibit 9: Export distribution for Technical Textiles



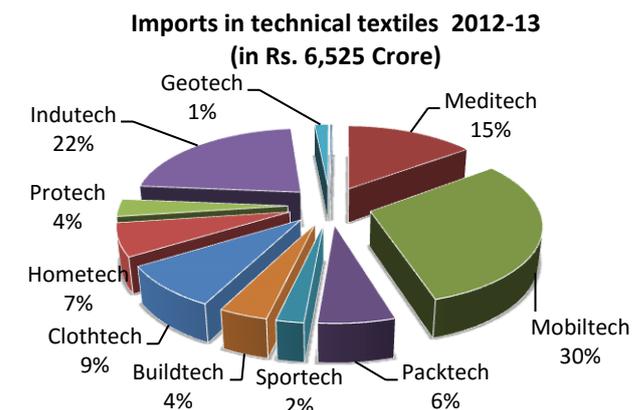
Source: IMAcS analysis, DGCIS, DGFT

Exhibit 8: Export import trend for Technical Textiles



Source: IMAcS analysis, DGFT, DGCIS

Exhibit 10: Import distribution for Technical Textiles



Source: IMAcS analysis, DGCIS, DGFT

Segment wise market summary is as follows:

Agrotech

The total estimated market for the segment including the exports is as shown in Exhibit 11.

Exhibit 11: Market summary of Agrotech

Agrotech		2012-13					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Shade nets (including plant nets)	Value (in Rs. Crore)	145	-	11	134	145	12	167	13	261
	Volume (in MT)	5,783	-	440	5,343	5,783	462	6,679	509	10,436
Mulch Mats	Value (in Rs. Crore)	14	-	-	14	14	-	17	-	22
	Volume (in MT)	692	-	-	692	692	-	796	-	1,053
Crop covers	Value (in Rs. Crore)	2	-	2		2	2	-	3	
	Volume (in MT)	171	-	148	23	171	170	27	225	36
Anti Hail & Anti Bird nets	Value (in Rs. Crore)	11			11	11	-	14	-	21
	Volume (in MT)	333	1	4	330	334	4	412	5	644
Fishing nets (including other agro nets)	Value (in Rs. Crore)	638	16	170	484	654	204	513	294	576
	Volume (in MT)	18,229	457	4,857	13,829	18,686	5,829	14,658	8,393	16,470
Total	Value (in Rs. Crore)	810	16	183	643	826	218	711	310	881

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis P=Provisional

Meditech

The total estimated market for the segment including the exports is as shown in Exhibit 12

Exhibit 12: Market summary of Meditech

Meditech		2012-13 (All values in Rs. Crore)					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Baby Diaper(TT Component)	Value (in Rs. Crore)	3.0	59.0		62.0	62.0	-	71.3	-	94.3
	Volume (in MT)	207	3,930		4,137	4,137	-	4,758	-	6,292
Incontinence Diaper TT Component	Value (in Rs. Crore)	1.0	10.0		11.0	11.0	-	13.2	-	19.0
	Volume (in MT)	37	698		735	735	-	882	-	1,270

Meditech		2012-13 (All values in Rs. Crore)					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Sanitary Napkin(TT Component)	Value (Rs. Crore)	3.1	59.5		62.6	62.6	-	71.9	-	95.1
	Volume (MT)	209	3,966		4,174	4,174	-	4,800	-	6,349
Wipes TT Component	Value (Rs. Crore)	94.6	6.5	1.1	100.0	101.1	1.2	110.0	1.5	133.1
	Volume (MT)	1,060	526	326	1,260	1,586	358.6	1,386	434	1,677
Under pads (TT Component)	Value (Rs. Crore)	0.7	13.4		14.1	14.1	-	16.1	-	21.3
	Volume(MT)	47	891		938	938	-	1,078	-	1,426
Ear Buds (TT Component)	Value (Rs. Crore)	0.4			0.4	0.4	-	0.5	-	0.7
	Volume(MT)	28			28	28	-	33	-	48
Surgical Disposables (TT Component)	Value (Rs. Crore)	66.0		34.5	31.5	66.0	38.0	34.7	45.9	41.9
	Volume (MT)	4,400		2,300	2,100	4,400	2,530	2,310	3,061	2,795
Disposable Bed-sheets, curtains, Pillow Covers (TT Component)	Value (Rs. Crore)	66			66	66	-	76	-	100
	Volume (MT)	800			800	800	-	920	-	1,217
Surgical Dressings	Value (Rs. Crore)	1,121	160	331	950	1,281	347.6	998	383	1,100
Eye Pads (TT Component)	Value (Rs. Crore)	0.3			0.3	0.3	-	0.3	-	0.3
	Volume (MT)	21			21	21	-	22	-	24
Dental Floss (TT Component)	Value (Rs. Crore)	19	22	8	33	41	8.8	36.3	11	43.9
	Volume (Kg)	90	300	145	245	390	159.5	269.5	193	326
Compression stockings for varicose veins (TT Component)	Value (Rs. Crore)	4.9	4.9	3.3	6.5	9.8	3.5	6.8	3.8	7.5
	Volume ('000 Nos)	974	692	466	1,200	1,666	489.3	1,260	539	1,389
Compression garments (TT Component)	Value (Rs. Crore)	140.3	9.4	49.7	100.0	149.7	52.2	105.0	57.5	115.8
	Volume ('000 Nos)	2,985	200	1,057	2,128	3,185	1,110.3	2,234	1,224	2,463
Surgical Sutures	Value (Rs. Crore)	660.0	340.0	260.0	740.0	1,000.0	286.0	814.0	346.1	984.9
	Volume		29Mn Mtr	4 Mn Dzn	5.5- Mn Dzn	9.5-10 Mn Dzn	4.4 Mn Dzn	6-6.5 Mn Dzn	5 Mn Dzn	7.5-8 Mn Dzn
Artificial Heart Valves	Value (Rs. Crore)	10.5	99.5		110.0	110.0	-	132.4	-	146.4
	Volume (Mtr)	191	1,809		2,000	2,000	-	2,408	-	2,662

Meditech		2012-13 (All values in Rs. Crore)					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Artificial Heart Patches (TT Component)	Value (Rs. Crore)		0.8		0.8	0.8	-	0.8	-	0.9
	Volume (mtr)		50		50	50	-	53	-	58
Artificial Vascular Grafts (TT Component)	Value (Rs. Crore)		25.0		25.0	25.0	-	26.5	-	29.8
	Volume ('000 nos)		20		20	20	-	21	-	24
Artificial Tendon/ Hernia Mesh (TT Component)	Value (Rs. Crore)	156	4.7	0.7	160.0	160.7	0.8	184.0	1.1	243.3
	Volume ('000 nos)	1,950	58	8	2,000	2,008	9.3	2,300	12.3	3,042
Artificial Ligaments (TT Component)	Value (Rs. Crore)		3.2		3.2	3.2	-	3.4	-	3.7
	Volume ('00 nos)		19		19	19	-	20	-	22
Prosthetics (TT Component)	Value (Rs. Crore)	0.2			0.2	0.2	-	0.2	-	0.2
	Volume ('000 mtr)	75			75	75	-	79	-	87
Artificial Kidney (TT Component)	Value (Rs. Crore)		48.0		48.0	48.0	-	52.4	-	63.9
	Volume (Mn Sqm)		4		4	4	-	4.4	-	5
Artificial Joints	Value (Rs. Crore)	23.3	85.2	13.5	95.0	108.5	15.5	114	20.5	165.0
	Volume ('000 nos)	24	87	14	97	111	15.8	116.2	21	168
Total	Value (Rs. Crore)	2,371	951	702	2,620	3,322	754	2,868	870	3,413

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Mobiltech

The total estimated market for the segment including the exports is as shown in Exhibit 13

Exhibit 13: Market size for Mobiltech

Mobiltech		2012-13					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Tyre Cord Fabric	('000 MT)	91.2	49.5	1.0	139.8	140.8	1.1	156.6	1.6	196.4
	INR Crore	2,571	1,420	21	3,970	3,991	24	4,447	32	5,578
Seat belt webbing	Mn metres	10	37	20	27	47	22	30	27	36
	INR Crore	62	90	32	120	152	35	132	42	160

Mobiltech		2012-13					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Airbags (TT component)	Mn Sqm	--	3	-	3	3	-	4	-	5
	INR Crore	-	94.48	-	94.48	94.48	-	109	12	144
Car body covers	In '000 Nos	783	2	-	785	785	-	863	-	1,045
	INR Crore	47	0.03	-	47	47	-	52	-	63
Seat covers fabric/upholstery	In Lakh mtrs	343	78	9	412	421	11	453	14	548
	INR Crore	530	262	71	720	792	82	792	109	959
Automotive interior carpets	Mn Sqm	15	0.4	-	16	16	-	17	-	21
	INR Crore	148	9.4	-	157	157	-	173	-	209
Headliners (TT component)	Mn Sqm	7	1	-	8	8	-	9	-	11
	INR Crore	43	12	-	55	55	0.003	60	-	73
Insulation felts	'000 MT	15.7	-	-	15.7	15.7	-	17.2	-	20.9
	INR Crore	115	3	0.01	118	118	0.01	129	0.01	157
Sun visors/sunblind	Mn nos	6	2	-	8	8	-	9	-	11
	INR Crore	85.8	19.5	-	105	105	-	118	-	148
Helmets	mn nos	28			28	28	-	31	-	39
	INR Crore	1,015			1,015	1,015	-	1,126	-	1,388
TT usage in airlines (upholstery and disposables)	INR crore	3	77	-	80	80	-	89	-	112
TT usage in railways	Mn Sqm	0.4	-	-	0.4	0.4	-	0.4	-	0.4
	INR Crore	1.3	-	-	1.3	1.3	-	1.3	-	1.5
Total	INR Crore	4,620	1,987	124	6,483	6,607	141	7,229	183	8,990

Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

* Air bags are imported and exported as complete set up and hence the value states the value of imports and exports of Air bag set up.

Packtech

The total estimated market for the segment including the exports is as shown in Exhibit 14

Exhibit 14: Market sizing of Packtech

Packtech	Unit	2012-13					2013-14(P)		2015-16 (P)	
		Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Polyolefin woven sacks	KT	1,309	3	641	671	1,313	693	752	808	943
	INR Crore	9,008	41	323	8,726	9,049	349	9,773	407	12,260
FIBC	KT	200	1	102	99	200	117	102	154	108
	INR Crore	3,200	9	1,542	1,667	3,209	1,773	1,717	2,345	1,822
Leno Bags	KT	50	-	1	49	50	1	57	1	75
	INR Crore	800	-	6	794	800	7	913	9	1,207.5
Treated/ coated Wrapping Fabric	KT	165	-	-	165	165	-	182	-	220
	INR Crore	2,150	-	-	2,150	2,150	-	2,365.4	-	2,862
Jute Hessian and Sacks	KT	1,428	11	155	1,285	1,440	186	1,413	268	1,710
	INR Crore	10,665	84	1,157	9,592	10,749	1,389	10,551	2,000	12,767
Soft luggage(TT component)	Mn Sqm	17	7	1	23	24	1	27	1	39
	INR Crore	356	141	16.5	480	497	16.5	576	16.5	829
Tea bags filter paper	KT	0.2	1	-	1	1	-	2	0	2
	INR Crore	503.7	39.2	0.03	542.9	542.9	0.03	651.4	0	938
Shopping bags(Spun bond nonwoven)	KT	67,008	2,947	3,684	66,271	69,955	4,236	70,910	5,602	81,185
	INR Crore	938	85	55	968	1,023	63	1,036	83.8	1,185.7
Total	INR Crore	27,621	399	3,100	24,920	28,020	3,598	27,583	4,861	33,871

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Sportech

The total estimated market for the segment including the exports is as shown in Exhibit 15

Exhibit 15: Market summary of Sportech

Sportech	Unit	2012-13					2013-14 (E)		2015-16 (P)	
		Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Sport Composites	Value (Rs. Crore)	738	27	288	477	765	325	548	416	725
	Volume (Mn. Nos.)	29	1	14	16	30	12.9	21.7	16.4	28.6
Sport Composite - TT	Value (Rs. Crore)	342	13	134	221	354	151	254	193	336

Sportech		2012-13					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Component										
Artificial turf	Value (Rs. Crore)	0	40	-	40	40	-	46	-	61
	Volume (lakh sq. m)	0	1	-	1	1	-	1	-	2
Parachute fabrics	Value (Rs. Crore)	100	2	3	99	102	3	111	4	139
	Volume (Mn. m)	6	0	0	6	6	0	7	0	9
Ballooning fabrics	Value (Rs. Crore)	1	-	-	2	2	-	2	-	2
	Volume (lakh sq. m)	10	2	-	12	12	-	13	-	18
Sleeping bags	Value (Rs. Crore)	34	2	11	24	35	11	28	11	37
	Volume (Mn. Nos.)	-	-	-	-	-	-	-	-	-
Sports Nets	Value (Rs. Crore)	74	-	47	27	74	59	33	92	52
	Volume (MT)	2,683	-	1,709	974	2,683	2,136	1,217	3,338	1,902
Sport shoe components	Value (Rs. Crore)	3,373	58	3	3,428	3,431	3	3,839	3	4,816
	Volume (Mn. Sq. m)	268	5	-	272	273	-	305	-	383
Tents	Value (Rs. Crore)	62	-	-	62	62	-	68	-	82
	Volume (MT)	1,565	-	4	1,561	1,565	4	1,717	4	2,078
High performance swim wears and sports wears	Value (Rs. Crore)	-	2	-	2	2	-	2	-	4
	Volume (nos.)	-	3,002	-	3,002	3,002	-	4,053	-	7,386
Sport Strings	Value (Rs. Crore)	3	27	-	30	30	-	34	-	43
	Volume (Mn. metres)	1	8	-	9	9	-	10	-	13
Other Products	Value (Rs. Crore)	-	1	-	1	1	-	1	-	1
	Volume (kg)	-	10,718	-	10,718	10,718	-	11,790	-	14,266
Total		3,989	144	198	3,935	4,132	227	4,418	303	5,574

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Buildtech

The total estimated market for the segment including the exports is as shown in Exhibit 16

Exhibit 16: Market summary of Buildtech

Buildtech		2012-13					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Architectural Membranes	Value(Rs. Crore)	8	22	-	30	30	-	36	-	52
	Volume (lakh sq. m)	2	4	-	6	6	-	7	-	10
Hoarding & signage	Value(Rs. Crore)	262.9	224	2.4	484.5	487	2	543	2	681
	Volume (Mn. sq. m)	89	75	1	163	164	1	183	1	229
Canvas - tarpaulin	Value(Rs. Crore)	412	1	18	395	413	19	391	23	383
	Volume (Mn. sq. m)	50	0	2	48	50	2	47	3	46
HDPE tarpaulin	Value(Rs. Crore)	1,432	4	2	1,434	1,436	2	1,649	3	2,181
	Volume ('000 MT)	124	0	0	124	124	0	143	0	189
Awning & canopy	Value(Rs. Crore)	37	3	1	39	40	1	51	1	86
	Volume (lakh mtrs)	14	1	0	15	15	0	20	0	33
Scaffolding Net	Value(Rs. Crore)	97	-	-	97	97	-	111	-	147
	Volume ('000 MT)	12	-	-	12	12	-	13	-	18
Acoustic fabric	Value(Rs. Crore)	11	-	-	11	11	-	13	-	17
	Volume ('000 MT)	284	-	-	284	284	-	327	-	432
Total	Value(Rs. Crore)	2,260	254	23	2,491	2,514	25	2,794	30	3,548

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Clothtech

The total estimated market for the segment including the exports is as shown under

Exhibit 17: Market summary of Clothtech

Clothtech		2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption

Clothtech		2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Treated/ coated Laces and tapes	Value (Rs. Crore)	478	59	10	527	537	11	590	14	740
	Volume (MT)	4093	506	86	4513	4599	96	5055	120	6341
Interlining	Value (Rs. Crore)	485	171	9	647	656	10	692	11	792
	Volume (Mn. Sq. m)	185	65	3	246	250	4	264	4	302
Zip fastener tape (T T Component)	Value (Rs. Crore)	183	3	20	166	186	22	179	28	209
	Volume (Mn. metres)	813	13	89	738	826	100	797	125	929
Elastic narrow tape	Value (Rs. Crore)	829	91	90	830	920	90	955	90	1,263
	Volume (Mn. metres)	2,256	248	245	2,259	2,503	245	2,597	245	3,435
Hook and loop fastener	Value (Rs. Crore)	137	43	1	179	180	1	206	1	272
	Volume (Mn. metres)	264	83	2	345	347	2	396	2	524
Labels and Badges	Value (Rs. Crore)	1,578	94	36	1,636	1,672	40	1,800	48	2,178
	Volume (Mn. pieces)	19,526	1,163	445	20,244	20,690	490	22,269	593	26,945
Umbrella Market	Value (Rs. Crore)				1,030			1,030	-	1,030
Umbrella cloth (T T Component)	Value (Rs. Crore)	30	76	3	103	106	3	113	3	137
	Volume (Mn. Sq. m)	3	9	0	12	12	0	13	0	15
Specialised and Industrial Sewing thread	Value (Rs. Crore)	548	30	17	562	578	17	629	17	789
	Volume ('000 MT)	22	1	1	22	23	1	25	1	32
Total	Rs. Crore	4,268	567	186	4,649	4,835	193	5,163	211	6,379

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Homotech

The total estimated market for the segment including the exports is as shown under

Exhibit 18: Market summary of Homotech

Homotech		2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption

Hometech	Unit	2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Fibrefill	Value (in Rs. Crore)	1,170	-	130	1,580	1,710	150	1,896	198	2,730
	Volume (in '000 MT)	210	-	16	194	210	18	233	24	335
Ticking fabric	Value (in Rs. Crore)	902	-	-	902	902	-	992	-	1,200
	Volume (in Mn. Sq. m)	120	-	-	120	120	-	132	-	160
CBC	Value (in Rs. Crore)	217	3	-	220	220	-	229	-	247
	Volume (in Mn. Sq. m)	16	0	-	16	16	-	17	-	18
Stuff toys	Value (in Rs. Crore)	1,057	23	405	675	1,080	466	776	616	1,026
	Volume (in Mn pieces)	64	1	24	41	65	28	47	37	62
Plush fabric (TT comp. In soft toy)	Value (in Rs. Crore)	314	10	122	202	324	141	232	186	307
	Volume (in Mn. Metres)	14	0	6	9	15	6	11	8	14
Blinds	Value (in Rs. Crore)	537	1	-	538	538	-	602	-	755
	Volume (in Mn. Sq. m)	10	0	-	10	10	-	11	-	14
Filter fabric - HVAC & Vacuum cleaner	Value (in Rs. Crore)	40	7	-	47	47	-	54	-	71
	Volume (in Mn. Sq. m)	3	1	-	4	4	-	4	-	6
Nonwoven Wipes	Value (in Rs. Crore)	32	2	-	34	34	-	38	-	48
	Volume (in Mn pieces)	717	45	-	762	762	-	853	-	1,070
Mosquito Nets	Value (in Rs. Crore)	434	37	1	470	471	1	541	1	715
	Volume (in Mn. Sq. m)	145	12	0	157	157	0	180	0	238
Furniture Fabrics & other coated fabrics	Value (in Rs. Crore)	1,629	375	522	1,482	2,004	585	1,660	733	2,082
	Volume (in Mn. Sq. m)	120	28	39	110	148	43	123	54	154
Total		5,814	435	775	5,474	6,249	876	6,243	1,118	8,156

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Protech

The total estimated market for the segment including the exports is as shown under

[Exhibit 19: Market summary of Protech](#)

Protech	2012-13	2013-14 (E)	2015-16 (P)
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Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Bullet Proof Jackets*	Value (Rs. Crore)	522	1	54	469	523	57	525	63	658
	Volume (lakh nos.)	2	0	0	2	2	0	2	0	3
FR Apparel	Value (Rs. Crore)	158	1	122	36	158	147	43	211	62
	Volume (lakh. nos.)	14	0	11	3	14	13	4	19	6
FR Fabrics for furnishings	Value (Rs. Crore)	223	-	-	223	223	-	241	-	281
	Volume (lakh metres)	63	-	-	63	63	-	68	-	80
Nuclear & Biological Protective Clothing	Value (Rs. Crore)	9	6	-	16	16	-	18	-	22
	Volume (nos.)	6,502	4,470	-	10,972	10,972	-	12,289	-	15,415
Chemical Protective clothing	Value (Rs. Crore)	15	4	-	19	19	-	23	-	33
	Volume (lakh nos.)	1	0	-	1	1	-	1	-	2
High visibility clothing	Value (Rs. Crore)	76	-	-	76	76	-	81	-	91
	Volume (lakh metres)	59	-	-	59	59	-	62	-	70
Industrial gloves	Value (Rs. crore)	1,263	-	1,010	253	1,263	1,162	290	1,536	384
Industrial gloves (T T component)	Value (Rs. Crore)	189			189	189	-	189		288
High Altitude clothing	Value (Rs. Crore)	420	189	-	609	609	-	658	-	768
	Volume (lakh pieces.)	4	2	-	6	6	-	7	-	8
Other protective clothing	Value (Rs. Crore)	145	29	72	102	174	83	112	110	136
	Volume (lakh. nos.)	58	11	28	41	70	33	45	44	54
Total	Value (Rs. Crore)	1,757	231	248	1,739	1,988	286	1,890	383	2,339

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Geotech

The total estimated market for the segment including the exports is as shown in Exhibit 20

Exhibit 20: Market summary of Geotech

Product	Unit	2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
		Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Geotextiles	Value (in Rs. Crore)	583	100	503	180	683	578	194	764	227
	Volume (in '000 MT.)	49	8	42	15	57	48	16	64	19

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Oekotech

The total estimated market for the segment including the exports is as shown Exhibit 21

Exhibit 21: Market summary of Oekotech

Product	Unit	2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
		Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Oekotextiles	Value (Rs. Crore)	120	-	-	120	120	-	132	-	160
	Volume ('000 MT.)	10	-	-	10	10	-	11	-	13

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Indutech

The total estimated market for the segment including the exports is as shown Exhibit 22

Exhibit 22: Market summary of Indutech

Product	Unit	2012-13					2013-14(P)		2015-16 (P)	
		Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export	Domestic Consumption
Conveyor belts (TT component)	'000 MT	12	2.6	3.3	11.2	14.6	3.5	12.9	3.98	17.1
	INR Crore	300	76	84	292	376	89	336	100	444
Drive belts(TT component)	MT	5,118	400	341	5,177	5,518	362	5,953	407	7,873
	INR Crore	199	33	19	213	232	20	245	23	325
Cigarette filter rods	mn nos	19,874	2	1,391	18,485	19,876	1,808	19,779	3,055	22,645
	INR Crore	421	2	29	394	423	38	421	64	482

Indutech	2012-13						2013-14(P)		2015-16 (P)	
	Product	Unit	Production	import	Exports	Domestic Consumption	Total	Export	Domestic Consumption	Export
Decatising cloth	mn metres	2	0.06	-	2	2	-	2	-	2
	INR Crore	35	6	-	41	41	-	43	-	48
Bolting cloth	000 sqm	339	432	38	734	772	38	807	40	977
	INR Crore	14	18	2	30	32	2	33	2	40
AGM glass battery separators	Mn Sqm	9	59	0	68	68	0	82	0	118
	INR Crore	50	325	0	375	375	0	450	0	648
Coated abrasives(TT component)	MT	53,092	1,410	278	54,224	54,502	289	65,069	312	93,699
	INR Crore	711	48	9	750	759	9	900	10	1,296
Ropes and cordages	'000 MT	122.5	11.7	37.1	97.1	134.2	44.5	108.7	64.1	136.3
	INR Crore	1,646	71	709	1,008	1,717	851	1,129	1,225	1,416
Glass fabrics as a part of composites (TT component)	'000 MT	81.8	46.5	14.3	114	128.3	15.2	131.1	17.1	173.4
	INR Crore	924	499	202	1,221	1,423	214	1,404	240	1,856
Printed circuit boards(TT component)	Mn Sqm	-	32	-	32	32	-	38	-	51
	INR Crore	-	29	-	29	29	-	34	-	46
Computers printer ribbon	mn metres	1,099	332	7	1,425	1,431	7	1,453	7	1,512
	INR Crore	220	66	1	285	286	1	291	1	302
Filtration products	Mn Sqm	5	1	0	6	6	0	7	0	9
	INR Crore	407	6.4	2	411	414	2	473	2	625
Paper making fabrics	MT	860	395	43	1,212	1,256	52	1,394	75	1,844
	INR Crore	147	67	7.4	207	214	9	238	13	314
Industrial webbings and slings	MT	4,080	5,043	325	8,798	9,123	358	9,678	433	11,710
	INR Crore	102	194	8.2	288	296	9	317	11	383
Others [#]	Sqm	-	-	-	-	-	-	-	-	-
	INR Crore	7	1.4	2	6	8	2	7	3	8
Values	INR Crore	5,183	1,442	1,075	5,550	6,625	1,246	6,320	1,694	8,235

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Others include Acoustic fabric for mobiles and Technical Textile hoses (Only T T Components)

5. New Technical Textile Products

New Technical Textile products have been segregated from traditional products based on the following parameters:

- Current usage level and prospects for growth in future
- New Technical Textile products that have emerged in last 2 years
- Technical Textile products where the consumption market is expected to have a significant growth prospect in near future
- Technical Textile products that have seen high level of value addition in recent past.
- Technical Textiles, where Government policies would significantly impact the market demand in a positive manner

The total new Technical Textile market in India is estimated to be Rs. 14,855 crore for 2012-13 and is expected to grow at 16% till 2015-16. It constitutes of 51 new products accounting for 23% of the total Technical Textile industry in 2012-13. The segment wise summary of new Technical Textiles is shown in Exhibit 23

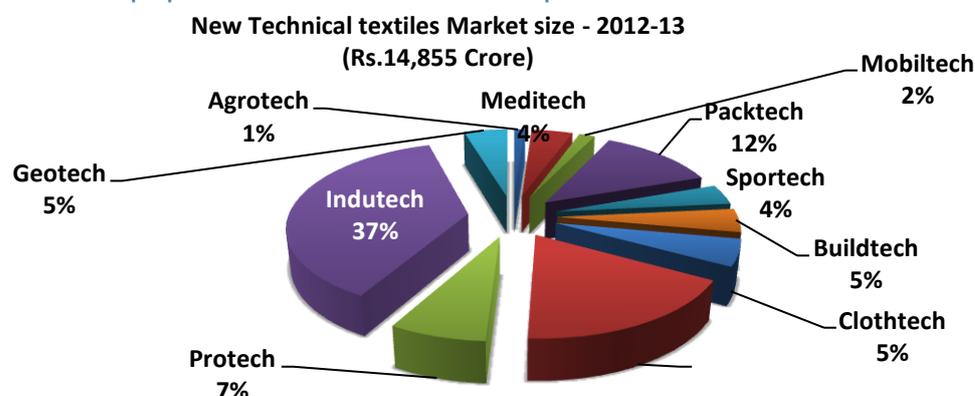
Exhibit 23: Market summary of new Technical Textiles

Sl. No.	Segment	Technical Textile Market 2012-13 (Rs. Crore)	New Technical Textile market share 2012-13	New Technical Textile Projected CAGR (2013-16)	New Technical Textile Market 2013-14(E) (Rs. Crore)	New Technical Textile Market(P) 2015-16 (Rs. Crore)	New Technical Textile Market(P) 2017-18 (Rs. Crore)
1	Agrotech	826	21%	~23%	212	321	361
2	Meditech	3,321	19%	~15%	752	973	1,317
3	Mobiltech	6,607	1.7%	~12%	276	346	447
4	Packtech	28,020	7%	~18%	2,164	3,000	4,171
5	Sportech	4,132	14%	~16%	662	884	851
6	Buildtech	2,514	26%	~14%	757	987	1,296
7	Clothtech	4,835	16%	~12%	852	1,079	1,367
8	Hometech	6,249	42%	~17%	3,112	4,295	5,946
9	Protech	1,988	54%	~14%	1,225	1,583	1,814
10	Geotech	683	100%	~13%	772	991	1,275
11	Oekotech	120	0%	-	-	-	-
11	Indutech	6,625	84%	~16%	6,042	8,585	11,557
	Total	65,920	23%	~16%	17,185	23,041	30,402

Source: IMAcS analysis

As it can be inferred from the above exhibit, Indutech, buildtech and Hometech are the major new Technical Textile segments. The segment wise distribution can be seen in the following exhibit.

Exhibit 24: Market size pie product wise – New Technical Textile products



Source: IMAcS analysis

The growth prospect for each of the new Technical Textile products has been shown in a segment wise fashion in the following exhibit. The detailed market size of each of the product can be seen in the respective segments.

Exhibit 25: New Technical Textile products – Growth prospects

Sl.no.	Segment/ Products	Projected CAGR 2013-16
Agrotech		
1	Shade nets	23%
2	Mulch Mats	15%
3	Crop covers	15%
4	Anti Hail & Anti Bird nets	25%
Agrotech average		23%
Meditech		
5	Baby Diaper(TT Component)	15%
6	Incontinence Diaper TT Component	20%
7	Sanitary Napkin(TT Component)	15%
8	Surgical Disposables	10%
9	Disposable Bed-sheets, curtains and Pillow Covers	15%
10	Artificial Heart Valves	20%
11	Artificial Tendon/ Hernia Mesh (TT Component)	15%
12	Artificial Joints	19%
Meditech average		14.6%
Mobiltech		
13	Airbags (TT component)	15%
14	Seat belt webbings	10%
Mobiltech average		12%
Packtech		
15	Soft luggage(TT component)	19%
16	Tea bags filter paper	20%
17	Leno Bags	15%
Packtech average		18%
Sportech		
18	Sport Composite - TT Component	14%
19	Ballooning fabric	15%
20	Parachute fabric	12%
21	Artificial turf	15%
22	Sports nets	25%
23	High performance swim wears and sports wears	35%
Sportech average		16%
Buildtech		
24	Architectural Membranes	20%
25	Hoarding & signage	12%
26	Awning & canopy	30%
27	Scaffolding Net	15%

Sl.no.	Segment/ Products	Projected CAGR 2013-16
28	Acoustic fabric	15%
Buildtech average		14%
Clothtech		
29	Hook and loop fastener	15%
30	Specialized and Industrial Sewing thread	12%
Clothtech Total new Tech Textiles		12%
Homotech		
31	Fibrefill	20%
32	Plush fabric (TT Component of soft toys)	15%
33	Blinds	12%
34	Filter fabric - HVAC & Vacuum cleaner	15%
35	Nonwoven Wipes	12%
Homotech average		17%
Protech		
36	Bullet Proof Jackets*	11%
37	FR Apparel	20%
38	Nuclear and biological protective clothing	12%
39	Chemical Protective clothing	20%
40	Industrial gloves (T T component)	15%
41	Other protective clothing	12%
Protech average		14%
42	Geotech	13%
Indutech		
43	AGM glass battery separators	20%
44	Conveyor belts (TT component)	13%
45	Drive belts(TT component)	14%
46	Coated abrasives(TT component)	20%
47	Ropes and cordages	15%
48	Glass fabrics (TT component)	14%
49	Printed circuit boards(TT component)	17%
50	Filtration Products	15%
51	Paper making fabrics	15%
Indutech average		15.7%
Total New Technical Textiles growth rate		16%

Source: iMaCS analysis

6. Investment In Technical Textiles

Technical Textile industry has been a growing industry for the last five with many players going for new investments for product diversification and capacity additions. In addition to that, the growing preference for non woven fabric in Technical Textile has led to entry of new players in the segment particularly for catering to the packaging, home and hygiene markets.

Domestic Investment in Technical Textiles

The Technical Textile sector had been the focus of major investments in the textiles sector from 2005 to 2008. Post 2008, the annual investment through TUFs has been growing at a very slow pace with loans under TUFs growing at 3.8% p.a from 2009 to 2014.

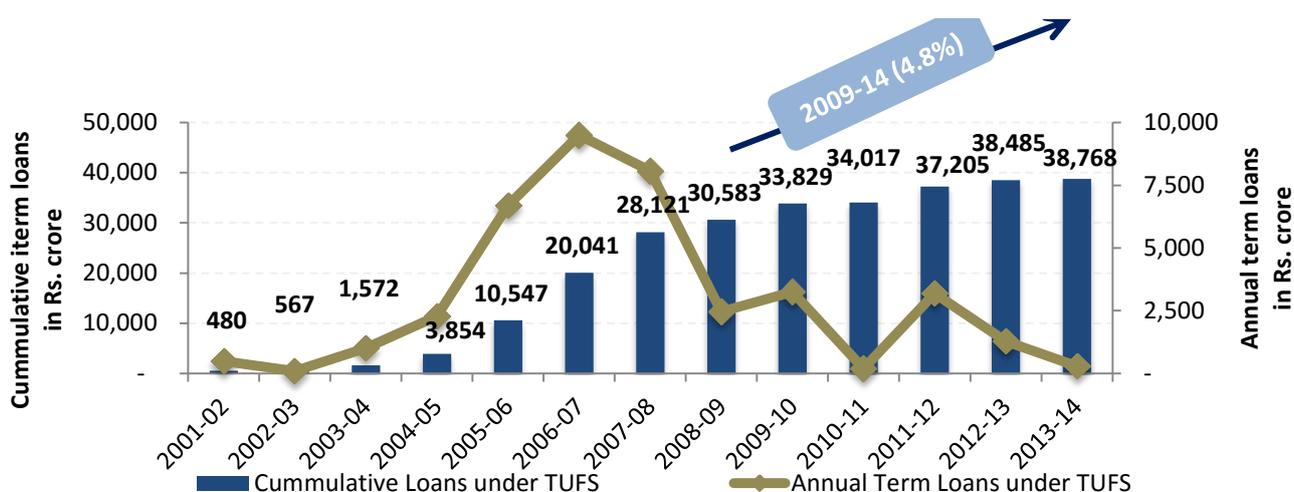


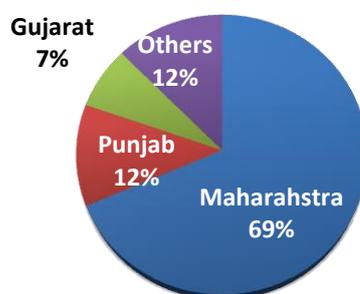
Exhibit 26: Term loans in Technical Textiles through TUFs

Source: Office of textile commissioner

The investments were mainly made in few specific states. 69% of the total investments during the 2007 to 2012 were made in Maharashtra. The following exhibit shows the key states and their share in investment via TUFs during the period.

Exhibit 27: Investment across states

Investment across states 2007-12
(Total Term loans - Rs. 14,348 crore)



Source: Office of Textile Commissioner, iMaCS analysis

The trend in investment has shown a sinusoidal nature of investments. The investments have dipped in 2012. The key investments in Technical Textile sector during the last five years have been presented in the following section.

Key investments in Technical Textile sector

The major investments in Technical Textile sector announced in the last five years are as shown in Exhibit 28:

Exhibit 28: Key investments in Technical Textile sector in last few years

Sl. No.	Year	Investing company	Sector	Details	Type of Investment
Investment in Meditech					
1	2012-13	CX Partner	Meditech	Purchased 40% stake in Sutures India for Rs. 200 Crore.	PE
2	2012-13	Global Non woven, US	Non woven & Meditech	New Spun melt line at Nasik of 20,000 MT capacity. It would target hygiene and medical applications	Capacity Addition
3	2012-13	Paramount Surgimed (India)	Meditech	Capacity addition for production of Adult diapers. It aims to expand its sales by 65%. Current capacity – 30 million per year	
Investment in Packtech					
4	2012-13	Alliance Polysacks	Packtech	Plans to double capacity from 63 million to 132 million sacks per year	Capacity Addition
Investment in Mobiltech					
5	2012-13	Caparo, UK	Composites – Mobiltech	Is setting up a unit for carbon fibre based composites for automobiles in South India	New Project
6	2012-13	Kaman Group & Kineco India	Composites - Mobiltech	New facility at Goa - called Kineco Kaman Composites India Pvt. Ltd. for production of advanced composites for airlines	Joint Venture via FDI
7	2012-13	Hollingsworth & Vose group	Automotive filters	Hollingsworth and Vose group is setting up a plant for manufacturing of automotive filters at Dahej worth Rs 1650 Crore ¹	Joint Venture
Investment in Protech					
8	2011-12	Shri Lakhmi Cotsyn Defence	Protech	Shri Lakhmi Cotsyn Defence, a major Technical Textile player located at Kanpur has made new investment to develop specific NBC fabrics and protective jackets for Indian defence sector. The capacity increase is currently underway	Capacity Addition
9	2011-12	Arvind Mills & Dupont	Protech	Arvind Mills and DuPont have come to a strategic alliance where in Arvind Mills would use Nomex fibre supplied by Dupont to develop inherent FR fabrics in India	Strategic Alliance
Investment in Indutech					
10	2014-15	Hollingsworth & Vose	Indutech	Acquires Raman FibreScience a manufacturer of AGM glass separator	Acquisition
10	2012-13	Freudenberg Filtration (India)	Indutech	Acquired Pyramid Filters Ltd.	Acquisition
11	2012-13	Hindustan Technical Fabrics & Toho Tenax Co. Ltd., Japan	Composites - Indutech	Rights to develop and market carbon fibre fabrics in India	Strategic partnership
12	2012-13	SK Capital	Indutech and composites	Acquisition of Textile chemicals, Paper specialty and emulsion business of Clariant	PE via FDI
13	2011-12	Arvind Mills & PD Fibreglass Group	Composites	Arvind Mills and PD Fibreglass group have started a JV with 51% stake of Arvind Mills to produce glass fibres which would have an investment of Rs. 80 crore in a span of five years	JV
Investment in Geotech					
14	2012-13	Oerlikon Neumag	Geotech	Sold an inline plant with 12 spindles for geo-textile manufacturing	Subsidiary

¹ Investment is around USD 30 million – Exchange rate taken to be Rs. 55/ USD

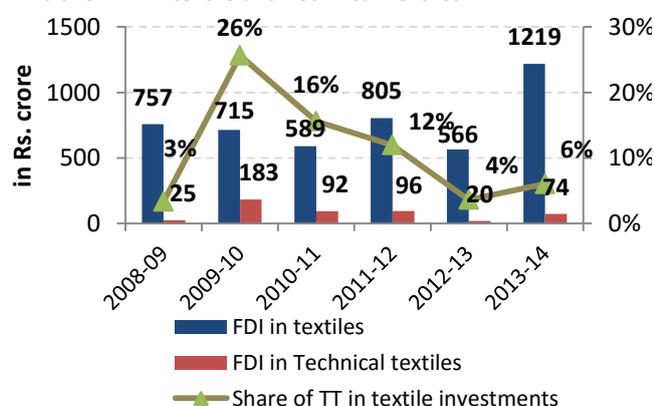
Sl. No.	Year	Investing company	Sector	Details	Type of Investment
15	2013-14	Fiberweb Holding	Geotech	Fiberweb Holdings of United Kingdom purchased majority stake in Terram Geosynthetics India Limited for Rs. 17.8 crore	FDI
Investment in Non woven					
16	2012-13	HB Fuller	Non woven	Capacity addition through new plant in Pune.	FDI
17	2012-13	Precot Meridian & VMI, Holland	Non woven & Meditech	Greenfield Non woven project in Karnataka for hygiene care products	Greenfield Project via JV
18	2012-13	Alpha Foam	Non woven	Capacity addition of Spun-bond non woven by 10,000 MTPA	Domestic Investment
19	2010-11	Ahlstorm	Non-woven	New Greenfield project at Mundra in Gujarat for production of non woven	FDI via subsidiary
20	2011-12	Sanhrea Technical Textiles	Non woven	The company is adding capacity of up to 200 MT for RFL dipped specialized fabrics. It would involve a investment of up to Rs. 50 crore	Capacity addition at Greenfield project
Strategic Partnerships					
21	2011-12	DuPont & Arvind Mills	Protech	Strategic alliance where Arvind acquired rights to manufacture and sell Nomex based products in India	Strategic Alliance
22	2012-13	Alok Intl & Richard and Kathy Hilton	Hometech	Alok acquired rights to manufacture and market home textile products under Hilton brand name.	Partnership
23	2010-11	NanoHorizans & Indorama	Specialty Fibres	Nano Horizons has made a partnership with Indorama to distribute its Smart Silver anti microbial products in India.	Partnership

Source: Office of Textile Commissioner, IMaCS analysis

FDI in Technical Textiles

Indian textile sector has grown mostly on account of domestic investment. The FDI in textiles sector of India is less than 1% of the total FDI inflow into India for last five years. The trend in FDI for textile sector is shown in the following exhibit:

Exhibit 29: FDI in textile and Technical Textiles



Source: Ministry of Textiles

Technical Textile sector is a major driver for FDI as the sector is witnessing a growth phase in India and the market is expanding rapidly for segments such as Protech, Geotech, Meditech, Packtech as the awareness and preference of Technical Textile is growing. Major FDI projects in Technical Textile sector for the last five years are enumerated subsequently:

- Duravit AG the Germany based parent company has invested a total of Rs. 41 crore in its Indian subsidiary Duravit India Pvt. Limited in a span of 3 years from 2008-09 to 2010-11. Duravit India Limited is a growing manufacturer of textile wadding products like sanitary napkins in the Meditech segment.
- Ahlstrom invested Rs. 150 crore in 2009-10 and 2010-11 through its Indian Subsidiary Ahlstrom (India) Pvt. Ltd. for production of non woven in Mudra Gujarat. The project became operational in 2010-11. The plant caters mostly to export demand of high quality spun bond non woven for Meditech segment.
- Pioneer Elastics India Pvt. Ltd. got FDI its parent organisation Pioneer in 2011-12 and 2013-14 to the tune of Rs. 22 crore.

- Global Non woven is establishing a new spun melt line at its Nasik plant in India for production of non-woven
- Klopman, the carbon composite player received FDI from its parent company worth Rs. 2 crore in 2011-12.
- Indorama received an FDI worth Rs. 55 crore in 2011-12 from its parent company and Nano horizon for Technical Textiles.
- Fiberweb Holdings, the global Technical Textile giant acquired India based Terram geo-synthetics for Rs. 17.8 crore in 2013-14.
- Caparo, an industrial composite maker based out of UK has invested to develop a new plant for plastic composites in South India to cater to automobile manufacturers.
- Hollingsworth and Vose group, based out of US are investing Rs. 1650 crore in Indian Technical Textile industry for starting an automotive filter plant at Dahej in Gujarat.
- Oerilikon Neumag, a global player for geo-textiles is planning to enter Indian markets. It has already invested for development of 12 spindles to produce 10,000 MT of geo-textiles in South India.

Possibilities for existing textile business to enter Technical Textiles

The following segments offer a significant potential for traditional textile players to enter into Technical Textiles:

1. **Woven and printed shopping bags:** The industry setup required for shopping bags is mostly shuttle looms, which are also commonly used across traditional textile industry. This indicates the ease with which an existing textile composite mill or MSME player can transit to becoming a Technical Textile manufacturer for woven shopping bags and poly-olefin bags.
2. **High performance sportswear:** The sportswear industry in India is growing at 14% per annum with key players like Addidas, Reebok, Puma having a major share of the market. In addition there are many MSME players which have a significant role to play in the mass market sportswear products. These players can manufacture Technical Textiles- high performance sportswear by using speciality fabrics and fibres like water repellent fabrics, breathable fabrics and other coated fabrics.
3. **Industrial sewing threads and speciality fibres:** Industrial sewing threads and speciality yarn is another area, where a traditional spinning player can transit into with adequate modifications and installing the required attachments in its pre-existing spinning machinery. The case of Vardhman Yarns and threads is a clear example of how a textile player

can transit from textile to Technical Textiles. Vardhman mills having a product of around 500 MT of threads annually also manufactures also manufactures industrial threads for special applications in footwear, leather garments, Automotive seating, luggage, compressor windings and book winding among others. For various applications of filtration woven scrim fabrics can also be manufactured from traditional looms, by using speciality yarn such as meta-aramid, etc.

4. **Fire retardant apparels and fabrics:** Fire retardant apparels and fabrics is a segment with high potential for new players coming from traditional textile industry. The segment has seen many such transitions where in a traditional textile player has dedicated some of its infrastructure for manufacturing FR fabrics and apparels, as the installation for apparel manufacturing works for FR apparel production also. Some of the leading Fire retardant players who have transited from traditional textiles are:

- Jaya Shree Textiles, a division of the Aditya Birla Group has a significant share in Fire retardant fabric manufacturing close to two lakh metres annually out of its two million metres capacity.
- Alok Industries has also established itself as a fire retardant apparel and work wear garment player where in fire retardant apparels contribute to around 2% of its garmenting revenue.
- Loyal Textiles also produce Protech products in spite of being a traditional textile manufacturer.

5. **Transmission belts fabric:** Transmission belts used in Indutech like drive belts are another segment that can be an entry level product segment for a traditional textile MSME or composite mill. Transmission belt production involves production of fabric and then applying rubber coating on it through dipping in rubber. Many of the industry players like Habasit Iakoka Pvt. Ltd., engage outside players for purchase of fabric before dipping. This is a good prospect wherein, a traditional textile player can tie up with a Technical Textile player for supply of fabric for transmission belting.

In addition to these initiatives, cost effective business models can be developed for promoting SME investment and entrepreneurship in Technical Textiles. These business models should be targeted at low investment products across segments that cater to industrial segment or intermediate products so that definite and clearly identified markets and customers can be targeted. The key products for which such business models can be developed are enumerated as follows:

1. All agro nettings excluding fish nets and high tensile nets

2. Non-woven end product converters like wipes, non woven interlining and medical disposables
3. Garment accessories like elastics and hook and loop fabrics
4. Medical dressing and bandages manufacturing
4. Coated fabric industrial gloves, sleeping bags and tent manufacturing.

7. Geographical Spread Of Technical Textiles

The Technical Textile industry in India is concentrated in few key pockets across the country. While Gujarat is the hub for categories like Hometech, Packtech, Agrotech and non woven, Maharashtra is the hub for most of Clothtech and Indutech production. The key states where Technical Textile industry is clustered along with their relative advantages have been discussed further:

Gujarat

Gujarat is the hub of Technical Textiles with many key players located in Ahmedabad and Surat, the two strong holds with over 300 units involved in textiles and Technical Textile at each location. Gujarat is the market leader amongst Indian states in production of manmade textile based Packtech and Clothtech products and non woven.

The state has the distinct advantage of an easy and cheap supply of raw material both cotton as well as manmade fibres, both of which are manufactured in large quantities in Gujarat. In addition to that, the textile policy of Gujarat offers up to 6% credit linked interest subsidy for promotion of Technical Textile industry. This along with the stream lined support from the State government in terms of easy availability of licenses goods, infrastructure support in terms of power and road connectivity have been the major boosters for Technical Textile industry in the state. As a result many new projects have entered in the state like Ahlstrom's Non-woven plant and Hollingsworth and Vose group's auto filter plant which would be set up at Dahej in Gujarat. Gujarat also enjoys the availability of skilled man power which has been trained over generations working on the textile industry as well as goods research and development support with ATIRA and MANTRA located in the state.

Maharashtra

Maharashtra is the other important state when it comes to Technical Textiles. The State excels in various Indutech and home tech products with key players located in and around the Mumbai – Pune area. Large players like Garware ropes, Bombay Dyeing, Entremont Polycoaters, Sky industries, Supreme Non

woven, Spica Elastic and Kusumgar corporate are some of the renowned names of Technical Textile industry that are located in Maharashtra.

The state has the largest area under cotton cultivation and enjoys goods supply of raw material . It is closely linked to the raw material supplying industries of Gujarat also. The state has one of the finest Technical Textile institutes in India with four COEs being located in Maharashtra. However, the textile policy of the state does not put special emphasis on the Technical Textile industry.

Tamil Nadu

Tamil Nadu is a major textile hub of the country. Over the years it has also made its mark in the Technical Textile industry with many key players of Clothtech and Hometech located within the state. The State has a large number of SMEs that are involved in supporting the garmenting industry of the state by supplying key Technical Textile raw materials. Key Technical Textile industries located in the state are Precot Meridian, Loyal Textiles, Zip industries, Ideal zippers, Habasit, Fennerand Fruedenberg non woven. In addition to this the state has a cluster of mosquito net manufacturers located at Karur. Both the Association of Fishnet manufacturers and Mosquito net manufacturers are located in Tamil Nadu.

The state has the largest number of spindles in the country and is a major fabric producer. It provides support to the Technical Textile industry by providing an easily approachable market of textiles and garments. As a result the Clothtech industry is flourishing in the state. It also has goods supply of cotton. However, the state lacks in providing incentives for promotion of Technical Textile industry.

Karnataka

Karnataka is another major hub of Technical Textiles with over 72 Technical Textile industries located in the state mostly around Bangalore. The key industries are Kurlon India, Madura Coats, Tata Advanced Materials and Futura Surgicare. The state is a major hub for Meditech and Packtech products.

Along with the key industries, the state also enjoys the benefit of having goods infrastructure and appropriate location between, Andhra Pradesh, Tamil Nadu and Maharashtra which are the major fibre and fabric manufacturing states. The state has come up with a new textile policy with special focus on Technical Textiles by providing an addition 10% capital subsidy for Technical Textile industries, thereby promoting companies to set up in the State. The State plans to spend Rs. 1,700 crore in the XIIth plan for development of Technical Textile industry in the state. This would act as a major booster for Technical Textile industry in the state.

Delhi/ NCR

Delhi/ NCR is a major hub of Technical Textiles with many key industries with operations across different segments of Technical Textile located in the National Capital region. The region has concentration of Mobiltech, Sportech and Hometech players. The key Technical Textile industries in the region are SRF, Uniproducts Ltd, Abhishek Auto industries, YKK Pvt. Ltd., Alps Industries, Sheela Foams, Flocksur India, Jasch Group and RSWM Ltd. The region enjoys the benefit of being the major industrial as well as business centre of Northern India well connected with goods infrastructure to promote industries.

Other major clusters

Other than the above mentioned key states, there are a few clusters of Technical Textile production. These have been discussed further:

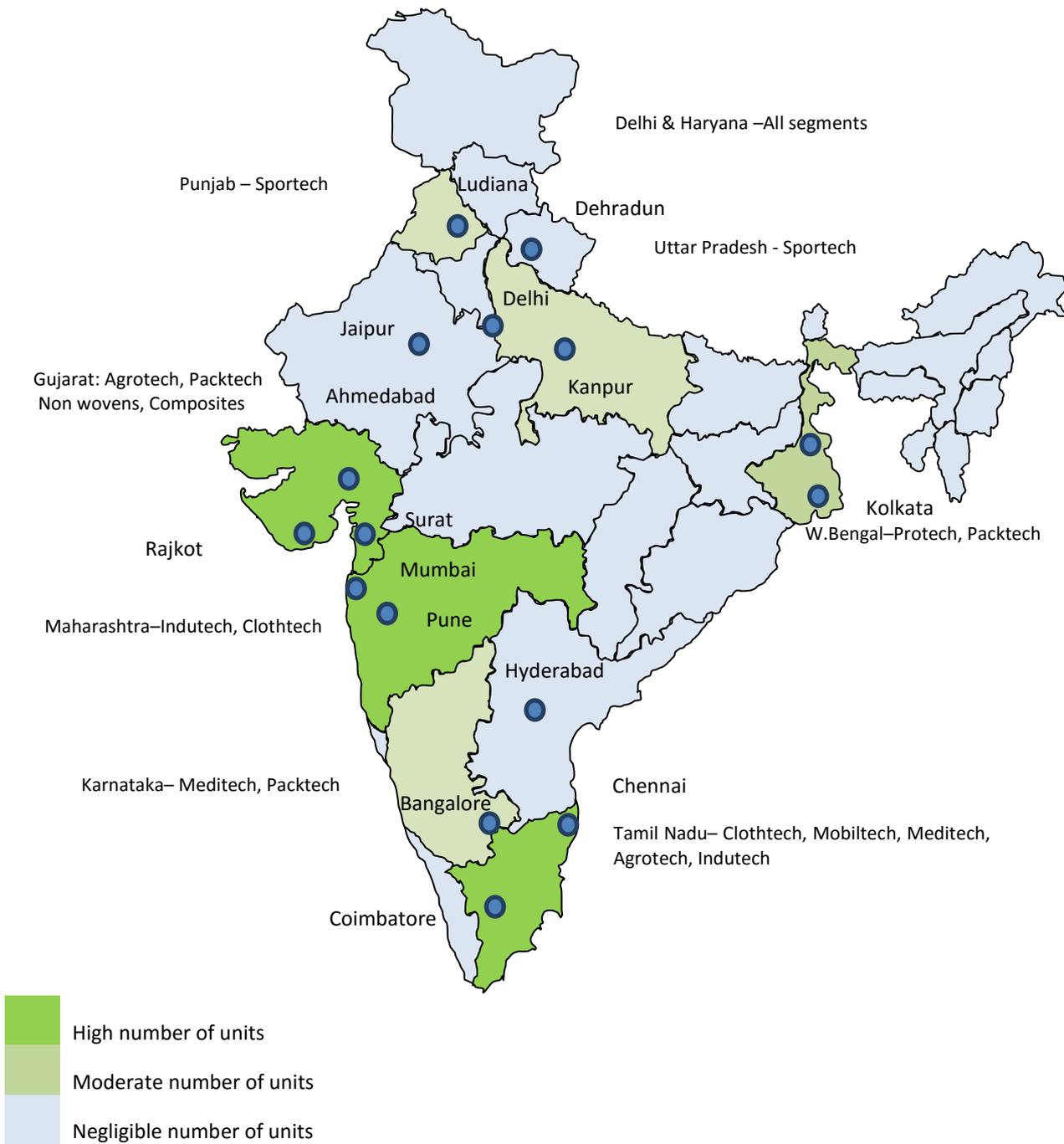
Kolkata: Kolkata is a major production of jute based Technical Textiles in particular hessians and jute sacks in addition to protective Technical Textiles like industrial gloves and industrial work wear. The city has most of the industrial gloves manufacturers present in

India. The key Technical Textile industry located at Kolkata are Chev Jute, Gloster jute mills and Bali jute mills in the Packtech segment and Mallcom India Ltd, Rajda exports, Tara Lohia, Intech Safety and Jayashree Textiles in the Protech segment. The cluster enjoys the benefit of easy availability of goods quality jute which is produced in West Bengal.

Kanpur: Kanpur is the major hub for production of tents, tarpaulins and sleeping bags. The city has many small SMEs like Tirupati Taxco and Kanpur tent factory as well as large Technical Textile players like Shri Lakshmi Cotsyn, M Kumar Udyog, Ganesha Ecosphere Ltd. and Standard Newar Mills. The city also has production facilities of ordinance boards that are involved in development of Technical Textile products. Although Kanpur has no distinct advantage in terms of easy supply of raw material or excellent power and road infrastructure, the city is a major industrial hub of Uttar Pradesh has work force that is skilled in these lines with ages of experience in the industry and is available at cheaper rates, in addition to the presence of defence institutions.

Meerut & Jalandhar: Meerut and Jalandhar are both major clusters and production hubs of sport composites. While Meerut excels in manufacturing of cricket and boxing based sport composites Jalandhar excels in manufacturing of inflatable balls. The major players at Meerut are S S industries, S G Pvt. Ltd., K L Mahajan group and Bhatia Sports. The major industries around Jalandhar are Soccer International at Jalandhar and Freewill Sports at Ludhiana. The clusters enjoy the advantage of having a cheaper work force. The key clusters for Technical Textiles are shown in the following exhibit:

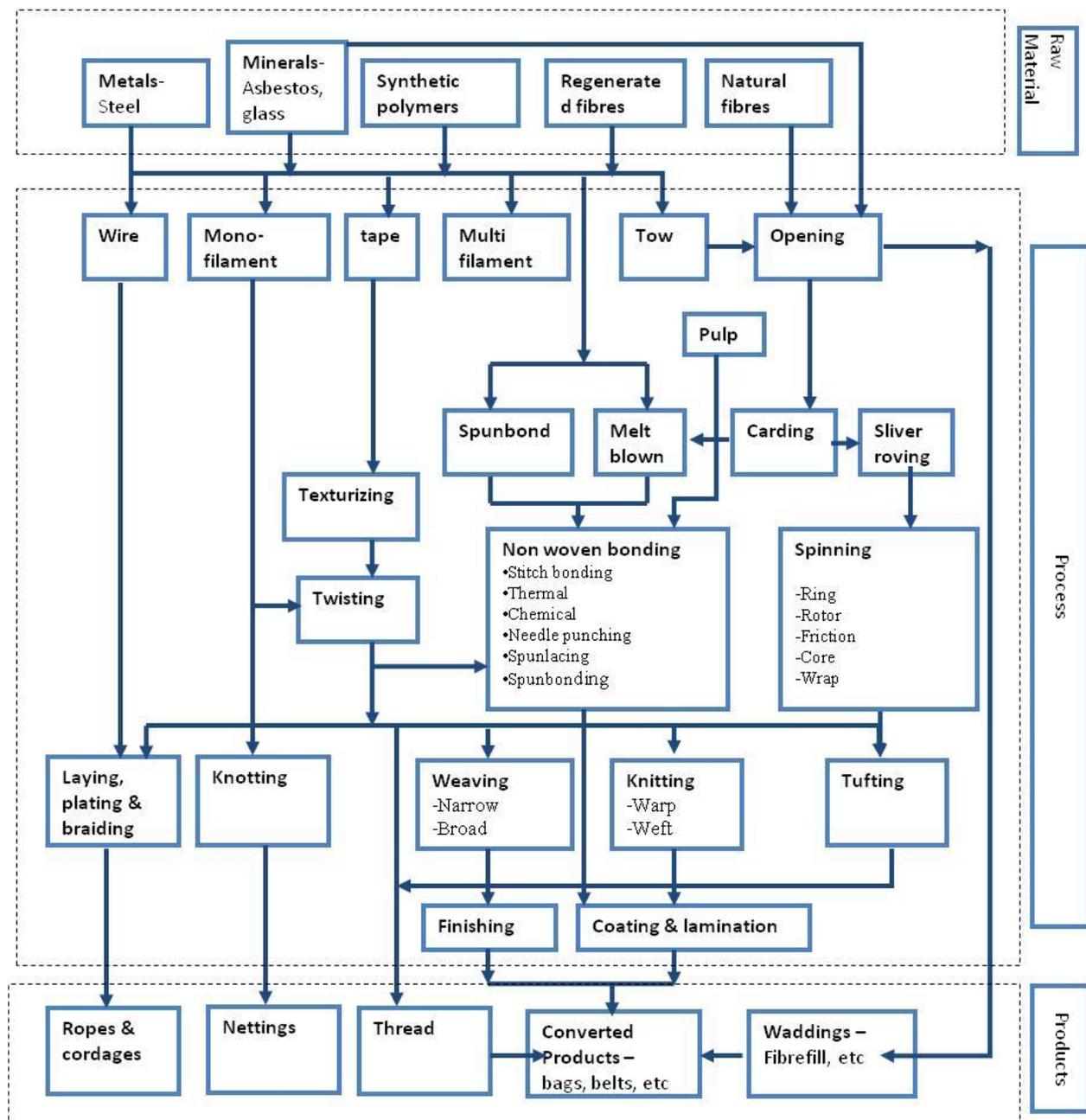
Exhibit 30: Geographical distribution of key Technical Textile industries



Source: IMaCS analysis

8. Technical Textile Process

The different processes involved in the manufacturing of Technical Textiles have been illustrated in the following exhibit

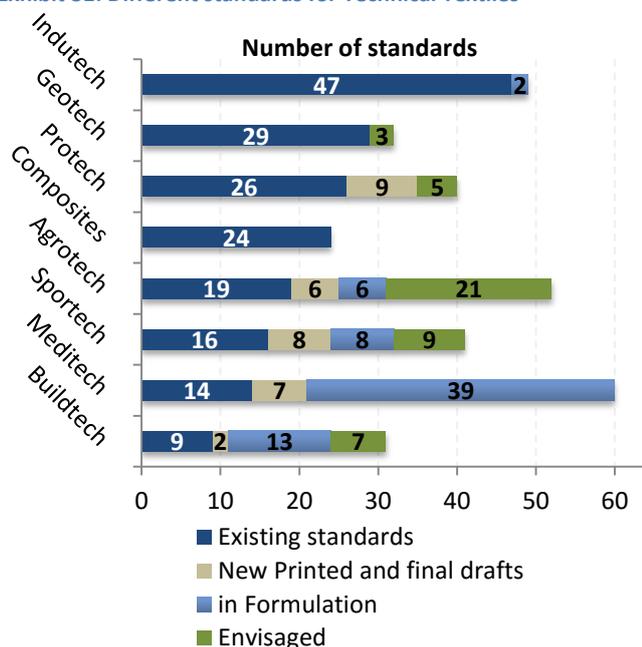


Source: David Rigby Associates

9. Standards For Technical Textiles

There are currently 184 standards for Technical Textiles listed under Bureau of Indian Standards (BIS). In addition to these, 21 new standards have been finalised which are under print and 11 where final drafts have been approved. In addition to these, different COEs and research institutes across India are currently in process of formulating a total of 69 new standards for different Technical Textile products. The status of formulation of standards across segments is as shown in Exhibit 31:

Exhibit 31: Different standards for Technical Textiles

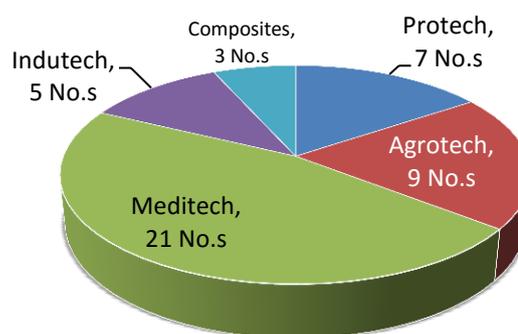


Source: FICCI seminar on standards for Technical Textiles, IMaCS analysis

Currently the available standards are distributed across seven key segments of Technical Textile, with a majority for Indutech, Geotech and Protech. However, large segments of Clothtech, Mobiltech and Homotech which is mostly do not have relevant standards or have standards driven by buyer requirements. These segments are mostly to cater to the intermediate product requirement of the automotive, clothing and home textile segments, where in the buyers either follows the universal standards for purchasing the Technical Textiles or have product specifications as per their own requirement to which suppliers adhere to.

India is also witness development in the formulation of new standards and a total of 45 new standards are envisaged to be developed in the coming years. The segment wise distribution of these standards is as shown in Exhibit 32.

Exhibit 32: New standards envisaged



Source: FICCI, IMaCS analysis

These new developments in drafting of standards of Technical Textile, India would be able to ensure quality for different products of Technical Textiles. It would have the following benefits for the stakeholders of Technical Textile industry:

- This would make it easier for current suppliers who would have a set standard to follow in manufacturing thereby ensuring high productivity and quality output.
- It would help the institutional buyers, who would be able to come up with tender requests following a set standard based on which the product quality would be easily gauged.
- It would provide the necessary support to the entrepreneurs planning to enter the manufacturing of Technical Textiles, as they would have ready standards for products they would like to enter into.
- It would provide protection to the consumers specially in case of Technical Textile end product
- It would help increasing the technological standard for the industry as all the manufacturers would have to comply with a minimum standard of technology for production

However, there are certain segments where in standards are yet to be formulated like crop cover and anti hail nets in Agrotech. Although last few years have seen extensive development in formulating of standards, there is still a lot that needs to be done.

10. Usage Potential Of Institutional Players

Institutional demand is one of the key drivers of growth in Technical Textiles market. Across several Technical Textile products government institutions are the key purchasing organisations. In addition, the technical nature of most of the products makes them of use as intermediate products for a finished end product. As a result the purchases of most products are institutional in nature. The key products that witnesses high institutional purchases are:

1. Meditech - Surgical sutures and surgical disposables sees high institutional purchases for both government hospitals and well as armed forces.
2. Mobiltech – Technical Textile fabrics for railways
3. Sportech – In Sportech the demand for parachute fabrics, sleeping bags and tents are entirely dependent on the institutional purchases for the requirements of armed forces and paramilitary forces.
4. Buildtech – HDPE tarpaulins are purchases institutionally by armed and paramilitary forces
5. Protech – A majority of products in Protech are purchased by government institutions. The key products having high share of institutional purchases include Personal protective jackets, Fire retardant fabrics and apparels, Nuclear, biological and chemical (NBC) suits and High altitude clothing
6. Geotech – the entire market for Geotech is based on institutional purchases as the usage of the product is driven by various departments such as roadways, railways, shipping and port Ministries and Irrigation.
7. Oekotech – Although a small part, the demand for Oekotech is not directly driven by institutional purchase is dependent on that, as the contracting firm which uses the Oekotech uses products based on recommendation of the government which is getting the land fill developed.

Current Institutional consumption by major User Ministries and Government departments:

1. **Indian Railways:** An Indian railway is a major consumer of fire retardant fabrics, Technical Textile seat and berth covers and geo textiles. In the market of FR fabrics, Indian railways have been a key driver player with consumption of close to 40% of the fabric production in India. It is estimated that Indian railways procures approximately 13.5 lakh metres of fire retardant fabrics worth Rs. 30 crore annually. On the geo textile front, over 700 km of rail lines are built on weak formation of soil, which require continuous maintenance. Use of Pre fabricated drains and geo grids and geo textiles as a base for

development of rail tracks prevents sinking of track ballast. Although, the use of geo textiles by railways is still in trial phase at many places, it is estimated that Indian railways would come as a major driver for geo textile usage in India consuming approximately Rs. 82 crore worth of geotextiles annually. Total purchases of railways are estimated to be worth Rs. 112 crore. The key applications where geotextiles are being used by railways are shown in the following exhibit:



2. **National Highway Authority of India and Ministry of Roadways:** Ministry of Roadways and National Highway Authority of India together are one of the largest institutional players when it comes to roadways. The use of synthetic and natural geotextiles for longer life of the roads is increasingly being put to test at different places. The While use of synthetic geo-textiles is increasingly being done for construction of major roads – Highways and expressways, use of coir geo-textiles which is cheaper and bio-degradable is being proposed for district level and village level roads. A pilot project of construction of roads using coir geo-textile has been taken up by nine states. Roadways, continues to be the largest consumer of geo-textiles in India. Out of the total geotextiles used for roadways, it is estimated that The Ministry of Roadways, uses close to 80% of it, while the other 20% is extensively used by Border Roads Organisation (BRO). It is estimated that Ministry of roadways would be consuming approximately Rs.67 crore worth of geo textiles in the coming years annually for development of express highways and national highway projects. The main consumption would be geo textiles, geo cells, geo grids for roads, geo textile for erosion control blankets and gabions.
3. **Border Roads Organisation (BRO):** Border road Organisation constructs and maintains the major arterial roads along Indian borders. It maintains a total of 3400 km long roads across India. Due to the difficult mountainous terrain and presence of heavy snowfall and rains at many areas along the work environment of the BRO, the use of geotextiles is preferred to enhance the life of the road and

minimise damage by rains, snow fall and melting of ice. The key products used by BRO are geo textiles, gabions and geo grids. The total purchase from BROs is estimated to be Rs. 17 crore. The potential for use of geo textiles by BRO is very high given the rough terrain and the poor climatic conditions where they have to make roads, in which the use of geo textiles can have significant impact on lower maintenance and repair costs. The following images describe use of geo textiles by BRO:



4. Ministry of Defence (Armed Forces): Indian armed force is a major consumer of Technical Textile products purchased either directly through the Ministry of Defence or through its own organisations for trade and purchases like Armed Forces Medical Supplies and Disposal (AFMSD). The key products being procured by armed forces are High altitude clothing, bullet proof jackets, sleeping bags, tents and tarpaulins. The total procurement of these items by Ministry of Defence is estimated to be 2/3rd of total procurement excluding supply by Ordinance factories. The estimated institutional requirement of different products are of 25,000 Bullet proof jackets, 50 lakh sq. metres of tarpaulins, 20,000 tents and 2 lakh sleeping bags. In addition it purchases Armed Forces requirement of medical textiles is estimated to be worth Rs. 200 crore. The total purchases of Technical Textiles by Armed forces and Ministry of Defence is estimated to be worth Rs. 294crore² approximately. Out of which, it is estimated that Bullet proof jackets, High altitude clothing account for majority of the purchases. The potential for usage is much higher when it comes to Bullet proof jackets, as India is still behind its mandatory target of having the adequate number of bullet proof jackets. However, significant and quick efforts are being made to bridge the gap.

5. Ministry of Home affairs: Ministry of Home affairs which purchases for police and paramilitary together are a major institutional buyers of protective textiles in particular bullet proof jackets. It is estimated to

purchase bullet proof jackets worth Rs. 31 crore annually.

6. Director General - Supplies and Disposals (DGSND): DGSND is responsible for purchase of small items in lesser quantities limited to a few thousands at a time. DGSND purchases Technical Textile items like sleeping bags and tents. They have listed vendors selected through bidding who supply as per tender requirement. The annual purchase is estimated to be worth Rs. 39 crore, a major chunk out of which is for purchase of tents.

7. Ordinance Factory Board: Ordinance factory board is responsible for production of different textile and other articles for armed forces of India. The board produces Technical Textile products like parachutes, High altitude clothing, sleeping bags and tents. It procures parachute fabrics and breathable fabrics from the civil suppliers. Total institutional purchase of ordinance factory is estimated at Rs. 75 crore as raw material for High altitude clothing, and around Rs. 90 crore as raw material for parachute fabrics and other Technical Textile products. Hence Ordinance factories are a major institutional players with a net purchasing of Rs. 165 crore annually.

8. Ministry of Ports and Shipping: The purchases from Ministry of Ports and Shipping is currently at a very small value as geo textiles are not yet being extensively tried for port and shipping developments. Geo tubes, Geo-membranes and geo-bags are often used at ports to prevent shore line erosion by water at ports. The key usage of geo textiles by the ministry are construction of a geo-tube sea wall which is being done at Uppada village in East Godavari District of Andhra Pradesh for prevention of erosion by sea. Geo-tubes are also being used at Kolkata Port on an experimental basis. The total purchase by the Ministry of Ports and Shipping is estimated at Rs. 87 crore.

9. Government Hospitals (Central and State): Medical Technical Textiles particularly, surgical sutures, disposables and dressings has a major institutional consumption coming from different Central and State Government Hospitals. These purchases are not done at one point but by different Central Govt. And State Govt. Departments, agencies and public sector units with which these hospitals are associated. The major requirement of Meditech products is of surgical dressings and sutures, which are estimated to be used at roughly 50 gm to 70 gm per bed per day at hospitals. The total purchases of these Meditech products at Government hospitals is estimated to be worth Rs. 1,070 crore annually out

² Does not include procurement from Ordinance factories

of which, close to 95% is used in procuring surgical dressings and sutures.

These nine institutional players are the key drivers of institutional purchases in Technical Textiles accounting for over 90% of institutional purchases. The total estimated purchase via institutions is Rs. 2,120 crore. The break –up of the same is shown in the following exhibit:

Exhibit 33: Key Institutional buyers of Technical Textiles

Sl. No	Institutional buyer	Estimated annual purchases (Rs. Crore)
1	Indian Railways	112
2	Ministry of Roadways	68e
3	Border Roads Organization	17
4	Ministry of Defence (Armed forces) ³	294
5	Ministry of Home Affairs	75
6	Director General – Supplies & disposals	39
7	Ordinance factory Board	165
8	Ministry of Ports & Shipping	87
9	Government Hospitals	1,070
9	Other Players	193
	Total estimated institutional purchases	2,120

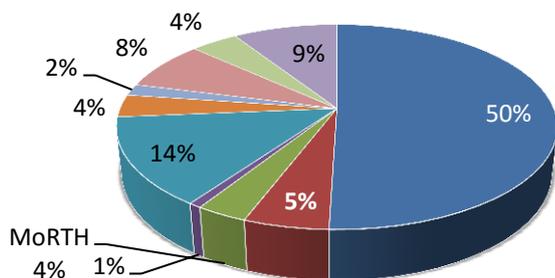
*Source: IMaCS analysis, Technotex 2014

The share of the key institutional buyers is as shown in the Exhibit 34

Exhibit 34: Share of key institutional buyers

Institutional Purchasing

- Govt. Hospitals
- Railways
- MoRTH
- Border Road Organisation
- Indian Armed forces
- Ministry of Home Affairs
- DG - SND



Source: IMaCS analysis

The key initiatives taken by these User Ministries and departments which promote use of Technical Textiles are:

³ Excluding ordinance factories

1. Ministry of railways is attempting various trials of geo textiles, under its sub-divisions. This would increase the awareness about geotextiles and also help the railways employee perceive the benefits of using geotextiles. The key projects are:

- Along the Udhampur- Jammu route, near the bridge on Tawi River, Railways has constructed a similar embankment of 35 m height
- Use of biaxial geo-grids is being tested for use in pilot projects in four divisions of Indian railways – NF railways, N railways, EC railways and SC railways
- Geogrid used for rehabilitation in a length of 6.4 Km in Kazipet-Ballarshah & Vijayawara-Visakhapatnam of South Central Railway during year 2006
- Geogrid used in around 10 Km length on Moradabad-Bareilly section for rehabilitation during year 2010
- Rehabilitation of 200m stretch in Delhi–Ambala section of Northern Railway
- Ratlam Division of Western Railway –
 - Geogrid has been laid in 4.5 Km length between km. 679.50 to 682.00 (UP & DN line) between Khachrod and Runkhera stations of Godhra- Nagda section in March 2013
- Secunderabad Division of South Central Railway –
 - 2 Km laid between km 263-265 near Manchiryal Station
 - 2.5 Km length laid between km. 136-140 (UP line) between Balharshah and Manikgarh stations of Balharshah – Kazipet section (Oct 2013)
- On Bhusaval Division of Central Railways:
 - Paras-Gaigaon stations, July to September 2012 (DN line).-Approx length 5.2 Km
 - Asvali-Padli stations, December 2007 to January 2008 (DN line) & January 2009 (UP line). Approx length 3.2 Km
- More tests and pilot projects are being done to see the advantages of geo-textiles for Indian railways

2. Ministry of roadways is also using geo textiles across various expressways it has recently started using coir based and jute based geotextiles for promotion of natural products. The key projects are:

- Use of geo textiles on expressways
- A pilot project of construction of roads using coir geo-textile has been taken up by nine states

3. Ministry of Defence and Ministry of Home Affairs have suitable norms and guidelines for Technical

Textile based products like each soldier should have a sleeping bag. Besides, the department is also taking quick measures and floating tenders for procurement of bullet proof jackets that are still pending. This is expected to give a significant spike to the market size in the coming one to two years. Changing the norms regarding the minimum number of such jackets required is expected to help increase the total market size. Ministry of Home affairs has recently launched a high value tender for procurement of 1.8 lakh bullet proof jackets.

4. Border Roads Organisation (BRO) has been actively using geo textiles, gabions and geo grids in many of

its projects in the Himalayan region, as the roads there are very fragile due to the climatic condition and require very frequent repairs. Use of geo textiles has turned out to be very helpful for BRO

5. Ministry of Ports and Shipping. - Ministry of posts and shipping has been using geo textiles in trial phase currently. The two key projects being implemented are:

- Geo-tube sea wall is being constructed at Upadda village in East Godavari District of Andhra Pradesh for prevention of erosion by sea
- Geo-tubes are also being used at Kolkata Port on an experimental basis.

Considering the key initiatives being taken by different user ministries and the progress in standards and norms which would help stream line institutional buying, it is estimated that the institutional consumption of Technical Textiles would grow at 9% from 2013 to 2016 reaching Rs. 2,716 crore by 2016. The segment wise growth forecast and market projections are shown in the following exhibit:

Exhibit 35: Key Institutional buyers of Technical Textiles

Sl. No	Institutional buyer	Estimated annual purchases 2012-13 (Rs. Crore)	Growth rate 2013-16	Estimated annual purchases 2012-13 (Rs. Crore)	Estimated annual purchases 2012-13 (Rs. Crore)
1	Indian Railways	112	12%	125	157
2	Ministry of Roadways	68	13%	77	98
3	Border Roads Organization	17	13%	19	25
4	Ministry of Defence (Armed forces) ⁴	294	9%	320	380
5	Ministry of Home Affairs	75	10%	82	98
6	Director General – Supplies & disposals	39	10%	43	51
7	Ordinance factory Board	165	10%	182	221
8	Ministry of Ports & Shipping	87	13%	98	126
9	Government Hospitals	1,070	7%	1145	1313
9	Other Players	193	12%	209	247
	Total estimated institutional purchases	Rs. 2,120			

*Source: iMaCS analysis

⁴⁴ excluding Ordinance factories

11. Success Stories

Over the last decade, the Technical Textile industry in India has grown at a moderate rate; however some of the stakeholders have seen significant growth owing to their special focus on exports, institutional sales or just by diversifying into different segments of Technical Textile. While some have grown by creating a streamlined process, there are a few who have excelled owing to foreign collaboration and creation of high tech infrastructure. This section portrays the growth of few such organisations that have excelled in the Technical Textile industry and how they did it.

Organisations diversifying from traditional textiles to Technical Textiles

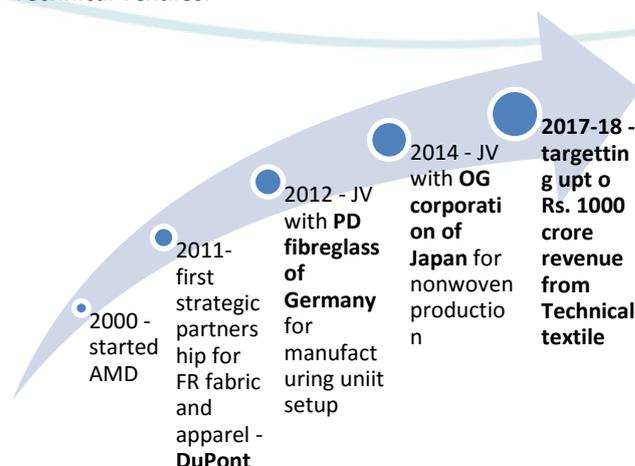
Alok Industries Ltd.

Alok Industries is a well established conglomerate in the Indian textile and garmenting industry. Started in 1986, it established its first polyester unit in 1989 and has been growing steadily ever since. Over the years, it has forayed into fabrics, home textiles, garmenting and even Technical Textiles, establishing itself as a key name in the industry. It started its Technical Textile operations in 2009, with offerings like anti microbial finishes, anti static finishes, etc. Soon thereafter it started its industrial work wear division targeting specifically Technical Textile requirements like fire retardant fabrics and garments, oil and mosquito repellent offerings, anti microbial and high visibility offerings. It caters to the industries like oil exploration, defence supplies, healthcare and hospitality sectors, aviation sector and fire brigade divisions. The company along with domestic supply has also been able to make a mark in the export market with the total exports of the company inclusive of both conventional and Technical Textile witnessing a 55% CAGR growth in the last ten years from Rs. 100 crore in 2004 to exports of Rs. 4,000 crore in 2014.

Arvind Limited – diversifying into institutional Technical Textile market of Protech

Arvind Limited started its Technical Textile division in late 2000 diversifying under the leadership of Mr. Sanjay and Mr. Punit Lalbhai under the name of Arvind Advanced Materials Division (AMD). Arvind's growth strategy for Technical Textiles has largely been rapid expansion and diversification using global partnerships and strategic alliances. It has strategically selected areas that have widespread application across industry to expand its Technical Textile business. While the JV with PD fibreglass and OG Corporation are still in a nascent stage it has provided a very comfortable platform for Arvind to foray further into Technical

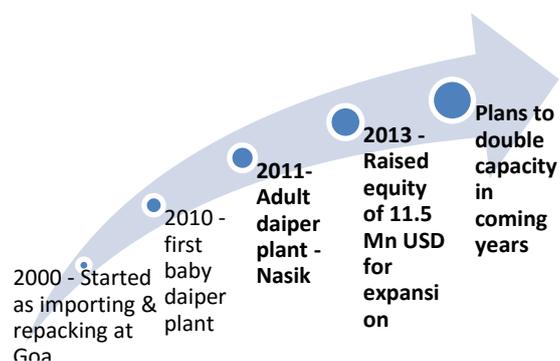
Textiles. Arvind has invested over Rs. 50 crore in each of the Joint ventures to develop this strong presence in Technical Textiles.



While currently Arvind is established as a strong player in fire retardant fabrics and apparels catering to the Protech division, it is expected to be a key stakeholder across the composites, nonwoven and Protech in the coming years.

Nobel hygiene – foraying in a prospective but unexplored Meditech

Nobel Hygiene Ltd is the market leader in adult / incontinence diapers segment. The company was started in the year 2000 with the objective of providing world class hygiene products to Indian consumers, at a time when the awareness of incontinence diapers was very limited. It started as an importer and repackaging unit, gauging the possibility and scope in Indian market. It took them 10 years to move from an importing and packaging unit to starting their own production line in 2010 and 2011 for baby diapers and adult diapers respectively. Today's they are one of India's largest diaper manufacturers with capacity of 150 million diapers annually. In 2015 the firm has bagged an investment of USD 10 Million from a global firm to leverage the exponential growth being witnessed in the Indian Market.



However, expanding capacities came with the added challenge of capturing larger markets and sell more

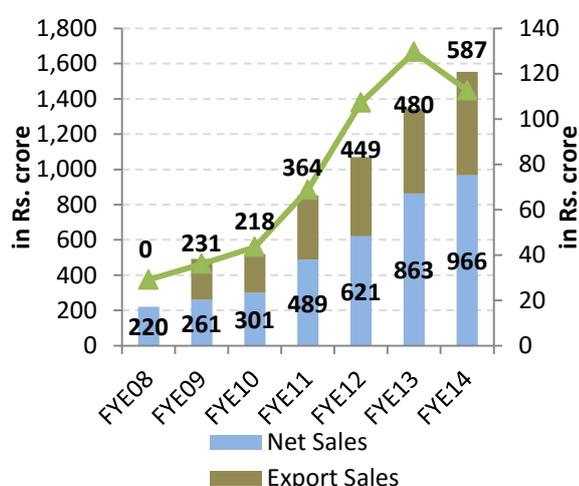
products in a segment that was already facing a major threat from cheap Chinese imports. To add to it, the high import duties made it a tougher task for the company to compete in domestic market. But, Mr. Kamal Johari, a first generation entrepreneur and Managing Director at Noble Hygiene had bigger plans and a well crafted strategy. They started targeting not just the domestic market through stronger branding and well distributed work force but also went strongly after the institutional sale prospects. Today it not only has its own brands but also is a major supplier for brands like Star Bazaar, Metro Cash and Carry, Max and many other Indian SMEs. With an aim to diversify its revenue sources, it forayed into the exports market and is a key exported to UAE, Malaysia and Australia. With a capacity 150 Mn diapers and 40 Mn under pads annually, Noble hygiene has grown at over 15% per annum in the last few years with sale of Rs. 65 crore to Rs. 70 crore annually

Flexituff International Ltd.

Flexituff International Pvt. Ltd is one of the largest FIBC suppliers in the country. It also provides offerings in Geotech and Oekotech segments of Technical Textiles. The company is a major exporter of FIBC and woven products from India and has received the Top Exporter Award from the PLEXCOUNCIL, Ministry of Commerce from 2005-06 to 2010-11.

The company has charted a good growth trajectory with its revenue growing at a CAGR of 28% from Rs. 220.23 Crore in 2007-08 to Rs. 966.26 Crore in 2013-14. EBITDA too has kept pace with the top line growing at a CAGR of 25% from a base of Rs.29.09 Crore in 2007-08 to Rs. 112.61 Crore in 2013-14. FIBC as a division contributed 53.80% of its total revenue in 2013-14.

Net Sales, Export component and EBITDA of



Flexituff started as an export oriented manufacturing unit and has had a core strategy of targeting exports market for Packtech and Geotech products. With a

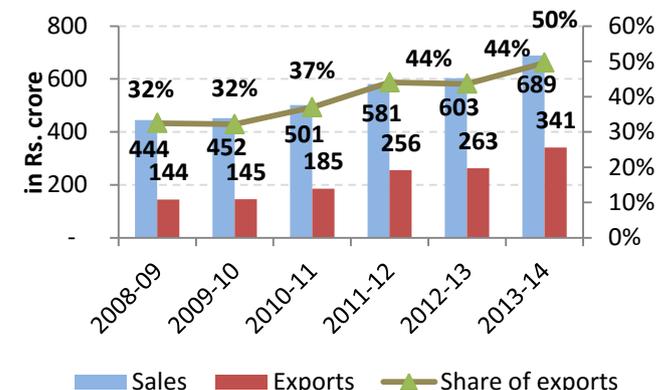
focused strategy the organization has seen an exports growth of 20% CAGR in the last six years from 2008-09 to 2013-14 reaching an export revenue of Rs. 587 crore in 2013-14.

As a strategy, to augment and retain its export competency, the company focuses on improving existing technologies and product engineering innovation through continuous expenditure on R&D in the forthcoming years also, so that the research and development opens new avenues for the Company along with new products and cost efficient processes. The Company continues to import technically upgraded machines for its products and performance. New technology so adopted has enabled us to produce and market our products in various new markets. It is in a position to produce high value of FIBC for pharmaceuticals sector and special fabrics and liner for the export market like Japan, pharmaceutical companies in Europe, fabric export market in South America & Australia and liner export market in North America. This is in addition to an already wide product portfolio and heavy capacity that as a combination gives Flexituff a significant edge over competition.

Garware wall ropes - decoding the export potential

Garware wall ropes Limited, a well known name in the world of Technical Textiles supplying netting products and cordages to cater to the fishing industry, sporting industry, geo-synthetics, shipping industry and across all industrial activities. Started in 1976, it has grown to be the largest polymer cordage manufacturer in the world. The company has made its mark across 75 countries with special focus in Europe, Canada and US which are its key client. The company had special focus on innovation and quality products targeting for export market and through its continuous efforts it has been able to grow its export income by 19% y-o-y while sales grew at 9%. It is also been awarded many prestigious export awards like – “Star Export house award” and largest sport nets exporter award by SGEPC.

Exhibit 36: Export growth of Garware



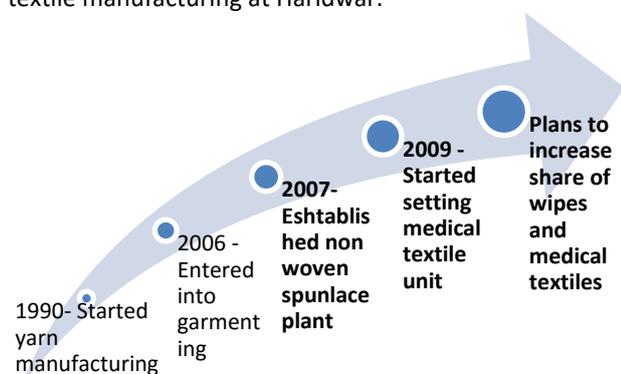
Source: Annual reports of Garware wall ropes

Innovation with high quality has been the key strategy for Garware. Its sport net and fish nets and continuous research and innovation in them like development of higher strength SNG nettings are the key bread winners in exports. It has also developed new innovative products like aquaculture cages and high modulus fibre ropes – Plateena ropes which slowly catching up in the market.

Garware plans to further strengthen its netting offerings targeting newer markets in Africa with agro products, while foraying into the new segment of coated defence textile solutions, which it expects would help them generate around Rs. 100 crore in a few years.

Ginni Filaments Ltd

Ginni Filaments commissioned its first manufacturing unit in 1990 for manufacturing filament yarns. Slowly it diversified into open end yarns in 1998 and then into garmenting in 2006. The company identified the nascent non woven industry very early and saw its vast potential in 2007 itself. It commissioned its modern spunlace non woven manufacturing unit in 2007 with a capacity of 12,000 MT per annum. Till date the company commands a significant share of non woven spunlace market in India and caters to the rolled good spunlace non woven fabric demand across the country. Along with developing a strong clientele for its non woven fabric, the company started to diversify into more value added Technical Textiles of non woven home and medical wipes. Currently close to 10% of its non woven production is used in manufacturing wipes catering to the retail segment either through own brand or private labels. It is also developing offerings for medical textiles and is setting up a plant for medical textile manufacturing at Haridwar.



Gujarat Raffia Industries Ltd.

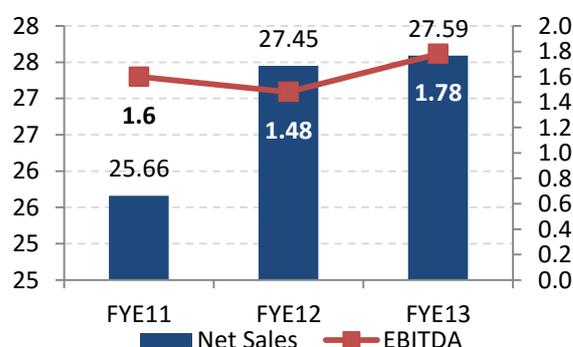
Gujarat Raffia Industries Ltd is one of the biggest players of Packtech active in the HDPE/PP woven sacks/bags products. Major products of the company

include PE Tarpaulin, Plastic Sheeting, Ground Sheeting, Geo-membrane, Tents, Shelters, Pond Lining, Canal Lining, and Fumigation cover, HDPE Woven Bags, PP Woven Bags, Vermibed and Ropes etc.

Despite intense competition in the Packtech segment over the last few years due to cheap and easy import of major petrochemical raw materials, Gujarat Raffia has been growing at a steady rate of CAGR 4% on the basis of its installed capacities and varied product offerings. It was strategic in targeting the key user industry of fertilizers and food grains aggressively and that has yielded steady results for the company helping it sustain in such economic environment.

The organization has a foresight in looking to the future demand and a market requirement due to relaxation of regulations related to jute sacking and food grain sackings and is accordingly prepared to maximize the revenues with regulatory changes in environment. In addition, with slowing domestic markets, the company has been actively engaging itself in exporting the products to conventional and newer markets, targeting exports for ~50% of its production. The case of Gujarat Raffia demonstrates how an organization in one of the mature segments of Technical Textile and strategize and grow even in face of intense competition and dismal economic scenario.

Net Sales and EBITDA of Gujarat Raffia Industries



Jasch Industries

Jasch Industries is a major PU based coated fabric supplier in India catering mostly to the Sportech segment. The company established in late 90s has had a focus on developing high-tech manufacturing capacity through modern machinery and IT integration. It is one of the largest PU coated fabric manufacturer with production of 31.8 lakh metres in 2013. While most of the coated fabric manufacturers in India are of PVC and mostly SME players, Jasch differentiated itself by specifically targeting PU coated fabric manufacturing and focussing on upcoming sectors of high value added sports shoes, women hand bag and purses and PU coated boots. This has helped Jasch to create a niche market for themselves in the coated

fabric segment which faces heavy price based competition due to presence of many fragmented players. The company had a sales turnover of Rs. 89 crore in 2013 growing from Rs. 75 crore in 2011.

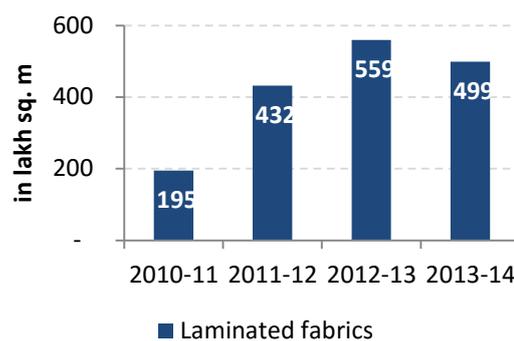
Reliance Industries

Reliance Industries is one of the top industrial and business houses in India. Over the years, it has also established itself as a key suppliers and retailer of fibre fill based Technical Textile offerings. Reliance has become the single largest supplier of fibre fill in Indian domestic industry catering to over 50% of the market. It is also the largest manufacturer of virgin fibre fill while most other companies in India are into manufacturing of recycled fibre fill, with a PSF manufacturing of 612 KT in 2013. The company besides catering to fibre fill demand has also developed its own line of business of mattresses and pillows branding its fibrefill as *Recron*. To crease higher value, it provides exclusive finishes like anti microbial finish to its recron offerings. It has also diversified into other Technical Textile sectors of high tenacity polyester and industrial ropes and agro based nettings of polypropylene. Reliance is a typical case which shows how an Indian brand has established monopoly over a sector and is benefitting from continuous value addition and branding efforts.

SRF Limited – capitalizing the domestic market

SRF Limited is one of the leading Technical Textile players in the country today with a turnover of Rs. 1810 crore from Technical Textile business in 2013-14 growing at 8% over 2012-13. The organisation a pioneer in nylon tyre cords has produces tyre cords, belting fabrics and coated and laminated fabrics. SRF is a leading domestic supplier of tyre cords in India. However, due to the de-growing market of nylon tyre cords, it started diversifying into other industrial applications of Technical Textiles including polyester tyre cord business. In today's lacklustre market, where intermediate products like tyre cords saw limited prospects, SRF was quick to change its strategy focussing on domestic markets and launch of different high value products to capture the market like breathable laminated fabrics, coated flex fabrics, newer awnings and tent fabrics. This strategy has helped SRF not only grow at a rate of 8%, but also has made it a key player in awning and tent fabric suppliers, which was mostly catered by SMEs or unorganised sector.

Exhibit 37: laminated fabric production of SRF



Source: Annual reports of SRF

SRF started manufacturing laminated fabrics in 2011 and since then the production has grown at 37% y-o-y to reaching a total of 500 lakh sq. m. Continuous efforts of SRF has placed it as one of the largest domestic manufacturers of flex fabric accounting for close to 40% of the flex fabric market which was once entirely catered by imports from China. SRF aims at capitalizing on the domestic markets of tent fabrics and awning fabrics in a similar fashion in the coming years. It has already launched its range of coated awning fabrics.

Welspun India

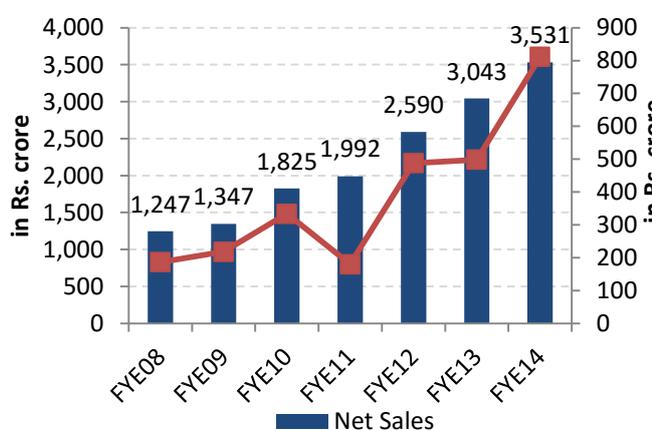
Welspun India is one of the leading and foremost players in the field of Nonwovens in India. Diversifying from home textiles to nonwoven and Technical Textiles, the organization has seen significant growth during the last five to seven years with sales growing from Rs. 1,246 crore in 2008 to Rs. 3,351 crore in 2014 at a growth rate of CAGR 19% per annum during a phase when most of Indian industry was under intense pressure in light of the global recession.

Its strategy involved strong continuous focus on innovation and development of new products with the company recording ~25% of revenues from innovative and new products in 2013-14. To stay competitive the organization strategized by opting for vertical integration increasing its spinning and weaving capacities to supplement its growth efforts of aggressive sales.

For the Technical Textiles, Welspun developed a patented production line for manufacturing high-end spunlace and composites products in a span of three years. To stay technologically updated the company had a machine configuration exclusivity agreement with Truetzschler (Fleissner) for the next 10 years. They are currently planning to increase cross lapping and multi layering capacities at Welspun from 6000 MT p.a to 13000 MT p.a. Going forward the Company plans to continue with its strategy of new product development focusing on broadening its non woven offerings to cater to industrial demands and also provide newer

offerings in Technical Textiles based on biodegradable and natural fibres.

Net Sales and EBITDA of Welpun India Ltd



Growth strategies of key players

Agrotech

1. Alpha Foam Pvt. Ltd.: Alpha foam is a major spunbond non-woven manufacturer, present in the segments on Agrotech and Meditech. It is a key non-woven mulch mat manufacturer in India having a manufacturing setup of 650 MT/ month of non woven fabric. Diverse business presence across Meditech, Agrotech, industrial nonwovens and coated textiles has been the key strategy for Alpha Foams. It also has strong focus on good quality testing infrastructure.

2. B & V Agro irrigation Co.: It is the oldest manufacturer of shade nets in India, manufacturing since 1988. Imported German Machineries. Today, the company deals in shade nets, insect nets, weed mats in the agro textile domain. Strong backward Integration Programs, R&D efforts, and focus on Customer Satisfaction and usage of modern German machinery for ensuring the best quality of nets have been the key strategy for the company.

3. CTM Agro Textiles: CTM Agro textiles started as a core agro textile manufacturer in 2009. It has diversified into offering all kinds of Agrotech products like shade nets, insect nets, mulch mats, green houses, crop covers and vermin beds. It had a turnover of Rs. 674 crore in 2012-13 and aims to grow into one of the renowned companies for agro solutions. It aims at achieving its goals through establishing strategic alliances with world class producers of Agro Textile material and setting up State of the Art manufacturing facilities in India.

4. Garware Wall ropes: It started in 1976, as a polymer cordage manufacturer and over years has grown to become one of the largest cordage and nettings manufacturer in the world and a key exporter of fishing nets. Innovation with high quality and continuous research has been the key strategy for Garware, like development of higher strength SNG nettings. It has revenue of Rs. 689 crore in 2012-13, growing at 9% y-o-y, with 50% of it coming through exports. Garware plans to further strengthen its netting offerings targeting newer markets in Africa with agro products.

5. Kwaliti Nets Mfg. Pvt. Ltd.: Kwaliti Nets is one of the leading companies providing efficient netting solutions. It is present in sectors of shade nets, scaffolding nets, sport nets and other agro protection nettings. Customer centric approach with strong design skills and quality along with timely delivery has been the stronghold of the organisation.

6. Neo Corp Ltd.: Neo Corp India Ltd, started as a woven sack manufacturer in 1988. In over two decades, it has grown to become a key sack manufacturer and also diversified into related Agrotech products making woven ground covers, vermibeds, mulch films and agro nets. It grew with a focus on export and enjoys a star export house status since 1994. It strategise to become One shop for all woven packaging and agro needs, investing in future and backward integration and developing itself as a multi location and multi market serving organisation. It had a turnover of Rs. 430 crore in 2012-13 growing from Rs. 289 crore in 2011-12. With strong focus on exporting and target on the select segment of woven Technical Textile products, the company is expected to have a steady growth in coming future

7. Netlon India Pvt. Limited (Tuflex India): Started in 1985, Netlon is a division of Parry Enterprises India Ltd. Manufacturing products in the field of polymer nets and knitted fabric. It is a part of the Murrugappa Group. It is a key manufacturer of polymer fishing nets and markets its under the brand name "Tuflex". It has developed itself into a key manufacturer and a strong brand by focussing on using the best international technology and machinery, high quality standards, strong market oriented approach and continuous innovation. The company had a sales turn-over of Rs. 145 crore in 2012-13. It aims at growing in a positive way despite a decline in sales in 2012-13, due to its continuous efforts towards technology up-gradation, new product development, increasing operational efficiencies and increasing customer centricity.

8. Rishi Tech Tex Limited: Started in 1984, as a HDPE/PP sack manufacturer, it soon diversified into manufacturing of agro-nettings. It is a leading manufacturer of shade nets and protection nets for agro-purposes in India, having achieved the feat of supplying more than 30 million metres of shade nets till date. It aims at providing high quality and cost effective solutions in Agrotech. It had a sales turnover of Rs. 36 crore in 2012-13.

9. Safeflex International Limited: Headquartered in Pitampur, Madhya Pradesh, the company has recently grown to become a significant player in the agrotexile space and markets its agro nettings under the brand name of "Duramet". The company manufactures shade nets, insect nets and anti hail nets along with fencing nets and scaffolding nets. An integrated manufacturing process with capacity to perform extrusion, film production, slitting and finishing along with stringent quality testing and customer centric approach is the success mantra for the company.

10. Shri Ambica Polymers Pvt. Ltd.: A 100% EOU located in Gujarat, is a highly recognised export house and a key exporter of geotextiles and agrotexiles from India. A focus on meeting the desired quality of output, continuous technological improvement, development of skill set via trainings and regular monitoring and updation of systems to have the most up to date and efficient operations has been the key drivers of the company. It has strong presence in woven ground cover fabrics for Agrotech and Geotech, shade nets, FIBCs and Jumbo bags.

Meditech

1. Ahlstrom Fibercomposites India Pvt. Ltd.: Ahlstrom Fibrecomposites started in 2007 at Mudra. It is a leading manufacturer and supplier of non woven fabrics for medical disposables. A state of the art manufacturing with high tech SMMMS non-woven line to cater to all high value added and technical requirements. It is a key manufacturer of nonwoven tea bags in India. It has put in strong focus on superior quality and technology along with economies of scale and primarily targets the export market.

2. ALIMCO Ltd.: ALIMCO Ltd. is a non-profit making organization, incorporated in the year 1972. The company is the largest manufacturer and supplier of artificial limb components and rehabilitation aids and is a major player in the implantable product category. Their focus is on continuous research and development to improve design of the existing components and aids and develop new assistive aids at affordable prices. The company had a sales turnover of Rs. 130 crore in the year 2012-13.

ALIMCO Ltd. plans to widen its present product range through expanding its manufacturing capabilities.

3. Ginni Filaments Ltd.: Ginni Filaments Ltd. was established in the year 1990 for manufacturing filament yarns. In the year 2007, the company started to diversify into more value added Technical Textiles of non woven home and medical wipes. Currently close to 10% of its non woven production is used in manufacturing wipes catering to the retail segment either through own brand or private labels. The company had a sales turnover of Rs. 717 crore in the year 2012-13. It also plans to develop offerings for medical textiles by setting up a plant for medical textile manufacturing at Haridwar.

4. Johnson & Johnson Ltd.: Johnson and Johnson India, started in India in the year 1947, is one of the leading players in the Indian pharmaceutical and consumer product business. Over the years, the company has expanded into three business segments: Consumer Healthcare, Medical Devices and Pharmaceuticals with focus on medical innovation. It has established itself as a major player in Meditech particularly wipes, surgical dressing and sanitary napkin, by continuously focussing on procuring intermediate goods and value adding and marketing it in domestic market with emphasis on marketing and branding. The company had a sales turnover of Rs. 4043 crore in 2012-13. Johnson and Johnson plans to further strengthen its consumer healthcare offerings by launching new global products in India.

5. Kimberly-Clark Lever Ltd. (KCLL): KCLL is a 50:50 joint venture formed in the year 1994 between Kimberly-Clark Corporation and Hindustan Lever Ltd. It is a major player under Meditech companies. It markets sanitary napkins and manufactures and markets baby diapers in India. It is a market leader in the baby diapers segment in India. The company leverages the contemporary technology and distribution system of the parent companies to satisfy the needs of the customer with specifically designed products that are easily available. The company recorded a sales turnover of Rs. 244 crore in the year 2011-12. KCLL plans to invest into technology to increase its market understanding and grow in the current categories.

6. Lotus Surgicals Private Ltd.: Lotus Surgicals Pvt. Ltd. was established in the year 2005. The company designs and develops a comprehensive range of products including surgical mesh, absorbable and non-absorbable sutures with focus on providing the best quality products at competitive prices. It is an ISO 9001 certified company and a leading manufacturer of Hernia Mesh in Meditech. The

company had sales of Rs. 36 crore in the year 2012-13.

7. Nobel Hygiene Ltd.: Nobel Hygiene Ltd is the market leader in adult / incontinence diapers segment. The company was started in the year 2000 with the objective of providing world class hygiene products to Indian consumers, at a time when the awareness of incontinence diapers was very limited. Their strategy targets the domestic market not only through stronger branding and well distributed work force but also through institutional sale prospects. Noble hygiene has grown at over 15% per annum in the last few years with sale of Rs. 65 crore to Rs. 70 crore annually. With an aim to diversify its revenue sources, it forayed into the exports market and is a key exporter to UAE, Malaysia and Australia.

8. Proctor & Gamble Hygiene & Health Care Ltd.: P&G started its operations in India in 1964 and is one of the largest and the fastest growing consumer goods companies in India. Its presence is across Healthcare, Household care and Beauty and Grooming segments. The feminine hygiene business (sanitary napkins) has been a growth engine for the company and currently the company is a market leader in this particular segment. The company had a sales turnover of Rs. 1699 crore 2012-13. The company emphasises on superior product propositions and technological innovations which has enabled it to achieve market leadership in various segments.

9. TTK Healthcare: TTK Healthcare Ltd. was established in the year 1985. Over the years, the company has spread across three strategic units namely: Pharmaceuticals Division, Consumer Products Division and Biomedical Devices Division with focus on providing innovative and “value for money” solutions to the customers. It has established itself as major player in Meditech especially in the Extra Corporeal product category. The company is a well-established player not only in the domestic market, but also exports its products to various countries. The sales turnover for the company was Rs. 382 crore in the year 2012-13.

10. Welspun India Ltd.: Welspun India is one of the leading and foremost players in the field of Nonwovens in India. It started in the year 1985. Diversifying from home textiles to nonwoven and Technical Textiles, the organization has seen significant growth during the last five to seven years with sales growing from Rs. 1,246 crore in 2008 to Rs. 3,351 crore in 2014 at a growth rate of CAGR 19% per annum. The company has continuous focus on innovation and development of new products. In the future, the Company plans to continue with its strategy of new product development focusing on broadening its non woven offerings to cater to

industrial demands and also provide newer offerings in Technical Textiles based on biodegradable and natural fibres.

Mobiltech

1. Autoliv IFB Pvt. Ltd.: Autoliv IFB is a wholly owned subsidiary of Autoliv Inc. and was incorporated in the year 2000. It is engaged in developing, manufacturing and supplying automotive safety systems like airbags, seat belts, active and passive safety systems, etc. Focus on innovation has been the key success mantra for the company.

2. Century Enka Ltd: Century Enka, a part of B.K. Birla Group of Companies, was established in the year 1965. The company is into manufacturing of Polyester and Nylon Chips of industrial and fabric grade, Nylon Industrial Yarn, Nylon Tyre Cord Fabrics and various other products. These yarns are used as reinforcing material in tyres, conveyor belts, etc. With a sales turnover of Rs. 1370 crore in the year 2014-15, the company has been continuously striving for innovation through use of modern technology to manufacture high quality products for the customers.

3. Hitakari Hitech Fibres Pvt. Ltd.: Hitakari Hitech Fibres Pvt. Ltd. was established in the year 1985 as a manufacturer of home-furnishings like carpets, pillows and blankets. Over the years, the company moved into manufacturing of automotive moulded carpets and gradually it became a leading manufacturer of automotive moulded carpets in India. The products include moulded passenger floor carpets, wheel arch moulded carpets, moulded boot carpets and many more. The company is ISO 9001: 2000 certified and continuously strives to provide the best quality products to its customers through its sophisticated in-built quality control laboratory.

4. Krishna Maruti Ltd.: Krishna Maruti Ltd., a division of Krishna Group, provides complete auto interiors solution to leading automotive companies in India. It is the youngest seating systems company in the world to receive the prestigious Deming Award in the year 2005. The company works towards meeting all seating requirements like Seating Systems, Seat Covers, Head Rest/Arm Rest Assemblies, etc. Focus towards innovation and commitment to providing best in quality seating systems has been the success mantra for the company.

5. KSS Abhishek Safety Systems Pvt. Ltd.: KSS Abhishek Safety System is a joint venture between Abhishek Auto Industries Limited and Key Safety System Inc. USA and was incorporated in the year 1985. The first company to introduce Automotive Safety Systems in India, KSS Abhishek has established itself as a leader in design, development and manufacturing of Seat belts and other automotive

safety critical components like airbags and steering wheels through innovative technology, lean manufacturing, efficient work force, and excellent product quality.

6. **Mayur Uniqouters:** Mayur Uniqouters was established in 1980s with an aim to cater to the upholstery and fabric requirements of the automobile manufacturing unit of Maruti. Over the years it has grown to become one of the largest domestic players in PVC artificial leather fabrics used in automotive textiles as well as home furnishings and sportswear. It is focussing on creating stronger ties with global players to increase its reach and market.
7. **SRF Limited:** SRF Limited is the leading tyre cord manufacturer in the country today with a turnover of Rs. 1810 crore from Technical Textile business in 2013-14 growing at 8% over 2012-13. Established as the dominant supplier of nylon tyre cords, the company strategized to grow by focussing on polyester tyre cords, in light of de-growth in demand for nylon tyre cords. It has also diversified into other segments of Technical Textiles like Indutech and Buildtech to reduce its exposure risks.
8. **Supreme Non-woven.:** One of India's largest diversified non-woven player, Supreme Non-woven has presence across Mobiltech, Indutech, Clothtech, Geotech and non-wovens. The company is a key supplier of automotive non woven trims and NVH components. Strategic focus on core industry of non-woven, constant investment in various growth platforms and continuous promotion of a culture of innovation has been the success mantra for Supreme Non-wovens. This coupled with strategically selected locations and clientele which is located at geographic proximity and a state of the art infrastructure has been the driving the business.
9. **SVM Non wovens.:** SVM Nonwoven is a Hyderabad based non woven manufacturing company, present in industrial non woven filter fabrics, automotive carpets and geotextiles and geo-bags segments of the Technical Textiles. Backed by a skilled team and a focus on higher quality at optimum pricing has been the approach of the company. This coupled with unique featuring of products and worldwide network to target export clients has been the driving force behind its success.
10. **Takata India Pvt. Ltd.:** Takata India, established in the year 2009, is a leading manufacturer and supplier of automobile safety products like Airbags, Seat Belts and Steering Wheels. The company, a joint venture between Takata Corporation and ANAND India, utilizes the capabilities of both the parent companies to provide a range of products of global standards

manufactured with Japanese expertise. Driven by dedication to saving human lives and to making automobiles safer, the company constantly innovates to better its products.

Sportech

1. **Cosco (India) Ltd.:** Started in 1980, Cosco (India) has steadily grown to become a major brand and supplier of inflatable balls and sporting equipments from India. It has become a key supplier of inflatable balls and accessories and attachments in the Domestic market, with more than 90% of its inflatable ball sales in domestic market. In an industry with extensive focus on exports, Cosco has strategically carved a space for itself by increasingly targeting domestic market.
2. **Entremonde Polycoaters Pvt. Ltd.:** Entremonde Polycoaters is a pioneer in Technical Textile industry in India with over three decades of manufacturing history. It has grown to be a Rs. 34 crore company by 2012, with strong focus on research and innovation. Its mantra to growth has been continuous innovation and research aimed at developing newer coated Technical Textile offerings across diverse industries with a diversified product basket to maximise reach and minimise risks.
3. **Freewill Sports Pvt. Ltd.:** Started in 1934, it is one of the oldest inflatable ball manufacturers of India. Over the years, it has established itself as a renowned player in Indian and exports market and market its sports balls and sport products under the brand –“Nivia”. With an aim to provide best in class sporting goods at the right price to the sporting fraternity, Freewill Sports have continuously kept focus on having updated technology, the right quality and in wide spread dealer network.
4. **Fruedenberg Nonwovens India Pvt. Ltd.:** Fruedenberg Nonwovens India is a key supplier of non woven shoe components like insole, shoe linings and shoe uppers, interlinings and industrial non woven filter fabrics. Customer value, a culture of innovation, leadership, trust, respect, responsibility and long-term orientation have been the values helping the organisation grow into a major on woven supplier with manufacturing located at Chennai and Pune
5. **Garware Wall ropes:** It started in 1976, as a polymer cordage manufacturer and over years has grown to become one of the largest cordage and nettings manufacturer in the world and a key exporter of Sports nets. It has also been the largest exporter of sporting nets from India consistently for last three years. Innovation with high quality and continuous research has been the key strategy for Garware, like development of higher strength SNG nettings. It has revenue of Rs. 689 crore in 2012-13,

growing at 9% y-o-y, with 50% of it coming through exports. Garware plans to further strengthen its netting offerings targeting newer markets in Africa.

6. Jasch Industries: Jasch Industries is a leading PU and PVC coated textile manufacturer catering primarily to the Sportech segment. It has been at the forefront of technology up-gradation and innovation and uses updated PU coating technology in its manufacturing. Along with it, diversified offerings of PU and PVC catering different segments like Sports Shoe components, artificial leather boots, purses has been the strategy of the company to minimize its exposure to adverse economic environment.

7. Kusumgar Corporates: Kusumgar Corporates in a Rs. 57 crore organisation started in 1970, with an aim to meet the continuously evolving textile needs. Over years, it has established itself as a major Technical Textile manufacturer with presence in many different Technical Textile offerings in Protech, for Sportech, for Indutech and geo-synthetics. It has strong presence in Sportech with product offerings that include fabrics for parachutes, sleeping bags and tents. Strong technical research and innovation coupled with strategic value addition to make the overall product attractive has been the key mantra for Kusumgar corporate. Started with an aim to cater defence applications, they have clearly also made a mark in fields like geo-tech and Indutech with their continuous innovation. Going forward Kusumgar aims to capitalise on growing Indian market by focusing on coated Technical Textile offerings and exports.

8. Kwaliti Nets Mfg. Pvt. Ltd.: Kwaliti Nets is one of the leading companies providing efficient netting solutions. It is present in sectors of shade nets, scaffolding nets, sport nets and other agro protection nettings. Customer centric approach with strong design skills and quality along with timely delivery has been the stronghold of the organisation.

9. Liberty Shoes: Liberty has been one of the largest manufacturers of shoe components in India. Its main focus has been on sport shoes, and it produces most of the shoe component for internal usage purpose.

10. Sanspareil Greenland Pvt. Ltd.: SG Pvt. Ltd is one of the largest cricketing goods manufacturers of India located at Meerut, with a sales turnover of Rs. 94 crore. It's focus has primarily been on exports and most of the manufacturer goods are exported to South Africa, Europe and Australia. It has a state of the art manufacturing centre and strategizes to become one of the leading sporting goods manufacturer and exporter in India by using modern day technologies, extensive export focus and continuous up-skilling.

Buildtech

1. Bharat textiles & Proofing Industries Ltd. (BTPL): Started in 1972, BTPL is one of the industry leaders in manufacturing of canvas tarpaulins in India. Acquisition of state of the art machinery to have a modern up-to-date manufacturing and management systems to increase efficiency along with strategic diversification into a wide range of products involving heavy duty fabrics for specialised industrial and commercial uses has been its success mantra.

2. Gujarat Crafts Pvt. Ltd.: Gujarat Crafts is a leading company in tarpaulin manufacturing. Its success mantra has been to consistently and strongly focus on client requirements, catering to the export demands from Caribbean, East/Middle Africa, North Africa, South/West Africa, East Europe, East Asia, Central America, North Europe, Middle East and South America with customised and specialised solutions as per the required specifications, colour and sizes.

3. Gujarat Raffia Industries: Gujarat Raffia Industries Ltd is one of the biggest players of in the HDPE tarpaulin. Gujarat Raffia has been growing at a steady rate of CAGR 4% on the basis of its installed capacities and varied product offerings. It has benefitted from the vast and growing demand for HDPRE tarpaulins for various purposes like truck covers, roof covers, and many other applications. This has helped it maintain a steady growth and strong presence in the market.

4. Kwaliti Nets Mfg. Pvt. Ltd.: Kwaliti Nets is one of the leading companies providing efficient netting solutions. It is present in sectors of shade nets, scaffolding nets, sport nets and other agro protection nettings. Customer centric approach with strong design skills and quality along with timely delivery has been the stronghold of the organisation.

5. Mehler Texologies Ltd.: Mehler Texologies is German based company in India catering to the new and upcoming market of permanent architectural membranes. High quality and appealing and aesthetic designing has been the fore front of the organisation, which caters mainly to the permanent architectural membrane requirements.

6. Mafatlal Gujarat Industries: Started in 1993, Mafatlal has been engaged in a exporting a wide variety of Technical Textiles ranging from coated fabrics to tarpaulins and FR retardant fabrics. Focus on quality, a skilled team and a modern manufacturing facility are the key selling points. This coupled with a strong after sale support and quality assurance along with client satisfaction is the success driver for the company.

7. Netlon India Pvt. Limited (Tuflex India): Started in 1985, Netlon is a division of Parry Enterprises India

Ltd. Manufacturing scaffolding nets and knitted fabric. It is a part of the Murrugappa Group. It is a key manufacturer of polymer fishing nets and markets its under the brand name "Tuflex". It has developed itself into a key manufacturer and a strong brand by focussing on using the best international technology and machinery, high quality standards, strong market oriented approach and continuous innovation. The company had a sales turn-over of Rs. 145 crore in 2012-13. It aims at growing in a positive way despite a decline in sales in 2012-13, due to its continuous efforts towards technology up-gradation, new product development, increasing operational efficiencies and increasing customer centricity.

8. Rishi Tech Tex Limited: Started in 1984, as a HDPE/PP sack manufacturer, it soon diversified into manufacturing of agro-nettings. It is a leading manufacturer of scaffolding nets and protection nets for agro-purposes in India, having achieved the feat of supplying more than 30 million metres of shade nets and scaffolding nets till date. It aims at providing high quality and cost effective solutions in buildtech. It had a sales turnover of Rs. 36 crore in 2012-13.

9. SRF Limited: SRF Limited is one of the leading Technical Textile players in the country today with a turnover of Rs. 1810 crore from Technical Textile business in 2013-14 growing at 8% over 2012-13. With increasing acceptability and market demand for buildtech products like flex fabrics, awning, and tent fabrics SRF was quick to identify the opportunity and strategized by focussing on domestic markets and launch of different high value products to capture the market like breathable laminated fabrics, coated flex fabrics, newer awnings and tent fabrics. It has grown to become the largest Indian supplier of flex fabrics and is swiftly capturing market of laminated fabrics.

10. System India Pvt. Ltd.: It is an upcoming player in the awnings market that has identified the vast business opportunity is the market where in a growing number of requirements can be fulfilled with awning solutions. It has been working on providing end to end solution from awning manufacturing to set-up and expects the industry to grow many folds in the coming future.

Packtech

1. Ahlstrom Fibercomposites India Pvt. Ltd.: Ahlstrom Fibrecomposite started in 2007 at Mudra. It is a leading manufacturer and supplier of non woven tea-bags. A state of the art manufacturing with high tech SMMMS non-woven line to cater to all high value added and technical requirements. It is

a key manufacturer of nonwoven tea bags in India. It has put in strong focus on superior quality and technology along with economies of scale and primarily targets the export market.

2. Cheviot Company Ltd.: Cheviot is a leading Jute hessian sack and Jute Packtech product manufacturer in India. It strategizes at offering the low value added Jute Hessian and sacks to the export market along with conversion of jute into high value added products like Jute bags for the domestic market.

3. Flexituff International Ltd.: It is one of the largest FIBC suppliers in the country. The company is a major exporter of FIBC and woven products from India and has received the Top Exporter Award from the PLEXCOUNCIL, Ministry of Commerce from 2005-06 to 2010-11. As a strategy, to augment and retain its export competency, the company focuses on improving existing technologies and product engineering innovation through continuous expenditure on R&D and importing updated technologies.

4. Gopala Polyplast Ltd.: Started in 1984, it is a major manufacturer of woven fabrics for packaging and PP woven sacks. The company has undergone several modernisations. Through its diversification and modernization strategy, the company is trying to enter a niche market with premium, higher margin products along with its existing product line. It is focussed on continuously identifying the high growth products, like BOPP bags and makes a presence there

5. Gujarat Crafts Pvt. Ltd.: Gujarat crafts is a leading company in diversified Packtech products manufacturing. Its success mantra has been to consistently and strongly focus on client requirements, catering to the export demands from Caribbean, East/Middle Africa, North Africa, South/West Africa, East Europe, East Asia, Central America, North Europe, Middle East and South America with customised and specialised solutions as per the required specifications, colour and sizes.

6. Gujarat Raffia Industries: Gujarat Raffia Industries Ltd is one of the biggest players of in the Packtech particularly HDPE/PP woven sacks/bags. Gujarat Raffia has been growing at a steady rate of CAGR 4% on the basis of its installed capacities and varied product offerings and strategic in targeting the key user industry of fertilizers and food grains aggressively.

7. Jumbo Bags Ltd: Started in 1990, as part of the Bliss Group, it is one of the largest manufacturers of FIBC bags in India. Focussing on only manufacturing of different types of FIBC bags, the company has established vertically integrated manufacturing facilities that match economies of scale with an

efficient capital structure that enable cost competitive products, along with integration of R&D to offer superior and innovative FIBC solutions.

8. Neo Corp Ltd.: Neo Corp India Ltd, started as a woven sack manufacturer in 1988. In over two decades, it has grown to become a key sack manufacturer and also diversified into related Agrotech products making woven ground covers, vermibeds, mulch films and agro nets. It grew with a focus on export and enjoys a star export house status since 1994. It strategized to become "One shop for all woven packaging needs", investing in future and backward integration and developing itself as a multi location and multi market serving organisation. It had a turnover of Rs. 430 crore in 2012-13 growing from Rs. 289 crore in 2011-12. With strong focus on exporting and target on the select segment of woven Technical Textile products, the company is expected to have a steady growth in coming future.

9. Shri Ambica Polymers Pvt. Ltd.: A 100% EOU located in Gujarat, is a highly recognised export house and a key exporter of geotextiles and agrotexiles from India. A focus on meeting the desired quality of output, continuous technological improvement, development of skill set via trainings and regular monitoring and updation of systems to have the most up to date and efficient operations has been the key drivers of the company. It has strong presence in woven ground cover fabrics for Agrotech and Geotech, shade nets, FIBCs and Jumbo bags.

10. Shri Jagdamba Polymers Ltd: It is an Ahmedabad based packaging solutions manufacturers with presence in PP woven bags and fabrics, FIBC, Box bas and geotextiles. The company has latest technology machines to produce the best quality of product and provide complete solutions in woven polypropylene market. It strategizes at providing 100% customised products, focussing on both domestic and export market.

Homotech

1. Alps Industries: It is a highly diversified textile based organisation with presence in yarn, home textiles, fabrics, ready-mades and Technical Textiles. It diversified into Technical Textile by offering blind fabrics and upholstery fabrics for automotives. While it is a key player in blind fabric market, it is also establishing itself in providing value added end product solution of window blinds under the brand of "Vista".

2. Chiripal Group of companies: Chiripal a well reckoned name in the Indian textile industry diversified its existing textile business into the Technical Textile segment of flock fabric

manufacturing in 2001. Since then it has grown to become a major supplier of flock and velvet fabric with three dedicated flock lines imported from Germany and Taiwan.

3. Dinesh Mills: Dinesh Mills a well known suiting and traditional textile manufacturer diversified into Technical Textiles segment of Indutech and Hometech by manufacturing industrial filter fabrics for HVACs and industrial uses. It has been in the industry since 1964, and over years has established itself with a market share of around 40% in the sub-continent. The strategy of the company has been towards having updated and latest technology by incorporating newer machineries from across the globe, as well as strong customer centric approached focus on complete customer satisfaction.

4. Ginni Industries: Ginni Industries have been a pioneer of non woven manufacturing in India, starting their non woven operations in 1990. It has become a key player in non woven rolled good manufacturing and is strategically moving into private label and value added non woven domestic and medical wipe manufacturing. Along with developing a strong clientele for its non woven fabric, the company started to diversify into more value added Technical Textiles of non woven home and medical wipes. It is also developing offerings for medical textiles and is setting up a plant for medical textile manufacturing at Haridwar.

5. Hanung Toys & Textiles Ltd.: Hanung toys and textiles is the pioneer of soft toy manufacturing in India, with a legacy of more than 30 years. The company has a turnover of Rs. 180 crore and is the largest soft toy exporter form India. It strategically focussed on targeting the export market as the domestic market faced stiff competition from cheap Chinese imports. Strong vertical integration, stringent quality check and focus on product innovation and designing, Hanung Toys have been steadily grown to become the largest exporter and organised domestic player of soft toys in India.

6. Hunter Douglas Window Fashions: It is part of Hunter Douglas India Pvt. Ltd. Started in 1995, as a subsidiary of Hunter Douglas Group. It has strong presence in the blind and sunscreen segment, with a turnover of Rs. 64 crore in 2011-12. It has two plants located in Silvasa, Chennai and was further planning expansion. Its success mantra has been a strong focus on marketing and branding has close to 40 dealers well spread across both metro and tier I and Tier II cities across India, offering complete window solutions.

7. Khosla Profil Ltd.: Khosla Profil, started in 1979, has over years emerged as a key manufacturer of filter fabrics for usage in home ACs and ACUs as well as industrial usage. The company focuses on

manufacturing industrial fabrics with excellent quality and specification as per International Standards. Modern up to date technology, superior quality, adherence to International standards and reliability of both product and timeliness of delivery has been the success mantra for Khosla Profil.

8. Mayur Uniouters: Mayur Uniouters was established in 1980s with an aim to cater to the upholstery and fabric requirements of the automobile manufacturing unit of Maruti. Over the years it has grown to become one of the largest domestic players in PVC artificial leather fabrics used in automotive textiles as well as home furnishings and sportswear. It is focussing on creating stronger ties with global players to increase its reach and market.

9. Pals Plush: Founded in 1996, Pals Plush is one of the leading organised stuff toy manufacturing company in India. It has presence in both India and China and has strategically placed itself in Indian markets driving its competitiveness by coupling Indian skilled labour with modern and up to date Chinese technology. It has a strong supply chain with China and utilises the designing and trend analysis of Indian and China to identify the key designs to target. These factors have helped the company make a mark for itself in the stuff toys market.

10. Reliance Industries: Reliance Industries is one of the top industrial and business houses in India. Over the years, become the single largest supplier of fibre fill in Indian domestic industry catering to over 50% of the market. The company besides catering to fibre fill demand has also developed its own line of business of mattresses and pillows branding its fibrefill as *Recron*. To crease higher value, it provides exclusive finishes like anti microbial finish to its recron offerings. It has also diversified into other Technical Textile sectors of high tenacity polyester and industrial ropes and agro based nettings of polypropylene.

Clothtech

1. Avery Dennison India Ltd.: Avery Dennison India Ltd. is a leader in labelling and packaging materials and solutions. It has been at the forefront of Clothtech labels manufacturing in India. Channelized approach towards achieving economies of scale, focus on R&D, product innovation and strong branding and marketing focus along with up to date manufacturing technology setup has been the key drivers for growth the company. The company had a sales turnover of Rs. 894 crore in the year 2012-13.

2. Bombay Dyeing: Bombay Dyeing began its operations in the year 1879 as a small operation of Indian spun cotton yarn. Over the years, the company has grown to one of the most respected

and trusted brands in the country. Envisaging an opportunity in Technical Textiles, the company decided to diversify into manufacturing of Interlining. Delivering the best quality products at an outstanding value for money has been the motto for the organization. In the year 2012-13, the company had a sales turnover of Rs. 2375 crore. Bombay Dyeing has always been at the forefront of launching innovative products and setting new trends and plans to start various new product categories.

3. Ruby Mills Ltd: Ruby Mills was incorporated in the year 1917 as a Composite Textile Mill manufacturing cottons. It strategized to diversify in the upcoming sector of Technical Textiles and hence moved into manufacturing Micro Dot Fusible Interlining and Basic Interlining, in technical collaboration with Gygli Textil AG, Switzerland in the year 1996. The company is a trend-setter in the textile industry due to consistent quality and research used in the manufacturing of the product. The company has a sales turnover of Rs. 246 crore. Strong R&D focus and continuous efforts to create value for the customer by providing accessibility to a wider range of products at competitive prices has been the success mantra for the company.

4. Shri Lakshmi Cotsyn Ltd.: The textile conglomerate Shri Lakshmi Cotsyn integrated its textile operations. The company moved into Clothtech Technical Textile with an aim to reduce its garment component procurement risk and has established itself as a major interlining manufacturer with annual capacity of 25 million metres.

5. Siddharth Filaments: Siddharth Filaments was established in the year 1994. The company is engaged in manufacturing, supplying and exporting a significant range of Hook & Loop fasteners in Technical Textiles industry. With a sales turnover of Rs. 3.72 crore, the company has an experienced R&D department along with large production capacity. Focus on producing high quality products and providing customized solutions to the customers are the key growth drivers. The company exports around 60-80% of their products to countries in North Europe, South America and South/West Europe.

6. Sky Industries: Sky Industries Ltd., subsidiary of SK Group of Companies, was established in the year 1989. The company has evolved over the years from being one of the smallest players to owning the highest market share. With a sales turnover of Rs. 63 crore in the year 2012-13, the company is the largest manufacturer of all kinds of elastics and other narrow fabrics in Technical Textiles industry. Sky Industries has gained reputation not only in domestic market but also in international market through exporting high quality products to countries like US, Canada and Europe. Focus on R&D, product

innovation along with up to date manufacturing technology setup are the key growth driver for the company.

7. Spica Industries Ltd.: Spica Industries Ltd. has established itself as the leading manufacturer of quality Elastic Narrow Fabrics in India. Continuous modernization, along with a strong technical workforce and advanced research facilities allow the organization to provide best-in class products to its customers. It had a sales turnover of Rs. 73 crore in 2011-12. From international presence, to strong R&D and turnaround times are the major factors leading to growth of the company in Technical Textile industry. It strategically moved out of the hook and loop fastener business and focussed on the more lucrative elastic fabric business in 2012.

8. Supreme Non-woven.: One of India's largest diversified non-woven player, Supreme Non-woven has presence across Mobiltech, Indutech, Clothtech, Geotech and non-wovens. The company is a key supplier of non-woven interlinings. Strategic focus on core industry of non-woven, constant investment in various growth platforms and continuous promotion of a culture of innovation has been the success mantra for Supreme Non-wovens. This coupled with strategically selected locations and clientele which is located at geographic proximity and a state of the art infrastructure has been the driving the business.

9. Vardhman Yarn and Threads Ltd. : Vardhman Yarns and Threads Ltd. , established in the year 1982, is a joint venture between Vardhman Textile Ltd. and American & Efird LLC, US. Vardhman is one of the world's foremost manufacturers of industrial sewing thread under Technical Textile industry. This strategic joint venture leverages the strength of both the parent companies to expand thread sales in India, which forms the success mantra for the company. Vardhman had a sales turnover of Rs. 464 crore in the year 2011-12. Vardhman aims to be the biggest textile organization in the world by providing its customers a diverse range of innovative and achieving excellence in manufacturing.

10. YKK India: YKK India Pvt. Ltd. was incorporated in the year 1995 for the manufacturing of metallic and non-metallic zippers. Manufactured to rigorous quality-control standards within a vertically integrated production system, YKK has been a market leader globally. YKK India caters to the large and spread out Indian market of Garments, Footwear, and Luggage, Leather garments, bags and home furnishing. Growth through taking new challenges, product appeal and proposals supported by technology are the three keys to success for the company. Sales turnover for YKK was Rs. 320 crore in the year 2011-12.

Protech

1. Alok Industries Ltd.: It started its Technical Textile operations in 2009, with offerings like anti microbial finishes, anti static finishes, etc. It strategized to offer not only intermediate finished fabrics but also high value added end products and soon thereafter started its industrial work wear division targeting specifically Technical Textile requirements like fire retardant fabrics and garments, oil and mosquito repellent offerings, anti microbial and high visibility offerings. High value added offerings to a diversified customer base involving many different industries across both domestic and export market has been the key strategy for the company.

2. Arvind Advanced materials: Arvind Limited started its Technical Textile division in late 2000. Arvind's growth strategy for Technical Textiles has largely been rapid expansion and diversification using global partnerships and strategic alliances. It has strategically selected areas that have widespread application across industry to expand its Technical Textile business. While the JV with PD fibreglass and OG Corporation are still in a nascent stage it has provided a very comfortable platform for Arvind to foray further into Technical Textiles. Arvind has invested over Rs. 50 crore in each of the Joint ventures to develop this strong presence in Technical Textiles.

3. Entremonde Polycoaters Pvt. Ltd.: Entremonde Polycoaters is a pioneer in Technical Textile industry in India with over three decades of manufacturing history. It has grown to be a Rs. 34 crore company by 2012, with strong focus on research and innovation. Its mantra to growth has been continuous innovation and research aimed at developing newer coated Technical Textile offerings for protective Technical Textiles like breathable fabrics for High altitude clothing, fabrics for NBC clothing, etc.

4. Jayashree Textiles: Jayashree textile a division of Aditya Birla Group is another significant player in the fire retardant fabric market in India with offering of acrylic and mod-acrylic based inherent fire retardant fabrics. It has been focussing on continuous innovation and high quality offering in the industry through R&D and technology acquisition.

5. Kusumgar Corporates: Kusumgar Corporates in a Rs. 57 crore organisation started in 1970, with an aim to meet the continuously evolving textile needs. Over years, it has established itself as a major Technical Textile manufacturer with presence in many different Protective Technical Textile products like fabrics for protective jackets, high altitude clothing, NBC, rain coats and other protective wears. Strong technical research and innovation coupled with strategic value addition to make the overall product attractive has been the key mantra for

Kusumgar corporate. Going forward Kusumgar aims to capitalise on growing Indian market by focusing on coated Technical Textile offerings and exports

6. Malcolm Industries.: It is a well known name in the protective Technical Textile industry since 1983, with offerings ranging from industrial gloves to industrial work wear and safety shoes. With a focussed approach to target only the industrial protective work wear segment, it has strategically offers the integrated coated personnel protective equipment offering to both domestic and export market.

7. MKU India Pvt. Ltd.: it has a legacy of more than 25 years in protective offerings catering both domestic and export markets. It has a strong presence in ballistic jackets and ballistic protection equipments. Its strategy has been continuous and focussed institutional sales along with high quality and continuously evolving and updated ballistic protection offerings.

8. Rajasthan Spinning & Weaving Mills: Rajasthan Spinning & weaving mills have been on the fore front of fire retardant fabric solutions in India. It has had a well known presence in the industry and focuses on catering to Institutional sales, which are the key consumers of the product. It strategized in offering high quality Inherent and coated fire retardant solutions with Indian Railways as its major clientele for the product.

9. Shri Lakshmi Cotsyn Defence: The textile conglomerate Shri Lakshmi Cotsyn diversified into offering protective Technical Textiles in 2003, by starting Shri Lakshmi Cotsyn Defence aimed at offering technical and security related Protech fabrics indigenously. It is involved in manufacturing of bullet proof jackets, high altitude clothing, NBC and fire retardant suits and well as tentage fabrics. It has strategically targeted the institutional consumption of Indian armed forces and tactically designed its offerings to cater to all the technical fabric requirement of the armed forces.

10. TATA Advanced Materials Limited: TAML is one of the oldest players in the Protech segment offering Bullet proof jackets. Over years, it has diversified into high value addition products like composite manufacturing and component manufacturing of defence systems. It aims to grow by continuously maintaining its presence in bullet proof offerings while expanding its presence in other less competitive and high value adding composite offerings for defence industry.

Geotech & Oekotech

1. Flexituff International Ltd.: It is one of the largest FIBC suppliers in the country, who strategically diversified to the Geotech manufacturing on account of growing export potential. The company is a key

exporter of FIBC and Geotextiles products from India and has received the Top Exporter Award from the PLEXCOUNCIL, Ministry of Commerce from 2005-06 to 2010-11. As a strategy, to augment and retain its export competency, the company focuses on improving existing technologies and product engineering innovation through continuous expenditure on R&D and importing updated technologies.

2. Garware Wall ropes: It started in 1976, as a polymer cordage manufacturer, Garware also diversified into Geotextiles woven fabrics and gabions. Innovation with high quality and continuous research has been the key strategy for Garware.

3. Meccaferrri Environmental Solutions Pvt. Ltd.: A global pioneer in geotextiles and geo-synthetics, Mecaferri started in India in 1998, with focus on geosynthetic and infrastructure product manufacturing in Pune. A holistic approach of providing customise Geotextiles solutions involving additional efforts on designing and long term environmental sustainability of the products has been the selling factor for the company, which has associated itself with many high credential projects and clients like J&K Flood Control, NHAI, Kolkata Port Trust, Water resource Department, etc.

4. SKAPS Industries (India) Pvt. Ltd.: A pioneer and a leading player in geo-synthetics and geo-textiles, SKAPS has been working in Indian Geotextiles sector since 2005, and has established itself as a major exporter of geotextiles from India with a sales of Rs. 198 crore in 2012-13. A strong focus on developing quality products with value addition in terms of development of PVDs and exclusive targeting of export market has been the driving SKAPS' success.

5. Shri Ambica Polymers Pvt. Ltd.: A 100% EOU located in Gujarat, is a highly recognised export house and a key exporter of geotextiles and agrotexiles from India. A focus on meeting the desired quality of output, continuous technological improvement, development of skill set via trainings and regular monitoring and updation of systems to have the most up to date and efficient operations has been the key drivers of the company. It has strong presence in woven ground cover fabrics for Agrotech and Geotech, shade nets, FIBCs and Jumbo bags

6. Shri Jagdamba Polymers Ltd: It is an Ahmedabad based packaging solutions manufacturers with presence in PP woven bags and fabrics, FIBC, Box bas and geotextiles. The company has latest technology machines to produce the best quality of product and provide complete solutions in woven polypropylene market. It strategizes at providing 100% customised products, focussing on both domestic and export market.

7. Strata Geosystems (India) Pvt. Ltd.: A subsidiary of the globally known Strata Geosystems, the company is a leading geotextile solution provider for soil re-inforcement. It is present mainly in geogrid manufacturing and is the leading exporter of geogrids from India. A customer centric approach, with focus on high quality, environmental sustainability and innovation for reusability has been the key selling factors for Strata's success.

8. SVM Non wovens.: SVM Nonwoven is a Hyderabad based non woven manufacturing company, present in industrial non woven filter fabrics, automotive carpets and geotextiles and geo-bags segments of the Technical Textiles. Backed by a skilled team and a focus on higher quality at optimum pricing has been the approach of the company. This coupled with unique featuring of products and worldwide network to target export clients has been the driving force behind its success.

9. Techfab India Pvt. Ltd.: Founded in 2003, with an aim to provide world class geosynthetic products and consulting services in geo-synthetics, Techfab has diversified into a host of products within the geotextiles segment with focus on high value adding products like re-inforced non woven composites, PVDs, Geogrids, Geo bags and geo-tubes along with the traditional geotextile fabrics. A channelized approach of focus on higher value addition products along with providing complete solution from product sale to consulting of implementation of geotextiles has been the success mantra for Techfab.

10. Terram Geosynthetics Pvt. Ltd.: A renowned name in geo-synthetics and geotextiles Terram started in Ahmedabad as an EOU and has grown with a focussed approach towards export marketing and non woven geotextile manufacturing to a Revenue of Rs. 20 crore in 2012-13, from geotextiles.

Indutech

1. Carborundum Universal Ltd. (CUMI): Founded in 1954, as a collaboration of Murrugappa Group, Carborundum CO., USA & Universal Grinding Wheels, UK, the company pioneered in manufacture of Coated Abrasives, Bonded Abrasives, and Nonwoven. It has an offering of over 20,000 products today, attaining a reputed position in coated abrasives market of Indutech. Strong focus on quality and innovation coupled with a state of the art modern manufacturing facility and strategic alliances with global partners has given CUMi the necessary competitive edge in the market.

2. Dinesh Mills: Dinesh Mills a well known suiting and traditional textile manufacturer diversified into Technical Textiles segment of Indutech offering filter fabrics and paper making fabrics. It has been in the industry since 1964, and over years has established

itself with a market share of around 40% in the sub-continent. The strategy of the company has been towards having updated and latest technology by incorporating newer machineries from across the globe, as well as strong customer centric approach focus on complete customer satisfaction.

3. Fruedenberg nonwovens India Pvt. Ltd.: Fruedenberg Nonwovens India is a key supplier of non woven shoe industrial filter fabrics. Customer value, a culture of innovation, leadership, trust, respect, responsibility and long-term orientation have been the values helping the organisation grow into a major non woven supplier with manufacturing located at Chennai and Pune.

4. Garware Wall ropes: It started in 1976, as a polymer cordage manufacturer and over years has grown to become one of the largest cordage and nettings manufacturer in the world and a key manufacturer and exporter of ropes and cordages. Innovation with high quality and continuous research has been the key strategy for Garware, like development of higher strength SNG nettings. It has revenue of Rs. 689 crore in 2012-13, growing at 9% y-o-y, with 50% of it coming through exports. Garware plans to further strengthen its netting offerings targeting newer markets in Africa.

5. Khosla Profil Ltd.: Khosla Profil, started in 1979, has over years emerged as a key manufacturer of industrial filter fabrics. The company focuses on manufacturing industrial fabrics with excellent quality and specification as per International Standards. Modern up to date technology, superior quality, adherence to International standards and reliability of both product and timeliness of delivery has been the success mantra for Khosla Profil.

6. Owens Corning India Pvt. Ltd: Owens Corning is the market leader in glass composite and glass fibre offerings in India catering Indian market since 1998. It initially focussed on having an organic growth by developing state of the art manufacturing unit for advanced composite solutions and has three operational plants in India. It now focuses on expanding its presence to Joint Ventures and strategic alliances and is actively looking for it.

7. Sahnrea Technical Textiles: Started in 1997, as a convertor of belting fabrics, Sahnrea Technical Textiles Ltd., soon strategized to integrate its Technical Textile operations for belting fabric manufacturing. It currently stands as one of the most reputed dipped and belting fabric manufacturer in India having a capacity of 160 MT with the finest and modern machinery for Technical Textiles installed in its premises.

8. SRF Limited: SRF Limited is one of the leading Technical Textile players in the country today with a turnover of Rs. 1810 crore from Technical Textile

business in 2013-14 growing at 8% over 2012-13. It has been on the fore front of nylon and polyester tyre cord manufacturing. However, with slowing demand, it was quick to re-strategise and identify key areas for focus. It is now a leading manufacturer of belting fabrics and industrial yarns. Continuous approach towards new and innovative product development has been the mantra for the company.

9. Supreme Non-woven.: One of India's largest diversified non-woven player, Supreme Non-woven has presence across Mobiltech, Indutech, Clothtech, Geotech and non-wovens. The company is a key supplier of non-woven filtration fabrics for dry and wet applications. Strategic focus on core industry of non-woven, constant investment in various growth platforms and continuous promotion of a culture of

innovation has been the success mantra for Supreme Non-wovens. This coupled with strategically selected locations and clientele which is located at geographic proximity and a state of the art infrastructure has been the driving the business.

10. SVM Non wovens.: SVM Nonwoven is a Hyderabad based non woven manufacturing company, present in industrial non woven filter fabrics, automotive carpets and geotextiles and geobags segments of the Technical Textiles. Backed by a skilled team and a focus on higher quality at optimum pricing has been the approach of the company. This coupled with unique featuring of products and worldwide network to target export clients has been the driving force behind its success.

Part B. Segment Wise Information On Technical Textiles In India

12. Agrotech

Agrotech includes Technical Textile products used in agriculture, horticulture (incl. Floriculture), fisheries, animal husbandry and forestry.

List of Products

The key Technical Textile products under the segment are further:

- Shade-nets
- Mulch-mats
- Crop-covers
- Anti-hail nets and bird protection nets
- Fishing nets
- Other Nettings for agriculture



Mulch Mats



Anti bird nets



Crop covers



Harvesting nets



Shade nets



Hail nets



Fishing nets



Root ball nets

Market-size and trends

The total market size of Agrotech is estimated to be Rs. 826 Crore. Close to 97% of the entire market is being catered by domestic supply. The market is driven by domestic consumption with exports market contributing 23% to the total market, with a major product being exported is fishing net. Product wise market size estimate has been shown in Exhibit 38. The domestic market is expected to grow to Rs. 881 crore by 2015-16 while the exports are expected to reach Rs. 310 crore by 2015-16 and to Rs. 1,614 crore by 2017-18. Overall the market is expected to grow at 12%.

Exhibit 38: Market summary of Agrotech

Agrotech		2012-13					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	Import	Exports	Domestic	Total	Export	Domestic	Export	Domestic
Shade nets (including plant nets)	Value (Rs. Crore)	145	-	11	134	145	12	167	13	261
	Volume (MT)	5,783	-	440	5,343	5,783	462	6,679	509	10,436
Mulch Mats	Value (Rs. Crore)	14	-	-	14	14	-	17	-	22
	Volume (MT)	692	-	-	692	692	-	796	-	1,053

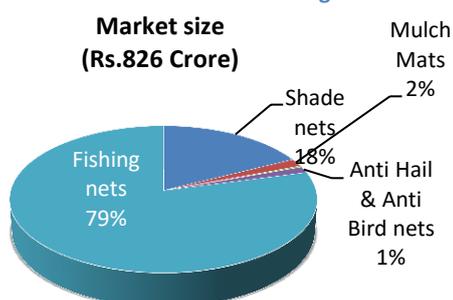
Agrotech	Product	Unit	2012-13				2013-14 (E)		2015-16 (P)		
			Production	Import	Exports	Domestic	Total	Export	Domestic	Export	Domestic
Crop covers	Value (Rs. Crore)		2	-	2	-	2	2	0	3	0.5
	Volume (MT)		171	-	148	23	171	170	27	225	36
Anti Hail & Anti Bird nets	Value (Rs. Crore)		11	0	0	11	11	0	14	0.2	21
	Volume (MT)		333	1	4	330	334	4	412	5	644
Fishing nets (including other agro nets)	Value (Rs. Crore)		638	16	170	484	654	204	513	294	576
	Volume (MT)		18,229	457	4,857	13,829	18,686	5,829	14,658	8,393	16,470
Total	Value (Rs. Crore)		810	16	183	643	826	218	711	310	881

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis P=Provisional

*Total market size is calculated as imports + domestic production

Fishing net is the largest product in the segment having 79% share in the market size of the segment. Shade-net is the other key product of the segment. Rest of the products have relatively much smaller share of less than 2% of the market. The product wise market share is as shown:

Exhibit 39: Product wise market share under Agrotech



Key players manufacturing agro textiles are as follows:

- Garware Wall Ropes Ltd.
- Rishi TechTex Ltd.
- Netlon India Ltd.
- Neo Corp Ltd.
- CTM Agro textiles Ltd. –
- Safeflux Pvt. Ltd.
- B & V Agro and Irrigation Co. Pvt. Ltd.
- Flora Agrotech Pvt. Ltd., Valsad

The profitability and capital employed by the key player are as shown in Exhibit 40

Exhibit 40: Profitability of key players - Agrotech

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Garware Wall Ropes Ltd.	31404	31484	4%	4%
Rishi TechTex Ltd.	1514	1542	-267%	3%
Parryware Enterprises India Ltd.	4249	5477	-6%	-2%
Neo Corp Ltd.	38717	33077	4%	6%
CTM Agro textiles Ltd.	674	542	1%	0%
Fiberweb India Ltd.	7685	7697	-2%	6%

Source: Annual reports of companies

The detailed analysis of each product of the segment is done in the subsequent sections

High potential products

In Agrotech segment, there are ten different products, most of which are netting products. While a majority of them have a very small market in India, Shade nets is one product that has shown considerable growth

during the last five years. Also with the focussed effort to promote use of agro textiles through various schemes of National horticultural Mission and National Horticultural Board, the demand for shade nets are expected to grow at 25% per annum during the next three to five years. Given the fact that, raw material for

these nettings is easily available in India, shade net is a high potential product, which should be focussed on by new entrepreneurs and investors.

Shade Nets

Shade nets have widespread applications in floriculture (roses, orchids, etc), horticulture (Cabbage, pepper, Grapes etc), vanilla cultivation, tea plantations, drying of agri-products, cattle-sheds, parking lots, swimming pools, etc. The shade nets provide protection to the plants from wind, extreme weather conditions and reduce water evaporation.

India with more than 32 MT of fruits and 66 MT of vegetables is the second largest producer of fruits and vegetables. India is the second largest producer of flowers after China with about 1,15,921 hectares of area under floriculture. India has adopted some of the newer techniques for agriculture, but modern techniques involving the use of polymers are still lagging behind. In comparison, China's agricultural sector uses modern techniques and consumes products like shade nets extensively. Hence, the potential of the shade-nets market in India is huge, in comparison with its existing usage.

Product characteristics

Shade nets are generally made of Polypropylene or HDPE in knitted or woven form. Shade-nets are tough, durable, tear resistant and light weight. The standard sizes of nets available are 2, 3, 4 & 8 metres in width and 25, 50 and 100 metres in length. The most common dimensions of these nets are 3 m (width) by 50 m (length) with GSM of 120 to 180. The shade nets are generally Green or Black in colour. The shade percentage, which indicates the degree of shade provided by the shade-nets, varies from 25 percent to 90 percent. The shade percentage depends upon the application / plants under cultivation.

Exhibit 41: Usage pattern of shade net

Type of Crop	Recommended shading
Roses, Strawberries, Gooseberries, Tomatoes, Cucumber and fruit bearing plant	25%
general Pot and foliage plants and Cut greens, Orchids, Anthuriums, Ginger,	50%
Indoor plants, certain Orchids, plantation crops, Tea, Coffee, Cardamom	75%
Cattle sheds, Poultry houses, and vehicular shades	95%

Source: Industry survey

Key Application Areas Of Shade-Nets

The key application areas of shade nets are as follows:

- Agricultural applications – horticulture and floriculture plantations, grape cultivation, orchid plantations, tea plantations, nurseries, as a net along with green houses
- Non-agricultural applications – swimming pool coverage, parking lots, etc

The demand for shade nets largely depends upon the usage in floriculture and horticulture. The increasing awareness of the benefits of using shade nets and assistance from schemes of National Horticulture Mission (NHM) are making a significant impact on the demand.

The demand for shade nets for grapes cultivation is slowing down as farmers are increasingly using paper instead of shade nets. The papers help to protect the plants from cold climate apart from providing the functionality of shading. However, the inspection of plants for any disease becomes difficult in case of paper usage.

The tea garden nurseries hold a lot of potential for shade-nets. The shade nets usage in the tea gardens nurseries is derived from the number of tea gardens going for re-plantation. Since the re-plantation of tea gardens is fairly minimal in India, shade nets usage is not significant in tea gardens.

The demand for shade nets is also increasing in non-agricultural applications like parking lots, garden fences, etc.

Plant Nets

Plant nets are nettings of PP or HDPE very similar to shade nets which are used to cover plants preventing them from birds, insects and animals.

National Horticulture Mission Subsidy Norms

National Horticulture Mission (NHM) provides subsidy to farmers for using shade net up to an extent of Rs. 710 per sq m limited to a maximum of 50% of the cost and for a maximum land area of 4000 sq. ft area per beneficiary for tubular shade net in plain terrain and Rs. 816 per sq. m for hilly terrain. The details of subsidy for other types of shade nets are listed in the following exhibit:

Exhibit 42: NHM subsidy for shade nets

Shade net type	Cost norm	Limitations
Tubular structure	Rs. 710/sqm Rs. 816/sqm for hilly areas	50% of cost limited to 4000 sqm. per beneficiary
Wooden structure	Rs. 492/sqm Rs. 566/Sqm for hilly areas	50% of cost limited to 20 units per beneficiary (each unit not to exceed 200 sqm)

Shade net type	Cost norm	Limitations
Bamboo structure	Rs.360/sqm Rs.414/sqm for hilly areas	50% of cost limited to 20 units per beneficiary (each unit not to exceed 200 sqm)

Source: NHM website

Market Size And Trade Trends

Subsidy under National Horticulture Mission (NHM) is the biggest driver for the market of shade nets. Currently NHM is offering a subsidy of up to 50% of the cost of shade nets limited to a maximum of 2 hectare per beneficiary. The usage of shade nets through NHM accounts for close to 80% of the usage of shade nets in India. This figure has been continuously growing at over 20%. In 2012-13 as per NHM reports, a total of 1415 Hectares of area was cultivated under shade-nets in India as against a target of 1322 hectares, indicating that more and more farmers are now opting for shade nets.

Market Size Estimate

The domestic market for shade nets and plant nets in India is estimated to be of 4,343 MT amounting to Rs. 134 Crore priced at an average of Rs. 30 per sq metre of area. In addition to this India has been exporting shade nets to a tune of about 440 MT amounting to Rs. 11 Crore in 2012-13. The total market size of shade nets has been shown in the table in the following exhibit:

Exhibit 43: Market size estimate for shade net

	2012-13
Quantity (in MT)	5,783
Value (in Rs. Crore)	145

*source: IMAcS analysis, industry sources, NHM reports 2012-13

The market has grown by 30% over last 5 years. The domestic market has been key driver for the industry growing at 36% while the exports have declined during the last five years. The total area for use of shade nets has also increased as compared to what it was in 2007-08.

Key Growth Drivers and Inhibitors

The market would mainly be driven by purchases via National Horticulture Mission subsidies. The focus of the NHB on development of horticultural crops in India has been a major driver for the industry and would continue to grow the industry. However, the lack of awareness about the benefits of shade-nets in most of the rural regions of Uttar Pradesh, Bihar, Maharashtra, Andhra Pradesh and interior Maharashtra which are major cultivators of horticulture crops, vegetables and

cash crops in India, has acted as a major hindrance in wide spread acceptability of the product. The market of shade nets sees high potential growth with more farmers opting for commercial farming and growth of large plantations. The domestic market is expected to grow at 25% in next three years on account of aggressive promotion through NHM and NHB subsidies. The export market is expected to grow at 5% p.a.

Key Manufacturers

Shade nets are mostly manufactured by netting manufacturers in India. As shade net in itself is not a very big business in India, many players are also in to production of other net products like hail nets, fishing net and sports nets. Key manufacturers of shade nets are:

- Neo Corp India Limited
- Netlon India Limited
- Garware Wall Ropes Limited
- Rishi Techtex Limited

Import export scenario

India is a net exporter of shade nets with exports of Rs. 11.14 Crore. In 2012-13, majority of export of shade net was done under the HS code 39269099. Other key HS codes for export were 39262099, 58061800, 6059000 and 94060011. The growing demand of shade nets in India which has grown by 30% each year over the last 5 years has been a major factor for declining exports. On the other hand, an import of shade net is negligible at just Rs. 8 lakh in 2012-13. The details of HS codes under which the exports have been done can be seen in the following exhibit:

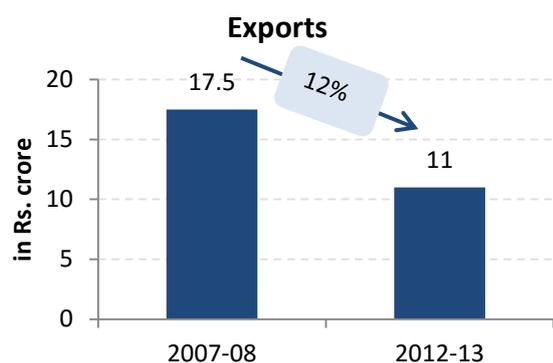
Exhibit 44: Export of shade nets from India

HS Code family	HS code description	HS codes	Export 2012-13
3926	Articles of Polypropylene, plastic,	39269099	Rs. 11.1 Crore
5608	Made up nettings of nylon	56081110	
	Other knotted netting of twine, cordage or rope of man-made textile materials	56081900	
9406	Green houses- in ready to assemble sets	94060011	

*source: IMAcS analysis, DGCIS, DGFT

The trend for exports is shown in the following exhibit:

Exhibit 45: Import export trend for shade nets



Source: IMaCS analysis, DGFT, DGCIS

The key countries where shade nets are being exported to are:

1. UAE – 54%
2. Kenya – 24%
3. Saudi Arabia – 7%
4. Oman – 4%
5. Guatemala – 4%

Machinery Details

Existing HDPE Woven sack processors can manufacture HDPE Agri-shade nets on the same tape extruder with an additional investment in knitting machines. Thus increasing the product mix leading to higher capacity utilization of the machinery would bring in a higher net profitability.

The Rachel knitting machines used for manufacturing shade-nets are mostly imported. GCL India Pvt. Ltd (Bangalore) is one of the local manufacturers of Rachel knitting machines. The key Rachel knitting machinery manufacturers in the world are Karl Mayer (Germany), LIBA Maschinenfabrik GmbH (Germany) and Bruckner Technology Holding GmbH (Germany).

The Indian associates / suppliers for these machinery manufacturers are:

- ATE engineering (Bombay) for Karl Mayer
- Bruckner Machinery and Service India Pvt. Ltd (Pune) for Bruckner.

Quality Standards

Different standard for shade nets as per BIS are:

- IS 16008:2012 – It defines specification of shade nets for horticulture and agricultural purposes for different shadings of the net – 50%, 75% and 90%.

Mulch Mats

Mulching is defined as covering of soil around the plants to conserve soil moisture, prevent weeds and modify soil temperature. It is an effective practice to restrict weed growth, conserve moisture and reduce the effect of soil borne diseases through soil

solarisation. Black film prevents the germination and growth of weed seeds in contrast to clear film. It absorbs more sun energy and retains higher heat underneath the film. Mulching has been helpful in not only preventing moisture loss through evaporation from the soil and lowering the temperature but also reducing nutrient loss by leaching and weeds control where chemical fertilizers and weedicides are used. Mulching also reduces run-off, increase penetration of rainwater, controls erosion, corrects the chemical balance of the soil and reduces damage done by pests and diseases. Apart from these major results mulching produces secondary effects such as improvement of soil structure, increase in micro-activity, earthworm populations and root systems that are more extensive.

In India, straw, hay, sawdust, asphalt paper, etc is traditionally used for mulching. Use of Technical Textiles for mulching is yet to gain momentum.

Mulch mats keep ripening fruits, off the soil. The reduced contact with the soil decreases fruit rot as well as keeps the fruit and vegetables clean. This is beneficial for the production of several fruits including strawberries. Before plantations of the seedlings, the beds of the field are covered with the mulch mats (generally a black opaque film) and the holes are made at the desired spots where in the seeds are planted. The use of mulch mats along with the use of drip irrigation can lead to significant increase in productivity. But, the non-biodegradable mulches must be removed from the field and disposed of properly.

Product Characteristics

Mulch mats are made of both natural (wool and jute) and man-made fibres (LLDPE, HDPE). Mulch mats can be classified as:-

- Woven
- Non-woven

Wool fibre is used for designing **Non-woven Mulch mat** and fibres like jute and cotton are used for **Woven mulch mats**. In addition polypropylene is also used for manufacturing both woven and non woven mulch mats.

Mulch mats made of biodegradable material are incorporated into the soil as fertiliser for the next crop. Wool mulch mats allow water to enter in to the soil (unlike black sheet) and act as a barrier to prevent excessive soil desiccation during dry period. It also provides better insulation and prevents damage from ground frost.

In addition, HDPE/LLDPE mulch films which are cheaper and last for few months to a year are more commonly used for mulching in India.

National Horticulture Mission Subsidy Norms

NHM gives subsidy at the rate of Rs. 32,000 per hectare for plain areas and Rs.36,800 per hectare for hilly areas for cultivation using plastic mulching limited to a maximum of 50% of the cost and 2 hectare of area per beneficiary. However, there are no set norms of subsidy for textile based mulching.

Market Size and Trade Trends

Mulch mats are used for protection of low lying cash crops and exotic horticultural crops like strawberries, water melons, and low height flowers. The use of mulch mats in India is promoted through NHM via its 50% subsidy for installation of mulch mats. In 2012-13 a total of about 15,400 hectares of area was cultivated using mulch mats in India through benefits from NHM. However, due to the shorter life of mulch mats which generally lasts two crop cycles, the replacement market for mulch mats is very high. The average rate of replacement of mulch mats is close to 2 years in India. Based on the data from NHM reports, the total replacement of mulch mats occurring in 2012-13 is close to 15000 hectares for plantations under NHM. Due to the high value of exotic horticultural crops cultivated under mulch mats and the low cost of mulch mats, many farmers and plantations purchase mulch mats through open market instead of through NHM. As a result the share of NHM sales in total mulch mats is limited to just about 40% of the entire market.

Market Size Estimate

The total market for Mulch films in India is estimated to be 3462 MT worth Rs. 72 crore. However, a majority of it is constituted by plastic mulch films which are a cheaper substitute of the woven or non woven fabric mulch mats. Out of the total market of mulch films, the market of woven and non woven mulch mats is estimated to be of 692 MT worth Rs. 14 crore. As there is insignificant import and export of mulch mats from India, the market potential is mostly dependent on domestic consumption. The table below shows the market size estimate for Mulch mats in 2012-13

Exhibit 46: Market size estimate for Mulch Mats

	2012-13	
	Total mulch film – Plastic & non woven/woven	Nonwoven/ woven mulch mats
Quantity (in MT)	4632	692
Value (Rs. Crore)	72	14

*source: iMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

The increase in cultivation of high value crops - vegetables, exotic fruits like strawberries, pine-apples,

cash crops like ground nuts and flowers has been the key for the growth in use of mulch mats. While many farmers purchase it via NHM, due to its cheaper cost and high margins in the crops it is used for, many farmers have now started to purchase mulch mats from open markets. This has led to far more sales than estimated via NHM, as more and more farmers are opting for it seeing the benefits. Deeper penetration in awareness of the product across the country and increasing preference for vegetables and fruits as compared to staple crops are the key factors for the growth of mulch mats in India. The entire demand of mulch mats is met via domestic supply with negligible exports and imports. The domestic market for woven and non woven mulch mats is expected to increase at 15% per annum driven by efforts of NHM.

Key Manufacturers

Some of the major manufacturers of mulch mats are Neo Corp International Ltd., Alpha Foam Pvt. Ltd., Fiberweb India, Shivam Polymers, Climax Synthetics Pvt. Ltd, Creative polymers Pvt. Ltd and Essen Multipack Ltd. Many of these players are located in Gujarat. Most of the manufacturers of mulch mats are small-scale industries.

Import Export Scenario

Foreign trade of mulch mats from India has been insignificant. The details of HS codes under which the exports have been done can be seen in the following exhibit:

Exhibit 47: Export of mulch mats from India

HS Code family	HS codes	HS code description
3926	39269080	Polypropylene articles, n.e.s.
	39269099	Other articles of plastic nes
5603 & 5608	56031200	Coated, covered or laminated non-woven made from manmade filament with weight more than 25 g/ SQM
	56089090	Other twines , cordages and ropes

*source: iMaCS analysis, DGCIS, DGFT

Machinery Details

Monolayer Blown Film Lines as well as Multilayer Blown Film Lines are used for the manufacture of mulch films. Monolayer lines give higher specific output per screw RPM. They have grooved feed technology for forward movement of the raw material and candle type screen changer to ensure wastage control and long production runs.

The machinery required is available locally and there are number of manufacturers for the same. The major

Indian manufacturer of these lines is Kabra Extrusion Technik Ltd (KET). A Plastic Mulch Laying Machine was also developed at CIAE, Bhopal.

The machinery required for non woven and woven mulch mats and ground covers have been covered under Chapter 2 – Technology of part D of the report.

Quality Standards

The Mulch Films (HDPE & LDPE) are covered under IS 10889:2004, IS 2508:1984.

IS 16190:2014 provides specifications for woven ground cover for horticultural applications.

In addition, Finalised draft standards for specifications of woven ground covers have been developed as 35 (1089) and draft standards for specification non woven ground covers for horticulture named as 35 (1237) are under preparation.

Crop covers

Crop-covers create an excellent microenvironment for seed germination and seedling growth. A crop-cover is placed over a large area (several rows) of a crop. In cooler climates, crop-covers are often placed over direct seeded rows or recently transplanted crops to create a warmer, more humid microenvironment to facilitate rapid plant establishment of warm season crops. Crop covers also provide crop protection from insects.

Advantages of using crop covers:

- Higher soil and air temperatures compared to those in the open field which leads to early harvest
- Protect crops from rain, hail, snow and wind
- Providing protection against insect pests
- Improvements in seed bed conditions
- Crop covers can also be used as a means to separate varieties to maintain line purity by excluding insects and thus preventing cross pollination
- Higher yields and improved crop quality

Product Characteristics

The crop covers can be classified as:-

- Woven
- Non Woven
- Sheet / Film

The light weight and the permeability of these covers allow gas exchange and penetration of rain, controls insects, enhances growth and freeze protection and eliminates hand ventilation. Although non-woven materials are more expensive, they do not burn or chaff crops as readily by allowing some penetration of water and lowering the maximum temperatures beneath the cover.

The non-woven crop covers are UV Treated fabrics of polypropylene manufactured using the spun bond technique. The crop covers are light in weight (generally 17-19 grams per square metre) so that the plants are not crushed under their weight. Generally 17 to 19 GSM UV treated white fabric is used in hot climate and 20 to 30 GSM in cold climates to protect the crops from frost. The non woven fabrics are packed in the form of rolls of 3 metre width and length of 450-500 metres.

In addition, woven crop-covers are also used around the world. The simplest and most economical form of crop covers are the direct or floating covers with no sustaining wire or cane hoops.

Key Applications

Key application of crop covers is in promoting faster and better growth of seedlings by providing a nurturing micro-environment of warmth. Usage of crop covers in India is very low. Due to lack any promotional policies like the ones for shade nets and mulch mats, the purchase of crop covers in India is very low. However, the product finds application in nurseries, cultivation of exotic cash crops and horticultural crops.

Market Size and Trade Trends

The domestic market size of crop-covers in India is insignificant limited to less than a Crore, as per insights from the industry. Presence of cheaper and easily available plastic tunnels as a substitute for crop covers further prevents the growth of crop cover industry in India. In presence of steep competition from plastic tunnels and the lack of any incentive from NHM or Government of India for use of crop covers, the market is expected to grow at just around 4% in the coming three years, as the product is yet to be included under NHM subsidies. Exports of crop covers in 2012-13 were ~Rs. 2 Crore. The total market estimate of crop covers is as shown in the following exhibit:

Exhibit 48: Market size estimate for Crop covers

Crop covers	2012-13
Quantity (in MT)	171
Value (in Rs. Crore)	2.40

**source: iMaCS analysis, industry sources, NHM reports 2012-13*

Key Manufacturers

Some of the key manufacturers of crop covers in India are Sidwin Fabric Pvt. Ltd., Alpha foam, K T International, Surya Tex Tech, Admire fibretex India Pvt. Ltd, Jill Mill Nonwoven Pvt. Ltd. and CTM Technical Textiles Ltd.

Import Export Scenario

The export of crop covers from India is about Rs. 2 Crore equivalent to 147 MT. No imports were recorded

in 2012-13. The details of HS codes under which the exports have been done can be seen in the following exhibit:

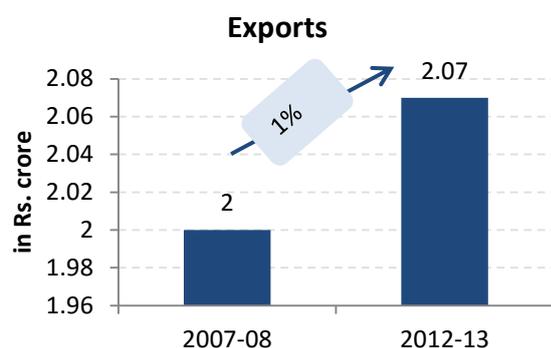
Exhibit 49: Export of crop covers from India

HS Code	HS code description	HS codes	Export (2012-13)
5603	Coated, covered or laminated non-woven made from manmade filament with weight less than 25 g/ SQM	56031100	Rs. 2.07 Crore
	Coated, covered or laminated non-woven made from manmade filament with weight between 70 to 150 G/ SQM	56031300	
9406	Green houses in ready to assemble sets	94060011	

*source: IMaCS analysis, DGCI, DGFT

The export trends for the last five years are as shown in the following exhibit:

Exhibit 50: Export trend for crop covers



Source: IMaCS analysis, DGFT, DGCI

The top countries to which India exports crop covers are:

1. Kenya
2. Tanzania
3. Zambia

Machinery details

Most of the machinery used is imported from Germany, China and Taiwan.

For spun-bond non-woven manufacture, the commonly used production line is Reicofil double beam production line manufactured by Reifenhauser GmbH of Troisdorf, Germany. Several Indian players have imported Chinese machinery (e.g. single beam PP spun-bond line from Shaoyang, China) at a much cheaper price.

Quality Standards

The BIS does have a common standard for all ground covers for agriculture and horticulture activities – IS 16190:2014.

In addition to the above standard, a draft standard - 35(1128) - Specifications of polypropylene spun bonded non-woven crop cover fabric for agricultural and horticultural applications is under wide circulation for approval.

Anti Hail Nets / Anti bird Nets

Anti Bird Nets

Bird production nets are used for protection of fruits and crops from birds. Bird protection net is a mesh product designed to exclude the birds and therefore stop the expensive losses they can inflict on crops. With an optimal holes size, it is large enough to allow movement of bees and keeps shade to a minimum.

Anti Hail Nets

Anti hail nets are used in to protect fruit trees and fruit crops like apples, strawberries, litchi mostly in high altitude areas which are prone to frequent hail storms like Jammu and Kashmir, Uttaranchal, Himachal Pradesh and the North Eastern States. These are either monofilament yarn woven together to form a mesh or knitted mesh of tapes.

Product Characteristics

Anti Bird nets

Bird protection net is a mesh product designed to exclude the birds and therefore stop the expensive losses they can inflict on your crop. It has large size holes so as to prevent birds, but at the same time not to hinder the light and air from reaching the plants. These nets are manufactured from Polypropylene or HDPE Monofilament yarn (UV stabilised) and knitted into a durable ultra light mesh fabric of 25 to 40 GSM. The key characteristics of bird nets are durability, light weight and tear resistance. The standard sizes of nets available are 1, 2, 3 & 6 metres in width and 10, 20, 50 and 100 metres in length. The mesh size for anti bird nets is around 25 mm. These nets are generally Green, Blue or White in colour. The shade percentage, which indicates the degree of shade provided by the nets, is around 20 percent.

Anti Hail nets

Anti-hail nets are used to prevent hail damage in a broad variety of crops. These are woven from HDPE yarn or are combination of HDPE monofilament and tape in knitted form, stabilised against UV rays. These nets are transparent in colour with hole size of 2*100 mm to allow the crops to receive a low level of shade

(13% to 30%). The GSM of these nets varies from 60 to 100. These nets are flexible, light, strong and easy to spread, and can be placed on simple support structures.

Norms of Assistance for Programmes under National Horticulture Mission

As per National Horticulture Mission, support in the form of assistance from the Govt. of up to 50% of the cost of anti-hail nets/ anti bird nets at the rate of Rs. 35/- per sq. metre of area, subjected to a maximum of 5,000 sq. metres per beneficiary is being provided for promotion of use of anti hail and anti bird nets.

Market Size and Trade Trends

The market for Anti hail nets and anti bird nets in India is mostly for protection of fruit bearing plants and trees. Close to 80% of the purchase of anti hail nets occur through NHM while the open sales account for the other 20%. The average requirement of hail net per tree is estimated to be 64 sq. metres. In 2012-13, a total of 301 hectares of area was brought under the use of hail nets and bird nets. With an average life of 7 years, the replacement market for these nets is estimated to be 20% of total demand for Anti hail and anti bird nets. It is estimated that the majority of demand is for anti hail nets which accounts for close to 85% to 90% of the demand, while bird nets have just about 10% to 15% of the total demand.

Market Size Estimate

The domestic market for anti hail nets and anti bird nets is estimated to be 330 MT covering a total of 376 hectares of area. The market has grown at 25% per annum over the last five years is estimated to be Rs. 11 crore. The entire demand is met through production in India as both imports as well as exports of anti are insignificant. The table below shows the estimated market size of anti hail and anti bird nets for 2012-13.

Exhibit 51: Market size estimate for Anti bird & hail nets

	2012-13
Quantity (in MT)	334
Value (in Rs. crore)	11

**source: IMAcS analysis, industry sources*

The domestic market has grown at 25% during the last five years. It is estimated that close to 75,000 trees in India are being protected by anti hail/ bird nets. This has been a major growth factor for the market, growing from coverage of 50,000 trees in 2007-08.

Key Growth Drivers and Inhibitors

The increasing awareness and the subsidy provided by NHM for use of anti hail nets has been the major driver for the industry. Close to 80% of the market is driven

by sales through NHM. With the government targeting a growth rate of 6% for fruits during the XIIth plan period as compared to 5.5% in the XIth plan, the market for anti bird and anti hail nets is poised to grow at higher rates. The total area under fruits for 2012-13 is 6873 hectares of which close to 4500 hectares is under cultivation of fruits that are grown on trees. Currently the market of anti hail nets and anti bird nets is about 9% of the total area under fruit trees. This indicates that there is still a modest opportunity to grow and the domestic market is expected to grow at 25% till 2015-16.

Key Manufacturers

The major manufacturers of anti bird and anti hail nets in India are:

- Netlon India Limited
- Garware wall ropes Ltd.
- Kwaliti Nets Manufacturing Co. Pvt. Ltd.
- B & V agro and Irrigation Ltd.

Import and Export

Import of Anti hail and anti bird nets into India is very small of just around Rs. 13 lakh. Export of these nets from India is also insignificant to the tune of Rs. 3 lakh. The details of HS codes under which the exports have been done can be seen in the following exhibit:

Exhibit 52: Export of anti hail & anti bird nets from India

HS Code family	HS code description	HS codes	(2012-13)
Import			
3926	Other hangers	39269069	Rs. 3 Lakh
	Other article of plastic	39269099	
5608	Made up nettings of nylon	56081110 56081900	
	Other knotted netting of twine, cordage or rope of man-made textile materials	56089090	
	Other twines , cordages and ropes		
Export			
3926	Other hangers	39269069	Rs. 13 Lakh
	Other article of plastic	39269099	
5608	Made up nettings of nylon	56081110	
	Other knotted netting of twine, cordage or rope of man-made textile materials	56081900 56089090	
	Other twines , cordages and ropes		

**source: IMAcS analysis, DGCIS, DGFT*

Machinery Details

Existing HDPE Woven sack processors can manufacture HDPE Agri- nets on the same tape extruder with an additional investment in knitting machines. Thus increasing the product mix leading to higher capacity utilization of the machinery would bring in a higher net profitability.

The Rachel knitting machines used for manufacturing shade-nets are mostly imported. GCL India Pvt. Ltd (Bangalore) is one of the local manufacturers of Rachel knitting machines. The key Rachel knitting machinery manufacturers in the world are Karl Mayer (Germany), LIBA Maschinenfabrik GmbH (Germany) and Bruckner Technology Holding GmbH (Germany).

The Indian associates / suppliers for these machinery manufacturers are:

- ATE engineering (Bombay) for Karl Mayer
- Bruckner Machinery and Service India Pvt. Ltd (Pune) for Bruckner.

The details of key machinery have also been covered under Chapter 2 of Part D under the head Technology.

Quality Standards

Bureau of Indian standards does not have a specified quality standard for anti bird and anti hail nets.

However there are draft standards that are under preparation for bird protection nets covered under DOC.TXD 35(1127) – Specifications for bird protection nets.

Fishing Nets

Fishnets are key Technical Textiles used in fishing industry. Fishing nets are knitted fabrics used for marine and inland fishing by fisherman, fishing trawlers and boats. The characteristics and specifications of fishnets to be used vary based on the method adopted for fishing. The fishnets are manufactured on imported electric looms.

Product Characteristics

Fishing nets are classified as:

- HDPE fishnets
- Nylon Mono-filament fishnets and
- Nylon Multi-filament fishnets

Fishnets are made from Nylon or HDPE twines which could be used in monofilament form or single twines twisted together for multifilament form. The basic characteristics for fishnets are transparency and invisibility in water. The critical operational characteristics of fishnets are - high tensile strength, high knot breaking strength, high abrasion resistance and low drag resistance. The mesh size ranges from 10 mm to 2,000 mm based on area and method of

application. The various types of knots used for fishnet construction are single, double and U-knots. In case of multifilament nets, the number plies in the yarn varies from 2 to 36. The length and breadth dimensions of the fishnets are primarily driven by customer specifications. These nets are available in 100 m, 250 m, 500 m, 600 m and 1000 m spools.

Market Size and Trade Trends

The market for fishnet in India can be classified into two important segments – Nylon based fishnets and twines and that of HDPE fishnets. While major players like Garware Wall ropes are leaders in manufacturing the Nylon based fishnet market in India, the HDPE fishnet market is a highly fragmented segment.

The demand for fishnet in India is driven by both the domestic and export demand of fishes from India. The fishery sector provides employment to about 14.4 lakh workers. The total fish production in India is estimated to be 9.13 million MT growing at 5% per annum. 90% of this production is consumed domestically with 10% being exported. India is the second largest producer of fish in the world with 5.43% share. Large domestic demand and lucrative export prospects are the major drivers of fishnet production in India. In addition to this, exports of fish-net from India have also risen over the last few years to Rs. 170 crore indicating a growing demand for Indian fish-nets in the world market. Garware Wall ropes is currently the largest exporter of fishnet from India with around 45% of the market.

Market Size Estimate

The market size of fish-nets is estimated at 18,686 MT growing at 8% for the last 5 years. This also includes other agricultural netting products very similar to fishing nets like turf protection nets, root ball nets, harvesting nets, etc. A description of these products has been done in the subsequent section. Based on industry insights, the total market size including exports is estimated to be Rs. 654 crore. However, exports constitute nearly 25% of this at Rs. 170 Crore for 2012-13.

Exhibit 53: Market size estimate

	2012-13
Quantity (in MT)	18,686
Value (in Rs. crore)	654

*source: iMaCS analysis, industry sources

The market has grown at 8% during the last five years driven by growing export market which has grown to Rs. 170 crore in 2012-13 from 67 crore in 2007-08.

Key Growth Drivers and Inhibitors

Government of India expects Indian fish production to grow at 6% in the coming years. This would require increased focus on fishing in sea waters which

currently contribute to just around 40 of total fish production in India despite having a vast coastline. There is huge potential of fishing in sea waters that remains untapped. Government support for fishing in sea waters and high value of sea food is expected to increase the share of salt water fishes in total fish production, which would ultimately drive fish net demand. In addition to it, growing value of fish exports is expected to attract more people to fishing. The domestic market of fishnets does not show a very high potential for growth and would grow along with GDP at 6%. The exports on the other hand have seen high growth in the last few years, and with growing acceptability of Indian products in the world market, the export potential is expected to grow at 12% in next three years.

Key Manufacturers

A Garware wall ropes Ltd. is the largest manufacturer of fishing nets in India. In addition to Garware wall ropes, Garware Marine, another unit of Garware group is into production of fishnets and produces close to 900 MT of fishnets. Along with Garware SRF polymer is a leading supplier of twines for fish nets. In addition to these, many small players dealing in HDPE and mono filament fishing nets are located in Tamil Nadu which has the fish net production cluster of India.

Import Export Scenario

Fish net exports from India have grown substantially in the last five years reaching Rs. 170 Crore⁵ in 2012-13, growing at 46% per annum. Garware has emerged to become the largest exporter of fishnet with more than 50% share. Fish net imports although have increased only marginally from Rs. 11 Crore in 2007-08 to Rs. 16 Crore in 2012-13, indicating that Indian players have gone for increasing production capacity during the last five years.

Exhibit 54: Import trends

HS code	HS code description	HS codes	2012-13
Imports			
5607	Nylon fish net twine	56075010	Rs. 16 Crore
	Others	56075090	
5608	Made up fishing nets of nylon	56081110	
	Made up fishing nets other than nylon	56081190	
	Other knotted nettings, cordages or ropes of manmade textiles	56081900	
	Other twines, cordages	56089090	

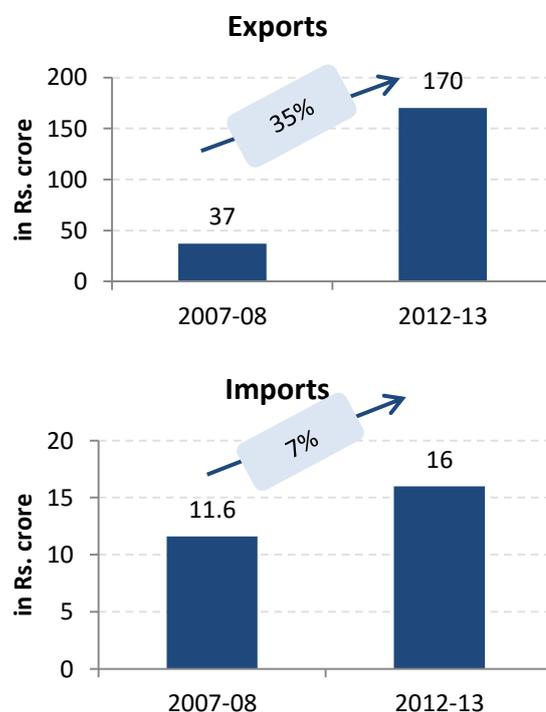
⁵ Includes export of fish net twines

HS code	HS code description	HS codes	2012-13
	and ropes		
5804	Tulles and other net fabrics of other textile materials	58041090	
Exports			
5607	Nylon fish net twine	56075010	Rs. 170 Crore
	Others	56075090	
5608	Made up fishing nets of nylon	56081110	
	Made up fishing nets other than nylon	56081190	
	Other knotted nettings, cordages or ropes of manmade textiles	56081900	
	Other twines, cordages and ropes	56089090	
5804	Tulles and other net fabrics of other textile materials	58041090	

*source: IMaCS analysis, DGCI, DGFT

The export import trend for fishing nets is as shown in the following exhibit:

Exhibit 55: Import export trend for fishing nets



Source: IMaCS analysis, DGFT, DGCI

Top five countries supplying fishing nets to India are:

1. China
2. Thailand
3. Denmark
4. South Korea

5. Taiwan

Top five countries where India exports fishing nets are:

1. United Arab Emirates
2. Oman
3. United States of America
4. Sri Lanka
5. United Kingdom

Quality Standards

Bureau of Indian standards (BIS) has the following standards for fishing nets:

- IS 4401:2006: It states the fifth revised standards for textile based twisted nylon fishnets
- IS 4402: 2005: It states the second revision for the basic terms and definitions for textile based fishnets and nettings
- IS 4641:2005: It provides the second revision for the description and designation of knotted nettings
- IS 5815: 1993 (Part 4): It provides first revision of the standards for determination of breaking load and knot breaking load for netting yarns
- IS 5815 (Part 5):2005: It provides second revision for the standards of mesh breaking force of netting.
- IS 5815 (Part 6):1993: It states the first revision for determination of change in length after emersion in water for netting yarns.
- IS 5815 (Part 7):1993: It states the first revision for determination of elongation for netting yarns.
- IS 6348:1971: It is the basic term for handing of netting
- IS 6920:1993: It states standards for cutting knotted netting to shape
- IS 8746:1993: It is the first revision of terms and illustrations for mounting and joining of fishing nets
- IS 9945:1999: It is the first revision stating the method for determination of taper ratio and cutting rate.
- IS 15788:2008: It states the method for determination of mesh size - opening of mesh
- IS 15789:2008: It states the method for determination of mesh size – length of mesh
- IS 5508(Part 1 to 24): These are guides for fishing gears
- IS 7533:2003: It is standard for polyamide monofilament line for fishing
- IS 14287:1995: It states standards for PP based multifilament netting twine

Other Products

Besides the key product segments shown above, Agrotech also consists of Root-ball nets, fruit covers, and harvesting nets. These form a very small part of Indian Agrotech market and their market size has been

considered as a part of fishing nets. The details of each of these products is discussed further

Root Ball Nets

Root ball nets are netting used to wrap roots of a new plants and shrubs. It is commonly used to provide protection to the root balls of the plant if it is being transplanted. As the roots are completely wrapped in the netting, during the transplant, issue of breaking of roots is minimised. Root ball nets are mostly used in nurseries, where transplanting of plants is a regular activity.

The advantages of root ball nets are:

- It protects root balls from damage during transportation and storage;
- It is biodegradable;
- It keep soil sticking to roots;
- It increase packing speed of root balls during transplantation, compared to covering with burlap and tying with twine;
- Ensure nice and aesthetic appearance of root balls.

Currently the market of root ball nets in India is very small with very few players in the industry. The usage is limited to only nurseries with low penetration. Currently most of the requirement in India is met through imports mostly from China. Key global manufacturers of root ball nets are Bonpack International, Netherlands, Nomanet Limited from Poland and Jetnet Corporation from USA.

Harvesting Nets

Harvesting nets are used for collection of fruits and flowers during the harvest. These nets are placed below the trees to prevent the fruits from falling to ground and hence prevent spoilage of fruits. Due to traditional harvesting techniques used in India, 5% to 15% loss of fruit occurs due to cracking because of falling onto the ground during harvesting. Harvesting nets aims at minimising these losses and also preventing the overall quality of fruit as the fruit does not suffer from any injuries.

Harvesting nets are high quality, UV treated nets with tear resistance usually made of PE material having a GSM ranging from 75 to 125.

The major manufacturers of harvesting nets on a global scale are the swiss company – Agroflor and the European Company Diatex.

Turf Protection Nets:

Turf protection nets are nettings used for protection of the soil surface after the seeds have been sown till the plants come. These provide protection against animals, pests as well as winds and sun. These are usually made of HDPE or PP. The use of turf protection nets for agricultural purposes is very limited in India.

Fruit Covers

Fruit covers are protection covers comprising of a fibrous fabric that allows sufficient vapour permeability to help the fruit ripe while reducing the passage of dust, small birds and insects, thereby providing protection to the fruit. Fruit covers are mostly made of polypropylene. The fruit cover can be pigmented as desired to control the sun light falling on the fruit. The key benefits of using fruit covers are:

- Protection from pests and birds
- It allows nutrient and air to permeate
- It can be used to control ripening of the fruit by controlling the permeability of fabric and the pigment of the fruit cover
- Its light weight

Fruit covers are mostly made from polypropylene through non woven manufacturing techniques. These have a GSM ranging from 15 to 25.

Currently the market of fruit covers in India is insignificant with a few limited players. The key players in the segment in India are Reliance Industries Limited, Vishal synthetics, Sunshine non-woven fabric Co. Ltd, Eco International and Karam Multipack Pvt. Ltd.

Pallet Nets

Pallet nets are knitted polyethylene wraps designed for holding temperature sensitive pallet loads. The mesh network allows easy airflow across the product preventing degradation and spoilage due to trapped condensation or change in temperature. Pallet nets are used mostly for holding of air cargo in aeroplanes and for packing of fruits, vegetables and food items that have low shelf life. The average GSM of a pallet net ranges in 80 to 100 GSM. These nets are usually sold in rolls of 2500 ft and 20 inches. The pallet nets offer the following benefits:

- Continuous air flow prevents degradation

- It is easy to tie and does not require an clips or fasteners
- Compact of disposal and recycling

Although the awareness for use of pallet nets has increased over time, the domestic market for pallet nets is still at a very nascent stage.

The key manufacturers of nettings in India are the ones involved in making of pallet nets also.

All these products are slowly gathering momentum in the domestic markets and are yet to carve out a niche significant position for them in the market. Their market size has been considered to be a part of the netting manufacturer's total supply considered in the segment of fishing and other nets.

Vermi Beds

Vermi beds are HDPE based woven bags which are extensively used for vermi composting and vermiculture. These bags are used in large plantations as well as by retail farmers and nurseries to create high quality organic manure, through vermi composting. The key properties for vermi beds are:

- Light weight
- Waterproof
- UV resistant
- Resistant to agricultural chemicals

The demand for vermi beds is relatively small compared to other Technical Textile agro products; however it has a high potential given the fact that the awareness regarding usage of organic manures and pesticides and the long term ill effects of chemicals on soil quality is spreading across the Nation. Currently most of the demand for vermi beds comes from nurseries and agricultural institutions and associations.

The key manufacturers of vermi bed in India are S. M Enterprise, Mumbai, Saurya Polypack, Vadodra, Rainsafe, Ahmedabad, Lamifab Industries, Mumbai and Neocorp International.

13. Meditech

We find several definitions for medical textiles in published literature. Based on our understanding and exposure in medical textiles, we feel that the following definition may be useful to include or exclude any product into medical textile basket;

“Medical Textiles are those textiles that incorporate at least one of the following in their structure – fibre, filament, yarn or fabric, and which involve one or more of the following processes - extrusion, spinning, weaving, knitting, non-woven, braiding, bonding and are applied for human hygiene, healthcare and/or medical practice.”

List of Products

The key Technical Textile products under the Meditech segment sub categorised as Hygiene and Healthcare are as follows:

- Hygiene
 - Baby Diapers
 - Incontinence Diapers
 - Sanitary Napkins
 - Wipes
 - Ear Buds
 - Under pads
- Healthcare: Non-Implantable
 - Surgical Disposables
 - Caps, Masks, Gowns – Drapes and Shoe Covers
 - Disposable-Bed sheets, Curtains and Pillow covers
 - Surgical Dressings
 - Bandages
 - Wound Care – Wadding, Gauzes, Cotton Lint and Surgical Cotton
 - Eye Pads
- Dental Floss
- Compression Stockings and Garments
- Orthotics and Prosthetics
- Healthcare :Implantable
 - Surgical Sutures
 - Others
 - Artificial Heart Valves and Heart Patches
 - Artificial Vascular Grafts
 - Hernia Mesh
 - Artificial Tendon/Ligaments
 - Artificial Joints
- Healthcare :Extra Corporeal
 - Artificial Kidney
 - Artificial Liver
 - Artificial Lung



Baby diapers



Incontinence Diapers



Sanitary napkins



Surgical disposables



Underpads



Wipes



bandages & gauges



Artificial valves

Market Size and Trends

The total market size of medical textile is estimated to be Rs. 3,322 crore in 2012-13, projected to grow to Rs. Rs. 4,281 crore by 2015-16 growing at 9% CAGR and further to Rs. 5,142 crore by 2017-18. Product wise market size estimate has been shown in the following exhibit

Exhibit 56: Market summary of Meditech

Meditech		2012-13 (All values in Rs. crore)					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	Import	Exports	Domes- tic	Total	Export	Domes- tic	Expo- -rt	Domes- -tic
Baby Diaper(TT Component)	Value (Rs. Crore)	3.0	59.0		62.0	62.0	-	71.3	-	94.3
	Volume (MT)	207	3,930		4,137	4,137	-	4,758	-	6,292
Incontinence Diaper TT Component	Value (Rs. Crore)	1.0	10.0		11.0	11.0	-	13.2	-	19.0
	Volume (MT)	37	698		735	735	-	882	-	1,270
Sanitary Napkin(TT Component)	Value (Rs. Crore)	3.1	59.5		62.6	62.6	-	71.9	-	95.1
	Volume (MT)	209	3,966		4,174	4,174	-	4,800	-	6,349
Wipes TT Component	Value (Rs. Crore)	94.6	6.5	1.1	100.0	101.1	1.2	110.0	1.5	133.1
	Volume (MT)	1,060	526	326	1,260	1,586	358.6	1,386	434	1,677
Under pads (TT Component)	Value (Rs. Crore)	0.7	13.4		14.1	14.1	-	16.1	-	21.3
	Volume(MT)	47	891		938	938	-	1,078	-	1,426
Ear Buds (TT Component)	Value (Rs. Crore)	0.4			0.4	0.4	-	0.5	-	0.7
	Volume(MT)	28			28	28	-	33	-	48
Surgical Disposables (TT Component)	Value (Rs. Crore)	66.0		34.5	31.5	66.0	38.0	34.7	45.9	41.9
	Volume (MT)	4,400		2,300	2,100	4,400	2,530	2,310	3061	2,795
Disposable Bed-sheets, curtains and Pillow Covers (TT Component)	Value (Rs. Crore)	66			66	66	-	76	-	100
	Volume (MT)	800			800	800	-	920	-	1,217
Surgical Dressings	Value (Rs. Crore)	1,121	160	331	950	1,281	347.6	998	383	1,100
Eye Pads (TT Component)	Value (Rs. Crore)	0.3			0.3	0.3	-	0.3	-	0.3
	Volume (MT)	21			21	21	-	22	-	24
Dental Floss (TT Component)	Value (Rs. Crore)	19	22	8	33	41	8.8	36.3	11	43.9
	Volume (Kgs)	90	300	145	245	390	159.5	269.5	193	326
Compression stockings for varicose veins (TT Component)	Value (Rs. Crore)	4.9	4.9	3.3	6.5	9.8	3.5	6.8	3.8	7.5
	Volume (th Nos)	974	692	466	1,200	1,666	489.3	1,260	539	1,389
Compression garments (TT Component)	Value (Rs. Crore)	140.3	9.4	49.7	100.0	149.7	52.2	105.0	57.5	115.8
	Volume ('000 Nos)	2,985	200	1,057	2,128	3,185	1,110	2,234	1224	2,463
Surgical Sutures	Value (Rs. Crore)	660	340	260	740	1,000	286	814	346	984.9
	Volume		29Mn Mtr	4 Mn Dzn	5.5 Mn Dzn	9.5-10 Mn Dzn	4.4 Mn Dzn	6-6.5 Mn Dzn	5 Mn Dzn	7.5-8 Mn Dzn

Meditech		2012-13 (All values in Rs. crore)					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	Import	Exports	Domes- tic	Total	Export	Domes- tic	Expo- -rt	Domes- -tic
Artificial Heart Valves	Value (Rs. Crore)	10.5	99.5		110.0	110.0	-	132.4	-	146.4
	Volume ('000 nos)	191	1,809		2,000	2,000	-	2,408	-	2,662
Artificial Heart Patches (TT Component)	Value (Rs. Crore)		0.8		0.8	0.8	-	0.8	-	0.9
	Volume (mtr)		50		50	50	-	53	-	58
Artificial Vascular Grafts (TT Component)	Value (Rs. Crore)		25.0		25.0	25.0	-	26.5	-	29.8
	Volume ('000 nos)		20		20	20	-	21	-	24
Hernia Mesh (TT Component)	Value (Rs. Crore)	156	4.7	0.7	160.0	160.7	0.8	184.0	1.1	243.3
	Volume ('000 nos)	1,950	58	8	2,000	2,008	9.3	2,300	12.3	3,042
Artificial Ligaments (TT Component)	Value (Rs. Crore)		3.2		3.2	3.2	-	3.4	-	3.7
	Volume ('00 nos)		19		19	19	-	20	-	22
Prosthetics (TT Component)	Value (Rs. Crore)	0.2			0.2	0.2	-	0.2	-	0.2
	Volume ('000 mtr)	75			75	75	-	79	-	87
Artificial Kidney (TT Component)	Value (Rs. Crore)		48.0		48.0	48.0	-	52.4	-	63.9
	Volume (Mn. Sqm)		4		4	4	-	4.4	-	5
Artificial Joints	Value (Rs. Crore)	23.3	85.2	13.5	95.0	108.5	15.5	114	20.5	165.0
	Volume ('000 nos)	24	87	14	97	111	15.8	116.2	21	168
Total	Value (Rs. Crore)	2,371	951	702	2,620	3,322	754	2,868	870	3,413

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Key Players

Key players manufacturing medical Technical Textiles in India are in the following exhibit:

Exhibit 57: Key manufacturing companies

Key Players in Meditech sector under each category are			
Product Category			Company name
Hygiene		Baby Diapers	P&G Home Products India
			Kimberley-Clark Lever Ltd
			Unicharm India Pvt. Ltd
		Incontinence Diapers	Nobel Hygiene Pvt. Ltd
			Walmart Meditech Pvt. Ltd
		Sanitary Napkins	P&G Hygiene and Health Care India
			Johnson & Johnson Limited
			Kimberley-Clark Lever Ltd
		Wipes	Gufic Biosciences Ltd
			Johnson & Johnson Limited
			Aditya Birla Group(Kara Wipes)
			Ginni Filaments Ltd
		Others (Ear Buds & Underpads)	Pristine Care Products
			Johnson & Johnson Limited
			Suparshva Swabs India
		Healthcare	Non-Implantable
Ahlstrom Fibercomposites India Pvt. Ltd			
Magnum Medicare Pvt. Ltd			
Mediklin Healthcare Ltd			
Sivashree Meditex India Pvt. Ltd			
Thea-Tex Healthcare Pvt. Ltd			
Bandages	KOB India		
	Johnson & Johnson Limited		
	Alves Group		
	Ramaraju Surgical Cotton Mills Ltd		
	Shanti Surgicals Pvt. Ltd		
Wound Care	Ramanathan Surgicals Pvt. Ltd		
	Johnson Johnson Limited		
	Smith and Nephew Healthcare Pvt. Ltd		
	3M India		
	Lavino Kapoor		
	Jajoo Surgicals Pvt. Ltd		
	Dr.Sabharwal Laboratories		
	Dental Floss-Colgate Palmolive		
	Technomed India Pvt. Ltd		
	Nomura DND Products Pvt. Ltd		
Tynor Orthotics Pvt. Ltd			
Implantable	Surgical Sutures Artificial Heart Valves Artificial Vascular Grafts	Johnson & Johnson Limited	
		Sutures India	
		Centennial Surgical Suture Ltd	

Key Players in Meditech sector under each category are			
Product Category			Company name
		Hernia Mesh	Lotus Surgicals Pvt. Ltd
		Artificial Ligaments	
		Artificial Joints	
		Heart Patches	
	Extra Corporeal	Artificial Kidneys	ALIMCO Ltd
		Artificial Liver	Endolite India Pvt. Ltd
		Artificial Lungs	TTK Healthcare Ltd
			Johnson & Johnson India
			ALIMCO Ltd

Capital Employed, Sales and Profitability of few key players of Meditech

Exhibit 58: Profitability of key companies

S.No	Company Name	Capital Employed (In crore)		Sales (In Crore)		Net Profit Ratio (%)	
		2011-12	2012-13	2011-12	2012-13	2011-12	2012-13
1	Johnson & Johnson Ltd	1261	1319	3601	4043	9.5	10.2
2	Procter & Gamble Hygiene & Health Care Ltd.	700	808	1304	1699	13.9	12
3	Kimberley-Clark Lever Ltd	46.9	-	244	-	-7.9	-
4	Nobel Hygiene Pvt. Ltd	12	12	76	112	13.1	6.8
5	Gufic Biosciences Ltd	42	59	86	106	1.8	3.3
6	Ginni Filaments Ltd	485	496	755	717	-6.1	2.4
7	Ramaraju Surgical Cotton Mills Ltd	244	244	198	240	9.5	-5.2
8	Suryavanshi Spinning Mills Ltd	131	126	271	268	-3	-5.8
9	Lotus Surgicals Pvt. Ltd	-	-	50	36	5.6	10
10	Dr.Sabharwal Laboratories	4.4	4.9	5.7	5.8	4.6	8.4
11	Centennial Surgical Suture Ltd	27	32	55	57	2.9	2.9
12	ALIMCO Ltd	77	100	82	130	14.3	18
13	TTK Healthcare Ltd	109	124	354	382	4.4	3.7
14	Welspun India Ltd	2654	2759	2610	3046	4.5	5.6
15	Venus Safety and Health Pvt. Ltd	-	-	32	40	10	10

*Source: IMAcS Analysis, Prowess, Company's Annual Reports and Industry Survey

The detailed analysis of each product of the segment is done in the subsequent sections.

Baby Diapers

Baby diapers are used to absorb and retain body fluids of infants in period between birth and 24 months. Diapers are essentially made by a sandwich of an absorbent pad between fabric sheets. The Technical Textile component of the diaper is the non-woven fabric which prevents fluid leakage and gives diaper the desired shape.

Product Characteristics

The baby diapers are generally available in four sizes - small, medium, large and extra large, with an overall

snug fitting. The typical product characteristics are as given below:

- Super absorbent polymer should ensure complete dryness and prevent growth of bacteria
- The non-woven used should be hydrophilic and absorb fluids fast
- Fastening mechanism, optionally adjustable.
- The cover should be breathable
- Optional, leg guards to prevent leakage

The spun bond non-woven fabric used in diapers is 20-25 GSM and accounts for close to 10-12% by weight of the diaper.

Market Size and Trade Trends

In India, there are around 65-70 million babies up to twenty months age group (census 2011), which is the potential size of the Indian baby diaper market. However, the penetration of these products has been less due to the following reasons:

- Costly diaper products
- Easy availability of maid/baby sitter
- Lack of awareness amongst parents
- Diaper considered as a luxury product and not a necessity amongst masses

The penetration of diapers in urban and rural India is about 4% and 1% respectively. In future, the market will be driven primarily by increased acceptance of these products either through increased awareness or reduction in product prices. Market-size estimate of baby diapers in 2012-13 is 1380 million pieces.

Consumption Norms and the Market Size Estimate

The non-woven fabric is 20-25 GSM and accounts for close to 10-12% by weight of the diaper i.e. around 3-4 grams per diaper.

Market-Size of Non-Woven

Exhibit 59 Market-size of Non-woven for baby diapers

Description	2012-13	2015-16(P)
Total No of diapers consumed in India(in million pieces)	1,380	2,100
Amount of Non-Woven per diaper	3-3.5 gm	
% of non-woven by weight(average)	~10	
Exports of Non-woven by value (in Rs. Crore)	10	
Total Non-woven fabric consumption(in MT)	4,137 MT	6,292 MT
Total Non-woven fabric consumed by value (Rs. Crore)	62	94

With an average price of Rs. 10-12 per piece, the diaper market by volume in India is approximately 1380 million pieces (the diapers are available in four sizes small, medium, large and extra large based on the baby's age). By value the diaper market about Rs. 1390 Crore. The value of the non-woven fabric in the diaper is approximately Rs. 62 Crore and expected to grow at a rate of 15% y-o-y, with increased penetration of diaper usage. The Nonwoven fabric market in India is estimated to grow to Rs. 94 Crore by 2015-16. In volume terms the non woven fabric market is expected to be 6292MT in 2015-16 up from 4137 MT in 2012-13.

Key Manufacturers of Baby Diapers and Non-Woven for Baby Diapers

The baby diaper market in India is quite oligopolistic in nature; the marketing of baby diapers in India is limited to a few large companies. The baby diaper is mostly manufactured in India as the non-woven fabric is also available domestically. The major brands such as Huggies (Kimberley Clark Lever), Pampers (Procter and Gamble) and Mamy Poko (Unicharm) cover more than 90% of the domestic market.

The key suppliers of non-woven in India are Surya Textech Pvt. Ltd, Alfa Foam Ltd. and Fiberweb Pvt. Ltd. the manufacturing capacity is shown in the following exhibit:

Exhibit 60: Manufacturing capacities

Manufacturer	Year	Prod. capacity (MT/yr)	Manufacturing unit
Alfa Foam Ltd	2012-13	9000	Pune, Maharashtra
Surya Textech Pvt. Ltd	2012-13	4800	Himachal Pradesh
Fiberweb Pvt. Ltd	2012-13	4000	Daman

In addition Fibertex also supplies from its non woven plant in Malaysia.

Import Export Trends

Imports and Exports for 2012-13 are as follows:

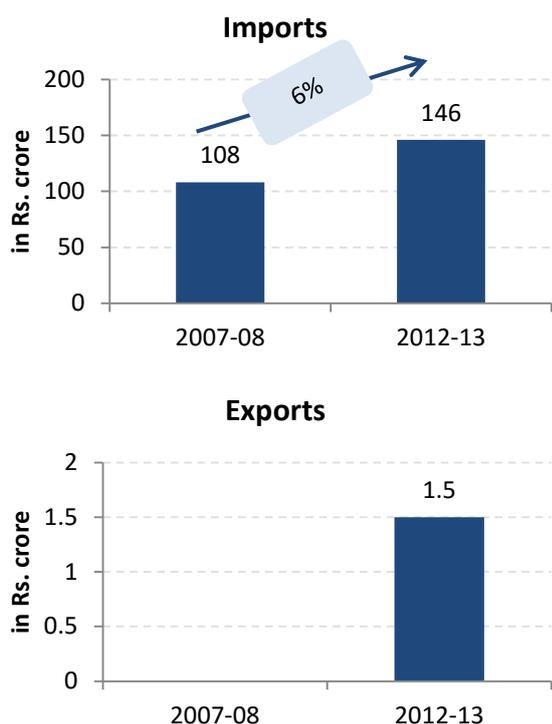
Exhibit 61 Import-Export: Baby Diapers

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
4818	48184010,48184090,48189000 and others	250 million pieces	Rs. 146 Crore
Exports			
4818	48184090,48189000 and others	1 Million pieces	Rs. 1.5 Crore

*source: iMaCS analysis, DGCIS, DGFT

The trends for export and import are as follow:

Exhibit 62: Import export trend for baby diapers



Source: IMaCS analysis, DGFT, DGCIS

The top countries exporting baby diapers to India are:

- China
- Japan
- Malaysia
- Poland
- Saudi Arabia

Incontinence Diapers

Incontinence diaper also known as adult diapers are for people with loss of bladder control which typically applies to people in the age group of 70 years and more. Incontinence diapers are disposable single use products specifically designed to absorb and retain fluids. The diapers are typically made of the absorbent material of cellulose with poly-beads to convert fluid into gel. The non-woven material is placed on top for dry feeling.

Product Characteristics

The adult diapers are generally available in two sizes medium and large with an overall snug fitting. The typical product characteristics are as given below:

- Super absorbent polymer should ensure complete dryness and prevent growth of bacteria
- Super absorbent should quickly convert liquid to gel
- The non-woven used should be hydrophilic and absorb fluids fast

- Fastening mechanism, optionally adjustable.
- The cover should be breathable
- Optional, leg guards to prevent leakage

Market-size and Trade Trends

According to 2011 census India has in excess of 39 million adults with age equal or above 70 years. The incontinence products are expensive and have very low penetration which is restricted to urban retail market and medical institutions around the country. The medical institutions account for about 40-50% of the adult diaper market volume wise. The rest is through retail markets. The estimated penetration in urban areas is 0.75%. However, with the increase in medical care services and increase life expectancy in India, the market is expected to grow briskly.

Market-size estimate of adult diapers in 2012-13 is 74 million pieces (approx). The future market would be driven primarily by increased awareness, penetration coupled with drop in product prices. It is expected to grow at a rate of 20% y-o-y. With an average price of Rs. 25 - 50 per piece, the adult diapers market by volume in India is approximately 64 million pieces which is being valued at Rs.153 Crore

Consumption Norms and the Market-Size Estimate

The non-woven used for these adult diapers is around 10 grams per piece. The non-woven material gives the feeling of dryness when the fluids are absorbed and convert it into a gel by the poly-beads in the absorbent material.

Exhibit 63 Market-size of Non-woven (adult diapers industry)

	2012-13	2015-16 (P)
Diaper production in 2012-13 (Million pieces)	74	110
Amount of non-woven per diaper	~10gms	
Total non-woven required used (MT)	735	1270
Total non-woven market by value (Rs. crore)	11	19

Source: Industry survey, IMaCS Analysis

The market of Incontinence diapers is expected to grow from 74 Million pieces in 2012-13 to 110 million pieces in 2015-16. In value terms the market size will grow from Rs.170 crore in 2012-13 to Rs.293 crore in 2015-16. The non woven market in volume will grow from present 735 MT to 1270 MT in the next 3 years. In value terms the non woven market shall reach Rs. 19

crore in 2015-16 from the present value of Rs.11 crore. No inflationary increase has been assumed in price.

Key Manufacturers of Adult Diapers

The adult diapers manufacturing has taken up strongly over the past one and a half year driven by the availability of the fabric and also because of increased awareness of the market potential among entrepreneurs

Kimberley-Clark Lever with its brand “Depend”, Noble Hygiene with its brand “Friend’s” and Paramount Surgimed Ltd are few key players in the market. The spunbond non-woven Technical Textile raw material is both imported as well as supplied by domestic players. Primarily the spun bond fabric is made out of polypropylene. Reliance industries Ltd, Indian Oil Corporation, etc are the manufacturers of polypropylene meant for spun bond industries.

Imports and Exports of Adult Diapers

The import export trend for adult diapers is as shown

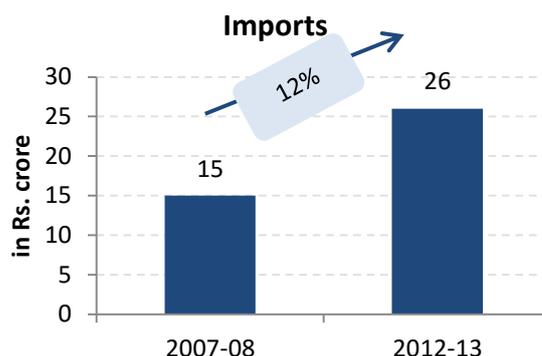
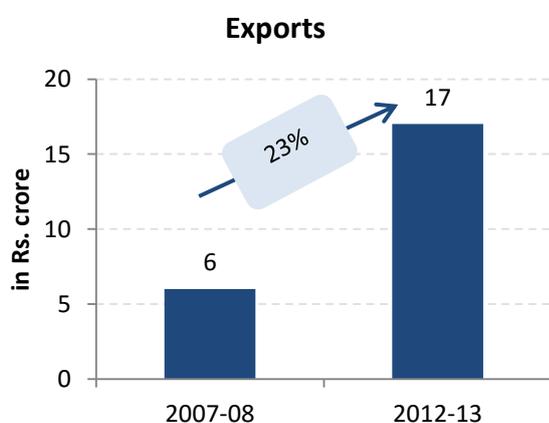
Exhibit 64: Import-Export: Adult Diapers

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
4818	48184010, 48184090, 48189000 and others	30 million pieces	Rs. 26 Crore
9619	96190030		
Exports			
4818	48184010,48184090, 48189000 and others	10 Million pieces	Rs. 17 Crore
9619	96190030		

*source: IMAcS analysis, DGCIS, DGFT

The trend for import and export is as shown below

Exhibit 65: Import export trend for incontinence diapers



Source: IMAcS analysis, DGFT, DGCIS

Most of the domestic market is dominated by Chinese imported adult diapers and the local manufacturers export mostly to the neighbouring countries like Sri Lanka, Nepal and Bangladesh. The top importing and exporting countries for incontinence diapers are:

Top Importing countries are China, Republic of Korea, Indonesia, United Kingdom, and Korea DPR

The top countries where India exports are Sri Lanka, United Arab Emirates, United Kingdom, Nigeria, Bangladesh.

Sanitary Napkins

Sanitary napkin is a hygiene absorbent product used by women during menstrual periods. Sanitary napkins are essentially made by a sandwich of an absorbent pad between fabric sheets. The Technical Textile component of the diaper is the non-woven fabric which prevents fluid leakage.

Product Characteristics –

The typical product characteristics are as given below:

- Super absorbent polymer should ensure complete dryness
- Hydrophilic non-woven to absorb fluids fast
- Snug fit
- Breathable cover

The non-woven fabric is 18-20 GSM and accounts for around 11-12% by weight of the sanitary napkin i.e. around 0.95 to 1 grams per napkin.

Market Size and Trade Trends

The penetration of sanitary napkins is around 13% of the target population. The potential market (females in the age group of 15 years to 50 years) for sanitary napkins is around 32.5 million (Source: Census India 2011 estimates). The sale of feminine hygiene products is low due to various factors, primary being:

1. Lack of awareness, especially in rural India
2. Lack of information on the products
3. Availability of substitutes

4. High price of the product

The price per unit varies from Rs. 3 to Rs 12 (average price Rs 3.5 per unit) and the Indian feminine protection market is pegged at around Rs.1600 Crore. The market is expected to increase with increased awareness and hence, adoption level amongst women. Attempts are being made to indigenise manufacturing machines to lower the cost of production. At present, the sanitary napkin market in India is growing at 15% y-o-y.

Consumption Norms and Market Size Estimate:

The non-woven fabric is 18-20 GSM and accounts for around 11-12% by weight of the sanitary napkin i.e. around 0.95 – 1 grams per napkin. Average weight of sanitary napkin is 8 to 10 gm.

Exhibit 66 Market-size of Non-woven (sanitary napkin industry)

	2012-13	2015-16 (P)
Sanitary napkin usage – approx. (million pieces)	4397	6583
Amount of non-woven per napkin (grams)	0.95	0.95
% of non-woven by weight (average)	11-12%	11-12%
Total non-woven consumed (MT)	4174	6349
Total non-woven consumption by value (Rs. Crore)	63	95

Source: The Indian Textile Journal, Industry survey, IMAcS Analysis

The market of sanitary napkins is expected to grow from 4394 million pieces in 2012-13 to 6683 million pieces in 2015-16. In value terms the market shall grow from Rs.1600 crore to Rs.2400 crore.

The non woven fabric market is estimated to be of 6349 MT in 2015-16 from the present 4174 MT in 2012-13. In terms of value the non woven fabric market shall grow from Rs.63 crore in 2012-13 to Rs.95 crore in 2015-16.

Key Manufacturers

The sanitary napkins market in India is dominated by Procter and Gamble, Johnson and Johnson and Kimberley Clark Lever. Johnson & Johnson whose brands Stayfree and Carefree and Procter & Gamble whose brand Whisper cover close to 85-90% of sanitary napkins market. The remaining market is shared by Kimberley Clark Lever's Kotex, Gufic Biosciences brand Shapers and other domestic brands such as Royal Hygiene Care, Actifit India Pvt. Ltd., Dima Products and Kaul Impex. Pvt. Ltd. Jayashree Industries

is the supplier of low cost indigenously made sanitary napkin manufacturing machinery.

The Imports and Exports of Sanitary Napkin

The import and export of sanitary napkin is shown as below:

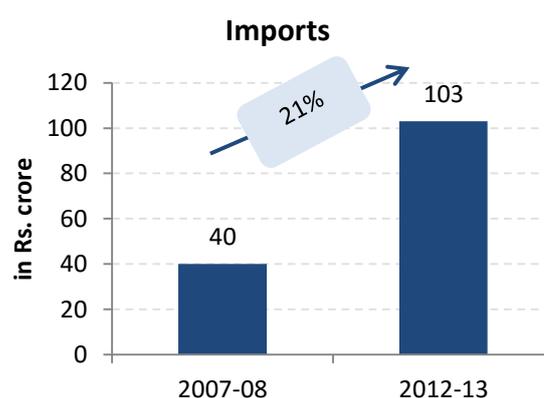
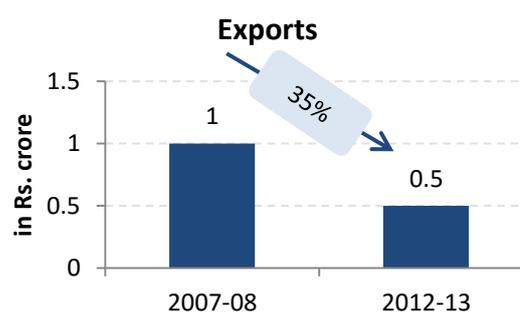
Exhibit 67 Import-Export: Sanitary Napkins

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
4818	48184010,48184090,48189000 and others	613 million pieces	Rs. 103.3 Crore
Exports			
4818	48184090 and others	0.38 Million pieces	Rs. 0.5 Crore

*source: IMAcS analysis, DGCIS, DGFT

The trends for export and import is as shown below

Exhibit 68: Import export trend for sanitary napkins



Source: IMAcS analysis, DGFT, DGCIS

The Nonwoven imported is approximately 200MT under HS Codes 39201019, 39199090 and 56031100. Top importing countries are China, Thailand, Germany, Canada, and United Kingdom. Top exporting countries are Mauritius, Poland, Seychelles, Nepal, and Liberia.

China dominates the import of napkins followed by Thailand. The exports are expected to grow with the set up of more manufacturing lines in the country.

Wipes

Wipes are used to clean surfaces. They can be in dry or wet form. Disposable non-woven wipes are increasingly used for various personal purposes. Mostly tissue based or spunlace non-woven fabric from viscose, polyester and polypropylene is used to manufacture wipes.

Product Characteristics:

The key properties required for wipes are as follows:

- High Absorption
- Low Static and gliding friction
- Good cleaning efficiency
- Lint free
- Non-allergic

The usage of baby wipes is well accepted as a convenient, portable and hygienic way to keep babies clean. Antibacterial wipes help to sanitize shopping trolleys, restaurant tables, etc. to reduce the exposure to germs. They also provide an easy way to maintain clean hands more effectively. Personal care wipes are specifically designed to carry cleansing creams with specific ingredients to help remove makeup. Wipes also find application in manufacturing and service industries especially in food service and health care. The success of nonwoven wipes is due to their ease-of-use, disposability, portability and reduced risk of cross-contamination.

The key ingredient or variable is nonwoven Spunlace fabric used as basic raw material and other variable being flexible packaging film for packing single pouch, multiple wipes C fold pouches or plastic dispensers. The product used is typically 40-45 gsm. Seasonal factors play important role with summer considered as peak season and rainy season as off season for market sales.

Market Size and Trade Trends

Today, there are different categories of wipes available in India focusing on various segments like baby wipes, antibacterial wipes, nail polish remover wipes, cosmetic wipes, make up remover wet wipes, cleaning wipes, disinfectant & personal hygiene wipes. However, personal hygiene wipes and baby wipes hold majority of the market. The market is driven by improved lifestyle and increase in the disposable income.

The annual consumption of wipes in India is about 1260 MT. The average market price of a wipe is Rs.1.5. The market for wipes in India is around Rs.101

Cre. The market is expected to grow at 10% y-o-y. In 2015-16 the consumption of Non woven is expected to be around 2111 MT and the value to be Rs.134.6 crore. No inflationary price of the non woven fabric has been assumed.

The increase in the urban population, increased awareness, and rise of the middle-class families with increase in their disposable income and lifestyle changes shall be the key drivers for the increase in market.

Exhibit 69: Market size - wipes

	2012-13	2015-16(P)
Quantity of Non Woven(in MT)	1586	2111
Value of Non Woven (in Rs. Crore)	101	134.6

*source: Primary Survey, IMaCS analysis, industry sources

Key Manufacturers:

The major players in wipes industry are Johnson & Johnson, Pristine Care products Pvt. Ltd, Ginni Filaments Ltd, Kimberly-Clark, Himalaya Health Care Pvt. Ltd, Kara Wipes by Aditya Birla Group and Tainwala Personal Care Pvt. Ltd. and Precot Meridian. Birla Cellulose is one of the biggest manufacturers of viscose fibre, the preferred raw material for wipes. Spunlace non woven is produced by Ginni Filaments Ltd. They have a production capacity of 10,000 MTPA.

Import Export Trend

China is the largest supplier of wipes to India. India is a net importer with imports worth Rs. 6.5 crore in 2012-13.

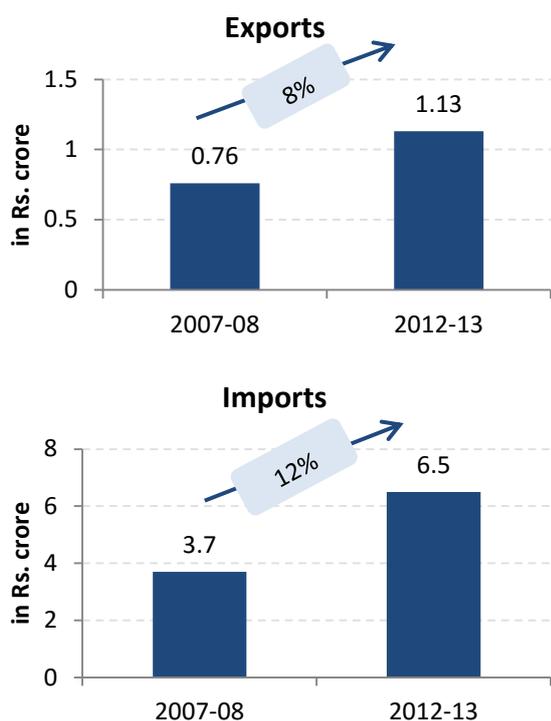
Exhibit 70: Import and export of wipes

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
4818	48182000,48189000,48184090	526 Tonnes	Rs.6.5 Crore
4803	48030010		
Exports			
4818	48182000,48184090,48189000	326 Tonnes	Rs.1.13 Crore
5603	56031200		

*source: IMaCS analysis, DGCIS, DGFT

The trend for export and import of wipes is as shown:

Exhibit 71: Import export trend for wipes



Source: IMaCS analysis, DGFT, DGCI

Top Countries of Imports and Exports of Wipes are as follows:

Exhibit 72: top trading countries

Imports	Exports
China	Maldives
Bangladesh	Nepal
UAE	UAE
USA	Egypt
Sweden	Oman

*DGFT and IMaCS Analysis

Most of the imports happen from China whereas our exports are to mostly to Maldives and the Middle East.

Under pads

An under pad is an item of removable bedding that sits on top of a mattress to provide protection to the mattress. They are used to prevent the beds, mattresses, chairs, sofas or wheelchairs from getting wet. An under pad is used by hospitals, nursing homes, households to avoid the under-layer of the bed or mattress from getting wet. It is used for both children and elderly who have loss of control on their bladder.

Product Characteristics –

Under pads come are of two types disposable and re-usable. However, most of the people prefer using

disposable under pads. A typical under pad shall have a super absorbent polymer for speedy absorption of the fluids and a non woven fabric on top of it.

Under pads should have the following features:

- The super absorbent should have a very good absorption quality
 - Super absorbent should convert fluid into gel and prevent bacterial growth
 - Dry feel on top of the pad
 - Skin friendly, breathable and comfortable cover on top
 - The pad should not move while on the bed or seat.
- Usually under pads of various sizes are available in the market. Sizes vary from 60"x40", 60"x50", 60"x60" to 60"x90". An under pad's weight varies from 70-90 gms and non woven component is 20-40gms.

Market Size and Trade Trends and Key Manufacturers

The market for under pads in 2012-13 is estimated to be Rs.45 crore and expected to grow to Rs.68 crore by 2015-16. In 2012-13 it is expected that the consumption of the under pads was 38 million pieces and by 2015-16 the consumption is estimated to increase to 57 million pieces. The non woven market for under pads in 2012-13 is estimated to be 938 MT in volume and Rs.14 crore by value. In 2015-16 this is expected to reach 1426 MT in volume and Rs.21crore in value. No inflationary increase in the price of non woven fabric has been assumed.

The increase of awareness about the product, reduction in the cost price, innovation in product and rise of the disposable income of the people in India are the key drivers for the growth.

Exhibit 73: Market size for under pads

	2012-13	2015-16(P)
Underpads usage – approx. (million pieces)	38	57
Amount of non-woven per under pad (grams)	~25	~25
Total non-woven consumed (MT)	938	1426
Total value of no woven (in Rs. crore)	14	21

*source: IMACS Analysis and Industry Insights

Though most of the market is dominated by Chinese under pads, Paramount Surgimed Ltd with AeroKleen brand is the market leader followed by Nobel Hygiene Pvt. Ltd in India. Nobel Hygiene has a capacity of producing 4 million pieces per annum.

Under pads are imported under HS Code 48182000, 48184090, 48189000. The import of under pads is estimated to be worth Rs. 13 crore.

Ear Buds

Cotton ear buds or swabs are used to clean ears from wax, absorb water in body parts, clean between baby's fingers, eyes and nose or apply creams on body parts. An ear bud must have the following features:

- Soft
- Absorbency
- Clean and dry

For the above features treated and processed absorbent cotton or swab is used as on soft plastic sticks. In India the ear buds are consumed in the urban society and is still considered a luxury product.

Market Size and Trade Trends and Key Manufacturers

Ear buds in India predominantly used by urban consumers. However, the market penetration is very low as people still consider it to be a luxury product. India has an urban population of about 37.8 crore (Census 2011) of which about 1% are estimated to buy ear buds. However the market is expected to grow at a CAGR of 20%. The market growth is linked to the product awareness, rise in disposable income of the people and the growth of organised retail, where most of the sales happen.

The total market of ear buds in India in 2012-13(E) is about Rs.14 crore and is expected to grow to Rs.24 crore by 2015-16. The absorbent cotton consumption will grow from 27.5 MT in 2012-13 to 47.5 MT in 2015-16 in volume terms and from Rs.43 lakh in 2012-13 to Rs.74 lakh in 2015-16. No inflationary rise in prices of absorbent cotton has been assumed.

Exhibit 74: Market size for ear buds

	2012-13	2015-16(P)
Total ear Buds Market (in Rs. Crore)	14	24
Total cotton consumed (in MT)	28	47.5
Total market of TT component (in Rs. lakh)	43	74

*source: IMACS Analysis and Industry Insights

The market has two major organised players, Johnson & Johnson Ltd, which sells under its own brand name and Suparshwa Swabs which sells ear buds under the brand name of Tulips.

Ear buds are traded under the HS Codes: 56011000 and 56012110.

Surgical Disposables

The surgical disposables primarily consist of masks, caps, drapes, gowns, gloves and shoe covers made of polypropylene spunbond fabric (non-woven) with or

without polyethylene film. Surgical disposables are used in hospitals and pharmaceutical companies to maintain hygienic and sterile operations. These are called as surgical disposables as these are for one time use and disposed off after one time usage. In India, the majority of hospitals use cotton reusable surgical wear which needs to be sterilised after every use. The peril of re-usage is cross contamination which should be avoided. The disposable medical items are gradually replacing the reusable cotton cloth based surgical gear. With growth in the multi-specialty hospitals, medical tourism and improvement in general hygiene level at the hospitals, the demand for medical disposables is experiencing positive growth. However, the price sensitive nature of the hospital purchase managers has resulted in the low penetration of surgical disposables.

Product Characteristics

The functional characteristics of surgical disposables are:

- High barrier to blood or body fluids
- Lower lint than linen (lint is a source of infection)
- Proven sterilisation performance
- Comfort and breathability
- Good bacteria filtration efficiency
- Breathing resistance
- Splash resistance

The surgical disposable masks and caps are made from polypropylene (PP) spunbond fabric; spunlace fabric and spunbond melt blown fabric and spunlace fabric (SMS) fabric. The weight of the fabric for caps is typically in the range of 12-25 GSM and for masks it is in the range of 25-40 GSM. The disposable drapes, gowns and covers are made of polypropylene (PP) spunbond fabric and Spun bond melt blown fabric and spunlace fabric (SMS). The weight of the fabric is typically 25-40 GSM for spunbond fabric for gowns and around 35-50 GSM for SMS fabric for drapes and covers.

These products are manufactured in sterilised environment and packed in PP bags and dispenser boxes sterilised before despatch.

Market size and Trade Trends

The growth of medical textile products is tied with the growth of the healthcare industry in India. The healthcare consumption in India is expected to grow to \$170 billion. The rural India is expected to follow the increasing healthcare spend trend of urban India. The demand for disposables is expected to increase with the emergence of new tertiary care hospitals with international accreditations and improvement of

service levels off the existing hospitals. In addition, the growth in pharmaceutical, biomedical and biotechnological companies would augment the demand for medical textiles especially disposables.

Consumption Norms and Market size Estimate

The penetration of surgical disposable products is limited primarily to the hospitals in metro and cosmopolitan cities and tertiary care hospitals. The larger hospitals in the major cosmopolitan cities in India (Delhi, Mumbai, Kolkata, Chennai, Bangalore and Hyderabad) account for nearly 5.5-6% of total beds in India. Almost all of these hospitals are using surgical disposables. The penetration of surgical disposables in the remaining hospitals is estimated to be around 20%. In addition, the usage of surgical disposables (masks, drapes, gowns and caps) in pharmaceutical companies has been assumed as 15% of the usage in hospitals based on the industry survey

The average price of surgical disposables like caps, masks and shoe-covers is around 70 to 90 paisa per piece while that of drapes is Rs 350 per units and of gowns and covers is around Rs 55 per unit. The medical disposables like caps, masks and shoe covers are 100% Technical Textile products made-up from PP spunbond or SMS non-woven fabric. The consumption of Polypropylene (PP) spunbond material and SMS fabric varies with size of the product. The product used for drapes and gowns is typically 25 GSM and 80 GSM. The average size of spunbond fabric per material is around 2 square metres. The typical weight of these products varies from 50 grams to 160 grams. Spunlace material is also used in this manufacture of surgical disposables. The caps and masks require approximately 3 grams of PP spun bond fabric while shoe-covers require 6 grams of PP spun bond fabric per unit. The raw materials account for 80-90% of the cost.

Exhibit 75: Nonwoven consumption norm

Description	Value
Usage caps, masks & shoe covers per month in 300 bed hospital (pieces)	8,000 to 11,000
Usage drapes, gowns & covers per month in 300 bed hospital (pieces)	150 to 200
Amount of non-woven per cap/mask	3 g
Amount of non-woven per shoe-cover	6 g
Amount of non-woven per drape, gown & cover	50 to 150 g
Average price per cap / mask / shoe cover	Rs 0.7 to 0.9
Average price per drape	Rs 320
Average price per gown / cover	Rs 55

Source: Industry survey, iMaCS Analysis

The domestic usage of the surgical disposables – caps, masks & shoe covers in India is estimated at around 80 million pieces annually. The domestic usage of the surgical disposables – drapes, gowns & covers in India is estimated at around 1.75 to 2.5 million pieces annually. The market is expected to grow at 10% y-o-y. The consumption in the surgical disposables market is given below:-

Exhibit 76: Market size of non woven surgical disposable

	2012-13	2015-16(E)
Non-woven fabric (Domestic Quantity in MT)	~2100	2795
Non-woven fabric (Export Quantity in MT)	~2300	2818
Market of Non-woven (Quantity in MT)	4400	5856
Market of Non-woven (Value in Rs. Crore)	66	88

*Source: Industry survey, iMaCS Analysis.

Disposable Bed-sheets, Curtains and Pillow Covers

Disposable bed sheets, curtains and pillow covers hold the same properties as of other surgical disposable products. They have been introduced in the market about 2 years back and have a very low level of penetration. Disposable bed sheets, pillow covers have gained acceptance in the Spa industry in India, as the cost of maintenance and laundry services in the country are rising. Hospitals could buy disposable curtains, bed sheets and pillow covers in almost the same price as that of laundry expenses, (a set of one bed-sheet and pillow cover would cost around Rs. 75-100). This industry is still in a nascent stage in the country.

It is estimated that about 75-80% of 2500 Spas in the country and over 10% of private hospitals are presently consuming disposable bed sheets, curtains and pillow covers. With the increase of awareness, the consumption of such products will increase rapidly. This segment is expected to grow at a CAGR of 15% y-o-y in India.

The estimated current market of non woven fabric for disposable bed sheets, curtains and pillow covers is about Rs.66 Crore in value and 800 MT in volume terms. In 2015-16 this market shall reach Rs.100 Crore in value and 1217 MT in volume. No inflationary increase in the price of non woven fabric has been assumed.

Exhibit 77: Market for nonwovens in surgical disposable

	2012-13	2015-16(P)
Non Woven consumed (Quantity in MT)	800	1217
Non woven market (Value in Rs. Crore)	66	100

*Source: Industry Survey, IMACS Analysis.

Key Manufacturers

The surgical disposables market in India is witnessing an initial growth phase. The imported surgical disposables from China are also available in the market. The major producers of surgical disposables are:-

- Ahlstrom Fibercomposites India Pvt. Ltd
- 3M India
- Thea-Tex Healthcare Pvt. Ltd.
- Mediklin Healthcare Ltd.
- Magnum Medicare Pvt. Ltd.
- Sivashree Meditex India Pvt. Ltd
- Surgiwear India
- Dispoline
- Venus Safety and Health Pvt. Ltd

Import Export Trends

Imports & Exports of surgical disposables is as given in the following exhibit:

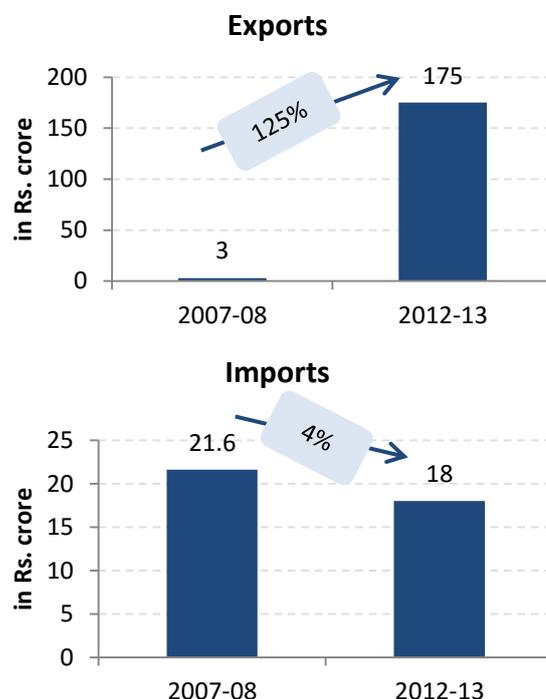
Exhibit 78: Import - export - surgical disposables

HS code family	HS codes	Quantity (million pieces) (2012-13)	Value (2012-13)
Imports			
4015	40159010,	Masks-0.12	Rs.18 Crore
	40151100	Caps-2.1	
5603	56031200,	Drape and Gowns-5.5	
	56031100,	Gloves-325 pairs	
	56039400	Shoe Covers-1	
6210	62101000	Others (bed covers,	Rs.17 Crore
6307	63079090 & others	table covers, pillow covers, curtains etc)-9	
Exports			
4015	40159010,	Masks-1.2	Rs.17 Crore
	40151100	Caps-3	
5603	56031100,	Drape and Gowns-1.1	
	56031200,	Gloves-123 (pairs)	
	56039400	Shoe Covers-13	
6210	62101000	Others (bed covers,	Rs.17 Crore
6307	63079090 & others	table covers, pillow covers, curtains etc)-0.16	

*source: IMACS analysis, DGCIS, DGFT

The trend for export and import of surgical disposables is as shown:

Exhibit 79: Import export trend for surgical disposables



Source: IMACS analysis, DGFT, DGCIS

Top Countries of Imports and Exports of Surgical Disposables are as follows:

Surgical Disposables	
Imports	Exports
Malaysia	USA
Sri Lanka	Germany
Thailand	UAE
USA	Saudi Arabia
China	Mauritius

Raw-materials and machineries -

The raw material for the medical disposables is PP spunbond non-woven fabric.

Quality Control and Standards -

There are no Indian standards. The gowns and drapes manufactured in India are compliant with AAMI PB 70 (Association for the Advancement of Medical Instrumentation) standards. For the mask products - ASTM F2101-01 is used as standard for the bacteria filtration efficiency. The Delta-P standard is used to set the breathing resistance and ASTM 1862 is used to set the splash resistance.

Surgical Dressing Material

Surgical dressing material is applied on the wound to expedite the process of healing and prevent further harm due to wound exposure. The dressing material can be primarily divided as

- Bandage
- Wound care layer

Bandage holds the wound care layer in place. Wound care products which are adhesive in nature are also available in the market. The bandage can also be used on standalone basis in case of orthopaedic cases (e.g. crepe bandage). The type of dressing used varies based on the type of wound and location of the wound. Typically, the wound care products consist of:-

- Absorbent pad
- Non-adhering/dressing
- Adhering pads or adhesive plaster
- The wound contact material is available in both woven and non-woven forms.
- The bandage products consist of:-
 - Rolled Bandage
 - Gauze bandage
 - Elastic/Non-elastic bandage
 - Light support bandage

Product Characteristics

The materials included under surgical dressings are: Rolled bandages, Crepe bandages, Plaster-of-Paris bandages, Absorbent gauze pack, plaster, absorbent pads, surgical pads, cotton lint, eye pads, compression stockings and garments.

The raw materials for surgical dressings are cotton fibre, viscose and acrylic. The functional properties like absorbency are improved for dressing material. Additionally, these products could be sterilised or non-sterilised. The wound contact layer is either woven medicated layer or non-woven medicated layer. The wound contact layer is non-adherent and allows new tissue to develop easily. Non-adherent hypoallergenic, gamma sterile dressing allows easy wound-drainage. It is soothing, enhances healing in burns, skin grafts, skin loss and lacerated wounds. The bandages provide support to the dressing material and function as compression material. Cotton gauze cloth is generally used for holding wound contact layer in place which is tied at the ends or joints using adhesive tape. Bandages are also made from polyester yarns. The bandages have a basis weight in the range of 55-60 GSM.

Crepe bandages / compression bandages: are knitted bandages made from thick woven polyester fabric

which have an elastic behaviour and porous nature for skin breathing. These bandages are used on limbs to create resting pressure and working pressure for the treatment. The crepe bandages are manufactured by weaving and warping the yarn and then processed to give properties like stretch ability. The crepe bandages are available in various sizes like 5, 7.5, 15 centimetre x 3 meter.

Plaster-of-Paris (POP) bandages: are made of cotton gauze of leno weave cloth with Plaster-of-Paris impregnated. The leno weave holds the POP material in the fabric. The bandage is dipped in water and applied on the limb which would graduate into a hard cast once dried. The POP bandages are available in various sizes like ~10, 15, 20 centimetre x 3 meter.

Dressing pads and absorbent gauze generally have basis weight of around 30 GSM. These pads and absorbents are available across various sizes. Cohesive bandages stick to themselves and not to the user's skin. Hence, they are suited for skin protection applications. Adhesive plaster (medicated or not medicated) is available in various lengths and shapes. The wound dressing material should be sterile, breathable and should provide a moist healing environment. The healing environment then reduces the risk of infection and helps the wound heal more quickly.

All the surgical dressing items are expected to be ISI, USP or BP compliant

Market Size and Trade Trends

The demand for surgical dressing material is primarily driven by boom in the healthcare sector and increase in hospital beds in the country. In addition to the domestic market, Indian dressing materials are also exported to several countries. The industry is primarily unorganised with units in across Tamil Nadu, Mumbai, Uttar Pradesh, Ichalkaranji, amongst others. The market for dressing material is primarily institutional with a share of around 60% of sales and the remainder is retail.

Exhibit 80: Usage norm - surgical dressings

Usage norms	
Rolled bandage	Around 100 units of 14 cm * 6 m (or equivalent)
Crepe bandage	Around 15 units of 10cm * 4 m (or equivalent)
POP bandage	Around 10 units of 10 cm width (or equivalent)
Elastic adhesive bandage	Around 1.5 units

Usage norms	
Band-aid / adhesive tape	Around 20 units
Absorbent cotton wool / Surgical Cotton/Lint	Around 10 units of 500 g
Absorbent gauze	~20 units of 90cm*20 mtr
Surgical pad	Around 2.5 units

*Source: Industry survey, IMaCS Analysis

In the past 6 years the government spending on the health sector has grown at a rate of 20% and with the surge of new private hospitals with improved services and the growth of medical tourism the surgical dressing industry is expected to grow at a rate of 5-6% y-o-y.

The present market of surgical dressings is estimated to be Rs.1281 crore and it is expected to reach Rs.1541 crore in 2015-16

Exhibit 81: Market size - surgical sutures

Surgical dressings usage in India	2012-13	2015-16(P)
Surgical dressings-bandages (in Rs. crore)	~500	580
Surgical dressings-wound care products (in Rs. crore)	~450	520
Exports of surgical dressings (in Rs. crore)	331	-
Imports of surgical dressings (in Rs. crore)	160	-
Total Surgical dressings (in Rs. crore)	~1281	1483

Source: Industry survey, IMaCS Analysis

Key Manufacturers

The industry is primarily unorganised with units in various states / areas of India including Tamil Nadu, Mumbai, Uttar Pradesh and Ichalkaranji, amongst others.

Surgical Dressings: The organised producers of the surgical dressings are as follows:-

- Johnson and Johnson India
- Lavino Kapoor – Absorbent cotton – 100% EOU
- Dr. Sabharwal Laboratories
- Ramanathan Surgicals Private Limited
- KOB textile – Dressing Material - 100% EOU (Export Oriented Unit)
- Ramaraju Surgical Cotton Limited
- Shanti Surgicals
- Jajoo Surgicals Private Limited
- Alves Industries

Import Export Trends

Imports and Exports of surgical dressing material in 2012-13 is as given in the following table

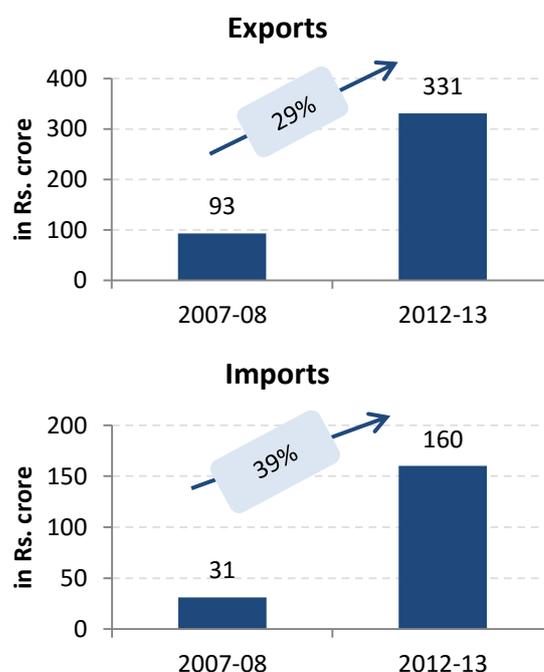
Exhibit 82: Import export - surgical dressing

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
3005	30051010,30051020,30051090,30059010,30059030,30059040,30059050,30059060 and others	800 '000kgs	Rs.160 Crore
Exports			
3005	30051010,30051020,30051090,30059010,30059030,30059040,30059050,30059060,30051090	56.21 mn kgs	Rs.331 Crore
5601	56012110, 56012190 and others,		

*source: IMaCS analysis, DGCI, DGFT

The trend for export and import of surgical dressings is as shown:

Exhibit 83: Import export trend for surgical dressings



Source: IMaCS analysis, DGFT, DGCI

Top Countries of Imports and Exports of Surgical Dressings are as follows:

Surgical Dressings	
Imports	Exports
China	UK
Portugal	Australia
USA	Netherlands
Japan	USA
Germany	Germany

*Source: DGFT, DGCI

Quality Control and Standards

The products require approval for usage by the medical authority. For handloom cotton bandages, the applicable standard is IS863 and for cotton gauze absorbents, the applicable standard is IS758. Several manufacturers also have ISI mark and ISO certification for their products and units respectively. All the surgical dressing items are expected to be ISI, United States Pharmacopoeia (USP) or British Pharmacopoeia (BP) compliant.

Eye Pads

Eye pad is a patch of cotton worn over the eyes to prevent any infection post an eye surgery or treatment. They are also worn at SPA's during various therapy treatments. The patch is tied with elastic around the head.

Eye Pads usage in India is subject to eye surgeries and the usage by spas. It is estimated that there are about 56 lakh eye surgeries per year in India and about 3 eye pads per day being consumed by 2500 SPA's in the country. Each eye pad consumes about 2.5-3 gms of non woven. The market is expected to grow at a CAGR of 5% y-o-y.

The following table shows the estimated market size of eye pads and non woven. No inflationary increase in the prices of non woven has been assumed.

Exhibit 84: Market size - eye pads

	2012-13	2015-16(E)
Total Eye pads consumed in quantity (in Mill pieces)	8.4	9.8
Per eye pad non woven (in gms)	~2.5	
Non woven consumed in quantity (in MT)	21	24
Total Non woven consumed in value (in Lakh)	30	35

*source: Industry survey and IMAcS analysis

Dental Floss

Dental floss is a soft nylon thread coated with wax used to clean between teeth.

Dental Floss is consumed in mostly in urban India. It is estimated that about 80 lakh to 1 crore of the urban population would be the real buyers of dental floss. The domestic consumption of dental floss is estimated to be Rs.41 crore in 2012-13 and is growing at a CAGR of 10% y-o-y. In 2015-16 the market is estimated to be Rs.54.6 crore. In 2012-13 exports are of the value of Rs.8.8 crore.

Exhibit 85: Market size dental floss

	2012-13	2015-16 (P)
Dental Floss market in quantity (in kgs)	390	519
Dental Floss market in value(in Rs. crore)	41	54.9

	2012-13	2015-16 (P)
Dental Floss market in quantity (in kgs)	390	519
Dental Floss market in value(in Rs. crore)	41	54.9

*source: Industry Survey and IMAcS analysis

The market of dental floss in the country shall be driven with increased penetration and reduction in prices. Dental Floss is mostly marketed by Colgate and Palmolive (India) Ltd, P&G under the brand Oral B, ICPA Health Products Pvt. Ltd and Sinhal Metal Industries.

Imports and Exports of dental floss in 2012-13 is as given in the following table

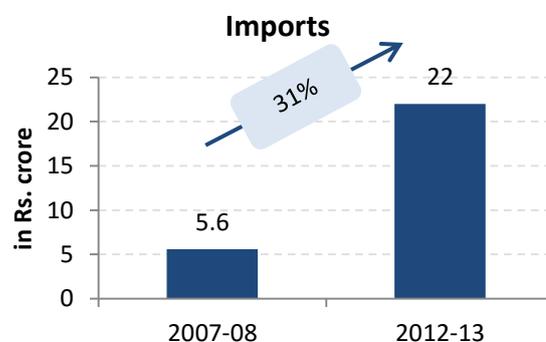
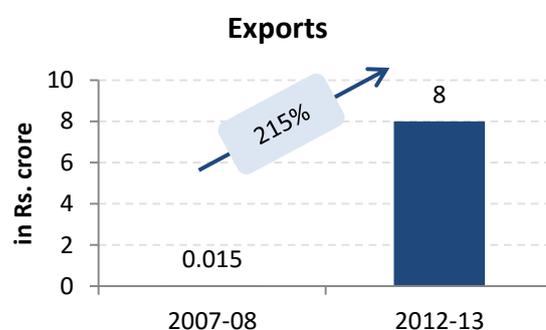
Exhibit 86: import export - dental floss

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
3306	33062000	30 '000kgs	Rs.22.13 Crore approx
Exports			
3306	33062000	14.5'000kgs	Rs.8.8 Crore approx

*source: DGFT, IMAcS analysis, DGCI

The trend for export and import of dental floss is as shown:

Exhibit 87: Import export trend for dental floss



Source: IMAcS analysis, DGFT, DGCI

The imports are done majorly from China, Taiwan, Singapore and USA and the exports are done to Bangladesh, Vietnam and Maldives.

Compression Stockings and Compression Garments

Compression stocking are used improve the blood flow in legs. People suffering from varicose veins, swelling or blood clotting are prescribed compression stockings by their doctors. They come with different level of pressure and in two sizes, up-to knee high or to the top of the thigh.

Compression Garments are worn by people, as prescribed by doctors, post skin surgeries. They are usually worn by patients who sustain a burn injury and post the surgery they are worn to avoid swelling and for skin tightening. Compression garments are also being used post liposuction surgeries in India. Such garments should apply pressure on the treated body part, be skin friendly and avoid any bacterial growth. They custom made to the size of the patient and his body part. Compression garments can be for whole body, just for the limbs, face or any part that is treated.

Market Trends

Compression stockings for varicose veins: It is expected that there are about 4 lakh patients suffering from varicose veins and swelling in legs in the country. These patients would usually buy stockings 3 times in a year. The average price of imported compression stockings for varicose veins is about Rs.70 per piece. The domestic consumption for compression stocking in 2012-13 is expected to be Rs. 6.5 crore and is expected to grow at CAGR of 5-6% y-o-y. The domestic consumption market shall be Rs.7.5 crore. The exports for the year 2012-13 are about Rs. 3.3 crore

Market Size:

Exhibit 88: Market size - compression stockings

	2012-13	2015-16(P)
Compression Stockings market in quantity (in million nos.)	1.67	1.9
Compression stockings market in value (in Rs. crore)	10	11.3

*Source: Industry survey, IMAcS Analysis

Compression Garments are consumed by the survivors of burn injuries. According to World Health Organization, over 10 lakh people in India are moderately or severely get burn injuries in India. It is estimated that there are about 5 Lakh people who get hospitalised and require compression garments.

Similarly about 5000 liposuction surgeries are done in 10 major cities of the country. Post a liposuction surgery also compression garments are required. Compression garments cost from Rs.400-1000 per meter. The domestic consumption of compression garments is around Rs.100 crore in 2012-13 and is expected to grow at a CAGR of 5% y-o-y to reach Rs. 116 crore by 2015-16. No inflationary increase in the prices of the fabric has been assumed. Exports for the year 2012-13 are about Rs.50 crore

Exhibit 89: Market size compression garments

	2012-13	2015-16(E)
Compression Garment in value (in Rs. crore)	150	173

*source: Industry survey and IMAcS analysis

Compression Stockings and Compression Garments:

This segment is highly unorganized. Technomed India Pvt. Ltd and Nomura DND are the major players in this category.

Imports and Exports of compression stockings and compression garments in 2012-13 are as given in the following table:

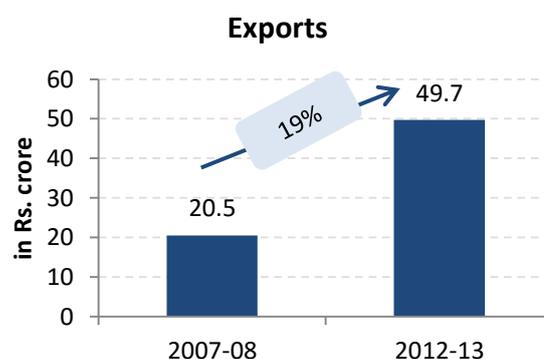
Exhibit 90: Import export trend - compression garments

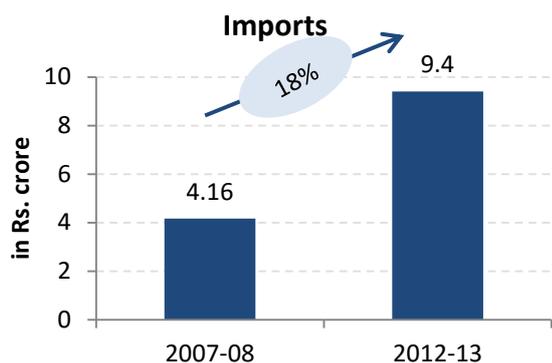
HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
6115	61151000 (stockings)	692'000 nos. approx	Rs.4.9 crore approx
	61152990 (garments)	4565 '000 nos	Rs.9.4 Crore approx
Exports			
6115	61151000 (stockings)	466'000 nos. approx	Rs.3.3 Crore approx
	61152990 (garments)	9396 '000 nos	49.7 Crore approx

*source: DGFT, DGCI, IMAcS analysis

The trend for export and import of compression garment and stockings is shown as follows:

Exhibit 91: Import export trend for compression garments





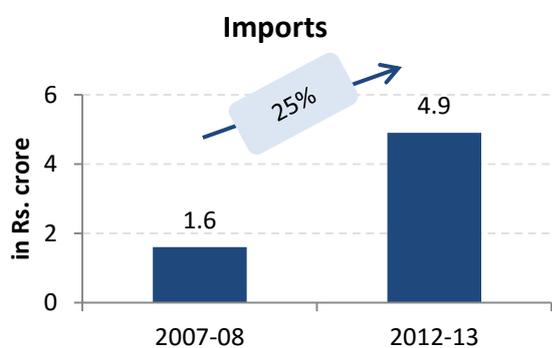
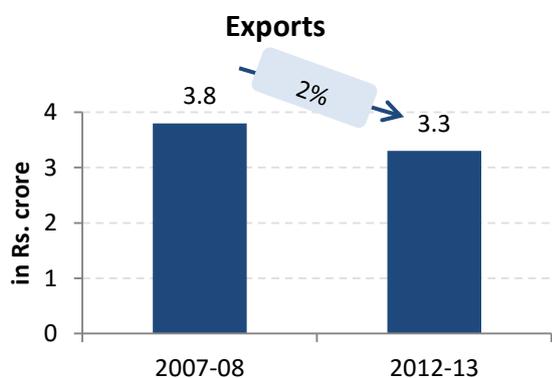
Source: IMaCS analysis, DGFT, DGCIS

Top countries of trade of compression stockings

Compression Stockings	
Imports	Exports
China	Russia
Turkey	Germany
Italy	UAE
Switzerland	Hong Kong
USA	Netherland

*source: DGFT

Exhibit 92: Import export trend for compression stocking



Source: IMaCS analysis, DGFT, DGCIS

Top countries of import and export of compression garments are as follows:

Compression Garments

Imports	Exports
China	USA
Korea	UK
Bangladesh	Belgium
Malaysia	Netherlands
Thailand	UAE

*source: DGFT

Surgical Sutures

The surgical suture is used for stitching together skin deformations, open wounds, organs and blood vessels. The surgical sutures are classified into two categories –

- Absorbable suture - These get dissolved in the body and do not require removal
- Non-absorbable suture - These are sterilised sutures which need to be removed after a specified time

The type of suture used depends upon the location of the required surgical intervention. The raw material for sutures ranges from bovine intestine tissues to Poly glycolic acid (PGA), collagen, mono filament polyester / polypropylene and multifilament nylon/polypropylene/polyamide

Product Characteristics

The type of suture used varies based on the area of application and type of medical intervention. They could be either monofilament, multifilament or braided. Generally, absorbable sutures are used for sewing internal body organs, while non-absorbable sutures are used for external injuries. However, absorbable sutures are used in case of external injuries as well.

The general characteristics of sutures are given below:

- Sterilised (non-toxic)
- Hypoallergenic
- High tensile strength
- High knot security
- Flexible and smooth passage through tissues
- Good pliability
- Minimum tissue reaction

The type of suture used depends upon the location of the required surgical intervention. The raw material for sutures ranges from bovine intestine tissues to Poly glycolic acid (PGA), collagen, mono filament polyester / polypropylene and multifilament nylon/polypropylene/polyamide.

Market Size and Trade Trends

The key purchase decision makers for surgical sutures are medical institutions and doctors. The companies invest heavily on promotion of their products amongst surgeons, nurses and hospital administrators to promote the usage and establish trust for the brand amongst these professionals. These relationships translate into product sales going forward.

Consumption Norms and Market Size

The surgical suture is a 100% Technical Textile material except for the needle portion at one end of the suture. The size of the needle and suture depend upon the wound and area of application. Johnson & Johnson and Centennial Surgical, Suture India Ltd control over 65-70% of the market. Suture price varies from Rs.1300 to 3500 per dozen. The market is expected to grow at 10% y-o-y. The market of sutures in 2012-13 is Rs.1000 crore and is expected to be Rs.1,331 crore in 2015-16. The current market of surgical suture industry is shown in the following exhibit:-

Exhibit 93: Market size - surgical sutures

Description	2012-13	2015-16(P)
Surgical sutures market in India in quantity (Mill dozens)	9.5-10	12.5 to 13
Exports Value (in Rs. Crore)	260	346
Surgical sutures in Value (in Rs. Crore)	1,000	1,331

*Source: Industry survey, IMAcS Analysis

Key Manufacturers

The surgical sutures market in India is dominated by Johnson and Johnson with its flagship Vicryl brand, which has a market share of 60-65%, followed by Indian companies like Centennial Surgical Suture Ltd, Sutures India Ltd, Futura Surgicals Pvt. Ltd and Lotus Surgical Pvt. Ltd amongst others.

The Imports and Export of Sutures

The import and exports of surgical sutures is as shown

Exhibit 94: Import-Export: Surgical Sutures

HS code family	HS codes	Quantity (2012-13)	Value (2012-2013)
Imports			
3006	30061010	29 million meters approx	Rs. 340 Crore
5402	54023990		
5404	54049010, 54049090		
5401	54011000 and others		
Exports			
3006	30061010	4 million	Rs. 260

HS code family	HS codes	Quantity (2012-13)	Value (2012-2013)
5402	54023990	dozens	Crore
5403	5403109	approx	
5404	54049090 and others		

*source: IMAcS analysis, DGCI, DGFT

Import export trend for surgical sutures is as follows

Exhibit 95: Export trends of surgical sutures

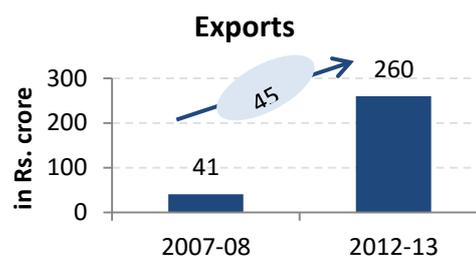
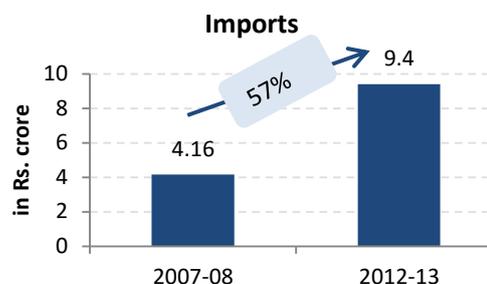


Exhibit 96: Import trend for surgical sutures



Source: IMAcS analysis, DGFT, DGCI

Top Countries of Imports and Exports of Sutures are as follows:

Exhibit 97: Top trading countries

Sutures	
Imports	Exports
Korea	Saudi Arabia
Germany	Bangladesh
USA	Malaysia
UK	Bulgaria
	USA

*source: IMAcS Analysis and DGFT

Quality Control and Standards – No BIS standard, manufacturers follow USP, European and American Foods and Drugs Authority (FDA) standards

Orthotics And Prosthetics

Orthotics as defined by International Standards Organisation is “an externally applied device used to modify the structural and functional characteristics of the neuromuscular and skeletal system”. For this purpose doctors use braces of metal, foam and other

materials. There is limited use of fabric, except for strapping purpose.

According to the International Standards Organisation Prosthetic device is “an externally applied device used to replace wholly or in part and absent or deficient limb segment”. Artificial limbs are made up of metal and fibre. Doctors use stockinet fabric to fix the sockets of the limbs.

Market and Key Players of Prosthetics

It is estimated that there are about 25000 people in the country who are provided with artificial limbs. Per limb about 3 meter of stockinet is used. The present market of TT fabric is estimated at Rs.15 Lakh and it is projected to grow at a CAGR of 5% y-o-y, to reach Rs.17 Lakh in 2015-16.

Exhibit 98: Market size - prosthetics

	2012-13	2015-16(P)
No of Artificial Limbs consumed (in'000 Nos.)	25	29
TT consumption (in '000 Meter)	75	87
TT Consumption (in Rs. Lakh)	15	17

*source: Industry survey and iMaCS Analysis

Artificial Heart Valves and Heart Patches

Artificial heart valves are implanted in the heart of the patients who need treatment for valve related diseases. The natural heart valve needs a replacement when two or more valves stop functioning properly. Generally an open heart surgery is performed to replace the valve. There are two types of artificial heart valves – Mechanical heart valve and Tissue heart valve

The mechanical heart valves last almost indefinitely, however, they need continuous treatment with anticoagulants. The tissue valves on the other side do not need anti-coagulants; however, they have shorter life span.

Product Characteristics

The heart valve has three parts, a metallic housing, a disc or ball which functions as occlude and a sewing ring made of synthetic material. The functional requirement of heart valves are as follows:

1. Minimum regurgitation
2. Minimum trans-vascular pressure gradient
3. Non-thrombogenic
4. Low wear/tear
5. Minimal leakage
6. Appropriate valve orifice to anatomical orifice ratio

The mechanical heart valve consists of Ultra high molecular weight-polyethylene (UHMW-PE) disc, Low density polyethylene plastic with knitted polyester sewing ring and a metallic housing. The Sewing Ring is fabricated from extensively implant tested, 100% polyester material. The Sewing Ring fabric is warp - knitted in a specific pattern using texturized yarn with superb tissue in growth and long term blood compatibility. The design and fabrication of the sewing ring gives a firm and secure seating on the frame and also permits rotation in the ring for proper orientation after suturing in place.

Heart Patches are made up of either Dacron or PTFE and are used to close the holes in the heart of new born babies. Two of the more common holes in the heart are between two of the four chambers in the heart. When a hole exists between the upper chambers, it is called an atrial septal defect or ASD. When the defect is between the lower, bigger chambers, it is a ventricular septal defect or VSD.

Market and Key Manufacturers

TTK Healthcare in collaboration with Sri Chitra Tirunal is the only domestic manufacturer. TTK has capacity to produce 20,000 heart valves in a year. Other large foreign players who hold about 70-75% of the market share are Edwards Life Sciences, St. Judes Inc., etc. The current market of Heart Valves is about 50,000-55,000 pieces with a value of about Rs.110 Crore. An artificial heart valve would have a 2cm x 2 cm sewing ring fabric. The market of the TT component would be around 2000 meter.

Exhibit 99: Market size - heart valves

	2012-13	2015-16(E)
Quantity (in '000 pieces)	50 - 55	65-75
Value (in Rs. Crore)	110	146
Quantity of TT (in Meter)	2000	2662

*source: iMaCS analysis, industry sources,

Heart patches used are about 1cm X 1 cm in size. They would cost about Rs.2500 -6000 for a large piece that can be cut and used in more than one surgery. The estimated market for heart patch is about Rs.75 Lakh. It is estimated to grow by 5% y-o-y and shall reach Rs.87 Lakh

Exhibit 100: Market size - Heart patches

Description	2012-13	2015-16(E)
Quantity (in '000 pieces)	5	5.75
Value (in Rs. Lakh)	75	87
Quantity of TT (in Meter)	50	58

*Industry survey and iMaCS Analysis

Import and Export of Artificial Heart Valves

India is a major importer of artificial heart valves and most of the domestic demand is met by imports.

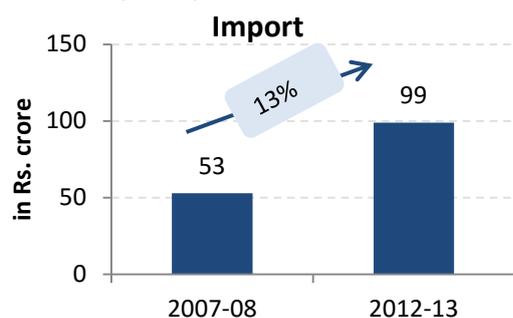
Exhibit 101: Import of artificial heart valves

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9018	90183990, 90181990 and others	45034 in nos.	Rs.99.45 Crore
Exports			
Nil			

*source: IMAcS analysis, DGcis, DGFT

The import trend for heart valves is as shown below

Exhibit 102: Import export trend for heart valves



Source: IMAcS analysis, DGFT, DGcis

Artificial Vascular Grafts

Vascular diseases are characterised by variations to the geometry and structure of the walls of the blood vessels. Variations in the mechanical characteristics of the vessels result in multiple complications like Thrombosis, Aneurysm and Arteriosclerosis

Product Characteristics

In order to function effectively, the grafts need to have special characteristics like – non-thrombogenic surface, elasticity and compliance, long-term tensile strength, bio-compatibility, durability, bacteria resistance, etc. The type of fabric used for prosthesis is woven fabric or knitted fabric. The knitted fabric is easy to suture and well suited for aortic replacement however not for large diameter vessels. The knitted fabric is porous and needs to be clotted with patient’s blood before usage. On the other hand, the woven fabric has the strongest construction but is difficult to suture. Most textile grafts for large and medium artery replacement are made of either PET (polyethylene terephthalate, commercial name Dacron) or PTFE (polytetrafluoro ethylene, commercial name Teflon).

Market and Key Manufacturers

TTK Healthcare in collaboration with Sri Chitra Tirunal is the pioneer of vascular grafts in India. However, products are still under clinical trials. TTK Healthcare is testing indigenously developed grafts with South Indian Textile Research Association (SITRA). In 2012, Vascular Concepts has set up India’s first state-of-art facility in Bangalore for R&D and production of

vascular grafts. The current demand is met through imports.

The current market of Vascular Graft is estimated to be around Rs.25 Crore.

Exhibit 103: Market size - vascular grafts

	2012-13	2015-16(E)
Quantity (in nos.)	20,000	24000
Value (in Rs. Crore)	25	30

*source: IMAcS analysis, industry sources,

Import Export trends

Import and Export of Vascular Grafts is as shown

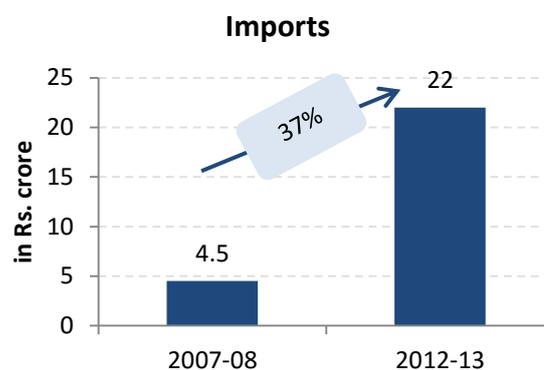
Exhibit 104: Import export - vascular grafts

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9018	90183990,90181990,901890 and others	~18000 in nos.	Rs.22 Crore
Exports			
9018	90181990	4 in nos.	Rs. 0.5 Crore

*source: IMAcS analysis, DGcis, DGFT

The import trend for artificial grafts is as shown:

Exhibit 105: Import export trend for artificial vascular grafts



Source: IMAcS analysis, DGFT, DGcis

Hernia Mesh

Hernia Mesh is used in hernia repair and abdominal wall replacement, where mechanical strength and fixation are very important. The long term function of the mesh is optimised by adjusting the porosity and the texture of the mesh.

Product characteristics

The mesh could either be woven or knitted based on the requirement of strength. Polypropylene, Polyester mesh is primarily used in hernia repair as it is resistant to infections. GOR-TEX is also used for making mesh for hernia repair. The size varies from 2’’x4’’to 10’’x14’’.

Market and Key Manufacturers

Hernia repair is one of the most common surgeries performed all over the world. The same is true about India. With more than a billion population, the number of hernia patients in India perhaps runs in millions. According to a research and consulting firm Global Data, India is poised to hold 37% of the global hernia repair market by 2019 and holds about 30% of the global market in 2012. It is estimated that there are about 2 million hernia surgeries done in India.

Dr.M.P.Desarda has introduced a new technique of hernia operation, called the Desarda Technique. This is tension free pure hernia repair, where no complicated dissection is done. TTK Healthcare and Johnson & Johnson are the key market players along with Lotus Surgicals Pvt. Ltd. The market for hernia mesh is expected to be Rs. 160.7 Crore. It is expected to grow at a CAGR of 15% y-o-y and shall be Rs. 244 crore market by 2015-16. No inflationary increase in the price of the mesh has been assumed.

Exhibit 106: Market size - artificial mesh

De	2012-13	2015-16 (E)
Value (in Rs. Crore)	160.7	244

*source: IMAcS analysis, industry sources,

Import Export Trends

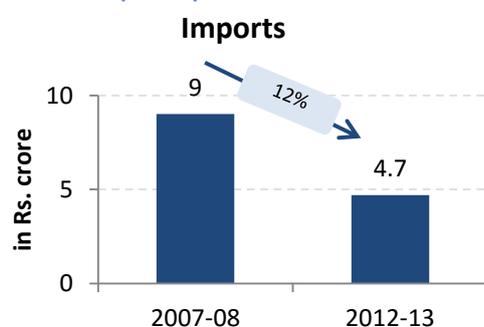
Import and Export of Hernia mesh is as shown:

Exhibit 107: Import export - artificial mesh

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9021	90213900	~58000 nos.	Rs.4.7 Crore
9018	90181990,90183990 and others		
Exports			
9018	90181990, 90183990 and others	~8100 nos.	Rs.0.72 Crore

*source: IMAcS analysis, DGCI, DGFT

Exhibit 108: Import export trend for Hernia Mesh



Source: IMAcS analysis, DGFT, DGCI

Artificial heart valves, vascular grafts, heart patches, and mesh are majorly imported from Denmark, Ireland, France, USA, Australia, Germany and China.

Artificial Ligaments

An artificial ligament is medical device for joining ends of two bones. The artificial ligaments are made from man-made fibres like polyester. The usage of the ligament varies based on type of operation. The artificial ligaments are generally subject to lot of wear and tear. They also carry a risk of septic arthritis.

Product Characteristics

Ligament is a multilayered or tubular woven structure having intra-articular region, at least one bend region and end regions. Each region is woven so as to possess the required flexibility and strength. Polyethylene Teraphthalate (PET) is primarily used for manufacturing artificial ligaments. The artificial ligament must be bio-compatible with contact blood and tissue and should have good bonding strength.

Artificial ligaments are imported and the market estimated to be as follows:

Exhibit 109: Market size - artificial ligaments

Description	2012-13	2015-16(E)
Artificial Ligaments consumption in value (in Rs. crore)	3.2	3.7

Import Export Trends

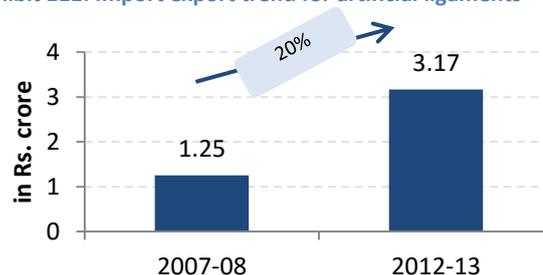
Import and Export of ligaments is as given in the table below:

Exhibit 110: Import & export - artificial ligament

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9021	90212900	~1900 nos.	Rs.3.17 Crore
Exports			
9021	90211000	~37 nos.	Rs.0.15 Crore

*source: IMAcS analysis, DGCI, DGFT

Exhibit 111: Import export trend for artificial ligaments



Source: IMAcS analysis, DGFT, DGCI

Artificial ligaments are majorly imported from Germany.

Artificial Joints

The orthopaedic joints are used for patients suffering from arthritis and accidental damage of joints. The

joints are made such that they are compatible with the human body.

Product Characteristics

The artificial joints are primarily made of Titanium, Stainless Steel and Chromium Cobalt, materials which exhibit compatibility with the human body. The Technical Textile component in joints is Ultra High Molecular Weight High Density Polyethylene (UHMWHDPE) material. This material is self lubricating and with extremely low friction.

The UHMWHDPE is a Technical Textile product which varies based on the product or type of joint replacement

Market and Key Manufacturers

A few manufacturers of artificial joints in India are TTK Healthcare Ltd and Narang Medical Ltd. Other players in the market are Smith & Mathew Orthopaedic India, Zimmer India Pvt. Ltd, Globus Medical India Pvt. Ltd etc. The current market is expected to be around Rs.108.5 Crore growing at a rate of about 15% y-o-y.

Exhibit 112: Market size estimate

	2012-13
Quantity (in '000 nos.)	111
Value (in Rs. Crore)	108.5

*source: IMAcS analysis, industry sources,

Import Export Trends

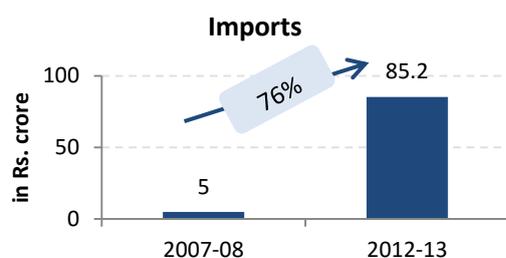
Import and Export of artificial joints is as given in the table below:

Exhibit 113: Import export - artificial joints

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9012	90213100,90213900 and others	~87000 nos.	Rs.85.2 Crore
Exports			
9021	90213100,90213900 and others	~17200 nos.	Rs.13.5 Crore

*source: IMAcS analysis, DGCIS, DGFT

Exhibit 114: Import export trend for artificial joints



Exports



Source: IMAcS analysis, DGFT, DGCIS

Extra Corporeal

Such medical devices that are used externally and not implanted with in the body have been categorised as extra corporeal. The following are the devices under this category are, Artificial Kidney, Artificial Liver and Artificial Lungs.

Artificial Kidney / Dialysers

Kidney serves the filtering mechanism of the blood. The kidney has a mechanical substitute in kidney dialysis machine. The kidney dialysis machine is outside the body and purifies the blood using a filter called the haemodialysor. The haemodialysor is made primarily of polysulphone and polyacetate.

The main element in a dialyser is a semi permeable membrane through which small molecules can pass by diffusion. Dialysers are encountered in medical work in renal dialysis where unwanted small molecules (e.g. urea) and water can be removed from the body. Haemodialysers (sometimes called artificial kidneys) take blood from the body and pass it along one side of the dialysing membrane so that unwanted small molecules may diffuse into a special dialysing fluid passing along the other side. Small molecules which need not be removed are included in the dialysate so that there is equal diffusion of these molecules in each direction.

Product Characteristics

The primary function of the artificial kidney is to purify the blood. The filtration medium used is hollow viscose or hollow polyester fibre. The typical characteristics of the fabric are:

- Low linting,
- High durability,
- Good capillary action,
- Good absorbency,
- Biodegradability and
- Inert behaviour

Market and Key Manufacturers

There are no manufacturers of artificial kidney in India presently, except Nipro Corp. The Japanese company has set up India's first artificial kidney manufacturing

plant in Pune in 2012-13. India is a net importer of artificial kidney. The membrane or dialysers are 100% Technical Textile products made up of polysulphane and polyacetate.

The current market of Artificial Kidneys is about Rs.48 Crore and projected to be Rs. 64 crore in 2015-16. Most dialyzers have membrane surface areas of 0.8 to 2.2 square meters

Exhibit 115: Market size - artificial kidney

	2012-13	2015-16(E)
Quantity (in Million nos.)	1.97	2.6
Value (in Rs. Crore)	48	64
Quantity of TT (in Mn sqm)	4	5.3

*source: IMaCS analysis, industry sources,

Import Export Trends

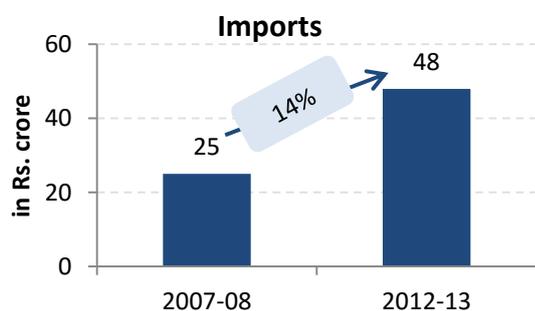
Imports of artificial kidney is as shown. Exports are negligible:

Exhibit 116: Import export - artificial kidneys

HS code family	HS codes	Quantity (2012-13)	Value (2012-13)
Imports			
9018	90189031	1.92 million nos.	Rs.46.7 Crore

*source: IMaCS analysis, DGCI, DGFT

Exhibit 117: Import export trend for artificial kidneys



Source: IMaCS analysis, DGFT, DGCI

Nipro India Corporation Pvt. Ltd, a subsidiary of Nipro Corporation Japan has set up an artificial kidney manufacturing plant in Shirwal, Pune. This is the only manufacturing plant of artificial kidneys in India.

Artificial Liver

Earlier, artificial support systems were not widely used in cases of liver failure, primarily because hepatic toxins are albumin-bound unlike most uremic toxins and hence cannot be removed by conventional dialysis. Recently, advances have been made for the removal of hepatic toxins making it now possible to support the patient with liver failure till the liver recovers or until liver transplantation is feasible.

The major artificial liver support systems are – Peritoneal dialysis, Haemodialysis, Haemofiltration, Continuous renal replacement therapy, Charcoal Haemoperfusion, Plasma exchange, Biologic – DT sorbent System and Molecular adsorbent recirculating system. In this system, patient's blood or plasma is pumped into bioreactors, which are hollow fibre devices, seeded on the dialysate side with freshly isolated or cryo-preserved porcine hepatocytes or transformed human hepatoma cell line.

Apollo Hospitals have done more than 500 liver transplantation surgeries in India. Cadaver donation or donation from brain dead patients is still the main source of transplants. The artificial lung does have a niche market in India. The cost of a liver transplantation is around Rs.25-35 Lakh.

Artificial Lung

Totally artificial lungs are not completely commercial. However, heart-lung machines are available in the market. The artificial lung device is connected to the heart's right ventricle. It relies on the heart—not a mechanical pump—to send blood through the lung, where it receives oxygen (and offloads carbon dioxide) as it flows through the arrays of microfibers or membrane oxygenators. Oxygen rich blood passes from the device into the left atrium and then to the rest of the body. The microfibers or the membrane oxy-generator are the Technical Textile component in the device.

14. Mobiltech

Mobiltech segment of Technical Textile products includes applications in automotive and automotive components (including aircrafts and railways).

List of Products

The key Technical Textile products covered under Mobiltech are as given below:

- Nylon tyre cord
- Seat belt webbing
- Airbags
- Car body covers
- Seat upholstery/fabric
- Automotive carpets
- Headliners
- Insulation felts (NVH components)
- Sun visors / sun blinds
- Helmets
- Airline disposables
- Webbing for aircrafts
- Aircraft upholstery
- Railways seating fabric



Tyre cords



Head liner fabrics



Seat cover fabrics



Seat webbing



Railway seat cover fabrics



Sun visors



Aig bags



Insulation felts



upholstery for aircrafts



Airline disposables



Webbing for aircrafts



Helmets

Market Size and Trends

The total estimated market size of Mobiltech is estimated to be Rs. 6,607 crore in 2012-13, with nylon tyre cord taking 60% share in the segment. Other key product is helmets that has about 15% share. Seat covers and Technical Textiles used in interiors upholstery constitutes about 21% of the Mobiltech segment by value. The demand in this segment is directly fuelled by the growth of automotive industry. The domestic consumption in Mobiltech stands at Rs. 6,483 Crore and exports total a Rs. 124 Crore. It is projected to grow at a rate of 12% reaching Rs. 9,173 crore by 2015-16 and Rs. 11,433 crore by 2017-18.

Exhibit 118: Market size for Mobiltech

Mobiltech		2012-13					2013-14 (P)		2015-16 (P)	
Product	Unit	Production	Import	Exports	Domes- tic	Total	Export	Domes- tic	Export	Domes- tic
Tyre Cord Fabric	'000 MT	91.2	49.6	1.02	139.8	140.8	1.2	156.6	1.5	196.4
	INR Crore	2,571	1,420	21	3,970	3,991	24	4447	32	5,578
Seat belt webbing	mn metres	10	37	20	27	47	22	30	27	36
	INR Crore	62	90	32	120	152	35	132	42	160
Airbags (TT component)	Mn Sqm	--	3	-	3	3	-	4	-	5
	INR Crore	--	94.48		94.48	94.48		109		144
Car body covers	Mn. Nos	782.8	2.04	-	784.8	784.8	-	863.4	-	1,044.7
	INR Crore	47	0.03	-	47	47	-	52	-	63
Seat covers fabric/upholst ery	Lakh linear mtr	343	78	9	412	421	11	453	14	548
	INR Crore	529.8	261.8	71.3	720.3	792	82	792	109	959
Automotive interior carpets	Mn Sqm	15	0	0	16	16	0	17	0	21
	INR Crore	148	9.4	0	157	157	0	173	0	209
Headliners (TT component)	Mn Sqm	7	1	-	8	8	-	9	-	11
	INR Crore	43	12	0	55	55	0	60	0	73
Insulation felts	MT	15,684	-	-	15,684	15,684	-	17,253	-	20,876
	INR Crore	115	3	0	118	118	0	129	0	157
Sun visors/sun blinds	mn nos	6	2	-	8	8	-	9	-	11
	INR Crore	86	19.5	-	105	105	-	118	-	148
Helmets	mn nos	28			28	28	-	31	-	39
	INR Crore	1,015			1,015	1,015	-	1,126	-	1,388
TT usage in airlines(upholst ery and airline disposable)		-				-	-	-	-	-
		3	77		80	80	-	89	-	112
TT usage in railways	Mn Sqm	0			0	0	-	0	-	0
	INR Crore	1			1	1	-	1.3	-	1.47
Total	INR Crore	4,620	1987	124	6,483	6,607	141	7,229	183	8,990

Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

*Value OF imports is of the entire air bag set up

Key Players

Key players manufacturing agro textiles in India are as follows:

- SRF Ltd.
- Supreme Nonwoven Ltd.
- Century Enka Ltd.
- Rane TRW Steering Ltd
- Uniproducts (I) Ltd.
- IFB Automotive Pvt. Ltd
- KSS Abhishek Safety Systems Pvt. Ltd.

The profitability and capital employed by the key player can be seen in the exhibit in the following exhibit

Exhibit 119: Profitability of key players - Mobiltech

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
SRF Ltd.	285590	265350	7.8%	11.0%
Century Enka	83643	91129	1.4%	0.5%
Rane TRW Steering Ltd	6381	8095	5.2%	7.8%
Uniproducts(I) Ltd.	--	13823	--	-3.0%
IFB Automotive	17288	16199	2.3%	5.3%

Source: IMAcS analysis, annual reports, VCCedge, Capitaline

High Potential Products

The Indian automotive sector is recovering now from a conspicuous slowdown of the past few years. Car sales rose 3% in May this year after falling for two years, and then expanded by 15%, 5% and 15% in the following three months, which had led many to consider it as a definite sign of an uptrend.⁶Riding on the promise of a business friendly government at the Centre with a strong mandate the automotive sector has already gone into the revival mode. However, growth perspectives for the sector are still only cautiously optimistic.

The demand for Mobiltech textiles is completely driven by the indigenous production of vehicles in India. This is yet to gain a firm trajectory and by our estimates shall grow by a realistic estimate of 10% only in the coming three year horizon. Factoring this perspective in, the major products within Mobiltech promising good growth are

- Seat covers fabric/upholstery
- Seat belt/webbing
- Automotive interior carpets
- Headliners (TT component)
- Insulation felts
- Sunvisors/sunblinds

The detailed analysis of each product of the segment is done in the subsequent sections.

Tyre Cord

Tyre Cord Fabric is a type of industrial fabric made using High Tenacity Synthetic Yarn Cord in the warp and has negligible density of weft just to hold the warps together. Tyre cord fabric provide the tyre its fundamental properties such as shape, load carrying capacity, abrasion resistance etc⁷. Earlier polyester tyre cords were popular but were gradually replaced by nylon tyre cord fabric. Nylon tyre cord provides reinforcement for all types of tyres. Nylon tyre cord (NTC) is made from high tenacity continuous filament yarn by twisting and plying. The major criteria for acceptance of any material in tyre are its tensile strength, dimensional stability, durability, thermal stability, hysteresis and adhesion. However, with the emergence of radial tyres, even nylon tyre cord fabrics face only modest prospects in the coming future. Polyester tyre cord is used to a very small extent and the bulk of it is imported rather than produced domestically.

Product Characteristics

Nylon 6 grey and dipped tyre cord fabrics having high strength, fatigue resistance, impact resistance, high adhesion characteristics, are mainly used as reinforcements of bias tyres. The tyre cords are generally available with the fabric characteristics of 930dtex, 1400dtex, 1870dtex, 2100dtex. The critical specifications drive the characteristics such as Breaking

strength, elongation, adhesion, ply twists and hot-air shrinkage.

Market Size and Trade Trends

The tyre cord industry follows the movement of the tyre industry which in turn moves in tandem with the automobile industry. In the past financial year, major tyre companies have seen a significant drop in the sales turnover mirroring the drop of the general economy.

Market Size Estimate

Based on industry insights, it is estimated that the total domestic consumption of tyre cord in India is about 139,799 MT valued at Rs. 3,970 Crore.

Exhibit 120: Market size estimate of tyre cord

	2012-13
Domestic consumption Quantity (in MT)	132,354
Value of domestic consumption (in Rs. crore)	3828
Exports of nylon tyre cord (in MT)	162.25
Exports of nylon tyre cord (in Rs Crore)	4.71
Market size of nylon tyre cord (in MT)	132,516.25
Market size of nylon tyre cord (in Rs Crore)	3,833.17

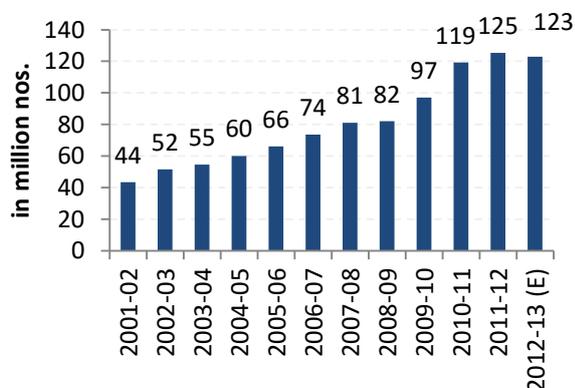
**source: IMAcS analysis, industry sources*

The tyre cord market has grown at 13% per annum during the last five years in terms of value which is more on account of inflationary measures than real value growth. Thus, a truer indicator of the industry can be taken to be the quantity consumption where there has been only a modest growth of 3%.

Key Growth Drivers and Inhibitors

The key growth driver for the tyre cord industry is the tyre industry. The tyre production in India in the past year has seen a drop as opposed to healthy growth in the first half of the past decade.

Exhibit 121: Tyre production in India



Source: ATMA, IMAcS Analysis

In accordance with the general trends of its consumer industry, the tyre cord consumption of India has grown

over the years as reflected in its 4% growth but can assume better growth rates once the general economy and consumption is revived. With the revival of the automotive sector, and production picking up the domestic consumption is expected to grow at 8% Y-o-Y in the three and five year horizon. Also, growing exports of PTC (tyre cord) may contribute a robust 15% growth in exports.

An emerging trend in the tyre industry is radialisation. The Passenger Car Radial (PCR) level is almost at 100% but the Truck and Bus Radial (TBR) level is way behind. The Indian Truck and Bus sector currently had a radialisation of 9-10% in 2012, but is expected to catch up at a much faster rate (Source: ICRA). A rise in radialisation will reduce the consumption of Nylon tyre cord.

Key Manufacturers

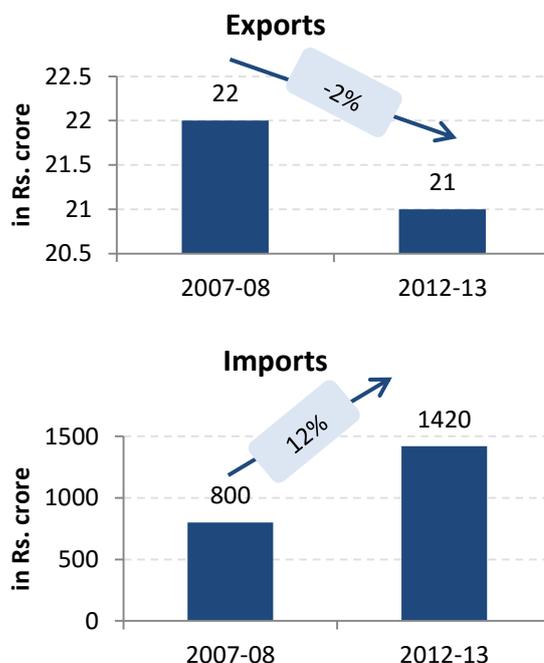
The tyre cord fabric industry is a relatively well organised industry since the consumer tyre industry is a well organised industry too.

Major manufacturers of Nylon tyre cord include SRF Ltd., Century Enka Ltd. and Madura Industrial Textiles

Import Export Scenario

Export of nylon tyre cord has seen a sharp decline over the last five years from 2007-08. Imports on the other hand have risen consistently over the years.

Exhibit 122: Export Import of tyre cord - FYE13 vs. FYE08



Source: DGFT, DGCIS, IMAcS analysis

Exhibit 123: Export & import - tyre cords

HS family	code	HS codes	(2012-13)
Exports			
5902		59021010, 59021090,	Rs. 4.70 crore
Imports			
5902		59021010, 59021090,	Rs. 1,385.89 crore

*source: IMAcS analysis, industry sources, DGFT

Key imports of NTC come from countries of China, Korea, Switzerland, Germany, France and Brazil. Key imports of PTC come from China, Taiwan, Indonesia, Korea and Hong Kong.

Seat Belt Webbing

Seat belts function as a safety harnesses which secure the passengers in a vehicle against harmful movements during collision or similar incidents. Seat belts minimise injuries during accidents. Seat belts are woven narrow fabric made from nylon filament yarns or high tensile polyester filament yarn. The load specification is an important criterion for usage in vehicles.

Product Characteristics

The seat belts are made from nylon filament yarn or polyester filament yarn which is woven to produce the webbing pattern. The linear density of synthetic yarns should be between 100dtex and 3000dtex, preferably 550-1800dtex. The filament linear density should be between 5dtex and 30dtex, preferably 8-20dtex. A typical seat belt is made of 320 ends of 1,100 dtex polyester each. Most weft yarns made from polyester are 550dtex. The critical characteristics of the webbing are abrasion resistance, resistance to light and heat, capable of being removed and put back in place easily and good retraction behaviour. The load bearing capacity of seat belts is 1500 kilograms. The surface of the webbing is of particular significance because its structure and properties decisively influence the retraction behaviour.

Market Size and Trade Trends

Based on industry survey and subsequent analysis, it is estimated that the total market size of seat belts in India is about 109 lakh units valued at Rs.300 crore. The seat belt webbing (the strap) is the Technical Textile in the complete seat belt assembly. The webbing is made of polyester or nylon. This Technical Textile composition of seat belts as indicated by our industry survey is about 40 to 45%. Domestic consumption of seat belt webbing is estimated to be Rs. 119.98 Crore and with exports at Rs. 31.81 crore

the Technical Textile market for seat belt webbing is estimated at about Rs. 151.79 Crore.

Exhibit 124: Market size estimate seat belts

	2012-13
Quantity of seat belts (in lakh units)	109 lakh units
Value of seat belts (in Rs. crore)	300
Domestic consumption of seat belt webbing (in million metres)	27.27
Value of domestic consumption of seat belt webbing (in Rs. crore)	119.98
Exports of seat belt webbing (in million metres)	20.19
Exports of seat belt webbing (in Rs. crore)	31.81
Market size of seat belt webbing (in Rs Crore)	151.79

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The key growth driver for is the four wheeler vehicles and hence, the growth of seat belts is slated to move in line with the growth in the four wheeler vehicles in India. This growth has taken quite a hit in the recent times with production slowing down considerably over 2010 to 2013.

Exhibit 125: Automobile production trend

Automobile Production Trends(Number of Vehicles)					
Year	UVS	MPV	Passenger cars	Total (Cars + UV + MPV)	YoY growth
2008	246,038	105,333	1,426,212	17,77,583	3.4%
2009	219,498	102,128	1,516,967	18,38,593	28%
2010	272,883	151,908	1,932,620	23,57,411	26.5%
2011	313,142	216,533	2,453,097	29,82,772	5.5%
2012	370,945	237,954	2,537,170	31,46,069	2.8%
2013	564,928	239,434	2,429,199	32,33,561	3.4%

Source: SIAM, IMAcS Analysis

In tandem with its consumer industry, the seat belt consumption and thus, the webbing consumption of India can grow only as fast as its main consumer - the four wheeler passenger vehicle production. Taking into account the revival of the automotive sector in the recent times, a reasonable 10% growth in domestic consumption and export markets for seat belt webbing is expected.

Import Export Scenario

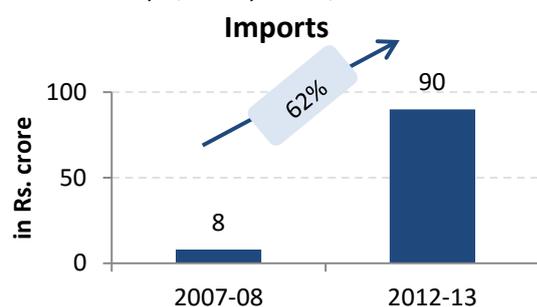
Both import and export of seat belt webbing has tabulated in Exhibit 126. The CAGR of exports at 39% is

far ahead of the growth of imports at 9% from 2012-13 over 2008-09 albeit on account of a lower base.

Exhibit 126: Import export trends of seat belt webbing

HS code family	HS codes	(2012-13)
Imports		
5806, 5911, 8708	58062000, 58063200, 59119020, 59119090, 87082100, 87089900	Rs. 89.69 crore
Exports		
5806, 5911, 8708	58062000, 58063200, 59119020, 59119090, 87082100, 87089900	Rs. 31.81 crore

*source: IMaCS analysis, industry sources, DGFT



*source: IMaCS analysis, industry sources, DGFT

Key export destinations of seat belt webbing are Germany, Brazil, Indonesia, Japan and China. Key countries from where India imports seat belt webbings are South Korea, Thailand, Germany, Japan and Czech Republic.

Airbags

Airbags are inflatable protective equipment which reduces injuries during an accident or impact in coordination with the seat belt.

Product Characteristics

The yarn / fabric generally used are nylon 66 or polyamide 66, lighter denier, lower dpf and silicone coated. We have assumed usage of 1.8 square meter of fabric per airbag module.

Market Size and Trade Trends

The domestic consumption of Technical Textiles in airbags in India is estimated to be Rs. 94.48 Crore and about 3.40 Mn Sqm. However, most of this consumption is met through imports of complete airbag assemblies. Export of airbag assembly stands at Rs 12.38 Crore, putting the market size at Rs. 106.86 Cr.

Exhibit 127: Market size estimate air bags

	2012-13
Domestic consumption of airbags in India (in nos.)	18,89,666
Domestic consumption of TT component of airbags (in Mn sqm)	3.40
Value of Domestic consumption of TT component of airbags (in Rs. crore)	94.48
Exports of airbags (in Rs. Crore)	-
Market size of airbags (in Rs. Crore)	94.48

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Consumption of airbags in India has still not caught up since the automotive market especially the four wheeler passenger vehicle market in India is very price sensitive. Airbag installation in cars pushes up the prices of a car significantly. Also, replacement of airbags after deployment implies similar cost. This being the case low-end cars and M&HCV / LCV commercial vehicles still do not have airbags. The airbags are typically fitted only in the high-end cars and higher end models of mid segment cars. Also, airbag installation in cars is not mandatory in India. Thus, the Technical Textile consumption of airbags has shot up in value fuelled by growth of number of high end/model vehicles. However, it has not resulted in expansion of domestic manufacturing capacity for the same, with most of this consumption met by imports which are cheaper than setting up manufacturing in India.

With the new Government at the centre and talks of rapidly introducing legislation for mandatory airbags installation in cars, there now is a significant chance for the airbags to become a full fledged OEM segment. In such a case, the demand for Technical Textile that goes into airbag assemblies shall shoot up. The observed penetration of airbags stands at a miniscule 8% for domestic production. Regulation shall push this number to a full 100% for passenger vehicles, at least. In addition, over a three year period recovery of the auto sector shall also entail a 12-15% growth in realistic terms. Factoring in both these growth factors, the airbags requirement is foreseen to grow at a rate of 15% CAGR over the next three years.

Import Export Scenario

The import export scenario outlined here is for airbag (inclusive of airbag assemblies) and thus, represents value of airbag assemblies rather than Technical Textile of the airbags only. Both import and export of airbag module assemblies have seen a spectacular rise over the last five years from 2007-08. While imports have risen substantially from Rs. 129 crore to Rs. 440 crore at a CAGR of 28%, there has been a increase in exports

from Rs. 0.97 crore from Rs. 12 crore, which displays a steep CAGR of 66% on account of a lower base effect.

Exhibit 128: Import export trends for airbag module assemblies

HS code family	HS codes	(2012-13)
Imports		
8536,	85369030,	85437029,
8543,	85437099,	87082900,
8708,	87089500,	87089900,
9401	94019000	Rs. 439.89 crore
Exports		
8536,	85369030,	85437029,
8543,	85437099,	87082900,
8708,	87089500,	87089900,
9401	94019000	Rs. 12.38 crore

**source: IMaCS analysis, industry sources, DGFT*

the above imports and exports are of the entire assembly of air bag and not just the Technical Textile component

Key countries from where India imports airbag modules are Republic of Korea, Germany, Thailand, Japan and Philippines. Key countries whom India exports to are Botswana, U.S.A, Japan, Germany and Nepal.

Quality Standards

There are no Indian standards.

Key players

IFB Autoliv, Takata and Rane TRW are the key players in this space.

Car Upholstery: Seat Cover Fabrics

Car seat cover(s)/fabric are one of the largest segments of Mobiltech accounting for as much as about 12% of the Mobiltech market size in value terms. With rising income levels and growing popularity of four wheelers amongst Indian families, consumption of seat cover fabrics in India has seen an expected rise. However, the recent slowdown in automotive sector has prevented a full throated growth of this segment.

Car seat covers comprise two components – the fabric which constitutes the part overlaying the seat over which a passenger is seated and the other is the peripheral fabric which spreads over the remaining of the seat. The former is designed to be more skin friendly and consists of PU laminated fabric and generally has a higher price per unit than the peripheral component. However, for the purpose of this study we have assumed a uniform distribution.

Market Size and Trade Trends

The market size of car seat covers is estimated at Rs. 791.69 Crore. Domestic consumption of seat covers is estimated to be Rs. 720.34 Crore and 411.62 Lakh linear metres which have increased from the estimates of 2007-08 of Rs. 402 Crore and 146.8 Lakh metres growing at a healthy CAGR of 22%. Exports for seat covers contribute Rs. 71.35 Crore to the market size.

Exhibit 129: Market size estimate car upholstery

	2012-13
Domestic consumption of seat cover fabrics (in Lakh of linear metres)	411.62 Lakh
Value of Domestic consumption of seat cover fabrics (in Crore)	720.34
Exports of seat cover fabrics (in Rs Crore)	71.35
Market size of seat cover fabrics (in Rs Crore)	791.69

**source: IMaCS analysis, industry sources*

Key growth drivers and Inhibitors

Seat cover market is driven by two components – new car seat sales comprising demand from newly manufactured vehicles and replacement market. The break of this market as per these drivers is given below.

Exhibit 130: Contribution of car seat cover sales from new and replacement market for 2012-13

Contribution of car seat cover sales from new and replacement market for 2012-13	
New Car seat covers market	2012 -13
Qty of seat cover fabrics (in Lakh linear metres)	251.17
Value of seat cover fabrics (in Crore)	439.55
Replacement Car seat covers market	2012 -13
Qty of seat cover fabrics (in lakh linear metres)	160.45
Value of seat cover fabrics (in Crore)	280.79

**source: IMaCS analysis, industry sources*

The new car seat sales are directly dependent upon the production of passenger vehicles in the country. In the face of recovery and an eminent turnaround in the sector, this product segment is expected to grow at a rate of 10%. Exports are also expected to grow at a robust 15% in keeping with the trend observed in the recent years for this segment.

Key Manufacturers

Key manufacturers include Shamken Multifab, Bhilwara Melba, Krishna Maruti and Harita Seating Systems

Import Export Scenario

The import export scenario for seat covers has been captured in the Exhibit 131. There is a significant dearth

of raw material of Automotive Dope Dyed (ADD) yarn which is the key raw material for manufacturing seat cover fabrics and also results in imports constituting a significant 19% of volume and an even larger 36% of value of domestic consumption.

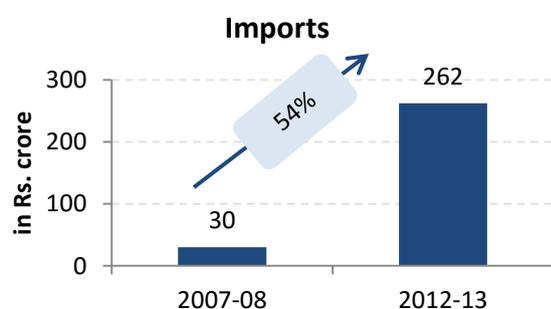
Exhibit 131: Import trends car seat covers

HS code	HS codes	(2012-13)	
Imports			
3926, 5903, 6304, 6307, 8708, 9401	39262029,	39269029,	Rs. 261.85 crore
	39269099,	39269099,	
	59032090,	59039090,	
	63049291,	63079090,	
	87082900,	87089900.	
	94012000.	94018000,	
94019000			
Exports			
3926, 5903, 6304, 6307, 8708, 9401	39262029,	39269029,	Rs. 71.35 crore
	39269099,	39269099,	
	59032090,	59039090,	
	63049291,	63079090,	
	87082900,	87089900.	
	94012000.	94018000,	
94019000			

**source: IMaCS analysis, industry sources, DGFT*

Over the years there has been a significant rise in the value of imports of seat cover fabric as shown in the graph below. Imports have grown from value terms of Rs. 30 Crore in 2007 -08 to Rs 262 Crore in 2012-13.

Exhibit 132: Import trend for seat cover fabric



**source: IMaCS analysis, industry sources, DGFT*

Key countries from where India imports seat cover fabrics are Germany , Czech Republic, Republic of Korea, Mexico and U.S.A. Key destinations for export of seat cover fabrics are U.S.A, Thailand, U.A.E, Brazil and Saudi Arabia.

Car Body Covers

Car body covers are used to provide protection to vehicles against weather agent especially if no covered space for parking (parking garage) is available.

Product Characteristics

The car body cover is a 100% Technical Textile product based on the raw material used. The car body covers are made of a variety of fabrics including canvas covers, HDPE, PVC reinforced cotton material and Nylon. Typically, price of a car body cover ranges from Rs. 600 to upward of Rs. 2000 for larger cars.

Market Size and Trade Trends

Market Size Estimate

The domestic consumption of car body covers is estimated to be Rs 47.09 Crore and 784,872 units up from Rs. 9 crore and 1.04 lakh units. Since, exports for the same are insignificant, we assume the same to be the market size for car body covers. The domestic market is expected to grow at a rate of 10% in the coming years as more and more people take to car covers to protect their vehicles.

Exhibit 133: Market size estimate of car body cover

	2012-13
Market size of car body cover (in lakh nos.)	7.85 Lakh nos.
Value of car body cover (in Crore)	47.09

**source: IMaCS analysis, industry sources*

Key Manufacturers

Car body covers is a market dominated mostly by unorganised sector and a multitude of small players.

Import Export Scenario

The imports and exports against car body covers are negligible.

Automotive Carpets

All passenger cars have company fitted carpets. The carpets are laid in the cabin and parcel shelf at the back. The carpets are primarily non-woven textile material. The usage of carpets varies based on the interior designs which vary across car models. Usage of carpets in buses and other M&HCVs is minimal.

Product Characteristics

The automotive interior carpets are non-woven Technical Textiles, made primarily from polypropylene fibres. The carpet is laid on the vehicle floor above which rubber mats are placed. The desired characteristics of automobile interior carpets typically are as given below:

1. High durability
2. High abrasion resistance
3. Tensile strength – warp around 50 KGF and weft around 45 KGF
4. Low in-flammability
5. Good compression recovery

The fabric is around 500 GSM with a thickness of about 3mm.

Market Size and Trade Trends

Market Size Estimate

Exports for automotive interior carpets are negligible. The domestic consumption and thus, market size of automotive carpets is estimated to be Rs. 157.36 Crore and 15.74 Mn Sqm up from 13.6 million sq. m. and Rs 136 Crore from 2007-08 growing at a CAGR of 3%.

Exhibit 134: Market size estimate of automotive interior carpets

	2012-13
Quantity of automotive carpets (in Mn sqm)	15.74
Value of seat cover fabrics (in Rs. Crore)	157.36

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth driver of automotive carpets is the passenger vehicle segment that has been growing over the horizon of past ten years but has seen a slowdown from 2010 to 2013. It is this segment that is the chief consumer of the product and thus, the key driver. With recovery setting in the automotive sector, the domestic consumption of automotive interior carpets is expected to grow at 10% in the short term of three to five years.

Key Manufacturers

The major producers of carpets in India include Uniproducts India, Bajaj Carpets, Hitkari Fibres and Supreme Non-woven.

Import Export Scenario

The import export scenario for automotive carpets has been captured in the table below. Imports stand at a value of Rs 9.36 crore and exports are insignificant amount of the total trade.

Exhibit 135: Import trends automotive interior carpets

HS code family	HS codes	(2012-13)
Imports		
3918, 3926, 4016, 5705, 8708	39181090, 39269099, 40169100, 40169990, 57050090, 87089900	Rs. 9.36 crore
Exports		
3918, 3926, 4016, 5705, 8708	39181090, 39269099, 40169100, 40169990, 57050090, 87089900	--

*source: IMaCS analysis, industry sources, DGFT

Key countries that India imports from are China, Hong Kong, Taiwan, U. K, Germany and U.S.A.

Machinery Details

The automotive interior carpets are non-woven (needle-punched) Technical Textiles, made primarily from polypropylene fibres.

The needle punching machine is imported from Austria, Taiwan and China

1. Oerlikon Neumag GmbH, Austria – Fehrer needle punching technology
2. Shoou Shyng, Taiwan- SPL-03+SVP

Headliners

Headliners are used in passenger cars and multi/sports utility vehicles as non-woven light weight roofing material. The cars were earlier fitted with knitted/woven fabric with hard cardboard type of backing. The trend has changed and increasingly non-woven headliners are being used in vehicles.

Product Characteristics

A headliner is a composite material that consists of a face fabric with nonwoven or foam backing that is adhered to the inside roof of automobiles. Most headliners consist of a tricot knit fabric that is knapped to provide a soft touch and uniform appearance. The fabric is adhered with melted polyurethane foam. This fabric-foam composite is glued to the interior fibreglass roof of the automobile.

Headliners non-woven fabrics have GSM in the range of 185-220 GSM. The desired characteristics of headliners are good sound damping properties and good aesthetics. The manufacturing process and material used varies across manufacturers and as per OEM specifications.

Market Size and Trade Trends

Market Size Estimate

The market size (domestic consumption) of headliners is estimated at Rs. 54.63 Crore and 8.40 Mn sqm up from 4.41 Mn Sq. and Rs 28.70 Crore in 2007–08 growing at a CAGR of 13.8%. Exports for the product are negligible.

Exhibit 136: Market size estimate of headliner

	2012-13
Market size of headliner (in Mn sqm)	8.40
Market size of headliner (in Crore)	54.63

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth driver of automotive carpets is the passenger vehicle segment that has been growing over the horizon of past ten years but has seen a slowdown in recent times. It is this segment that is the chief consumer of the product and thus, the key driver. With

recovery setting in the automotive sector, the domestic consumption of automotive interior carpets is expected to grow at 10% in the short term of three to five years.

Key Manufacturers

The major producers of automobile headliners in India are Krishna Maruti and Multivac India

Import Export Scenario

The import export scenario for headliners has been captured in the table below. Imports stand at a value of Rs 11.86 crore and exports are a negligible amount of the total trade.

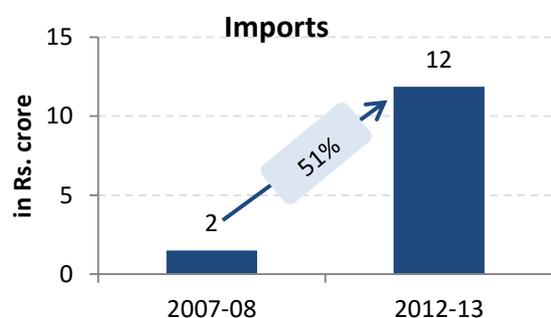
Exhibit 137: Import trends of headliner

HS family	code	HS codes	(2012-13)
Imports			
5603		56039400	Rs. 11.86 crore
Exports			
5603		56039400	--

*source: IMAcS analysis, industry sources, DGFT

The imports of the segment have grown at a CAGR of 51% from Rs. 2 Crore in 2007-08 to Rs. 12 Crore in 2012-13.

Exhibit 138: Import trend of Headliner - TT Component - 2012-13 vs. 2007-08



Machinery Details

Typically the headliners are non-woven Technical Textiles made of PSF, polypropylene or polyurethane core sprayed between two reinforcing layers. Needle loom is the key machinery for manufacturing headliners non-woven. The needle looms are generally imported. One of the most famous needle punch machine manufacturers in the world is Dilo (Germany).

Insulation Felts

Insulation felts, often known as NVH products (Noise, Vibration, and Harshness parts) are used for acoustic and thermal insulation in the automobiles. These are Bonnet liner, Outer dash, Wheelhouse, and Outer floor

under shield. These parts not only provide noise protection inside the car but also a reduction in the noise emission outside. Uses of NVH parts in automobiles started after introduction of EURO norms in the sector.

Product Characteristics

The NVH products or insulation felts are 100% polyester non-woven Technical Textile products. These products are classified based on the manufacturing process as needle-punched, phenolic resin bonded and thermoplastic. The felts are generally soft and used with or without harder backing. The thermal insulation products provide dissipation of heat at high temperature areas in the engine and under car body. The NVH products combine noise and heat protection function into the integrated comfort system.

Market Size and Trade Trends

Market Size Estimate

Exports for insulation felts are negligible and thus the domestic consumption in itself constitutes the market size for insulation felts. The domestic consumption of insulation felts is estimated to be Rs. 117.63 Crore and 15,684.35 MT.

Exhibit 139: Market size estimate of insulation felts

	2012-13
Market size of insulation felts (in MT)	15,684.35
Value of Market size insulation felts (in Crore)	117.63

Key Growth Drivers and Inhibitors

Key growth driver of automotive carpets is the passenger vehicle segment that has been growing over the horizon of past ten years but years but has seen a slowdown in recent times. It is this segment that is the chief consumer of the product and thus, the key driver. With recovery setting in the automotive sector, the domestic consumption of automotive interior carpets is expected to grow at 10% in the short term of three to five years.

Key Manufacturers

The major producers of insulation felts are Uniproducts India and Supreme Treves Pvt. Limited, a group company of Supreme Non-woven.

Import Export Scenario

The import export scenario for insulation felts has been captured in the table below. Imports stand at a value of Rs 2.57 crore and relevant exports are insignificant.

Exhibit 140: Import trends of insulation felts

HS code family	HS codes	(2012-13)
Imports		
5602, 7019	56021000, 56022990, 70199010	56022910, 56029090, Rs. 2.57 crore
Exports		
5602, 7019	56021000, 56022990, 70199010	--

*source: IMaCS analysis, industry sources, DGFT

Machinery Details

The machinery used for manufacturing NVH components is primarily imported. The details are as given below:

1. Opening and Blending machine – (Key supplier - Reisky and Schlese)
2. Needle Loom – (Key supplier - Dilo (Germany))
3. Foaming and Moulding machine
4. Lamination machine
5. Resin felt manufacturing machine
6. Thermo-bond interlining manufacturing machine

Sunblind/Sun Visors

The sunvisors are located in the interiors of a four-wheeler just above the windshield. The sunvisors are used to block the light from the sun from entering through the windshield. The blinds can also be turned to the front side window to reduce lateral sun exposure. There are two sunvisors in a car, one for driver and the other for the co-passenger. However, the high end car models have up to four sunvisors.

Product Characteristics

Sun visor needs to effectively reduce the sun obstruction to the driver and passenger. Nowadays, a small mirror is also fitted on one of the two sun visors (on one side). The blinds are primarily made of three parts, the synthetic backbone made of polypropylene or kenaf fibres, scrim – coarse woven reinforcement fabric and upholstery – typically artificial leather

Market Size and Trade Trends

Market Size Estimate

The domestic consumption of sunvisors is estimated to be Rs 105.37 Crore and 8.11 million nos growing at CAGR of 7.32% from Rs. 74 Crore in 2007-08. A good part of this consumption is catered to by imports as can be seen from the numbers in the export import section. Since exports for sunvisors are negligible we can assume the market size to be the same as the domestic consumption.

Exhibit 141: Market size estimate - sun blinds

	2012-13
Market size of sunblind's (in Mn nos.)	8.11
Market size of sun blinds (in Crore)	105.37

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth driver of automotive carpets is the passenger vehicle segment that has been growing over the horizon of past ten years but years but has seen a slowdown in recent times. It is this segment that is the chief consumer of the product and thus, the key driver. With recovery setting in the automotive sector, the domestic consumption of automotive interior carpets is expected to grow at 12% in the short term of three to five years.

Key Manufacturers

The key manufacturers of automobile sun blinds are:

1. Krishna Grupo Antolin Pvt. Ltd., Pune
2. Mayur Industries Ltd., Haryana
3. The Krishna Polymer Technologies, Noida

Import Export Scenario

India's imports for sun blinds stand at about Rs. 19.5 Crore. India has negligible exports for sun blinds.

Exhibit 142: Import trends - sun blinds

HS code family	HS codes	(2012-13)
Imports		
3926, 6303, 8708	39269099, 63031200, 87089900	Rs. 19.5 crore

*source: IMaCS analysis, industry sources, DGFT

Helmets

Helmets are used as protective headgear for two wheelers. The typical motorcycle helmet has an inner layer of polystyrene or polypropylene foam and an outer layer made of plastic, glass, and other synthetic fibres. The chief purpose of a helmet is to absorb the impact of a crash and thus prevent primary injury to the brain, rather than preventing skull and face fractures. The outer shell prevents sharp objects from puncturing the skull and also protects the inner liner upon contact with the road. The inner foam lining is crushed following impact, thereby increasing the stopping time and distance of the helmet. This, in turn, limits the accelerative forces on the brain, reducing the chance of primary brain injury. The helmet consumption is mainly driven by the sales of two wheelers in the country. It also has replacement consumption.

Product Characteristics

The two types of helmets available are:

1. Full face helmet
2. Open face helmet

The critical characteristics of the helmets are -- protection of head, clear vision through the visor, quick release chin strap and appropriate ventilation (in case of full face helmets). The outer shell is made from Acrylonitrile-Butadiene-Styrene (ABS) or Polypropylene or glass fibre plastic which is hard in nature. The inner side of the shell is expected to provide cushion to the rider and is made from regulated density concussion padding.

Market Size and Trade Trends

Market Size Estimate

The domestic consumption for helmets is estimated to be at Rs 1,014.59 Crore (28.18 million units) growing at a CAGR of 32% from Rs. 250 Crore (16.7 million units). Since, there are no exports of helmets; we assume this to be the market size of helmets in India.

In our interactions with leading composites player, one of the observation shared was that helmets are made up of composites that are glass fibres. A good quality helmet may contain roughly about 200-250 grams of glass fibres that provides it with lightweight toughness. This glass fibre is mostly imported as imports provide the best and cheapest alternative.

Assuming that organized players of the helmet market use such fibres – a conservative estimate of the glass fibre composites used in helmets would be 2818 MT and 56.37 Crore.

Exhibit 143: Market size estimate for helmets

	2012-13
Market size of helmets (in Mn nos.)	28.18 Mn nos.
Market size of helmets (in Crore)	1014.59

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The key growth driver for the market of helmets is the sale of two wheelers in India. The growth of sales in two wheelers has somewhat moderated over the period of last five years as can be seen from growth Exhibit .This effect can be seen in the number wise consumption which has grown only at about 3% from 2007 -08. However, with a turnaround eminent in the automotive sector, the two wheelers segment is also poised for growth. Factoring this in, the domestic consumption of helmet is expected to grow at rate of 11% in tandem with the rebound expected in two wheeler sales.

Exhibit 144: Sale of two wheelers in India and corresponding year-on-year growth

Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Sale of 2Wheeler s	7,249,278	7,437,619	9,370,951	11,768,910	13,435,769	13,797,748
Y-o-Y growth		2.6%	25.9%	25.6%	14.2%	2.7%

Source: SIAM. IMAcS Analysis

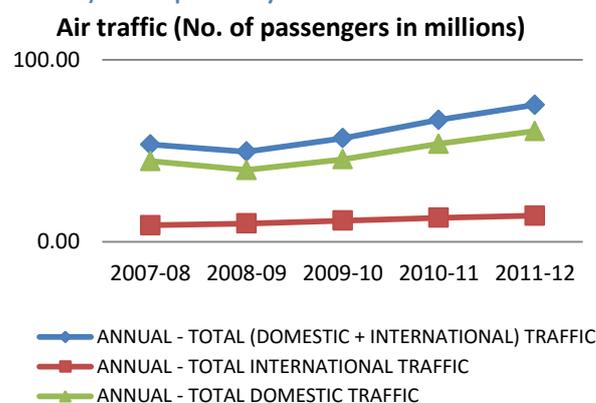
Key Manufacturers

Various international players like KBC (price range from Rs 3,600 to Rs 11,500) and Sparx (price range from Rs. 3,600 to 5,600) are already present in India. The famous Indian brands of helmets are Spark, Wrangler, Steelbird and Fasttrack which has joined this club recently.

Usage Of Technical Textiles In Airlines Industry

The scenario of the Indian aviation industry has changed drastically in the period of past five years from a comparison horizon of last ten years. Where the domestic traffic grew to about 70 million in 2006-07 at a CAGR of 30% over the period 2004 to 2007, it has stagnated substantially over the last five years. As can be seen from the DGCA passenger traffic data, airlines have more or less stagnated over the period of past five years. Even so, with growing popularity of air travel as a choice for masses, the domestic market for Technical Textiles is expected to grow at 12% Y-o-Y in the near short term horizon of three to five years. The main driver for this would be replacement and replenishment demand over and above the growth of value due to inflation.

Exhibit 145: Indian Air traffic (Number of passengers carried in millions) for the past five years



Source: DGCA

Accordingly challenges such as, elevated fuel prices over coupled with intense competition and

unfavorable foreign exchange environment has again deteriorated the financial performance of airlines. Price Sensitive traveller base which again adds to the woes of the airlines industry in India (Source: ICRA). A stagnation or slowdown in this consumer industry accordingly ripples through into the demand for Technical Textiles products for the industry.

Technical Textile products used in India include airlines disposable, headrest covers, webbings in aircraft seat belt and upholstery for aircrafts. The domestic production of these Technical Textiles shall be updated pending meetings with industry player active in the relevant space. However, the imports against these products which are a critical component with significant share have been tabulated in the following exhibit:

Exhibit 146 : Import trends - aircraft webbings and upholstery

Product	HS code family	HS codes	(2012-13)
Imports			
Webbings - parts for aircrafts	5407, 5902	54073090, 59022090	Less than Rs. 1 lakh
Upholstery – aircraft material	5112, 5403, 9401	51121990, 54034990, 54034990, 94011000, 94019000	Rs 75.91 Crore
Aircraft headrest covers	4811, 4818, 6302, 6304	48114100, 48189000, 63022200, 63029900, 63049230, 63049300	Rs. 0.76 Crore

*source: iMaCS analysis, industry sources, DGFT

The demand driven consumption of Technical Textiles used in airline disposable is pegged at Rs. 2.5 Crore which is mostly met by indigenous production.

Usage Of Technical Textiles In Railways

The Indian Railways

The Indian Railways is an over than 150 years old, one of the largest rail networks in the world, has contributed significantly to the economic growth and the transport needs of the country. The developmental role of the railways is particularly important in the context of both passenger and freight sectors. In 2011, Indian Railways carried 21 million passengers and 2.54 million tonnes of freight traffic daily over its 64,460 kilometre network. Fire retardant fabric is also used

extensively in Railways. The same has been covered under the Protech Segment.

The key Indian Railways statistics are as given below:

Exhibit 147: Statistics of Indian railways

Particulars	2011 Figures
Route Length	64,460 kms
Locomotives	9,213
Passenger Service Vehicles	53,220
Other coaching vehicles	6,493
Wagons	229,381
Railway Stations	7,133

Source: Indian Railways Year Book 2011

Key Technical Textile item used by the railways is the seat covers used to furnish our coaches.

Railways Seat Cover Fabric

In Railways, the material for seat berths fabric is the key Technical Textile usage. Material used in the berths is polyurethane foam and rexine cloth.

Product Characteristics

Rexine material is used in railway seat covers. The rexine material is constructed from single or multiple poly vinyl film layers with choice of backing cloth. Synthetic cloth like polyester and rayon is used. The rexine material is fire retardant coated fabric.

Market Size and Trade Trends

Market Size Estimate

The railway seat cover fabric consumption is estimated to be Rs. 1.05 crore and 351,292 Mn sqm of rexine used in seat covers. The fundamental unit of consumption of seat cover in railways would be the number of berths. The approximations and estimations used in arriving at the market size have been tabulated the following exhibit. The domestic consumption is expected to grow at 5% per annum in the near short term.

Exhibit 148: Market sizing of seat cover fabrics in railways

RCF Data	Berths/Coach	2012-13
Non-AC	72	937
AC	72	225
Total Coaches	-	1162
Non-AC Berths	-	67464
AC Berths	-	12375
Total Berths	-	79839
Rexine (Quantity in sqm.)	4.4 sqm /berth	351291.6
Rexine (Value in Rs crore)	Rs. 34.5 /sq. m.	1.27

Source: iMaCS analysis, industry sources

15. Packtech

Packtech, is the segment of Technical Textiles that includes various packaging materials ranging from polymer based bags used for industrial packing to jute based sacks used for packaging food grains and packaging used for tea. The Technical Textile products covered under Packtech are as give below:-

- Polyolefin Woven Sacks (excluding FIBC) Flexible Intermediate Bulk Containers (FIBC)
- Leno bags
- Treated/ coated Wrapping fabric
- Jute Hessian and Sacks (including Food grade jute bags)
- Soft luggage products (TT component)
- Tea-bags (filter paper)
- Nonwoven shopping bags



PP woven sacks



FIBC bags



Leno bags



Wrapping fabric



Hessian sacks



Jute bags



Tea bag filter paper



Soft luggage

The market size for the Packtech has been captured in the following exhibit

Exhibit 149: Market sizing of Packtech

Packtech	Units	2012-13					2013-14(P)		2015-16 (P)	
		Production	Imports	Exports	Domestic	Market size	Export	Domestic	Export	Domestic
Polyolefin woven sacks	KT	1,309	3	641	671	1,313	693	752	808	943
	INR Crore	9,008	41	323	8,726	9,049	349	9,773	407	12,260
FIBC	KT	200	1	102	99	200	117	102	154	108
	INR Crore	3,200	9	1,542	1,667	3,209	1,773	1,717	2,345	1,822
Leno Bags	KT	50	-	1	49	50	1	57	1	75
	INR Crore	800	-	6	794	800	7	913	9	1,207.5
Treated/ coated Wrapping Fabric	KT	165	-	-	165	165	-	182	-	220
	INR Crore	2,150	-	-	2,150	2,150	-	2,365.4	-	2,862
Jute Hessian and jute Sacks	KT	1,428	11	155	1,285	1,440	186	1,413	268	1,710
	INR Crore	10,665	84	1,157	9,592	10,749	1,389	10,551	2,000	12,767
Soft luggage(TT)	Mn Sqm	17	7	1	23	24	1	27	1	39

Packtech		2012-13					2013-14(P)		2015-16 (P)	
Products	Units	Production	Imports	Exports	Domestic	Market size	Export	Domestic	Export	Domestic
component)	INR Crore	356	141	16.5	480	497	16.5	576	16.5	829
Tea bags filter paper	KT	0.2	1	-	1	1	-	2	0	2
	INR Crore	503.7	39.2	0.03	542.9	542.9	0.03	651.4	0	938
Shopping bags(Spun bond nonwoven)	KT	67,008	2,947	3,684	66,271	69,955	4,236	70,910	5,602	81,185
	INR Crore	938	85	55	968	1,023	63	1,036	83.8	1,185.7
Total	INR Crore	27,621	399	3,100	24,920	28,020	3,592	27,583	4,841	33,871

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Technical Textiles market size under Packtech is estimated at around Rs 28,020 Crore in 2012-13. Jute hessian and sacks (including Food grade jute bags) account for around 38% of this followed by PP Woven sacks (excluding FIBC) with around 32% share. FIBC and wrapping fabrics account for around 19% of the total usage. Usage of Technical Textiles in soft luggage products, leno bags, tea-bags and shopping bags is little more than 10% of the total usage in Packtech. The market for Packtech is projected to reach Rs. 38,833 crore by 2015-16, growing at 11% CAGR and further to Rs. 48,318 crore by 2017-18. Exports of Packtech products (Technical Textiles component) from India have been estimated at almost Rs 3100 crore. Imports are a much smaller percentage at about Rs. 318 Crore. The domestic consumption of Technical Textiles under Packtech is expected to increase by about 8 – 12%

Key Players

Key players manufacturing agro textiles in India are as follows

- Gujarat Raffia Industries
- Cheviot Ltd
- Gloster Ltd
- Jagdamba Polymers Ltd.
- Rishi TechTex Ltd.
- Jumbo Bag Ltd
- Flexituff International Limited
- Texplast
- Gopala Polyplast Ltd
- Big bags International Ltd

The profitability and capital employed by the key player can be seen in the exhibit in the following exhibit

Exhibit 150: Profitability of key players - Mobiltech

Company Name	Capital Employed (Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Gujarat Raffia Industries	1814	1365	2%	2%
Cheviot Ltd	3156	2931	5	7
Gloster Ltd	4137	2901	6	7
Jagdamba Polymers	2841	2570	4%	3%

Company Name	Capital Employed (Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Ltd.				
Rishi TechTex Ltd.	1514	1542	267%	3%
Jumbo Bag Ltd	6815	6137	0%	1%
Flexituff International Limited	4941	4246	8	2
Texplast	-827	776	4%	6%
Gopala Polyplast Ltd	6634	5872	1%	1%
Big bags International Ltd	-2050	277	1%	1%

The detailed analysis of each product of the segment is done in the subsequent sections.

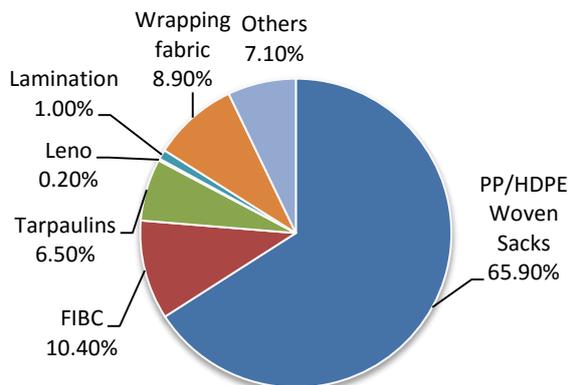
Indian Raffia Industry

The Raffia Industry can be categorized into six main categories depending upon the type of woven bag made. They are namely:

- Polyolefin Woven Sacks (excluding FIBC)
- Flexible Intermediate Bulk Containers (FIBC)
- Tarpaulins
- Leno bags
- Lamination
- Wrapping fabric
- Others

Exhibit 151: Break -up of Raffia industry

Break-up of the Indian Raffia Industry



Source: Industry research, IMAcS Analysis

For around 50% of the applications above, Polypropylene (PP) is used exclusively (cement, etc.). For around 7.5% applications, (Polymer, lamination etc.), Poly Ethylene (PE) is used. The remaining 42% is an overlap of PP & PE where either can be used (Fertilizer, wrapping fabric, chemicals, cattle feed, food grains, sugar etc). Indian Raffia industry is estimated to grow at 5-6%.

The current market estimates of Raffia industry is given below:-

Exhibit 152: Market size estimate of Raffia Industry

Description	2012-13
Quantity (in MT)	1.40 Million MT
Value (in Rs. crore)	Rs. 18,200 Crore

*source: IMAcS analysis, industry sources

Key manufacturers

Though the Raffia industry is spread all over India, it is mainly concentrated around the region which has major fertilizer and cement players like the states of Gujarat, Maharashtra, Punjab, Rajasthan, Karnataka, MP and Tamil Nadu. Though there are several small scale units, there are a few big players with capacity as high as 36,000 MT per annum. Thus the player size ranges from 200 MTPA to 36,000 MTPA with average size of about 300 MTPA taking into account all players of the industry and its total capacity.

Exhibit 153: Revenue of key manufacturers

Manufacturer of raffia	Year	Sales (Rs Crore)
Jai Corp Ltd.	2012 - 13	634.34
Neo Corp International Ltd.	2012 - 13	424.23
Bajaj Steel Industries Ltd.	2012 - 13	285.23
Narendra Plastic Pvt. Ltd.	2012 - 13	284.23
Flexituff International Ltd.	2012 - 13	863.35
Ashok Polymers Ltd.	2012 - 13	99.62
KG Petrochem Ltd.	2012 - 13	97.05
Texplast Industries Ltd.	2012 - 13	89.46

Manufacturer of raffia	Year	Sales (Rs Crore)
Polyspin Exports Ltd.	2012 - 13	82.55
Marvel Industries Ltd.	2012 - 13	66.51
Mewar Polytex Ltd.	2012 - 13	44.07
Rishi Techtex Ltd.	2012 - 13	35.53
Pankaj Polymers Ltd.	2012 - 13	31.25
Gujarat Raffia	2012 - 13	27.59
Deccan Polypacks Ltd.	2012 - 13	23.24
Karnavati International Ltd.	Alfa 2012 - 13	5.49
Promact Plastics Ltd.	2012 - 13	3.66

Source: Capitaline, Annual reports, Company Websites, Industry survey

The detail of product wise markets of different Packtech products is discussed in subsequent sections:

Polyolefin Woven Sacks (excluding FIBC)

Polyolefin (HDPE/PP) woven sacks are versatile packing materials used extensively in the packing of cement, fertilizers, thermo plastic raw materials, food grains, sugar etc. The list of user-industries of sacks:

1. Cement
2. Fertilizers
3. Chemicals
4. Food Grains
5. Cattle Feed
6. Salt
7. Sugar
8. Polymers
9. Sacks - Export
10. Others

Product Characteristics

Exhibit 154: Product characteristics - HDPE bags

HDPE Bag Capacity	Weight of the HDPE Bag (100% TT)
50 kgs	110 – 116 grams

Source: Industry survey, IMAcS Analysis

Cement bags on an average weigh 70g and fertilizer bags 130g.

Exhibit 155: Woven bag details

WOVEN BAG FABRIC DETAILS	
Material	PP / HDPE
Fabric Weave	5x5 to 14x14 per sq. in. OR 20x20 to 56x56 per sq. dm.
Tape Specification	Standard 2.5 mm. width. Denier: 500 D to 2000 D

WOVEN BAG FABRIC DETAILS	
Fabric Colour	Natural, Milky or coloured
Additives	Ultra Violet Stabilized. TiO ₂ , CaCO ₃ or antislip coated or as specified.
Lamination	Laminated or Unlaminated
APPLICATIONS	Fertilizers, Cement, Sugar, Food grains, Salt, Flour, Cattle Feed, Seeds, Sand, Chemicals

The various advantages that HDPE/PP bags have conventional packing materials are:

- Higher Strength
- Light Weight
- Minimal Seepage
- Moisture Proof
- Long Lasting (Durable)
- Cheaper (as it can be reused)

Market Size and Trade Trends

Market Size Estimate

The domestic consumption of market size for Polyolefin sacks is estimated to be Rs. 8726.28 Crore and 671.25 KT up from Rs 6,725 crore at 2007 – 08 growing at a CAGR of 5.35%. Exports for the same are at Rs. 323.23 Crore which bring the market size to Rs. 9049.51 Crore.

Exhibit 156: Market size - woven poly-olefin bags

	2012-13
Quantity of domestic consumption (in KT)	671.25
Value of domestic consumption(in Rs. crore)	8726.28
Value of exports (in Rs. crore)	323.23
Market size of exports (in Rs. crore)	9049.51

Key Growth Drivers and Inhibitors

The market for polyolefin woven sacks would track the growth of these driver industries chiefly cement and fertilizers which are the biggest consumers of polyolefin sacks both put together nearly at 50%. With a new Government in place that is expected to boost infrastructure spending, polyolefin sacks are expected to grow significantly. The domestic consumption is expected to grow easily by 12% and exports are expected to grow at a rate of 8% Y-o-Y in the short term horizon of three to five years.

Impediments to Growth

This industry is highly sensitive to the prices of HDPE/PP granules which are its key raw materials constituting about 60% of the total input. With the

prices of polymer granules increasing sharply, the woven sack manufacturers are finding it increasingly difficult to maintain competitive prices of their bags. To maintain the prices, the percentage of 'Filler' material being used is increasing. Increased usage of filler brings the cost of the bag down but the strength and the quality is also lowered. To protect the interest of the end users of these woven sacks Government of India plans to setup a limit up to which fillers can be used for every end user segment. This will significantly increase the price of a HDPE bag.

Key Manufacturers

Key manufacturers in the polyolefin sacks industry are:

- Asia Pack
- Ganpati Plastfab
- Gopala Polyplast
- Gujarat. Raffia Industries
- Jumbo Bag
- Kanpur Plastipack
- Karur KCP Pack.
- KG Petrochem
- Mewar Polytex
- Neo Corp Intern
- Pankaj Polymers
- Pankaj Polypack
- Pithampur Poly
- Planter's Poly
- Polyspin Exports
- Promact Plastics
- Rishi Tech.
- Salguti Industries
- Sh. Jagdamba Polymers
- Stanpacks (India)
- Texel Inds.
- Texplast Inds.
- TPI India

Besides the leading ones mentioned above, there are various other players spread across the country.

Import Export Scenario

The import export scenario for polyolefin sacks is captured in Exhibit 157.

Exhibit 157: Import Export trends for polyolefin sacks industry

HS code family	Applicable HS codes	2012-13
Imports		
3923, 3926, 6305	39231010,	39232100,
	39239090,	39261099,
	39269080,	63051090,
	63053300, 63053900	
Exports		
		Rs. 41.54 crore

HS code family	Applicable HS codes	2012-13
3923, 3926, 6305	39231010, 39239090, 39269080, 63053300, 63053900	39232100, 39261099, 63051090, Rs. 323.23 crore

*source: IMAcS analysis, industry sources

Key export markets for polyolefin sacks are U.S.A, Tanzania, Spain, Chile, Brazil and United Kingdom. Nations sending bulk of the imports are Pakistan, Saudi Arabia, China and Malaysia.

Machinery Details

The main machine required for woven sacks manufacturing are the Shuttle Loom and circular looms. The main suppliers of these looms in India are:

- Lohia Starlinger Limited
- J. P. Industries
- Kabra Extrusionstechnik Ltd. (KET) – Kolsite
- Windsor Machines Limited

Quality Standards

- IS 6899:1997 Textiles - High density polyethylene (HDPE) woven fabrics
- IS 8069:1989 High density polyethylene (HDPE) woven sacks for May packing pesticides [amalgamating IS 8069(Part 2):1981]
- IS 9755:2003 Textiles - High density polyethylene (HDPE)/Polypropylene (PP) woven sacks for packing fertilizers
- 9 IS 11652:2000 Textiles - Woven sacks for packing cement - High density polyethylene/ Polypropylene
- IS 12100:1987 High density polyethylene (HDPE) woven sacks for packing flour
- IS 14252:2003 Textiles -High Density Polyethylene (HDPE)/Polypropylene (PP) woven bags for filling sand
- IS 14887:2000 Textiles - High density polyethylene (HDPE)/ polypropylene (PP) woven sacks for packing food grains
- IS 14968:2001 Textiles - High density polyethylene (HDPE)/polypropylene (PP) woven sacks for packing 50 kg/25 kg sugar

Flexible Intermediate Bulk Containers (FIBCs)

Flexible Intermediate Bulk Containers (FIBC), popularly known as “Jumbo Bags”, is similar to the HDPE/PP bags but that of a larger size. FIBC’s are one of the most cost effective and ideal types of packaging for shipping and storing dry bulk products. They can be produced from either tubular or flat polypropylene (PP) woven fabrics. These fabrics can be coated or uncoated and vary in

terms of weights depending upon the requirements of the Safe Working Load (SWL), or Safety Factor (SF).

There are three types of FIBC bags

- Panel Type
- Circular woven
- Baffle type (Square bags)

Product Characteristics

The general bag specifications used in the industry are as follows:

Exhibit 158: Specifications of FIBC bags

Capacity (cubic feet)	Empty size width (inches) X depth (inches)	Filled diameter (inches)	Applications
5 to 20	29 X 29 to 31 X 31	38	For higher bulk density products or smaller weight requirements
21 to 75	35 X 35 to 37 X 37	46	Most common sizes for all products. Used in truck shipments and export containers
76 and above	41 X 41 to 43 X 43	53	For smaller bulk density products or where height restrictions occur. Used for rail shipments

In general the approximate weight of FIBCs is as follows:

Exhibit 159: Weight of FIBC bags

Type of bag	Weight in grams
Builder bag	900-1200
Technical bag	1800-2200
Speciality bag	1800-2400

Exhibit 160: TT component in FIBC

FIBC Bag Capacity	Weight of the FIBC Bag (100% TT)
500 kgs	1-2 kg

Source: Industry survey, IMAcS Analysis

These bags have capacities ranging from 500-4000 kgs. The weight of fabric varies from 180-275 gsm. FIBCs can vary from 900 gms to 3 kgs in weight depending upon the bag properties and weight to be carried.

Market Size and Trade Trends

Market Size Estimate

The market for FIBC containers is estimated to be at Rs. 3,208.63 Crore and 200.30 KT. Domestic consumption

of FIBC in India is estimated to be at about 98.76 KT and exports to be at 101.54 KT.

Exhibit 161: Market size estimate of FIBC

Description	2012-13
Domestic consumption of FIBC(in KT)	98.76
Value of domestic consumption of FIBC(in Rs. Crore)	1667.04
Exports of FIBC ⁸ (in KT)	101.54
Value of exports of FIBC (in Rs. Crore)	1541.59
Market size of FIBC (in KT)	200.30
Value of market size of FIBC (in Rs. Crore)	3208.63

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

Consumption of FIBCs by various industries esp. Key consumer like soda ash industries also depends a great deal on how well the industry is equipped to handle FIBC since handling of these FIBCs requires special equipment. This has grown at a CAGR of 7%. Going forward the domestic market is expected to grow at a conservative 3% with exports fuelling the growth of market size. Exports are expected to grow easily at 15% Y-o-Y in the short term horizon of three to five years.

Import Export Scenario

The imports and exports of FIBCs are captured in the following exhibit.

Exhibit 162: Import export trends for FIBCs

HS code family	Applicable HS codes	2012-13
Imports		
3932, 6305	39232990, 39239090, 39269080, 63051030, 63053200, 63053900	Rs. 8.63 crore
Exports		
3932, 6305	39232990, 39239090, 39269080, 63051030, 63053200, 63053900	Rs.1541.59 crore

Majority of the FIBCs exported from India find their way to China, Italy, France, Indonesia and Pakistan.

Machinery Details

The main machine required for FIBC manufacturing is the Shuttle Loom. The main suppliers of these looms in India are:

- Lohia Starlinger Limited
- J. P. Industries
- Kabra Extrusiontechnik Ltd. (KET) – Kolsite
- Windsor Machines Limited

Leno Bags

Leno bags are excellent for packing & preserving vegetables like potato, onion, ginger, garlic, cabbage etc. and fruits like pineapple, citrus fruits, raw mango, coconut etc.

Product Characteristics

The Leno bags have widths between 20cm to 72cm. The length also varies as per the customer's requirements. The mesh again is as per requirement with a maximum of 574 tapes in the warp in different colours. Leno bags on an average weigh 50g (or less).

Exhibit 163: Key application - leno bags

Size (In cm)	Application
Width x height	
56.0 x 105.0	50 Kg Potato/ Onion
45.8 x 84.0	25 Kg Potato/ Onion
30.5 x 66.0	10 Kg Potato / Onion

The Leno Bag is made of netted fabric of virgin Polypropylene (PP) with colour Masterbatch.

Market Size and Trade Trends

Market Size Estimate

The market size of leno bags is estimated to be at Rs 800 Crore and 50 KT. Domestic consumption of leno bags is estimated to be ~Rs. 794 and 49 KT. The exports stand at ~ Rs. 6 Crore and about one KT.

Exhibit 164: Market size of leno bags

	2012-13
Value of domestic consumption of leno bags (in Rs Crore)	794
Domestic consumption of leno bags (in KT)	49
Value of exports (in Rs. Crore)	6
Exports of leno bags (in KT)	1
Market size of leno bags (in Rs Crore)	800
Market size of leno bags (in KT)	50

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The key growth driver for usage of leno bags is the fruits and vegetables industry. There is great potential for the leno bags in India, India having significant production in Fruits and vegetable. Despite the fact that India is the 2nd biggest producer of fruit and vegetables in the world, this market has still not been captured by Leno bags. Slow growth of agricultural produce is one of the reasons for slacking acceptance of leno bags in the country overall. Leno bags are also suitable for cold storage which has plenty of room to

grow in India. With a small base to grow and a huge potential to tap into, the domestic consumption and exports of leno bags both are expected to grow at 15% Y-o-Y in the near future.

Import Export Scenario

The export scenario of leno bags has been captured in Exhibit 165. The imports against leno bags for India are negligible.

Exhibit 165: Export trends of Leno bags

HS code family	Applicable HS codes	2012-13
Exports		
3923, 5407, 5516	39231010, 39231090, 39232990, 39239090, 54075290, 54075300, 55162300, 58013690	Rs. 6 Crore

**source: IMaCS analysis, industry sources*

Most of these exports go to UAE, Malaysia, Australia, U.S.A., Qatar and Italy.

Machinery Details

The main machine required for leno bags manufacturing is the Loom. The main suppliers of these looms in India are:

- Lohia Starlinger Limited
- J. P. Industries
- Kabra Extrusiontechnik Ltd. (KET) – Kolsite
- Windsor Machines Limited

Quality Standards

DOC.TXD 23(906) Textiles- Polypropylene (PP)/ High Density Polyethylene (HDPE) Woven Leno Sacks for Packing of Fruits and Vegetables

Treated/ Coated Wrapping Fabric

Treated / coated Wrapping fabric, hereon referred as wrapping fabric is made out of HDPE/PP, cotton canvas, etc. Unlaminated PP/HDPE Woven Fabric is mainly used for wrapping of paper rolls, paper bundles, steel coils, tyres, yarn cones etc.

Product Characteristics

Wrapping fabric weighs 50 to 200 gsm and its size varies from 20 to 210 cm. The fabric is generally packed in roll form and can be run on automatic cutting and stitching machines.

Clear Woven Sheets (Natural Woven Laminated Sheets) are used for packing of used clothes etc. These sheets are see through and are mainly used as a wrapping material. The most common size is 40" * 54" with side lamination and weighs up to 100 grams.

Lumber Cloth is a wide width fabric used to cover huge logs of wood. It can either be one side or both side laminated. It can be printed or non-printed as is available in roll form.

Market Size and Trade Trends

Market Size Estimate

The market size for wrapping fabric is largely constituted by the domestic consumption of the country. Domestic consumption is estimated to be at Rs 2150.35 Crore and 165.41 KT up from Rs 1350 Crore in 2007 -08 growing at a rate of 9.76%.

Exhibit 166: Market size of treated/ coated wrapping fabric

	2012-13
Domestic consumption of wrapping fabric (in KT)	165.41
Value of domestic consumption of wrapping fabric (in Rs. Crore)	2150.35

**source: IMaCS analysis, industry sources*

Key Growth Drivers and Inhibitors

These fabrics are widely used in industries such as paper bundles, wrapping of paper rolls, steel coils, yarn cones, tyres etc. These fabrics can be utilized with automatic cutting & stitching machines for manufacturing bags too. The domestic consumption of wrapping fabric is expected to grow at 10% Y-o-Y in the short term horizon of three to five years.

Quality Standards

IS 6899:1997 Textiles - High density polyethylene (HDPE) woven fabrics

Soft Luggage

The luggage industry is classified into hard and soft luggage. Hard luggage is mainly the large travel bags made from moulded plastic. Soft luggage is made out of woven fabrics like nylon and polyester. It comprises of uprights, totes, duffle and sky bags which can be with or without wheels and handles. The soft luggage today is becoming very popular due to the ease of carry as it is light and flexible. It includes handbags, military backpacks, athletic backpacks, wallets, briefcases and other soft sided luggage items.

Product Characteristics

Outer dimensions of a soft luggage bag vary from 460mmX340mmX160mm to 790mmX620mmX280mm. The size of a small soft suitcase can vary from 20" to 31".

Market Size and Trade Trends

Market Size Estimate

The domestic consumption for soft luggage is estimated to be Rs.2,640 crore and the Technical Textile component value is pegged at Rs. 480 crore and 22.53 million sqm. This is a CAGR of about 25% over a base of Rs. 160 Crore market in 2007-08. Exports stand at Rs. 16.53 Crore, bringing the market size to Rs. 496.53 Crore.

Exhibit 167: Market size of Technical Textile component in soft luggage

Market size for soft luggage	2012-13
Domestic consumption of soft luggage in Value (in Rs Crore)	2,640
Quantity of Technical Textile (In Million sqm)	22.53
Value of Technical Textile (in Rs Crore)	480.00
Exports of Technical Textile (In Million sqm)	0.78
Exports of Technical Textile component (in Rs. Crore)	16.53
Market size of Technical Textile component (in Million sqm)	23.31
Market size of Technical Textile component (in Rs. Crore)	496.53

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Out of the total luggage industry, 30% is estimated to be hard luggage while 70% is soft goods by value. The changing demographics and growing propensity of people towards soft luggage is reflecting in the growth of the segment which boasts of a 15% growth as revealed by our industry survey. Polypropylene makes up around 75% of the raw material pie for hard luggage. Hence, more and more people are shifting from hard luggage to soft goods. In the soft goods market, around 50% of the market belongs to the unorganised sector. The price of a soft luggage in the organized market ranges from Rs 1,200 to Rs. 12,000 depending upon its size, raw material, etc.

Today, most luggage and travel bags companies in India are following international trends and designs closely because they are aware that the buyer is becoming more conscious of design and exclusive patterns looking luggage/baggage. With more and more people travelling, manufacturers, exporters and suppliers of handbags, bags, luggage and travel accessories ensure that each and every luggage item are given away with ample safety features, theft-proof, sturdy and strong. On the back of a booming travelling class and soft luggage market, the corresponding Technical Textile market is also expected to grow at 20% in the coming three to five years.

Exhibit 168: Particulars about the soft luggage industry

Particulars	
% of soft luggage industry in total luggage	70%
Value of textile in the total value of soft goods	15%
Average price of fabric used in soft luggage	Rs 213 per sq m
Share of organised sector in soft luggage industry	50%
Expected growth rate of the organised segment	15%
Expected growth rate of the unorganised segment	15%

Key Manufacturers

Key manufacturers in the soft luggage are mentioned in the Exhibit 169 with their corresponding soft luggage sales.

Exhibit 169: Key manufacturers of soft luggage in India

Manufacturer	Year	Value* (Rs crore)
VIP industries	2012-13	586.46
Samsonite India	2012-13	NA
Safari Industries	2012-13	93.40

Source: Capitaline, Company Annual Reports, Company websites, Industry Survey

*These are Net Sales figures for soft luggage for VIP and complete portfolio for Safari.

Soft goods market has an unorganised segment that accounts for about 50% of the total value. In the organised segment, the leading players are VIP, Samsonite and Safari. VIP's portfolio of brands includes V.I.P., Aristocrat, Alfa, Skybags and Delsey. In the organised sector, VIP is the market leader with almost 55% of the market share whereas Samsonite leads in the premium segment. Samsonite's global revenues in the year 2006-2007 were US\$ 1,070 million, out of which 7% were from India.

Import Export Scenario

The imports and exports were soft luggage are captured in Exhibit 170.

Exhibit 170: Import export trends for soft luggage

Applicable HS codes(Under 4202)	2012-13
Imports	
42021110/20/30/40/50/60/90, 42022210/20/30/90,	Rs. 560.67 crore (TT component)

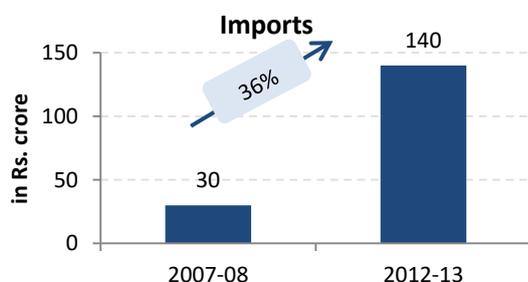
Applicable HS codes(Under 4202)	2012-13
42022910/90, 42021910/20/30/40/60/90, 42021190, 42022110/20/90, 42021210/20/30/40/50/60/80/90, 42023110/20/90, 42023290, 42029900, 42029200	of around Rs 140.17 ⁹ crore)
Exports	
42021110/20/30/40/50/60/90, 42022210/20/30/90, 42022910/90, 42021910/20/30/40/60/90, 42021190, 42022110/20/90, 42021210/20/30/40/50/60/80/90, 42023110/20/90, 42023290, 42029900, 42029200	Rs 66.11 crore(TT component of around Rs 16. Crore)

*source: IMaCS analysis, industry sources, DGCIIS

The imports against this product have grown substantially from Rs. 30 Crore in 2007-08 to Rs. 140 Crore in 2012-13 at a CAGR of 36%. Exports have grown from Rs 12 Crore in 2007-08 to Rs. 17 Crore in 2013-13.

Key export destinations for the product are China, UAE, Belgium, USA and Korea. More importantly, majority of the imports are sourced from China, France, Vietnam, Thailand, Indonesia and Taiwan.

Exhibit 171: Import trends of Soft luggage - TT component - 2012-13 vs. 2007-08



Source: IMaCS analysis, industry sources, DGCIIS

Jute Hessian And Sacks (Including Food Grade Jute Bags)

Jute Hessian

Jute Hessian also termed as Burlap is a finer quality jute fabric that has been long used as the most preferred packaging material for all kinds of goods. Hessian is used for bags and many other coarse fabric uses, such as wrappers, wall coverings, etc. Presently,

shopping bags are being made out of hessian fabrics. It is also used in the upholstery and home furniture. Also available in "dyed" or "bleached" form and treated with vegetable oil, Burlap meets the latest international standards for food safety.

Jute Sacks

A range of heavy jute fabrics either in plain or twill weaves manufactured by using coarse jute fibre in larger percentage than used for manufacturing tarpaulin, hessian or such light fabrics.

Sacking refers to the coarser and heavier cloth, used primarily for sacks for packing materials, which do not need special protection, but has higher weight.

Jute bagging material is in demand because of the openness of the weave, which allows air to circulate while protecting the contents.

Sacking bags, specifically used for the purpose of storing agro-based products, are known as Hydro carbon free bags that have been treated with vegetable oils to destroy the harmful effect of hydrocarbons. Thus sacking bags have great demand not just in the cement industry but also in the agro-based industries.

Different categories of sacking are:-

- A-Twill
- B-Twill
- L-Twill
- D.W. Flour
- D.W. Salt
- D. W. Nitrates
- Heavy Cees
- Light Cees
- Sydney Woolpacks
- Australian Woolpacks
- Australian Cornsacks
- New Zealand Cornsacks
- New Zealand Woolpacks
- Fine Twill Cloth
- Cement Bags

Food Grade Jute Bags

Food grade jute bags are jute sacks which comply with the IJO Standard 98/01. The Government of India has maintained the compulsory packing of food grains and sugar at 100% under Jute Packaging Materials (Compulsory use for Packing Commodities) Act, 1987 (JPMA).

Product Characteristics

Jute Hessian

A plain weave cloth made wholly of Jute with single warp and weft interwoven, weighing not more than 576 g/m². Hessian fabrics are lighter than sacking fabrics.

Jute Sacks

Either plain or twill weave cloth made wholly of jute, inter-woven and weighing not less than 407 g/m².

Exhibit 172: Description of twills

Type	Details
Twill	The weave that produces diagonal patterns on the surface of the cloth. In the Jute industry, generally 2 x 1 simple twill weave is used.
A-Twill Cloth	A double warp, 2/1-twill weave sacking jute cloth weighing 750 g/m ²
B- Twill Cloth	A double warp 2/1-twill weave sacking jute cloth weighing 643 g/m ²
L- Twill Cloth	A double warp twill weave sacking cloth weighing approx. 716 g/m ²
Oslo Twill Cloth	A twill sacking cloth for making bags of about 108 cm width weighing about 534 g/m ²
Brattice Cloth	Hessian fabrics, which after rot and fireproofing is used in mines as windscreens and for ventilation purposes.
Heavy Cee	A double warp plain weave sacking jute cloth having 68 ends/dm and 35 picks/dm and weighing 673 g/m ²

The difference between hessian and sacking is in the quality of the cloth and the jute used for its production, the difference being primarily one of fineness, the former being made of finer grade jute, the latter of coarser qualities. Hessian can be available in cloth lengths while the mills usually convert sacking cloth into bags and sacks.

Market Size and Trade Trends

Market Size Estimate

The market size for jute hessian and jute sacks is tabulated in the following exhibit.

Exhibit 173: Market size of jute hessian and jute sacks

	2012-13
Domestic consumption of jute hessian (in million MT)	0.166
Value of domestic consumption of jute hessian (in Rs. Crore)	1,238

	2012-13
Domestic consumption of jute sacks(in million MT)	1.12
Value of domestic consumption of jute sacks (in Rs. Crore)	8,354
Exports of jute hessian and sacks (in million MT)	0.155
Value of exports of jute hessian and sacks(in Rs. Crore)	1157.47
Market size of jute hessian and sacks(in million MT)	1.44
Market size of jute hessian and sacks (in Rs. Crore)	10,749.50

*source: IMAcS analysis, JCI

The market size for jute hessian and sacks stands at 1.44 MT and Rs. 10,749.50 Crore.

Key Growth Drivers and Inhibitors

There is not much growth expected in the next five years as sacking segment faces threat from the polymer sacks, though hessian is expected to grow moderately by around 2-3%. The domestic consumption is expected to grow by 10% for jute products, only on account of MSP rise for sacking. Volume wise the growth is stagnant. Also, exports shall drive the market size significantly with expected growth of about 20% in the coming three to five years, drawing on both consistent value and volume rise.

Key Manufacturers

Key manufacturers of jute bags and sacks include:

- Cheviot Co Ltd
- Gloster Jute Mills Ltd
- Birla Corp Ltd
- Bally Jute Co

Import Export Scenario

The import export scenario for jute hessian and sacks is tabulated in below.

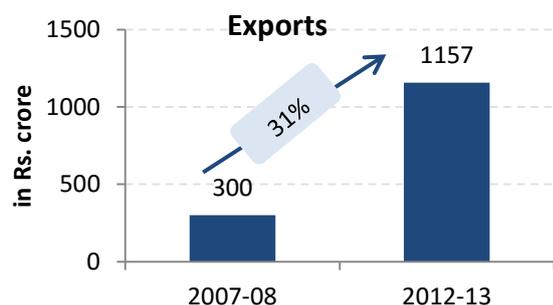
Exhibit 174: Import export - jute hessian bags

HS code family	2012-13
Imports	
Jute hessian and sacks	Rs. 84 crore
Exports	
Jute hessian and sacks	Rs 1157.47 crore

*source: IMAcS analysis, JCI

The export of Jute hessian and sacks has grown in substantial terms given its large base. It has grown from Rs. 300 Crore in 2007-08 to Rs. 1157 Crore at a CAGR of 31%. Key export destinations of jute hessian and sacks are USA, Thailand, Netherlands, Ghana, Germany and Ivory Coast.

Exhibit 175: Export trend of Jute hessian and sacks - 2012-13 vs. 2007-08



Machinery details

One of the key suppliers of machinery in India is Lagaan Engineering Company Ltd. situated in Kolkata.

Quality Standards

The various standards applicable to Jute goods in India are listed below:

1. IS 1943:1995 A-twill jute bags
2. IS 2566:1993 B-twill jute bags for packing
3. IS 2580:1995 Jute sacking bags for packing cement
4. IS 2818(Part 1):1990 Indian hessian
5. IS 2818(Part 2):1971 Indian hessian
6. IS 2818(Part 3):1971 Indian hessian
7. IS 2818(Part 4):1971 Indian hessian
8. IS 2818(Part 5):1974 Indian hessian
9. IS 2818(Part 6):1977 Indian hessian
10. IS 2873:1991 Packaging of jute products in bales
11. IS 2874:1993 Heavy cee jute bags
12. IS 2875:1993 Jute corn bags
13. IS 3667:1993 B-twill jute cloth
14. IS 3750:1993 Jute corn sack cloth
15. IS 3751:1993 Heavy cee jute cloth
16. IS 3790:1991 Hessian bags
17. IS 3966:1967 DW-Flour jute cloth
18. IS 3984:2002 DW-Flour bags
19. IS 4436:1989 Jute bagging for wrapping cotton bales
20. IS 7406(Part 1):1984 Jute bags for packing fertilizers
21. IS 8569:1977 Jute fabrics used in the packing of textile products
22. IS 9113:1993 Jute sacking - General requirements
23. IS 9685:2002 Sand bag
24. IS 7406(Part 2):1986 Jute bags for packing fertilizers
25. IS 10036(Part 1):1982 Jute canvas
26. IS 10036(Part 2):1982 Jute canvas
27. IS 11193:1984 Jute canvas postal bags
28. IS 12001:1987 Jute Sacking cloth for cement bag
29. IS 12154:1987 Light weight jute bags for packing cement
30. IS 12174:1987 Jute synthetic union bags for packing cement
31. IS 12493:1988 Specification for jute bags for packing sugar
32. IS 12494:1988 Specification for jute bags for packing urea
33. IS 12626:1989 Specification for laminated jute bags for packing milk
34. IS 12650:2003 Jute bags for packing 50 kg. food grains
35. IS 13649:1993 Polyethylene lined jute bags for packing tea
36. IS 14342:1996 Jute yarn/twine - Packaging code
37. IS 15138:2002 Jute bags for packing 50 kg sugar

Standards set for food grade jute bags in India and internationally are:

1. IJO Standard 98/01
2. Sacks for the Transport of food aid, European Standard EN 766
3. Erstwhile British Standard 3845:1990

Besides the above mentioned established standards the draft standards are listed below:

1. DOC.TXD 3(687) Jute sacking - General requirements
2. 2 DOC.TXD 3(688) Jute bags for packing 50 kg sugar
3. DOC.TXD 3(9001) Food grade jute packaging materials

Tea Bags

Tea bags are sold by organised tea producers to the high-end consumers. Tea bags consist of a filter paper pouch with a thread, which holds the tea powder and a tag. The tea bag is dipped in hot water / milk to produce the beverage. The two major marketers of tea bags in India are Hindustan Unilever Limited (HUL) and Tata Tea Limited.

Product Characteristics

Tea bag filter paper is made with a blend of wood and vegetable fibres. The vegetable fibre is bleached pulp abaca hemp, a small plantation tree grown for the fibre, mostly in the Philippines and Colombia. Heat-sealed tea bag paper usually has a heat-sealable thermoplastic such as PVC or polypropylene, as a component fibre (100% non-woven Technical Textile) on inner side of the teabag surface. The filter paper used for making tea-bags is a 12-17 GSM non-woven material. The heat-sealing type tea-bag paper is of 16.5 to 17 GSM approx while the non-heat sealed tea-bag paper is around 12 – 13 GSM.

Market Size and Trade Trends

Market Size Estimate

The market size for tea markets is chiefly driven by the domestic consumption estimated to be Rs 543 crore. This is a significant rise at a CAGR of 22% from Rs. 200 Crore market, estimated in 2007 – 08.

The total size of the organised tea market in India is around 400 million kilograms. The penetration of tea bags in the country is around 1.5-2% of the organised tea market and still remains to be exploited. Most of the tea-bags contain about 2 grams of tea though some of the bags contain up to 4 grams of tea. Hence, the total number of tea-bags used in India is estimated is around 6 – 6.7 billion.

The exports for tea bag filter paper are negligible. Thus the domestic consumption itself is the key contributor to the market size of tea bags. The market size of tea-bag filter has been estimated as given below in Exhibit 176. The domestic consumption of tea bag filter paper is expected to grow at about 20% in the coming three to five years, taking into account huge scope of penetration of tea bags in India.

Exhibit 176: Market sizing tea bag filter

Tea-bags filter	2012-13
Value of Domestic consumption of Tea bag filter paper (in KT)	1.34
Value of Domestic consumption of Tea bag filter paper (in Rs. crore)	Rs 542.86 crore

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth driver of the tea bag filter paper is the consumption of tea bags by masses at large which is still a long way off. The tea bag manufacturers also have a proclivity to import the filter paper rather than source it from within India. Also, industry player expect only 5 – 7% growth in this segment.

Key Manufacturers

Key manufacturers of tea bags include:

- J.V.Gokal
- Madhu Jayanti

Import Export Scenario

The import scenario for tea bag filter paper is captured in the below. The estimated export figures for Tea-bags filter paper from India are negligible, totalling to 0.57 MT in quantity terms and Rs. 0.03 Crore in value.

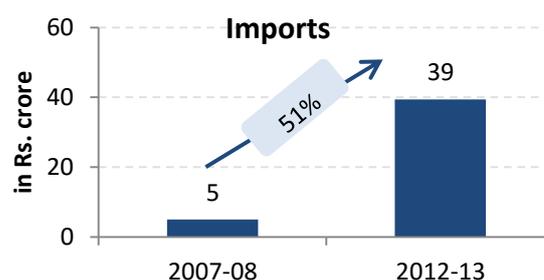
Exhibit 177: Tea bag filter - trade trends

HS code family	Applicable HS codes	2012-13
Imports		
4805, 4823	48054000, 48232000	Rs. 39.2 crore

*source: IMAcS analysis, industry sources

Imports cater to a majority of the demand for tea bag filter paper. There has been a sharp rise from the imports of Rs. 5 Crore in 2007-08 to Rs. 39.2 Crore in 2012-13.

Exhibit 178: Import trend of tea bag filter paper - 2012-13 vs. 2007-08



Key sources of import are Germany, U.S.A., China, United Kingdom and Netherlands.

Machinery Details

Key machinery employed are Consenta (from Tecchnomechanica) and T2 Prima (from Mais, Argentina).

Shopping bags

Shopping bags made of spun bond non-woven fabric are a critical product within the segment. They are a key consumer of the spun bond non-woven.

Product Characteristics

A shopping bag consists of 100% spun bond non-woven fabric that is cut and pieced together in a separate machine. Spun bond non-woven affords the necessary strength required for the product to carry weight. Generally, 80 – 150 GSM fabrics are employed in this category depending upon its application.

Market Size and Trade Trends

The market size of car seat covers is estimated at Rs. 1023.05 Crore. Domestic consumption of shopping bags is estimated to be Rs. 967.91 Crore and 66271.13 MT. Exports for shopping bags fabric contribute Rs. 55.14 Crore and 3683.45 MT to the market size.

Exhibit 179: Market size estimate domestic shopping bags

	2012-13
Domestic consumption of shopping	66271

	2012-13
bags/fabrics (in MT)	
Value of Domestic consumption of shopping bags/fabrics (in Crore)	967
Exports of shopping bags/fabrics (in Rs Crore)	55
Exports of shopping bags/fabrics (in MT)	3683
Market size of shopping bags/fabrics (in Rs Crore)	1023
Market size of shopping bags/fabrics (in MT)	69954

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Shopping bags is a category that derives its demand quite heavily from the consumer class and organized commerce. As of the present day, India has a significant capacity in excess of 167 KT for spun bond non-woven that goes into shopping bags. However, the industry wide production is only a little over 66.27 KT, which implies only about 40% capacity utilization, which is a norm across the industry as seen in our industry interactions. Only the large players boast of capacity utilization of the order of 70 % to 80%. These huge capacities were set up from the expectation that there would be a strictly implemented regulation against use of polythene shopping bags. However, this is yet to happen and this has led to supply exceeding the demand. Thus, the growth prospects for the industry are very modest and can be pegged optimistically at 7%. Exports, however, may drive the market size of this segment in future with a Y-o-Y growth of 15% in keeping with the growing exports in recent times.

Key Manufacturers

Key manufacturers include:

- Hari om polypacks
- Jhilmil Nonwoven
- Sidwin fabrics Pvt. Ltd.

Import Export Scenario

The import export scenario for seat covers has been captured in the Exhibit 180. Imports are greater than exports and most of these happen from China. China has a duty drawback on these exports of the order of 17 – 20%, which renders imports much cheaper than the production here. It also leaves us in a weak spot in terms of export competency.

Exhibit 180: Shopping bags - export import trend

HS code family	HS codes	(2012-13)
Imports		
5603	56031300, 56039300	Rs. 84.93 crore
Exports		
5603	56031300, 56039300	Rs. 55.14 crore

*source: IMaCS analysis, industry sources, DGFT

Key export destinations for the product are U.S.A, Russia, U.K, Japan and UAE

Key import destinations for the product are China, Germany, Republic of Korea, Japan and U.S.A.

16. Sportech

Technical Textiles used for sports purposes are termed as Sport Technical Textiles or Sportech. Sportech includes all types of fabrics that are used for development of sport related clothing or sporting goods like high performance swim wears, parachute fabrics or fabrics used for making of inflatable balls. Along with this fabric and textiles used in accessories for sports like shoe lining fabrics and sleeping bags are also included in Sportech.

List of Products

The key Technical Textile products under the segment are as follows:

- Sport composites
- Artificial turf
- Parachute fabrics
- Ballooning fabric
- Sail cloth
- Sleeping bags
- Sport nets
- Sport shoe components
- Laminated tents
- High performance swimwear and sportswear
- Sport strings



Sport
Composites



Artificial turf



Parachute
fabric



Ballooning
fabric



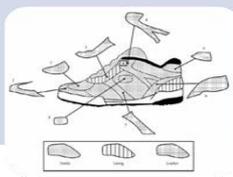
Sleeping
bags



Sport nets



Tent fabrics



Sport shoe
components



High
performance
sports & swim

www.shaliss



Sport strings



Sail cloth



Pool table cloth

Market Size and Trends

The total estimated market size of Sportech is estimated to be Rs. 4,080 crore in 2012-13. Close to 97% of the entire market is catered by domestic supply. The market is mostly dependent on the domestic consumption with exports potential limited to just 8% of the total market. The segment is projected to reach Rs. 5,877 crore by 2015-16 growing at 12% CAGR and further to Rs. 7,111 crore by 2017-18.

Product wise market size estimate has been shown in the following exhibit.

Exhibit 181: Market summary of Sportech

Sportech		2012-13					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Sport Composites	Value (in Rs. Crore)	738	27	288	477	765	325	548	416	725
	Volume (in Mn. Nos.)	29	1	14	16	30	13	21.7	16.4	28.6
Sport Composite - TT Component	Value (in Rs. Crore)	342	13	134	221	354	151	254	193	336
Artificial turf	Value (in Rs. Crore)	-	40	-	40	40	-	46	-	61
	Volume (in lakh sq. m)	0	1	-	1	1	-	1.1	-	2
Parachute fabrics	Value (in Rs. Crore)	100	2	3	99	102	3	111	4	139
	Volume (in Mn. m)	6	0	0	6	6	0	7	0	9
Ballooning fabrics	Value (in Rs. Crore)	1	0	-	2	2	-	2	-	2
	Volume (in lakh sq. m)	10	2	-	12	12	-	13	-	18
Sleeping bags	Value (in Rs. Crore)	34	2	11	24	35	11	28	11	37
	Volume (in Mn. Nos.)	0	0	0	0	0	0	0	0	0
Sports Nets	Value (in Rs. Crore)	74	-	47	27	74	59	33	92	52
	Volume (in MT)	2,683	-	1709	974	2,683	2,136	1,217	3,338	1,902
Sport shoe components	Value (in Rs. Crore)	3,373	58	3	3,428	3,431	3	3,839	3	4,816
	Volume (in Mn. Sq. m)	268	5	0	272	273	0	305	0	383
Tents	Value (in Rs. Crore)	62	-	0	62	62	0	68	0	82
	Volume (in MT)	1,565	-	4	1,561	1,565	4	1,717	4	2,078
High performance swim wears and sports wears	Value (in Rs. Crore)	-	2	-	2	2	-	2	-	4
	Volume (in nos.)	-	3,002	-	3,002	3,002	-	4,053	-	7,386
Sport Strings	Value (in Rs. Crore)	3	27	-	30	30	-	34	-	43

Sportech		2012-13					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
	Volume (in Mn. mtrs)	1	8	-	9	9	-	10	-	13
Other Products	Value (in Rs. Crore)	-	1	-	1	1	-	1	-	1
	Volume (in kg)		10,718		10,718	10,718	-	11,790	-	14,266
Total		3,989	144	198	3,935	4,132	227	4,418	303	5,574

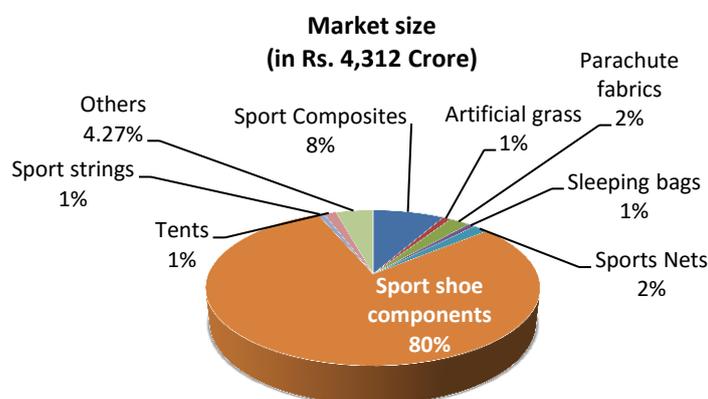
*Source: Annual reports, websites, secondary reports, ITTA, IMAcS analysis

P: Provisional

*Market size is calculated as export + domestic market

Sport shoe components having 75% share in the segment. Other key product is sport composites that has 7% share. Rest of the products have very limited market in India. The product wise market share is as shown in the following exhibit.

Exhibit 182: Market size pie product wise of Sportech



Source: IMAcS analysis

The profitability of these players is as shown:

Key Players

Key players manufacturing sports Technical Textiles in India are as follows:

- Great Sports Infra Pvt. Ltd.
- Indrajeet Mehta Construction Co. Ltd.
- Entremonde Polycoaters
- Kusumgar Corporates
- S G Pvt. Ltd
- S S Pvt. Ltd
- Bhalla Sports Pvt. Ltd
- Cosco India Ltd
- Freewill Sports Pvt. Ltd.
- Page Industries Ltd.
- Adidas India marketing Ltd.
- Garware Wall Ropes Ltd.
- Standard Newar Ltd.
- K C industries
- Bata Limited
- Liberty
- Jasch Industries Ltd.
- Bandhu Aero Space Ltd

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Garware Wall Ropes Ltd.	31404	31484	4%	4%
Cosco India Ltd.	3059	3035	0.1%	-5%
Freewill Sport Pvt. Ltd.	2396	2007	5%	4%
Bata Ltd.	92028	75644	9%	9%
Liberty Shoes	17532	16463	2%	2%
Sanspareil Greenland Pvt. Ltd.	4814	3166	6%	5%
Entremonde Polycoaters	-	1122	-	1%
Kusumgar Corporates	-	7377	-	2%
Jasch Industries	4044	3753	2%	5%

Source: Annual reports, IMAcS analysis, Capitaline, VCCedge, MCA

High Potential Products

There are a total of 12 products in Sportech segment, in which sports composites and shoe components take the major share of the market. However, there are many small products that are in the nascent stage in Indian market and are expected to grow at significant rates during the coming three to five years. The following products in Sportech present a high potential and should be the focus area for new investments and entrepreneurs:

High Performance Sports Wears And Swim Wears: The segment has grown slowly over the last five years and form less than 1% of the total Sportech market. However, with increasing focus on sports and creation of sporting and swimming facilities in schools, colleges, residential societies and club houses, the accessibility of sporting arenas for a common man has increased considerably. In light of this, there is a surge in the market of swimwear and sports wears. With limited branded players in the segment, the market still has a lot of potential to accommodate new players. The market of this product is expected to grow at 35% per annum during the next three years.

Sports Nets: Sports net also present a moderate potential of high growth, driven primarily by the growing exports demand. While export demand for sports net is growing at a steady rate of over 10%, the product is yet to make its mark in the domestic market. The detailed analysis of each product of the segment is done in the subsequent sections

Sport Composites

Sports composites usage in India includes boxing equipments, inflatable balls and protective equipments for cricket

Product Characteristics

Boxing equipments consist of Boxing Gloves, Boxing Punching Gloves, Boxing Head Guards, Boxing Punching Pads, Abdominal Guard, Speed Ball, Punching Bag etc.

Inflatable balls consist of football, volleyball, basketball, handball etc. Footballs account for 50% of the market of inflatable balls. Footballs have varying sizes i.e. Size-3, Size-4 and Size-5. Circumference for size 5 is 68.5cm to 69.5cm. Official weight of the football is 420~445 grams with ball pressure of 0.8 bar.

Protective equipments for cricket comprise of leg-guards, batting gloves, wicket keeping gloves, thigh pads, helmets, caps & hats, cricket kit bags etc. The segment also includes sport helmets, more than 90% of which is used primarily for cricket in India.

Market Size and Trade Trends

Indian sporting goods industry is concentrated primarily in the cottage and small-scale sector. It is a highly labour intensive industry and also employs a large number of women as well. Most of the units work on a job work basis for the major manufacturers/exporters and also sell their produce to wholesalers who in turn sell these equipments to sports goods retailers. The market for these goods is mainly driven by the export demand and the institutional demand, with very limited retail sales.

Sports composites market in India is constituted by the inflatable balls, cricket protective items – guards, gloves and helmet and the boxing equipments like gloves, etc. The market size for these products has been done using insights from key manufacturers and inputs from Sports Goods Export Promotion Council (SGEPC).

Market Size Estimate

The estimated market size for different sport composites are shown in the following exhibit

Exhibit 183: Market size estimate

	2012-13		
	Cricket protective gears (including sport helmets)	Inflatable balls	Boxing and other gears
Value (in Rs. Crore)	229	433	76
Volume (in Mn. Nos.)	1.9	20	8
T T Component (in Rs. Crore)	201	77	76

*source: IMaCS analysis, industry sources

Exhibit 184: Market size estimate

	Total Sports Composites		
	2012-13	2013-14 (E)	2015-16 (P)
Value (in Rs. Crore)	765	873	1,140
Volume (in Mn. Nos.)	30	35	45
T T Component (in Rs. Crore)	354	405	529

*source: IMaCS analysis, industry sources

The market for cricket equipments has grown at 14% in the last five years owing to the increasing interest of people in sport and growing number of cricket clubs and camps. The market for inflatable balls has also shown similar trend growing at 11%. However, while

Cricket equipment market has grown mostly on account of domestic market which grew at 20%, market for inflatable balls has grown on account of rising exports which grew by 14%. The market for boxing gloves and equipments is also growing on account of growing export market which has grown by 37%. The total sport composite market has grown at 13% during the last five years.

Key Growth Drivers and Inhibitors

The sports composites industry is driven by both the export market and the domestic market. The producers in India have their competence due to the cost of manufacturing being low. The domestic market of these products is growing due to increased interest of students in sports. With many new cricket coaching clubs and cricketing summer and winter camps being organised, the market for cricket is set to grow at a good rate in the coming years. The market for inflatable balls on the other hand is seeing slow but steady growth due to increased focus of corporate and government institutions on promotion of the sport through education institutes and corporate having their own football clubs. With the proposal of having an Indian premier league for soccer, the market is expected to grow. The domestic market is expected to grow at 15% per annum driven by increasing focus on sports in institutions and rising number of sports academies. The export market is expected to grow at 13% per annum till 2015-16.

Key Manufacturers

Manufacturing of sport composites in India is done mostly by small scale industries. These industries are labour intensive and are generally clustered together. The key clusters for manufacturing of sports composites are located at Jalandhar and Meerut, with Jalandhar doing a lot of Inflatable balls and Meerut excelling in the Cricket and boxing sports goods industry. Some of the prominent manufacturers for the segment are:

- Sanspariel Greenland Pvt. Ltd.
- S S India Pvt. Ltd.
- Soccer India Pvt. Ltd
- Freewill Sports Pvt. Ltd
- Cosco India Ltd.
- Leisure Exports Worldwide
- United Sports India Ltd.

Import Export Scenario

While the export market for cricket goods exports has remained stagnant growing at just 1%, the export market of inflatable balls and boxing equipments has grown by 14% and 37% respectively. The details of

imports and exports of sports composites are shown in the following exhibit:

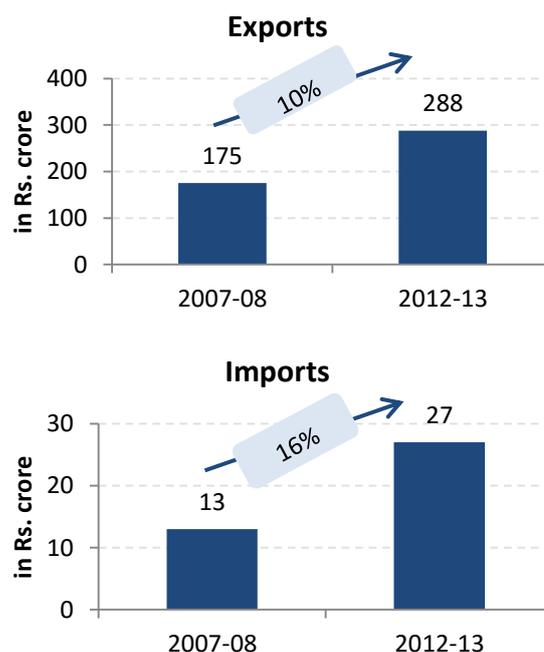
Exhibit 185: Import export trends

HS code family	HS code description	Applicable HS codes	Product	2012-13
Exports				
9506	Inflatables – football, volleyball, basket ball, others	95066210 95066220 95066230 95066290	Inflatable balls	Rs. 183 Crore
	Equipment of Gym, cricket, boxing, others	95069110 95069920 95069999	Cricket protective gear Boxing equipment	Rs. 53 Crore Rs. 53 Crore

*source: DGCI, IMAcS analysis,

The export import trend for sport composites is as shown in the following exhibit:

Exhibit 186: Import export trend



Source: IMAcS analysis, DGFT, DGCI

The major countries from where sports composites are imported into India are China, Germany, Pakistan, Netherlands and United Arab Emirates.

The major countries where sports composites are exported from India are United Arab Emirates, United Kingdom, Australia, Mexico and Ireland.

Machinery Details

Manufacturing of these products is a labour intensive work requiring a lot of sewing. Therefore, the machinery requirement is mainly of stitching machines.

Quality Standards

The standards for different Sports composites are specified by their governing bodies. Currently, the BIS have standards for only the batting and boxing gloves. These are:

- IS 3870:1983 – Batting glove specification
- IS 3874:1987 - Boxing glove specifications

Artificial Turf

Artificial turf, or synthetic turf, is a man-made surface manufactured from synthetic materials with appearance similar to natural grass. It is used for making world-class surfaces for playing sports (especially hockey and soccer) which are normally played on grass. The hockey stadiums account for most of the consumption of the artificial turf in India. It is also used indoors or outdoors for landscaping.

Artificial turf is considered a safe alternative to natural grass; turf has no direct harmful effects to pets or children. Several studies have shown that the artificial turfs have a higher injury rate than grass on playgrounds. The new manufacturing and installation procedures have resulted in lowering of injury rates than on natural grass.

Product Characteristics

The artificial turf system consists of various layers - the pile fibres & backing cloth, shock absorbing layer and the supporting base.

- **Pile Fibre** - The grass like piles are non abrasive and soft to touch. The synthetic grass is made of either the polyamide nylon/nylon 6.6 or PP/PE, which is custom extruded into a monofilament ribbon form. The pile fibre has to allow for smooth ball roll and bounce, support non-directional foot traction, allow for water permeability and should have the correct balance of strength, elasticity and stiffness to withstand the wear and tear of regular usage.
- **Backing Fabric** - the material to which surface fibres are attached to form the underside of the artificial turf surface. The backing has to permit water to flow through the fabric readily.
- **Shock-Absorbing Foam** - provides cushioning for running or falling athletes. The foam is made of a closed-cell polymer alloy like polyurethane, typically 1/2 inch in height and perforated for vertical drainage

- **Supporting Base** - supports the load placed on the entire structure, typically a 2-foot or 3-foot layer of asphalt or concrete

The artificial grass fibres that are used are of two different grades –

1. High grade Poly-ethylene grass – It is a high density (high GSM) non-directional grass.
2. Polypropylene grass fibres - These fibres are interlinked to form the artificial grass. However, its density (GSM) is lower than PE grass and it is directional grass.

The cost and quality of artificial grass depends on three different parameters:

1. **Pile Fibre length:** The cost of the artificial turf is directly proportional to the length of pile fibre. It generally comes in two different lengths – 9 mm and 13 mm. The length of the pile fibre determines the amount of fibre that goes into surface. Hence, it is a major price determining factor.
2. **Density (GSM):** The density of the weaves determines the quantity of the fibre required. Hence a high density artificial grass would be costlier than a low density one.

Key Application

Artificial grass is being used for providing artificial surfaces for sports as well as for landscaping and decorating purposes. The use of artificial grass for different sports and their specific requirement is as shown in the table enumerated below:

Exhibit 187: Usage norms for artificial turf

S.No	Application	Average Requirement (in sq. ft)	Average cost (in Rs./ sq m)
1.	Hockey Turf	67000	3,770
2.	Football turf	67000	3,770
3.	Cricket wickets	1000	3,350
4.	Golf putting greens	400	4,000

*Dollar to rupee conversion rate – Rs. 55/ USD

*source: industry survey

The use of artificial grass offers the following benefits:

1. **Low maintenance:** As compared to natural grass, the maintenance required for artificial grass is very low.
2. **All weather fields:** Artificial grass fields can be used in all weathers even during the rains. This is a major benefit of the playground as it can be dried very quickly as compared to the natural grass fields which require aggressive efforts for drying.
3. **Conservation of water:** Rainwater on the artificial turf can be easily harvested using the underlining pipes.

4. **Conservation of Soil:** While natural grass maintenance requires use of a lot of fertilizers, pesticides and insecticides which increases the toxicity and the ground water, use of artificial grass does not require any such measures.

Market Size and Trade Trends

Artificial turf market in India is mainly driven by usage in infrastructure up-gradation of hockey fields and to some extent soccer fields. Based on industry inputs it is estimated that close to 35 hockey fields would be upgraded in the XIIth five year plan indicating that an average of 7 fields are upgraded every year. An average of about 3 football fields is up-graded every year in India. Hockey and soccer together account for the major chunk of usage of artificial turf. In addition to this, usage as cricket wickets, golf greens and landscaping greens is rapidly catching up in India.

Market Size Estimate

The market size of artificial turf is estimated to be of 168 MT which is valued at ~Rs. 40 Crore. The entire market is based on imports with no manufacturers in India. The industry has very limited players who are primarily importers of artificial turf. The majority of imports in India are of Tiger turf and Field turf, two of the recognised brands supplying into Indian market. In addition to that, lot of cheap Chinese imports also comes in which are used mostly for landscaping. The market size estimate of artificial turf for 2012-13 is as shown in the table below:

Exhibit 188: Market size estimate for artificial turf

	2012-13	2013-14 (E)	2014-15 (P)
Quantity (in lakh sqm)	1	1.1	1.5
Value (in Rs. Crore)	40	46	61

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Usage for large sports installations like and hockey and soccer turf are the key drivers for the industry. With increased focus of National and regional government of development of Sports after the recent performances by Indian sportsmen in world events, the demand for hockey and soccer turfs are expected to gradually rise in coming years.

Along with these, smaller applications in cricket wickets are rapidly growing with many cricket associations going for low maintenance cricket wickets. In addition to that demand from corporate for landscaping and golf greens is growing at a rapid rate, with many new infrastructure parks and premium residential societies coming up.

While rapid growth is expected in Indian artificial turf market, the market faces stiff challenge from low cost Chinese imports, which are quickly capturing the growing retail demand in India owing to its cheaper rates. This along with the small retail market for artificial turf has been a major deterrent for organisations like field turf and tiger turf that have not started manufacturing of artificial turf in India, despite easy availability of base fabrics and latex in India. The domestic market is expected to grow at 15% per annum during the coming years.

Import Export Scenario

The entire market of artificial turf in India is catered via imports. There are no manufacturers of artificial turf in India. The key HS codes under which imports were made in 2012-13 have been listed in the table below. There are set HS codes defined for import of artificial turf. However, the commonly used HS codes have been shown in the table.

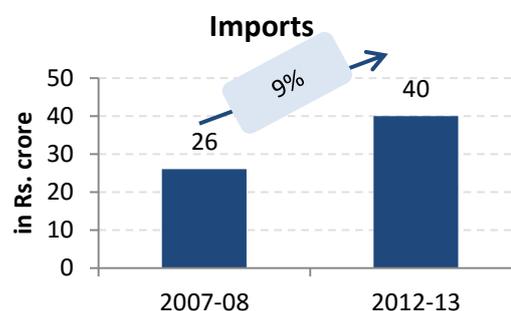
Exhibit 189: Import export trends

HS code family	Applicable HS codes	HS code description
Imports		
	39189010	Floor covering of lynoxin
	54049090	Other Synthetic Textiles of width less than 5 mm
	57033090 57039090	Textile floor covering of manmade textile material Other floor covering of other textile material
	67021090	Other synthetic articles

*source: DGCI, IMaCS analysis

The export import trend for the product is as shown in the following exhibit:

Exhibit 190: Import export trend



Source: IMaCS analysis, DGFT, DGCI

The top five countries exporting artificial turfs into India are USA, China, Belgium, Spain and France.

The market is governed by only a few key importers namely - Great Sports Infra Pvt. Ltd., Sports Infratech Pvt. Ltd, Indrajeet Mehta Construction Company Ltd. and Altius Sports and Leisure Pvt. Ltd.

Machinery Details

The pile fibre used for making of artificial turf is a specialise fibre whose patented production rights is with only a limited few organisations in the world. Although China also manufactures the pile fibre, however, the quality in terms of GSM of the chine product is very low and is not preferred for sporting applications. It is used only for landscaping requirements.

Quality Standards

The International Hockey Federation (FIH) has developed standards for Hockey turfs. Manufacturers of synthetic turfs have to adhere to the FIH standards to get their products registered as FIH approved products. These products are tested and verified by a FIH accredited laboratory.

The standards for artificial turf used in football grounds are governed by FIFA. It specifies various ball / surface and player / surface tests for these turfs and certifies as FIFA recommended 1 Star and 2 Star.

1 Star is mainly for recreational, community and municipal use while 2 Star for artificial turf designed specifically for the playing characteristics of professional football. Both the FIFA recommended 1 Star and 2 Star have to go through a series of stringent laboratory and field tests for getting the FIFA certificate.

Parachute Fabric

A parachute is a device used to slow the descent of a free falling body or load. The product is a large fabric with ropes attached to it. When the body free falls, the fabric traps the air, thus, using the air resistance to slow down the descent.

Product Characteristics

A parachute consists of four main components: parachute canopy, rip-cords, suspension lines and the harness.

- **Parachute canopy-** Parachute canopy the actual parachute fabric that is tied using the ropes. The canopy act as a barrier for the air flow thus slowing the fall.
- **Harness** - The pack is fastened to the person's back or front with a harness. The harness is specially constructed so that the parachutist is not injured as the forces of deceleration (slowing down), gravity and wind are transmitted to the wearer's body as the chute opens.
- **Rip-cord** - A rip-cord is used to open the duck pack and allow the chute to deploy (pop out). The rip-cord

can be used in three different ways (pulling the rip manually, a static line connected to the aircraft deploys the chute as the person jumps or automatically as the pilot is ejected from the aircraft).

- **Suspension lines** - Suspension lines, or shrouds, connect the canopy (parachute cloth) to a ring on the harness. The line is continuous from the ring, through a seam in the shroud over the top of the chute and back down to the ring again.

Parachute canopies are primarily made of high tensile nylon or polyester multi-filament fibres, generally rip stop woven, from 32 to 200 deniers. Rip stop fabrics are woven fabrics whilst using a special reinforcing technique that makes them very resistant to tearing and ripping. Older lightweight rip stop fabrics display the thicker interlocking thread patterns in the material quite prominently, but modern weaving techniques make the rip stop threads less obvious.

Rip stop fabrics have high strength to weight ratio. The smaller tears and rips cannot easily spread further in the fabric. Air-permeability is one of the most important characteristics because it determines the behaviour of the parachute itself, the rate of descent depends dramatically on this characteristic. The fabric should be of minimal thickness to enable folding of the parachute into a bag.

Harness, webbing, tapes etc are made-up of high tensile nylon yarn (denier range 210 to 840 denier) as nylon has the highest strength to weight ratio.

Market Size and Trade Trends

Market for parachute fabrics is governed by demand from Indian Armed forces, which commands 95% of the market. The demand is higher for break parachutes used in fighter aircrafts and supply drop parachutes which together account for close to 70% of the demand from Armed forces.

Market Size Estimate

Taking into account the average price of different types of parachutes and the production figures of Ordinance factories the market size estimate for parachute fabrics in India is estimated taking into consideration insights from major manufacturers. The estimated market potential for parachute fabrics in India in 2012-13 is of 6.2 million metres which is valued at Rs. 100 Crore.

Exhibit 191: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in Mn. mtrs)	6.2	7.1	8.9
Value (in Rs. Crore)	100	114	143

*source: IMaCS analysis, industry sources

The market for parachute fabrics in India has increased considerably over time driven mainly by increasing production of the ordinance factories. Currently Ordinance factories produce about 1.17 lakh parachutes of different kinds – supply drop, break parachutes, man drop parachutes, torpedo parachutes and inflammation parachutes.

Key Growth Drivers and Inhibitors

The market for parachutes in India is driven by the demand from Indian armed forces. In the armed forces the demand for supply drop parachutes and break parachutes is highest and is expected to grow with increasing deployment of armed forces personnel in high altitude and hazardous environments. In addition to that demand for break parachutes would also increase as India upgrades its Air force with modern fighters.

However, the applications other than by Armed forces like adventure sports – sky diving and para-gliding is yet to become popular in India. As a result the demand from private sector is very low. The domestic market is expected to grow at 12% in next three years, driven by both entries from private firms as well as increased production of ordinance factories. With increasing focus of Indian players including ordinance factories towards the global demand for parachutes, the export market is also expected to grow at 12% per annum in next three years.

Key Manufacturers

Key manufacturers of parachute fabrics in India are:

- Kusumgar Corporates
- Entremonde Polycoaters

Import Export Scenario

Import and export of parachute fabrics from India has had a small share in the total market. Most of the production is utilised domestically. However, lately ordinance factories along with other parachute fabric manufacturers have shown interest in exports and the exports value for 2012-13 stands at Rs. 3 Crore. Imports are estimated at Rs. 1.5 Crore.

Exhibit 192: Import export trends

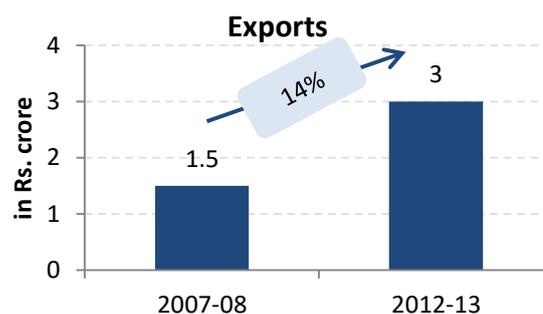
HS code family	HS description	code	Applicable HS codes	2012-13
Imports				
5407	Bleached Unbleached and other parachute fabrics		54071011 54071021 54071091	Rs. 1.9 Crore
Exports				

HS code family	HS description	code	Applicable HS codes	2012-13
5407	Bleached Unbleached and other parachute fabrics		54071011 54071021 54071091	Rs. 3 Crore

*source: DGCIS, IMaCS analysis

The export import trend for the product is as shown in the following exhibit:

Exhibit 193: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The import of parachute fabrics is from China and Taiwan, where in China accounts for over 90% of imports. The major countries to which parachute fabric is exported from India are as follows France, Turkey and South Africa

Quality Standards

Quality control is a stringent requirement for parachutes. The relevant standards are framed by Aerial Delivery Research and Development Establishment, Agra, India. In addition to that BIS also have standards for parachute fabric and parachute components under standard:

- IS 2964:1987 – Breaking cord for parachute
- IS 2970:1987 – Cotton fabric for supply drop
- IS 3449:1984 – Cotton webbing for parachute
- IS 14564: 1998 – Cotton tapes for personal parachute

Hot Air Balloon Fabric

Ballooning fabric is the envelope fabric used in hot air balloons, inflatable balloons and bouncies. These are high tenacity strong fabrics made out of polyester, taffeta or nylon often coated with silicon. The ballooning fabric industry is a very niche and small market with very limited players across the globe catering specifically to the hot air balloon demand in India. In addition, the market for inflatable balloons which are often used for publicity is growing are where ballooning fabrics are used these days.

Product Characteristics

The ballooning fabrics are usually classified on the basis of the usage. The three major usage of ballooning fabrics are:

- 1. In hot air Balloons** – Silicon coated Nylon or taffeta fabrics are used for the ballooning requirements in Hot air Balloons. These are high tenacity fabrics tested for fire retardant properties, strength and abrasion resistance. These require high tenacity silicon coated taffeta or nylon fibres. They constitute a small but very important part of the hot air balloon. It has a general life of about 5 years.
- 2. In inflatables** – Inflatables are gas or air filled inflatable balloons that are used for publicity during events. These have come into demand recently with organisations investing on their publicity stunts. Here the entire product is a Technical Textile product.
- 3. In Bouncies and zorb balls** – Bouncies are air filled fabrics made of nylon or polyester, which are used as a playing ground for kids. It can be often seen at different malls or fairs.

The consumption of ballooning fabric for the three segments is shown in the following exhibit:

Exhibit 194: Consumption norms for Hot air balloon fabric

S. No.	End product	Type of fabric	Average requirement of Ballooning fabric
1.	Hot air Balloons	Siliconised Taffeta or Nylon with FR coating	700 metres for a small balloon of 2 people to 1500 metres for larger ones capable of flying up to 8 persons
2.	Inflatable balloons	Nylon Taffeta with FR coating – 210 GSM	70 metres for a small Inflatable up to 12 metre height
3.	Bouncies	High tenacity polyester	Depends on specific requirements

Source: iMaCS analysis based on primary meetings

Market Size and Trade Trends

There are only two manufacturers of hot air ballooning fabrics in India. The market is mainly driven by the requirement of inflatables which are used at events, corporate functions and fairs for publicity purposes. The market for hot air balloon in India is very small, with just three such balloons being made in last three years.

Market Size Estimate

The market for ballooning fabrics has been stimulated based on inputs of key, manufacturer of ballooning fabrics in India. The estimated market size for the same

is about Rs. 1.5 Crore mainly due to the inflatable market.

Exhibit 195: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity(in lakh mtr)	11.6	13	17.6
Value (in Rs. Crore)	1.5	1.7	2.3

*source: iMaCS analysis, industry sources

The market has grown at just 5% in the last five years, due to lower promotional events by corporate and lower demand for inflatable because of the ongoing recessions. As far as hot air balloons are considered, the market in India is still in a very nascent stage and has not grown in the last five years. The market for zorb balls and bouncies on the other hand has grown in volume but the value addition premium that was being commanded in the industry has drastically one down with prices of bouncies coming down to around Rs. 20,000 from close to Rs. 50,000 around five years back.

Key Growth Drivers and Inhibitors

The major growth drivers for the Ballooning fabric industry in India in the coming future:

- **Growth in Hot air balloon sports** – Increase in hot air balloon sports could be the major boost to the ballooning fabric manufacturers. However, currently India is not expected to see such growth in the sports sector.
- **Increase in publicity expenses of corporate houses** – The biggest driver of ballooning fabric industry is the publicity expenses of corporate in inflatable balloons. The growth of the industry is directly correlated to the growth in publicity expenses of large corporate houses.

Impediments

- **Heavy restrictions by DGCA** – As hot air ballooning is a risky sport, the DGCA closely monitors it. Heavy restrictions, like no permission to fly hot air balloons around New Delhi have been a major deterrence for the industry, preventing it from growing around Delhi.

While the market for hot air balloons is expected to grow at a very trivial rate, the market for inflatables would be driving the segment with a high growth rate. Over all the market is expected to grow at 15%.

Key Manufacturers

There are only two manufacturers of ballooning fabric in India - Bandhu Aerospace Pvt. Ltd. and Unique Inflatables.

Import Export Scenario

Import of ballooning fabric in India has gone up by 36% in the last five years. Manufacturers in India have been

purchasing fabric from outside depending on the demand from customer. Export of hot air balloons has been negligible in 2012-13, indicating lower demands from European countries who are the major customer for ballooning fabrics from India.

Exhibit 196: Import export trends

HS code family	HS description	code	Applicable HS codes	2012-13
Imports				
8801	Balloons and dirigibles; gliders, hang gliders and other non-powered aircraft.		88010020*	Rs. 0.24 Crore

*source: IMAcS analysis, industry sources

*Also shipped in 53101011

Quality Standards

Director General of civil aviation (DGCA) is the regulatory body for hot air balloons in India. The standards prescribed in FAR Part 31(Federal Aviation regulations) for the design are the minimum requirements for airworthiness of the hot air balloons. Hot air balloon cannot be flown unless it possesses a valid Certificate of Airworthiness. The suitability and durability of all materials must be established based on experience or tests. It has to be ensured that the material has the strength and other properties assumed in the design.

Persons/firms desirous to take up design and manufacture of hot air balloons have to intimate the DGCA of their intention and apply for necessary approval as required under CAR Section 2 - Series 'E' Part I.

There are several security requirements mandated for flying air balloons. One time security clearance of the manufacturer, owner, and operator shall be obtained from the State Police authorities before initial commencement of the operations. The hot air balloon shall not be sold or disposed of in any way to any person or firm without production of a certificate from the DGCA. The hot air balloon shall not be flown over entire air space covering VIP locations, defence installations, other restricted and prohibited areas. The hot air balloon shall also not be flown over an assembly of persons or over congested areas unless prior permission in writing is obtained from appropriate authorities. The restricted areas are notified by the DGCA from time to time in consultation with the Ministry of Home Affairs.

Sleeping bags

A sleeping bag is a protective "bag" for a person to sleep in, similar to a blanket that can be closed with a zipper (allowing it to be folded in half and secured in that position) and functions as a bed while camping, hiking, hill-walking or climbing. Its primary purpose is to provide warmth and thermal insulation. Sleeping bags are used at high altitudes in extremely cold weather. It also protects against wind chill, precipitation, etc.

Product Characteristics

The basic design sleeping bags work well for most camping needs but are inadequate under more demanding circumstances. The second major type of sleeping bags is mummy bags (because of its shape). Most modern sleeping bags are of a 'mummy' shape as it is the most thermally efficient design. A sleeping bag with little or no 'dead space' around the user is warmer as there is less air to warm up with heat from the body.

Market Size and Trade Trends

Sleeping bags in India is mostly used by armed forces and in small numbers for camping and mountaineering. As a very small part of the population is involved in adventure sports like camping and mountaineering, the retail market for sleeping bags is very small. Out of the institutional sales, close to 90% of the demand for sleeping bags comes from armed forces. As a result many of the manufacturers are located in and around Kanpur the major purchase location for ordinance board. Most of these players supply sleeping bags based on tenders for purchases.

Market Size Estimate

Based on industry insights and information from key members of Ordinance factories, it is estimated that the total market size of sleeping bags in India is about 3.7 lakh units which is valued at Rs. 35 Crore.

Exhibit 197: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in lakh pieces)	3.7	4.1	5.0
Value (in Rs. Crore)	35	39	48

*source: IMAcS analysis, industry sources

The market has grown at 4% per annum during the last five years, governed by the demand from armed forces. The basic mandatory requirement for provision of sleeping bag to every soldier and increasing deployment of soldier in extreme environments are two factors leading to the growth of the market.

Key Growth Drivers and Inhibitors

Key growth driver for sleeping bag industry is the consumption of sleeping bags by armed forces. Currently it is mandatory for all soldiers to have a sleeping bag. The replacement market for armed forces is the major demand for sleeping bags.

Lower preference for adventure sports like camping and mountaineering in India has kept the retail market demand lower. As a result most of the manufacturers produce sleeping bags only as per the tender requirements for the defence sector. A boost in adventure sports can be a real boon for the growth of retail market for sleeping bags. The domestic market for sleeping bags is expected to grow at 15% per annum uptill 2015-16, driven primarily by the growing armed forces of India.

Key Manufacturers

90% of the manufacturing units of sleeping bags are located in Kanpur including ordinance factory units. These players are SME and MSME units involved in production of sleeping bags, tents and tarpaulins mostly to cater the demand from Armed forces. The key players are:

- K C international
- Standard Newar Mills
- Tirupati Taxco Pvt. Ltd.
- Naveen Textile agencies
- Industrial Enterprisers

Import Export Scenario

Both import and export of sleeping bags have seen a decline over last five years since 2007-08. While imports have gone down marginally from Rs. 3 Crore to Rs. 1.5 Crore, there has been a substantial decline in exports of sleeping bags from India which has gone down to Rs. 11 Crore from Rs. 18 Crore declining at 12% per annum.

Exhibit 198: Import trends

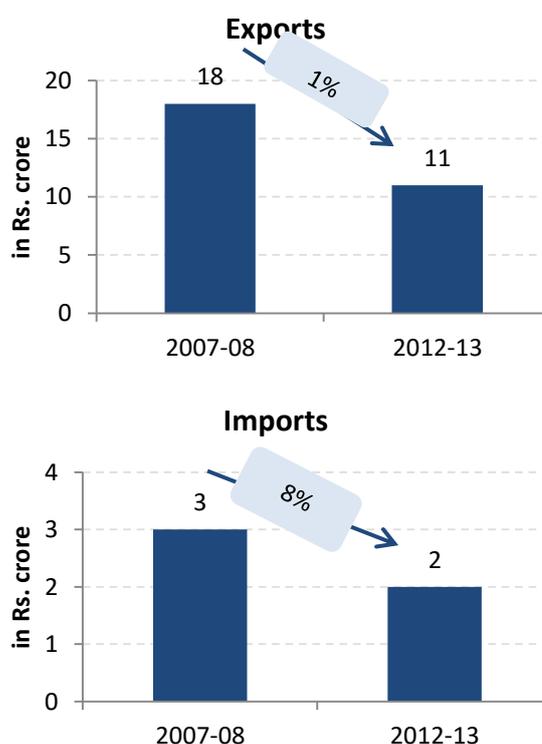
HS code family	HS codes	Description	2012-13
Imports			
9404	94043010	Sleeping bag filled with feathers and down	Rs. 1.5 Crore
	94043090	Other sleeping bags	
Exports			
9404	94043010	Sleeping bag filled with feathers and	Rs. 11 Crore

HS code family	HS codes	Description	2012-13
	94043090	down Other sleeping bags	

*source: IMAcS analysis, DGFT, DGCIS

The export import trend for sleeping bags is as shown in the following exhibit:

Exhibit 199: Import export trend



Source: IMAcS analysis, DGFT, DGCIS

The top countries exporting sleeping bags to India are:

1. China
2. Bangladesh
3. Singapore
4. Austria
5. Germany

Top countries to which India exports sleeping bags are:

1. United States of America (USA)
2. United Kingdom (UK)
3. Belgium
4. Germany
5. United Arab Emirates (UAE)

Quality Standards

The relevant Indian standards are IS 8991: 1978, JSS-8465-25:1997

Sports Nets

Sports nets are used in various sports like Badminton, Football, Basket ball, Volleyball, Tennis, Handball, etc. Nets are also used by cricket players in practices areas.

Product Characteristics

The typical specifications of the various kinds of sports nets are given in the table below:-

Exhibit 200: Product characteristics

Product features	Twine Size	Colour	Mesh opening size	Dimensions	Side & Bottom	Material of construction
Badminton nets	0.75mm	Black	20mm	24X2.5 ft	Black PVC tape (width 20 mm + 20 mm)	HDPE, P.P., Cotton & Nylon
Tennis Nets	3.5mm	-	45mm	42 ft x 4 Ft	Black vinyl coated fabric (width = 63mm + 63mm)	HDPE, UV heated-Machine knotted
Volley Ball Nets	3 to 4 mm	-	100 mm	9.5 Mtr x 1 Mtr	PVC coated fabric	HDPE, P.P., Nylon
Football Nets / Soccer Goal Nets	7 to 10mm	-	5 inch	24 x 8 x 6ft	-	HDPE, P.P., Nylon
Handball Nets	-	-	4 inch	2 x 3 x 1 mtr	-	HDPE & P.P.
Cricket nets	-	-	2 to 3 inches	100 x 10ft, 100 x 12ft, 100 x 15ft	-	HDPE & P.P.

The sports nets have an average GSM of 400 and typically cost Rs 250 per square metre.

Market Size and Trade Trends

The nets used in cricket, football and badminton account for majority of the domestic consumption. The market for sport-nets is driven by the development of sports in the country. In India, the investments in sports are very low as compared to other countries. Sports are regarded more as a leisure activity.

The end customers include various schools, colleges, universities, sports clubs and individuals. Sports nets are not purchased centrally by Sports Authority of India (SAI) as these are low cost items. The regional centres of SAI purchase the sports nets. Most of the purchase is done by institutional buyers. The replacement market of sport nets is very small, with most organisations use a net for 3 to 4 years with repairs. The purchase demand is driven by various tournaments.

Market Size Estimate

Most of the sports net manufactured in India are being exported. The domestic market for nettings is relatively small and comprises of demand of nets for – volleyball, basket ball, tennis, cricket nets, goal post nets and table tennis nets mostly from schools and institutions in India. Along with it demands from sports clubs, sports associations are also significant part of domestic demand. While export from India is estimated to be Rs. 47 crore the domestic market makes up for another Rs.

27 crore. The total market for sports net is estimated to be Rs. 74 Crore.

Exhibit 201: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in MT)	2,683	3,354	5,240
Value (in Rs. Crore)	74	92	144

**source: IMAcS analysis, industry sources*

Market has mostly grown on account of growing exports which have grown at 38% during the last five years.

Key Growth Drivers and Inhibitors

The market for sports net has been driven by growing exports. The domestic market is currently very small and is expected to grow at a decent rate due to growing sport events occurring across the nation. The export market on the other hand has been growing at a goods rate of over 20% during the last five years. Both the domestic as well as export market is expected to grow at 25% per annum in the next three years owing to increased focus on sports and sports tournaments in domestic market and increasing preference for Indian products in the world market.

Key Manufacturers

Key manufacturers of sport-nets in India are Garware wall ropes and Kwalty Nets Manufacturing India Ltd.

Import Export Scenario

While the import of sport-nets in India remained insignificant, the export of sports net has grown by 38% to reach Rs. 47 Crore in 2012-13. The year was also very prestigious for Garware a wall rope, who was awarded for best performance in sports net exports by SGEPC.

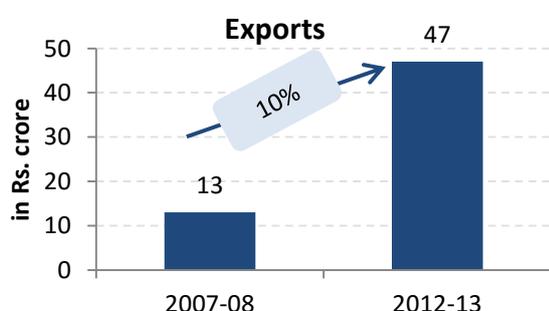
Exhibit 202: Import trends

HS code family	HS codes	HS code description	(2012-13)
Exports			
9506	95069960	Sport nets	Rs. 47 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

The export import trend for sport nets is as shown in the following exhibit:

Exhibit 203: Import export trend



Source: IMAcS analysis, DGFT, DGCIS

The key countries where sports nets are exported from India are USA, UK, Australia, Italy, and South Africa.

Quality Standards

The standards for different sports are governed by their respective governing bodies. There are no relevant standards for practice nets used in cricket.

Sports Foot Wear Components

Sports foot wear component includes shoe lining and shoe upper fabrics used in making of sport shoes. These fabrics are placed to provide comfort to the shoes by keeping it ventilated and moisture free.

Product Characteristics

The Technical Textile components typically used in the sport shoes are as following:

- Shoe uppers made of PU/PVC coated/Laminated fabrics
- Linings on the counters and below the shoe uppers
- Others including non woven insoles, laces, tapes, labels, elastics, sandwiched meshes, etc

Product Characteristics

The shoe upper material should have uniform thickness and colour and should possess water-proofing property. The desired characteristics of the shoe uppers are

- Breathability
- Dimensional flexibility
- Colour fastness
- Light weight
- Durability

The shoe uppers and linings account for 90-95 % of the Technical Textile components used.

Market Size and Trade Trends

Production of sport shoes in India is estimated to be about 317 million pairs¹⁰ for 2012-13. Taking into consideration the average requirement of Technical Textile based shoe components – shoe uppers and shoe lining fabrics, as per the industry survey the total market for Technical Textile sport shoe components is estimated to be of 272 million sq. metres which is valued at Rs. 3700 Crore.

Market Size Estimate

Based on inputs from industry and CLE, the total market for sport shoe components is estimated to be Rs. 3,431 Crore. The table below gives the domestic production estimate for 2012-13 in India.

Exhibit 204: Domestic production estimate

Product	2012-13	
	Quantity	Value
Sport shoes	634 mn pieces	
Sport shoe uppers	146 Mn. Sq. m	Rs. 2,477 Crore
Sport shoe linings	127 Mn. sq. m	Rs. 950 Crore
Total Domestic market	272 Mn. Sq. m	Rs. 3,428 Crore
Total Market		Rs. 3,431 Crore

*source: IMAcS analysis, industry sources

The total market and projections for sport shoe components is as shown in following exhibit.

Exhibit 205: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in Mn. sqm)	273	305	383
Value (in Rs. Crore)	3,431	3,842	4,819

*source: IMAcS analysis, industry sources

Indian sport shoe component industry has grown at 12% over the last five years. The growth of the industry is directly linked to the growth of footwear industry in India. The growth has been driven by the Women's sport shoe segment which has grown at 20% while

¹⁰ Based on analysis of footwear production data from CLE

men's sport shoe segment has grown by around 7%.¹¹ The growth has been mostly in the domestic market with little growth in exports.

Key Growth Drivers and Inhibitors

Increasing income levels in the middle and lower middle class has been a major reason for the growth of footwear industry in India, which in turn drives the market for sport shoe components. Although the footwear industry of India has been growing at a considerable rate, the growth of sport footwear has been limited to just 7% in the men's segment and 20% in the women's segment. The prime reason is the price competitive market of India, where the organised footwear industry has just about 20% share. Rest of the 80% market is supplied by low cost economy shoes, the market of which is growing at over 30% per annum. Many of the manufacturers in the un-organised sector use low cost lower quality lining material and often rubber or PVC uppers to cut cost. This has prevented the market from reaching its full potential. Growth in the organised sector is expected to help the sport shoe component industry to grow to higher levels. The domestic market is expected to grow at 12% during the coming three years.

Key Manufacturers

The manufacturing of sport shoe Technical Textile components is done mainly by small un-organised players in India. In addition, large players like Bata and Liberty which manufacture their own footwear components

Import Export Scenario

Import of Technical Textile sport shoe components has grown at 30% from Rs. 20 Crore in 2007-08 to Rs. 58 Crore in 2012-13. It is mainly driven by the growing foot wear industry of India. On the other hand the export of footwear components remains insignificant at Rs. 3 Crore for 2012-13.

Exhibit 206: Import trends

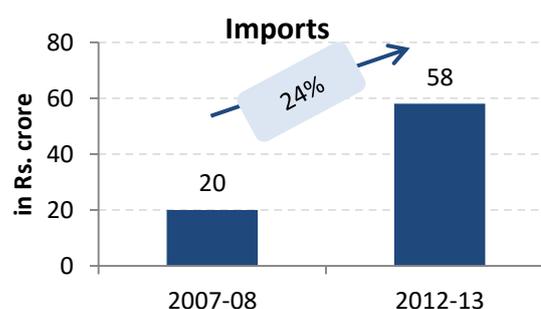
HS code family	HS code description	Applicable HS codes	Import (2012-13)	Export (2012-13)
5603	Man-made filmnt wghng betwn 70g/sqm and 150g/sqm	5603 1300	Rs. 58 Crore	Rs. 3 Crore
	Non woven & man made filaments weighing >150G/SQM	5603 1400		
	Nonwovens , other	5603		

¹¹ Source: <http://www.browneandmohan.com/file3.pdf>

HS code family	HS code description	Applicable HS codes	Import (2012-13)	Export (2012-13)
	filaments weighing between 70G/SQM & 150G/SQM	9300		
5903	Textile fabrics impregnated, coated, covered or laminated with plastics, other than Tyre cord fabric of high tenacity manmade yarn impregnated, coated, covered with PVC plastic, other fabric or other plastic	5903 1090 5903 9010 5903 9090		

*source: IMAcS analysis, DGCIS, DGFT

Exhibit 207: Import export trend



Source: IMAcS analysis, DGFT, DGCIS

Top countries exporting shoe components to India are Taiwan, Republic of Korea, China, Germany, and Italy. Export of shoe components from India is insignificant.

Quality Standards

There are no specific quality standards for shoe textile components.

High Performance Sports and Swimwear

High Performance Sports Wear

High performance sportswear includes clothing made of fabrics which could help out in playing a sport like breathable fabrics, moisture absorption fabrics and muscle relaxant fabrics. In India, mostly breathable moisture free fabrics are used as high performance sportswear. These products have the molecular property of drying away all the moisture generated by the body as sweat. This helps in reducing the fatigue while increasing the efficiency of the sports person, as otherwise constant friction between the body and

sweaty wet fabric increases the amount of effort being put in by the sportsman. These products are being developed by top sporting brands like Adidas, Nike, Puma, Reebok, etc only. It is made out of breathable fabric. These also include specialised sportswear designed for use in long distance sports riding of cars and motor vehicles, which have additional layers of protection and coating to provide ease to the rider.

High Performance Swimwear

A swimsuit, bathing suit or swimming costume is an item of clothing designed to be worn while participating in water sports and activities such as swimming, water polo, diving, surfing, water skiing. Men's swimsuit styles are swimming trunks such as board shorts, jammers, Speedo-style briefs, thongs, g-strings or bikini. Women's swimsuits are generally one-pieces, bikinis or thongs. The most recent innovation is the burin, a more modest garment designed for Muslim women; it covers the whole body and head (but not face) in a manner similar to a diver's wetsuit.

Special swimsuits for competitive swimming, designed to reduce skin drag. For some kinds of swimming and diving, special bodysuits called 'dive skins' are worn. Most competitive swimmers also wear special swimsuits including partial and full bodysuits, racer back styles, jammers and racing briefs to assist their glide through the water and gain speed advantages.

Market Size and Trade Trends

The market for high performance sportswear and high performance swimwear is still in a very nascent stage in India. At present only breathable active sportswear are being sold in the domestic market. With limited players offering the product, the market is limited to just a few thousand pieces. The market for high performance swimwear is catered mostly by the International brand of Speedo, whose products are sold by Page Industries Ltd in India.

Market Size Estimate

Market size of high performance swimwear and sportswear has been estimated from the supply side taking into consideration, supply of major brands in India – Speedo, Reebok, Adidas, Puma and Nike.

Exhibit 208: Market size estimate for high performance swimwear & sports wear

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in nos.)	~3,000	~4,053	~7,386
Value (in Rs. Crore)	1.8	2.4	4.3

*source: iMaCS analysis, industry sources

*includes both high performance swimwear and high performance sportswear

Key Growth Drivers and Inhibitors

The market for swimwear is growing at 20% per annum due to the changing lifestyle in India and coming of new residential societies with swimming pools. However, the market for speciality swimwear and sportswear is still limited to sportspersons. With growing of the affluence class and the growing interest of people in sports and leisure this segment is expected to grow. However, due to lack of awareness and price sensitivity of the market, the demand for speciality wears is not expected to grow in the coming few years. Although with the growing interest in Sports and focus of the government to promote sports in India is expected to act as a major driver for the industry. With the growing focus on sport events, and given the small base at which the current market stands, the domestic market of high performance swimwear and sportswear is expected to grow at a high growth of 35% per annum.

Key Manufacturers

Key manufacturers of speciality high performance sportswear and swimwear in India are the major sports brands - Page industries Ltd – having dealership for Speedo, Adidas India Limited and Reebok India Limited.

Import Export Scenario

A table of current HS codes and import and export statistics

Exhibit 209: Export Import trend

HS code family	HS code description	HS codes	(2012-13)
Imports			
6112	men's/boy's swimwear of synthetic fibers	61123100	Rs. 9 Crore*
	swimwear of artificial fibres	61123920	
	swimwear of other fibers	61123990 61124100	
	women's swimwear of synthetic fibers	61124910	
	women swimwear silk	61124920	
	women swimwear of artificial fibres	61124990	
	women swimwear of other fibres	61124990	
6211	swimwear for men's	62111100	
	swimwear for women's	62111200	
Exports			
6112	men's/boy's swimwear of synthetic fibers	61123100	Rs. 3 Crore*
	swimwear of artificial fibres	61123920	
	swimwear of other	61123990	

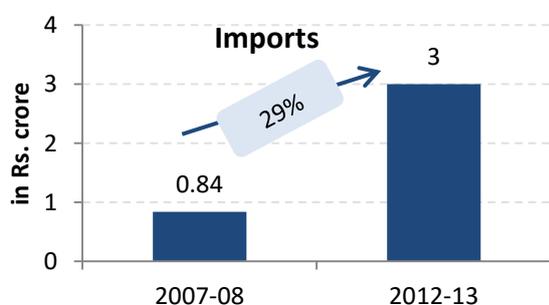
HS code family	HS code description	HS codes	(2012-13)
	fibers		
	women's swimwear of synthetic fibers	61124100	
	women swimwear silk	61124910	
	women swimwear of artificial fibres	61124920	
	women swimwear of other fibres	61124990	
6211	swimwear for men's	62111100	
	swimwear for women's	62111200	

Source: iMaCS analysis, DGFT, DGCIS

*Import & export figure for 2012-13 indicate all swimwear

The export import trend for high performance sports and swim wears is as shown in the following exhibit:

Exhibit 210: Import export trend



Source: iMaCS analysis, DGFT, DGCIS

The top countries exporting high performance swim wears and sports wears to India are China, Italy, Thailand, France and United Kingdom.

Quality Standards

There are no set quality standards for speciality swimwear and sportswear in India. However BIS has standards for sportswear fabric under IS 2150:1989 and IS 4375:1975.

Tents

Different Technical Textile fabrics used in making of tents constitute the Technical Textile segment of tents and tent fabrics. These fabrics have technical characteristics of fire resistance or water proofing, temperature maintenance, etc. These tents are either laminated fabrics like PVC coated or and rubberized fabrics or made of Technical Textile fibres like breathable fabrics, high quality parachute fabrics, inherent fire retardant fabrics, etc.

Product Characteristics:

Key characteristics preferable in tenting fabrics are:

- Water proofing
- Tear and abrasion resistance

- Wind proof
- Breathable
- Fire resistance
- Light weight
- High elasticity
- Better insulation

Classification and Applications

Technical Textile tents can be classified as follows:

- **Arctic tents:** These are high performance tents used for extreme environment like high altitude and windy locations. In India most arctic tents are the most commonly used tents as it can be easily used at high altitudes and have a wide variety of technical characteristics as compared to other tents, which have limited technical characteristics and applications. Common application of such tents lies with the armed forces and mountaineering at high altitudes. These come in three sizes – small, large and medium. The size specifications for these are shown in the table below:
- **Extendable tents:** These are tents suitable for two to four persons at time made from two different layers of Technical Textile fabrics having properties of water resistance and higher insulation. These tents were first used during the Second World War, and ever since are frequently used by the Indian armed forces.
- **Swiss cottage tents:** Swiss cottage tents are luxury tents aimed at providing the experience of being close to the environment and nature. These tents are large tents with size ranging from 20 sq. m to 40 sq. m. These are mostly built with beautiful finish and designs. These are made from tear resistant canvas and are waterproof and resistant to extreme weather conditions.

Exhibit 211: Types of Technical Textile tents

Sl. No.	Type of Tent	Size specification	Typical technical characteristics
1.	Small Arctic tent – MK2	2.1 X 1.9 sq. m	Waterproof and rot proof canvas Dasootie lining for insulation
2.	Medium Arctic tent – MK2	18.8 sq. m	Insulated outer layer Fire proof inner layer made of parachute fabric Rubberized fabric for flooring
3.	Large Arctic tent – MK2	6.7 m X 9.8 m	Outer layer of water resistant duck cotton Inner layer with Dosooti lining
4.	Extendable tent –	2.05 m X 4.65	Outer layer of water resistant duck cotton

Sl. No.	Type of Tent	Size specification	Typical technical characteristics
	2M	m	Inner layer with Dosooti lining

Raw Material

Key raw material used in manufacturing of Technical Textile tents is mostly

Market Size and Trade Trends

. Although, the market for tents is very large especially with retail demand for different types of *shamiyanas* and tents for various occasions, the component of Technical Textile in these *shamiyanas* is absent. Key reason is lack of laws and guidelines for use of protective Technical Textiles, like fire retardant fabrics in these tents. As a result, many manufacturers in India prepare tents with normal cotton or canvas fabric which run the risk of catching fire easily. The market of Technical Textile tents is primarily governed by the demand from Indian armed forces, with small contribution for mountaineering, camping needs and some Technical Textile *shamiyanas*. Indian armed forces account for close to 80% of the tent demand, due to its vast personnel deployment in active duty and exercises.

Market Size Estimate

Based on the demand from Indian armed forces and insights from key players in the industry, the domestic market size of tents is estimated to be Rs. 103 Crore. The Technical Textile fabric in tents is estimated to be of 1561 MT which is valued at Rs. 62 Crore. With negligible import and export, the total market size of Technical Textile fabric in tents for 2012-13 stood at Rs. 62 Crore.

Exhibit 212: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in MT)	1561	1721	2,082
Value (in Rs. Crore)	62	68	83

*source: IMaCS analysis, industry sources

While the overall market has grown at 6% per annum for last five years since 2008-09, domestic demand has seen an upsurge and has grown at double the rate at 12% per annum. The market currently is driven by the requirement from armed forces and is expected to grow at a steady rate of 8% per annum.

Key Growth Drivers and Inhibitors

Key growth driver is demand from the armed forces, which control the quality of output in the industry as well as determine the total production. Most of the

manufacturers located in Kanpur which is the hub of tent making produce tent specifically for supplying to the defence forces. While usage in armed forces remains to be the major driver, establishment of norms and guidelines for use of fire resistant fabrics for tents and *shamiyanas* as a precautionary measure can be a big boost to the industry.

In addition to that, growth of adventure sports like camping and mountaineering would also help the industry grow although not in the same proportion as the above mentioned two drivers. A major hindrance in the growth prospect of tent industry is the declining exports.

The market for Technical Textile tent fabric is expected to grow at 10% during the coming three years on account of increasing awareness about usage of fire retardant and coated tents. The usage from Indian armed forces is expected to be a major driver.

Key Manufacturers

More than 80% of the manufacturers of tenting fabrics are present in and around Kanpur. These players are SME owner or MSME players, who do the regular business with ordinance boards for supply of tent fabrics, sleeping bags and work orders for ordinance factories. Key players in the tent industry are A V enterprises, Standard Newar Mills, Tirupati Taxco Pvt. Ltd. and K C International.

Import Export Scenario

Import of Technical Textile tent fabrics in India is significant and has not any change in the last five years. Export of tents from India stood at 11.5 Crore showing insignificant growth from 2007-08. The export of Technical Textile fabrics – coated or laminated tents or tents made of special fabrics was Rs. 16 lakh for 12-13

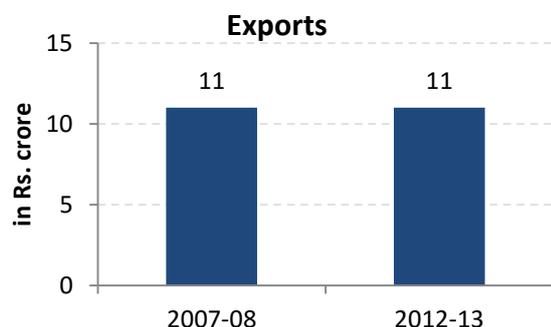
Exhibit 213: Export trends

HS code family	HS code description	Applicable HS codes	2012-13
Exports			
5407	Bleached, unbleached, dyed, printed or other tents of cotton, jute, synthetic fibres or other materials	54071011 54071022 54071032 54071042 54071092	Tent exports – 11.5 crore Rs. 0.16 Crore –
6306	Camping goods of textile material	63062100 63062200 63062090 63069010 63069090	Technical Textile component

*source: IMaCS analysis, DGCIS

The export import trend for tents and tent fabrics is as shown in the following exhibit:

Exhibit 214: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The top countries importing tent and tent fabrics from India are South Africa, Malaysia, United Kingdom, Djibouti and Denmark

Quality Standards

The quality standards applicable to the tent fabrics are shown in the following exhibit:

Exhibit 215: Quality standards for Tents

Code	Description
IS 7609: 1988	General requirements for tents
IS 12989: 2000	Camping Tents
IS 12990: 1990	Camping tents - Requirements and test methods - Type L (Lightweight tents)
IS 12991: 2005	Textiles - Camping Tents and Caravan Awnings - Vocabulary and List of Equivalent Terms
IS 14445: 1997	Textiles - Fabrics for awnings and camping tents - Specification.
JSS: 8340-38: 2002 (Amds No 2)	Tent Extendable Frame Supported
JSRL 8340-01: 2000 (REV No. 1)	Tents
JSRL 8340-02:2004 (REV No. 1):	Poles Tent

Sport Strings

Sport strings are nylon and polyester based strings that are used for stringing of sports racquets used for badminton, lawn tennis, squash, etc. The textile based sport strings account for over 95% of sport string usage with natural gut strings accounting for a very small share world over.

Product Characteristics

Sport strings are mostly made of polyester or nylon. The different types of sport strings are:

1. Monofilament strings: These are made of a single solid extrusion material. These are generally made of

nylon or polyester, depending on the quality and pricing of the string. These strings have high durability. The playability of the string depends on the softer nature of the mono filament used, the softer the monofilament higher would be the playability.

- 2. Multifilament strings:** Multifilament strings are made up of many strands of material twisted together to form the string. It does not have a core and is often coated on the outer for providing protection to the string. These strings provide high playability as the shock absorbance is very high. However, the durability of these strings is lesser than solid core or monofilament.
- 3. Solid core with single wrap:** This type of strings contains a solid monofilament centre with a single layer of fibres twisted around the core. Like multifilament strings, there are often coated on the outside for protection.
- 4. Single core double winding:** This type of strings contains a solid monofilament centre with a two layers of fibres twisted around the core. The two fibres are twisted in different directions. Like multifilament strings, there are often coated on the outside for protection. While the central solid core gives durability the two windings increase playability of the string.
- 5. Multi-core with wraps:** These have complex multi-cores with different fibres at each core. These provide excellent playability and elasticity to the string.
- 6. Natural Gut strings:** This is the oldest form of sport string, developed from the intestine of sheep and bovine animals. They offer unmatched elasticity and playability. However, the life of the string is dependent on the weather and the durability is low. These strings often require regular stringing.

Key Applications

The key application of sport strings are in racquets sports primarily – badminton, tennis and squash.

Market Size and Trade Trends

The major use of sport strings in India is for badminton strings. Other racquets games like tennis and squash make a relatively small part of the strings consumption in India. The majority of strings used in India are imported primarily from China, Taiwan and Japan. There are very few manufacturers and 90% of the strings are imported. There are many small players in India, who would import large reels of strings and then provide them in SKUs to the retail industry.

Market Size Estimate

The market for sport strings has been estimated using the demand side mapping. The demand for racquets sports has been considered for this purpose. The total estimated market for sport strings in India is 9.1 million metres worth Rs. 30 crore.

Exhibit 216: Market size estimate

	2012-13	2013-14 (E)	2015-16 (P)
Quantity (in mn metres)	9.1	10.3	13.2
Value (in Rs. Crore)	30	34	43

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

The market for sport strings is entirely dependent on demand for racquets sports. With the recent performance in badminton and growing preference for tennis and squash the participation of sportsmen in racquets games is rising. Currently badminton is the second most played game in India after cricket. Given these facts, it is estimated that the demand for sport strings would grow considerably in near future in line with that of sport equipments at 13% per annum in the next three years. Badminton would continue to be the single largest driver for the industry in India.

Key Manufacturers

There are no major manufacturers for sport strings in India. However, some of the prominent stakeholders in the Industry are Sunrise sports India Pvt. Ltd, the sole distributor for Yonex which commands over 60% of badminton racquets sales and Sportiff India Pvt. Ltd, which is the exclusive distributor for Babalot tennis racquets and strings in India.

Import Export Scenario

Close to 90% of the sport strings are imported into India. The imports occur in the three major HS codes. The export of strings from India is limited to few natural gut strings and high end strings and is not significant. The estimated import and exports for strings and racquets is as shown below.

Exhibit 217: Import export trends

HS code family	HS codes	HS code description	Value
Imports			
9506	95065100	Tennis racquets, W/N strung	Rs. 61.7 Crore*
	95065910	Badminton racquets, W/N strung	
	95069970	Tennis & badminton racquets pressure	
Exports			
9506	95065100	Tennis racquets, W/N	Rs. 0.3

HS code family	HS codes	HS code description	Value
		strung	Crore*
	95065910	Badminton racquets, W/N strung	
	95069970	Tennis & badminton racquets pressure	

*source: IMaCS analysis, industry sources, DGFT, DGCIS

*Contains data of both strings and racquets

The top five countries which are exporting sport strings to India are China, Taiwan, Japan, Singapore, and France

Quality Standards

There are no existing Indian standards for sport strings.

Other Sportech Products

Sail cloth

Sail is a large piece of fabric (usually canvas fabric) by means of which wind is used to propel a sailing vessel. Sails were used for in every type of boats before the advent of motorized boats. In the modern times, the sails are used in sailing boats, yachts for sports and recreational purpose.

Product Characteristics

Earlier, sails were made from flax (linen), hemp or cotton in various forms including canvas. However, modern sails are rarely made from natural fibres. Most sails are made from synthetic fibres ranging from low-cost nylon or polyester to expensive aramids or carbon fibres.

The cotton canvas sails tend to wear out faster and are not capable of achieving high sail speeds. They also tend to be more bulky compared to sails made of polyester and polyamides as they have a higher strength to weight ratio.

The usage of sail cloth is primarily in the following segments:

- **Luxury yachts** - The demand of luxury yachts in India less. They have a huge potential for leisure tourism as is the case in the developed countries. Royal Bombay Yatch Club is the leading yatch club having membership of 90% of luxury yatch owners in India.
- **Sporting sail boats** - Sailing as a sport is yet to become popular in India. The Yachting Association of India (YAI) is promoting the sport in the country, developing and training judges, umpires and other administrators of the sport and representing the sailors in all matters concerning the sport. There are 55 clubs affiliated to YAI, spread across various parts of the country like the Kerala Yachting association, Tamil Nadu Sailing Association, etc. The sporting sail boats use modern sail cloths which are made from

synthetic fibres which are imported into India. The sporting sails boats are categorized into various classes. There are 9 class associations affiliated to YAI, ranging from the smallest, the Optimist Dingy, to the largest, the J 24 class. The fabric requirement is dependent on the type of class.

Exhibit 218: Sail cloth requirement for different boats

Key classes of Yachts in India	Type	Requirement of Sail cloth per Yacht in square metre
Laser	Centre boat	7.06
Laser Radial	Centre boat	5.76
470	Centre boat	9.45

- **Non motorized Fishing boats** - These sail boats are used by small fishermen who cannot afford the motorized fishing boats. These boats are propelled by sails made of natural fibres. The canvas sails are being substituted by hand plastic sheeting or sacking.

Market Size and Trade Trends

The requirement for synthetic sail cloth is very small in India due to the small fleet size. The growth of luxury yacht segment and the sport yacht sailing are the key drivers for the sail cloth industry in India. However, after the 2009 terrorist attacks a series of restrictions has been put up on luxury yacht sailing. In addition to that the increase in import tariff of luxury boats from 20% to 48% by the central government has kept the demand down. The number of sail yacht in Indian waters is very low; as a result the replacement market is very small.

In absence of any yacht manufacturer and small size of Indian fleet, there are no significant manufacturers of sail cloth in India. The total market is entirely dependent on import of sail cloth which was just about Rs. 12 lakh in 2012-13. The market is not expected to grow in a big way in coming years due to various sailing restrictions on yacht and luxury boats and lack of proper parking bay. It is expected to grow at 10%, due to the small base at which it currently stands.

Import Export Trends

The total import of sail fabric in 2012-13 was 12 lakh rupees equal to 2,005 sq. m. While the overall imports have grown, the market is still very small.

Raw materials

The performance of a sail depends on two crucial aspects: Sail Design and Sail cloth. The sail cloths are tightly woven fabrics and mostly made of Polyester and polyamides like Nylon. These fabrics have a GSM of 200-600. Some of the high value sail cloths are laminated using sheets of PET.

An ideal sail cloth should have the following properties:

- Tear resistance
- Modulus of elasticity: stretch resistance per weight
- High Tensile strength or tenacity
- High breaking strength per unit weight
- Good Creep properties (the long term stretch of a fibre or fabric)
- UV Resistance

Quality Standards

There are relevant Indian standards for sail cloth.

Snooker/ Pool Table Cloth

The table cloth used for snooker, pool and billiards is a specialised high performance table cloth made from worsted wool and nylon. The cloth is generally preferred in blue green, yellow green or electric blue colours.

Product Characteristics

The cloth must have worsted wool by 80% to 85% of volume and nylon by 15% to 20% by volume although 100% worsted wool cloth is preferred. The cloth should have the following characteristics: - It must be non directional, It should not pill or fluff, It should not have a cloth backing.

Market Size and Trade trends

The market for pool table cloth in India is a very niche but rapidly growing segment. With a majority of recreational avenues and club houses having pool, snooker and billiards table, the market is fast growing. However, in India only the table is manufactured while the table cloth is imported mostly from China and United Kingdom. The total domestic market is estimated at 34,437 metres worth Rs. 53 lakh, which is entirely met by imports. The market is expected to grow at 10% to 12% in the coming three years.

Import Export trends

The total import of pool table cloth fabric in 2012-13 was Rs. 53 lakh with no exports at all. The exports were pre-dominantly from China followed by United Kingdom. The major HS codes under which imports happened has been shown in the following exhibit:

Exhibit 219: Import export trends

HS code family	HS codes	HS code description	Value
Imports			
5111	51111990	Others	Rs. 53 lakh
5112	51121990	Other woven fabrics containing >=85% by wt. of combed wool/fine	

HS code family	HS codes	HS code description	Value
		animal of wt. exceeding 200 g/m ²	
	51123090	Other woven fabrics mixed with manmade staple fibres of combed wool & fine animal hair	
5911	59119090	Others	
6307	63079090	Other made up articles other than cotton	

HS code family	HS codes	HS code description	Value
9504	95042000	Articles & accessories for billiard	
9506	95069990	Other sports equipments	

**source: IMaCS analysis, industry sources, DGFT, DGCIS*

Quality Standards

The relevant standards for sail cloth are being currently developed.

17. Buildtech

The textile components and fabrics used in building and construction industry are called as building Technical Textiles or Buildtech. These include products like tarpaulins which are used as roof coverings and architectural textile hangers and tensile structures amongst others.

List of Products

The major products under the segment have been listed as follows:

1. Architectural Membranes
2. Hoarding and signage
3. Tarpaulins – Canvas & HDPE
4. Awning and canopies
5. Scaffolding nets
6. Wall coverings
7. Acoustic fabrics



Architectural membranes



Hoarding & sinages



Canvas tarpaulins



HDPE tarpaulins



Awning & canopies



Scaffolding nets



House wraps



Wall coverings

The total estimated market size of Buildtech is around Rs.2,514 Crore with domestic market valued at Rs. 2,491 Crore. Domestic production caters to 85% of the market with imports catering to the other 15%.The product wise market size has been shown in Exhibit 220. The total market is expected to grow at 12% in the next three years and is expected to touch Rs. 3,577 crore by 2015-16 and further to Rs. 4,587 crore by 2017-18, mainly driven by the domestic market with exports limited to just about Rs. 30 crore.

Exhibit 220: Market summary of Buildtech

Buildtech	Unit	2012-13					2013-14 (P)		2015-16 (P)	
		Production	import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Architectural Membranes	Value (Rs. Crore)	8	22	-	30	30	-	36	-	52
	Volume (lakh sq. m)	2	4	-	6	6	-	7	-	10

Buildtech	Unit	2012-13					2013-14 (P)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Hoarding & signage	Value (Rs. Crore)	262.9	224	2.4	484.5	487	2	543	2	681
	Volume (Mn. sq. m)	89	75	1	163	164	1	183	1	229
Canvas - tarpaulin	Value (Rs. Crore)	412	1	18	395	413	19	391	23	383
	Volume (Mn. sq. m)	50	0	2	48	50	2	47	3	46
HDPE tarpaulin	Value (Rs. Crore)	1,432	4	2	1,434	1,436	2	1,649	3	2,181
	Volume ('000 MT)	124	0	0	124	124	0	143	0	189
Awning & canopy	Value (Rs. Crore)	37	3	1	39	40	1	51	1	86
	Volume (lakh m)	14	1	0	15	15	0	20	0	33
Scaffolding Net	Value (Rs. Crore)	97	-	-	97	97	-	111	-	147
	Volume ('000 MT)	12	-	-	12	12	-	13	-	18
Acoustic fabric	Value (Rs. Crore)	11	-	-	11	11	-	13	-	17
	Volume ('000 MT)	284	-	-	284	284	-	327	-	432
Total	Value (Rs. Crore)	2,260	254	23	2,491	2,514	25	2,794	30	3,548

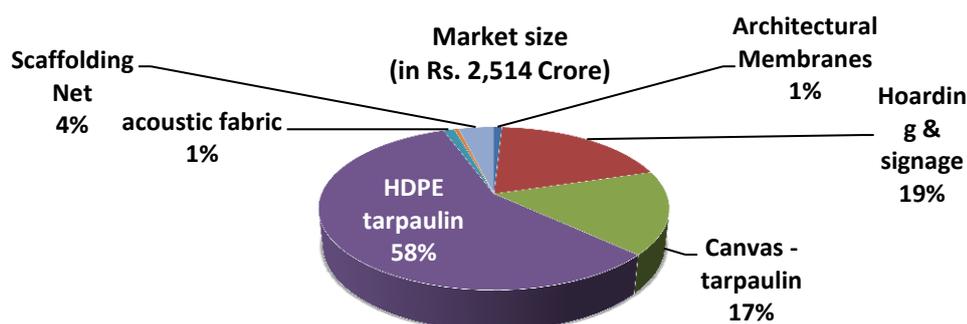
*Source: Annual reports, websites, secondary reports, ITTA, IMaCS analysis

*Source: IMaCS analysis

Market size calculated as imports + domestic production

The products which have the highest market shares in Buildtech are floor and wall covering and HDPE tarpaulins. Products like Architectural membranes and scaffolding nets are still in their nascent stage in the industry and are expected to grow rapidly in coming years. Product segment wise market share has been shown in the following exhibit.

Exhibit 221: Market size pie product wise - Buildtech



Source: IMaCS analysis, excluding floor and wall carpets

Key Players

The key players of the segment have been listed as follows:

- SRF Ltd.
- Royal Cushion Vinyl Ltd
- Mehler Texologies
- Serge Ferrari Ltd.
- Gujarat Raffia industries
- Mafatlal Industries
- Binni Ltd.
- Rishi Techtex Ltd.
- Garware Wall ropes Ltd.
- Bharat Textiles
- Gokak Textiles

The profitability of key players is as follows:

Exhibit 222: Profitability of key players - Buildtech

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Responsive Industries	83116	78620	3%	5%
SRF Ltd.	285590	265350	8%	11%
Royal Cushion Vinyl Ltd.	-4695	-4604	-66%	-32%
Gujarat Raffia Industries	1814	1365	2%	2%
Gujarat Crafts Pvt. Ltd.	2815	2076	2%	1%
Rishi TechTex Ltd.	1514	1542	267%	3%
Binni Ltd.	17242	17321	-2%	15%
Gokak Mills	10742	13736	-4%	4%
Bharat Textiles & Proofing Industry	572	514	3%	4%
Systems India Pvt. Ltd.	207	205	1%	-

Source: Annual reports, iMaCS analysis, Capitaline, VCCedge, MCA

High Potential Products

Buildtech is a growing segment of the Indian Technical Textile industry having a high potential for growth in the next three to five years. The key products in the segment that show very promising prospects are:

The detailed analysis of each product has been done in the subsequent sections.

Architectural Membranes

Architectural membranes are relatively new construction materials being used in India. The applications of architectural membranes include construction of permanent and semi-permanent structures such as car park covers, cafes, walkways, hotels, outdoor entertainment areas, pool surrounds, greenhouses, airports, stadiums, sports halls, exhibitions and display halls, storage bases for industrial and military supplies and any venues that require protection against harsh UV rays, heat, glare, rain and wind. The textile structures used for construction material can be classified into the following types:

- **Clear-span structures:** These structures provide a clear space beneath the fabric, free from supporting elements. Clear span structures are less permanent than air or tensile structures however, they

- **Awning and Canopies:** With the rising awareness regarding awnings and canopies and higher spending on luxuries and appearances by both commercial establishments as well as residential buildings, the demand for awning and canopies is fast growing in India. The market has grown many folds from Rs. 2.5 crore in 2007-08 to Rs. 40 crore in 2012-13. In future it is expected to grow at 25% during the next three to five years.
- **Hoarding and Signages:** Hoarding and signages have grown substantially due growing preference of flex fabrics for hoardings, advertisements as well as posters. The market has grown at 23% during the last five years and is expected to grow at 12% during the next five years. With limited domestic players like SRF, the market presents itself as a potential segment of domestic investment. The key challenge faced by the players is the cheap imports from China.
- **Architectural Membranes:** This is a fairly new product segment, which is currently being supplied mostly through imports into India. The product finds usage in development of temporary and permanent hangers for exhibitions, beautifications, use at stadiums, and other places as a cheap and lasting substitute for construction. With the growing focus on exhibitions and advertisements on hangars and tents during the same, the potential market of architectural membranes have increased significantly in recent years. The market has grown at 15% during the last five years and is expected to grow at the same rate during the next three to five years.

accommodate doors, flooring, insulation, electricity and HVAC easily as compared to tents.

- **Tension structures:** In this structure, the fabric is supported by metal pylons, tensioning cables, wooden or metal frameworks. A relatively minimal rigid support system is required for these structures since the fabric carries most of the load.
- **Air Structures:** The main components of an air supported system are the envelope (fabric), inflation system (fans), anchorage system (cables and foundation), doors and access equipment. Air pressure inside the envelope provides tensioning and maintains required configuration and stability.

Product Characteristics

Architectural membranes are strong, energy efficient and aesthetically superior products that offer flexibility to designers and architects thus, allowing high levels of

creativity. The textile material used for construction purpose is expected to be:

- Waterproof
- Fire retardant
- Resistant to deformation and extension under tension
- Impermeable to air and wind
- Resistant to abrasion and mechanical damage
- Resistant to sunlight and acid rain
- Resistant to microbial attack

Architectural membranes can be classified into two types:

Permanent membrane structures: These are high density tensile structures generally set up at long term projects like the ones at Jawaharlal Nehru Stadium in Delhi and the one at Mumbai Domestic Airport. These have a life of 25 to 30 years and as per building norms they are made of FR fabric. These are made of very high density fabrics having a GSM of around 470. With growing demand for landscaping, the market for permanent architectural membranes is growing in India at 7% per annum.

Temporary Membrane Structures: Temporary membrane structures are made of fabrics with density of around 270 GSM. These fabrics are used in making of artificial hangers at events like trade fairs, exhibitions, etc.

Depending on application, the fabric may need to transmit or reflect different levels of light. Commonly used coating for architectural membranes has been discussed as follows:

- **PVC coated polyester**

PVC coated high tenacity polyester fabric with weight ranging from 600 gsm to 1100 gsm is used for construction applications. The polyester base cloth is used because of its durability, strength and relatively low cost. The base cloth is coated with PVC to impart the colour, strength and waterproof properties. PVC coating also allows adjoining panels of fabric to be seamed by high frequency welding.

Most architectural PVC coated polyester fabrics have some sort of top-coating on their exterior surface which improves the appearance of material, extends its life and allows self cleaning of material by rain water. Different types of top-coatings include acrylic solutions, PVDF solutions and PVF film laminations.

Acrylic topcoat: This is the most economical and most widely available finish. It gives a transparent glossy finish to the PVC. The acrylic coatings have a good resistance to UV degradation. It is a thin coating, thus, this material is easy to fabricate and repair. Acrylic top-coats give the material a ten-year lifespan depending

on the ambient climatic conditions and air quality at the site where it is installed.

Polyvinylidene fluoride topcoat: This finish offers resistance to UV degradation, atmospheric chemical attack, algae and fungal attack thus, is far superior to the acrylic topcoat. These properties result in a membrane lifespan of 15 to 20 years depending on site conditions. Like acrylic top-coats, they are highly flexible and resistant to cracking, making them easy to handle during installation. Though, owing to chemical-resistant properties of PVDF the finished top-coated material cannot be welded. The top-coating must be abraded off to effect welding which increases the cost of fabrication and involves risk.

PVDF/PVC top-coating: This is effectively a dilution of the PVDF topcoat; the finished fabric is weldable thus, offering saving in fabrication costs. Fabrics with this coating have a life expectancy of 10 to 15 years, depending on prevailing conditions.

Pedlar top-coating: Pedlar is the trade name for polyvinyl fluoride (PVF). This is a film-layer that is laminated to the fabric during manufacture. This results in a thicker finished fabric that is more resistant than its competitors to weather and chemical attack. It has superior self-cleaning capabilities than the PVDF range of top-coatings and resists attack from graffiti, acid rain and bird droppings. For this reason it is frequently specified for use in highly industrialized areas, high saline coastal zones and desert environments. Having a thicker coating, it erodes at a much slower rate giving it a life expectancy of about 25 years depending on conditions.

The Tedlar film renders the PVC sheet non-weldable. This problem is overcome by butt welds. Tedlar top coated material is comparable in price to PVDF but substantially less costly than PTFE coated glass fibre.

- **Polytetrafluoroethylene (PTFE) coated glass fabric**

PTFE coated glass fabric is a frequently specified material due to its life expectancy of 30 years, depending on conditions. The woven fibreglass is incombustible, strong and does not undergo significant stress relaxation. The PTFE or Teflon coating is incombustible and has good self-cleaning ability. Fabrication of a PTFE membrane requires slow and specialized welding techniques under controlled environmental conditions. It also requires extra care in handling and packaging due to susceptibility to cracking and self-abrasion. These properties contribute to its high cost and to the need for additional tensioning hardware for the finished fabric structure. The tensioning of PTFE glass fabric is a slow process, as it requires incremental adjustment over long periods of time on site. This factor also contributes to its higher cost.

However, due to cost factors, most of the architectural membranes used in India are made of PVC coated fabrics.

Market Size and Trade Trends

In India, stadiums, airports, restaurants, hotels, residential complexes and shopping malls account for majority of application of architectural membranes. According to industry experts, tensile structures are now well accepted by the architects and builders on account of their light weight, aesthetic superiority and the design flexibility offered by the product. The market for architectural membranes is at a nascent stage for permanent structures. The market for permanent structures is estimated to be around 1.25 lakh sq. metres in India. On the other hand the market for temporary structures is slowly catching up with many exhibitors now preferring hangars and shades made of these structures to host events. Due to its cheaper costs, these structures have a big replacement market. The current market for temporary architectural structures in India is estimated to be around 3 lakh sq. metres.

Market Size Estimate

The market for architectural membranes is estimated to be of Rs. 22 Crore in India worth 4.25 lakh sq metres of fabric. Market has grown at 8% per annum for last five years since 2007-08 on account of growing domestic demand. While demand for temporary structures used as hangars for conducting exhibitions is a major driver.

Exhibit 223: Market size estimate

	2012-13
Quantity (in Lakh sq. m)	4.25
Value (in Rs. Crore)	22

*source: IMAcS analysis, industry sources

Key Growth Drivers

Growing demand for temporary architectural structures would be the biggest driver for the industry in the future. Due to its quick replacement and growing scale of events and exhibitions occurring in India, the demand for these structures is expected to see a significant rise in the coming years. On the other hand with growing awareness and the focus of design and aesthetics, the market for permanent structures are expected to grow at a relatively slower but stable rate in the next three years, driven primarily by growing infrastructure development and corporate building constructions in India. The domestic market for architectural membranes is expected to grow at 20% p.a during the next three years till 2015-16.

Key Manufacturers

The market of architectural membranes is entirely catered through imports.

Import Export Scenario

The market is catered mainly through imports from Germany and France. Mehler Texologies, is the largest importer of architectural membrane in India importing from its Germany. Other than Mehler, Serge Ferrari is a French company providing architectural membrane solutions in India. These two companies together cater to close to 90% of the industry demand. In addition to it, Hira Oka is a Japanese tensile structure provider catering to the Indian market.

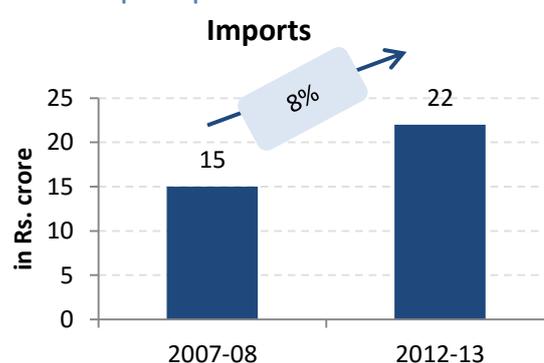
Exhibit 224: Export Import trends

HS code family	Applicable HS codes	2007-08	2012-13
Imports			
3921 & 3926	39219099 39269029	Rs. 15 Crore	Rs. 22 Crore

*source: DGCI, IMAcS analysis, Industry sources

The export import trend for architectural membranes is as shown in the following exhibit:

Exhibit 225: Import export trend



Source: IMAcS analysis, DGFT, DGCI

The major countries supplying architectural membranes to India are Germany, France and Japan.

Quality Standards

The parameters tested by Indian manufacturers for tensile membrane along with the test methods are mentioned as follows:

Parameter	Test Method
Fire resistance testing	BS 3119
Physical Testing	IS-7016
Tearing Strength (Tongue Tear)	BS-3424 7A
Resistance to Heat & Loss of Mass	IS: 1259
Water Repellency	IS-390

Source: Industry survey

The desired properties depend on the end application and desired life of the tensile structure.

Hoarding And Signage (Flex)

Hoardings / Signage are made of a translucent flexible textile substrate called flexible-face sign fabric. Flexible-face sign fabric, also known as flex was developed as an alternative to rigid-faced substrates like acrylic, plastic and polycarbonates. Besides hoardings, this material has applications in light boxes, exhibits, trade show displays and majority of other static out of home (OOH) advertising.

Flex is preferred over its rigid counterparts since the material offers flexibility in taking on graphics. It is amenable to screen printing, inkjet printing or painting, thus opening up more channels of creativity. As a result, print consistency can be maintained across locations. It is possible to produce large seamless signage using flex. Since this material is designed to withstand winds of speed 110 to 140 miles per hour, it is ideal for huge billboards on the expressways and national highways. Moreover, it can be easily transported because of its light weight and ease of handling.

Product Characteristics

Flex is made of a PVC coated polyester warp knitted fabric. The fabric is made from high tenacity polyester filament yarn of denier ranging from 250 to 500. This fabric is coated with PVC and surface treated with lacquer. The material has the following properties:

- Light transmission
- Printability
- Ultra Violet resistance
- Heat Seal ability
- Mildew resistance
- Anti wicking

Flex is available in different varieties depending on its application. The flex used for front-lit hoardings is available in GSM ranging between 280 and 370 and that for back-lit hoardings is available in GSM ranging from 450 to 650.

Market Size and Trade Trends

Flex is the most preferred material for hoardings / signage and other static OOH media. As per a FICCI report on Indian advertising industry, bill boards and hoardings contribute to about 60% of the OOH advertising industry. OOH media has assumed great significance because of considerable shift in consumers' lifestyles and suburban growth. Consumers spend an average of four hours a day travelling, shopping and eating at out-of-home areas like airports, shopping malls, restaurants and multiplexes which has

resulted in increased importance of OOH media at these spaces. OOH industry is expected to account for 70% of the total usage of flex fabric as hoarding and signage. In addition to the OOH advertising industry, flex have also used extensively for promotion during public events, exhibitions, trade fairs, local advertising and advertising on vehicles – trains, buses, etc. OOH

Hoardings are facing resistance because of potential traffic hazards as well as environmental hazards, specifically in large. On the other hand, new/refurbished airports, highways, street furniture and mushrooming retail space present opportunities for significant growth. Though the use of digital media i.e. LCD, LED is expected to reduce the share of static advertising, the rate of adoption of digital media is slow. Thus, flex is expected to continue as preferred media for the OOH advertising industry.

The average price of getting a front led printed flex fabric is Rs. 9 per sq. ft.

Market Size Estimate

The market of flex fabric usage as hoarding and signage is estimated using the supply side inputs from key manufacturers in India like SRF and the growth of OOH industry in India. The estimated market size for 2012-13 is Rs. 487 Crore which is valued at 164 million sq. metres.

Exhibit 226: Market size estimate

	2012-13
Quantity (in million sq. m)	164
Value (in Rs. Crore)	487

*source: IMaCS analysis, industry sources

Market has grown at 30% per annum for last five years since 2007-08 on account of growing preference of flex banners for bill boards. The market is expected to grow at 5% to 7% per annum during the coming five years. With coming of Indian manufacturers, in the industry the share of Chinese imports which once ruled the market has gone down to 50% of the market. The market is expected to grow at 12% in the coming three years, driven mainly by the OOH industry.

Key Growth Drivers and Inhibitors

Growth of the bill board OOH advertising would be the key for the growth of the industry. In the last five years, the use of flex fabric has made a very significant penetration in the bill board market with close to 95% of bill boards today using flex fabric, which led to goods growth rates. In the coming years, the growth of the industry would be dependent on the growth of the bill board industry which is expected to grow at 8.4% and the usage for small publicity events which is increasingly using flex fabric over other alternatives.

The domestic market is set to grow at 12% per annum till 2015-16.

Key Manufacturers

SRF Limited is the largest manufacturer of coated flex fabric in India accounting for more than 50% of Indian production. In addition to it, there are many coated fabric players in the country in SME and MSME segments that are involved in production of flex fabric in small quantities.

Import Export Scenario

India is a big importer of flex fabric most of which come in from China. Total import of flex in India has grown at 6% during the last five years reaching Rs. 224 Crore for 2012-13

Exhibit 227: Relevant HS codes and trade value

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
3920	Plates, sheets etc. of polymers of styrene nes	39201019	Rs. 224 Crore
	other plates sheets of polymer of vinyl chloride	39203090	
	sheets of ploy-methyl methacrylate flexible plain	39204900	
	poly acrylate sheets rigid, plain	39205112	
	poly acrylate sheets other	39205911	
	other of poly (vinyl butyral)	39205919	
	plates sheets films foil and strip of poly (vinyl acetate) nes	39209119	
	plate sheet film foil and strip of co-polymer of vinyl chloride and acetate other	39209919	
	others plate/ sheets etc. of other plastic n.e.s	39209939	
	plates sheets etc. of polymers of styrene nes	39209999	
3921	plates etc of polymers of vinyl chloride	39211200	
	other plates sheets etc of other plastics cellular	39211900	
	other plates, sheets, film foil, strip etc, of polymer of vinyl chloride : other	39219020	
	other plates, sheets, film foil, strip etc nes flexible, laminated	39219096	
	other plats, sheets, film foil, strip etc nes other	39219099	
4911	Posters- printed	49111010	
	other advertising matter printed	49111090	
	others	49111990	

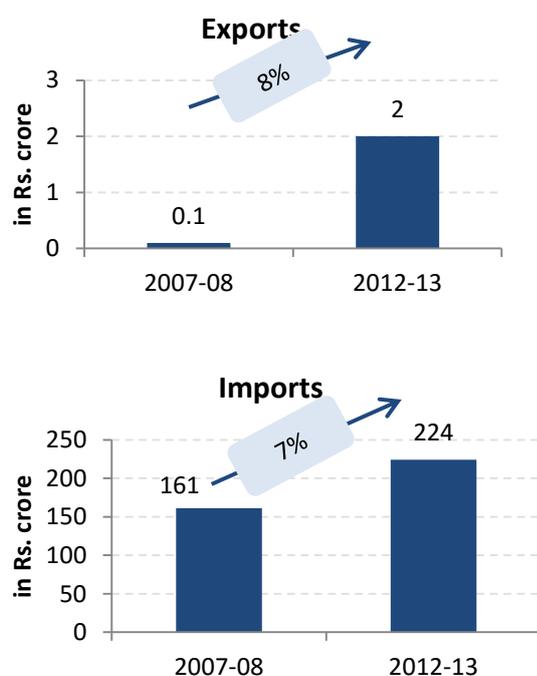
HS code family	HS code description	Applicable HS codes	2012-13	
5903	other fabric impregnated, laminated plated and coated with PVC	59031090	Rs. 2.4 Crore	
	other fabrics impregnated laminated plated and coated with polyurethane	59032090		
Others	poly (vinyl chloride) resins	39042110		
	other self-adhesive plates etc nes	39199090		
	other article of plastic nes	39269099		
Exports				
3920	other sheets of polyethylene	39201019		
	plates sheets etc. of polymers of styrene nes	39203090		
	other plates sheets of polymer of vinyl chloride	39204900		
	sheets of ply methyl methacrylate flexible plain	39205112		
	poly acrylate sheets rigid, plain	39205911		
	poly acrylate sheets other	39205919		
	other of poly (vinyl butyral)	39209119		
	plates sheets films foil and strip of poly (vinyl acetate) nes	39209919		
	plate sheet film foil and strip of copolymer of vinyl chloride and acetate other	39209939		
	others plate/ sheets etc. of other plastic n.e.s	39209999		
3921	plates etc of polymers of vinyl chloride	39211200		
	other plates sheets etc of other plastics cellular	39211900		
	other plates, sheets, film foil, strip etc, of polymer of vinyl chloride : other	39219020		
	other plates, sheets, film foil, strip etc nes flexible, laminated	39219096		
	other plats, sheets, film foil, strip etc nes other	39219099		
4911	Posters- printed	49111010		
	other advertising matter printed	49111090		
	others	49111990		
5903	other fabric impregnated, laminated plated and coated with PVC	59031090		
	other fabrics impregnated laminated plated and coated with polyurethane	59032090		
Others	poly (vinyl chloride) resins	39042110		
	other self-adhesive plates etc nes	39199090		

HS code family	HS code description	Applicable HS codes	2012-13
	other article of plastic nes	39269099	

*source: DGFT, industry, IMaCS Analysis, DGCIS

The export import trend for hoarding and signage fabrics is as shown in the following exhibit:

Exhibit 228: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The major countries exporting flex fabrics, hoarding and signage fabrics to India are Malaysia, South Korea, China, Thailand and Vietnam

Machinery Details

The process of manufacturing flex involves coating the base fabric with PVC emulsion by either dip or knife roll method followed by drying and curing. Drying and curing of the chemicals applied to the substrate is accomplished by means of heat wherein the fabric is passed through an oven with continuous circulation of hot air.

The domestic manufacturers/suppliers of coating lines are:

- ATE Pvt. Ltd
- Harish Enterprises
- Kuster Calico Machinery Ltd.
- Shreeji Engineering and Marketing Services
- Stovec Industries Ltd.

Quality Standards

There are no quality standards available for this product.

Tarpaulins - Canvas & HDPE

A **tarpaulin** or **tarp** is a large sheet of strong, flexible, water resistant or waterproof material. Traditionally tarpaulins were made out of cotton however currently nylon and polyester fibre fabrics are being increasingly used in manufacturing tarpaulins.

Tarpaulin is widely used for rain water protection in sheds, transportation - trucks & other automobiles, storage godowns, boats, snowmobiles, construction sites, lumber, grain storage, temporary storages, tents, ground-sheets, etc.

Tarpaulins are categorized as given below:-

1. Cotton canvas tarpaulins
2. HDPE/PP/Nylon tarpaulins

Tarpaulins are sheets made out of polyethylene, cotton canvas, jute, etc. Polyethylene tarpaulin is also known as HDPE Tarpaulin, Laminated Tarpaulin, Plastic Tarpaulin, etc. Traditionally, cotton canvas had been the more common form of tarpaulins, but, lately, HDPE woven and laminated fabric and polyethylene sheets have replaced canvas in many of the applications.

Canvas Tarpaulin

Canvas tarpaulins are largely used as truck covers. Trucks travel long distances and hence come across huge climatic variations. Given India's rough environmental conditions, damage to goods is inevitable if the goods are not adequately shielded. A steel body truck not only increases the weight of the truck but also reduces the fuel efficiency. Thus, truck tarpaulin covers are widely used as truck covers. As the logistics industry is getting more and more organised, the product liability clauses are being enforced on the logistics players leading to increase in usage of truck covers. Moreover, the advent of organised players in retail industry has also given boost to the use of well covered trucks.

Product Characteristics

Canvas Tarpaulin covers are made of cotton canvas or nylon or polyester fibre fabrics coated with PVC. The cotton fabric is available in GSM ranging from 380 to 500. Vinyl coated polyester fabrics are 610 GSM to 678 GSM with the base fabric of 102 GSM to 107 GSM. These fabrics being heavy have lower elongation, minimum shrinkage over wide range of temperature and humidity conditions and resistance to UV degradation

Market Size and Trade Trends

The key application of canvas tarpaulins is as truck covers. In India, road is the dominant mode of transportation carrying almost 65% of the country's freight. Truck transport accounts for majority of the goods transfer through road and thus, holds immense significance. Around 3.1 lakh new trucks are sold in 2012-13, increasing at 16% y-o-y for the last four years.

Each truck requires about three to four tarpaulins, one to two out of which is generally of canvas. An average canvas is of 70 sq m and has a life of 18 months. The market size for canvas tarpaulins has been estimated using the demand from HCV – trucks and buses. The sale figures for HCV and buses are as shown:

Exhibit 229: Sale of MCVs in India

	2012-13	2011-12	2010-11	2009-10
M & H goods carrier sales (in lakh nos.)	3.17	3.30	2.91	2.04
M & H Passenger carrier sales (in Lakh nos.)	0.53	0.54	0.54	0.46

*Source: SIAM

Market Size Estimate

The total domestic market size for canvas tarpaulins in India is estimated to be of 48 million sq. metres amounting to Rs. 395 Crore with exports worth Rs. 18 crore. The total market is estimated at Rs. 413 crore of 50 million sq. m.

Exhibit 230: Market size estimate for canvas tarpaulins

	2012-13
Quantity (in million sq. m)	50
Value (in Rs. Crore)	413

*source: IMAcS analysis, industry sources

The domestic market for tarpaulin has been growing at a very slow rate due to increasing preference for HDPE tarpaulins which are not only cheaper but also water proof. The domestic market has dropped at 5% y-o-y, while exports have increased at 33% to reach Rs. 18 Crore.

Key Growth Drivers and Inhibitors

Usage by the trucking industry which accounts for a major demand for canvas tarpaulins remains to be the major growth driver for canvas tarpaulins. The market for tarpaulins is expected to decline at 1% per annum till 2015-16 owing to increasing replacement by HDPE tarpaulins. At the same time with, a favourable growth in exports at 10% for the next three years is expected till 2015-16, as more and more manufacturers look to export options, due to slowing domestic market.

Key Manufacturers

Key manufacturers of canvas tarpaulins in India are Gokak textiles, SRF limited and Bharat textiles. The industry is highly fragmented with many players in the un-organised sector. Key manufacturers of canvas tarpaulins are:

- Shri Arjun Tarpaulin industry – Salem
- Delhi Tirpal House – New Delhi
- Calcutta canvas Company – Chennai
- Daisy trading company – Mumbai

- Lamifab Industries - Mumbai

Import Export Scenario

India imports of canvas tarpaulin in very small at just Rs. 1 Crore. However, India has slowly grown as a supplier of tarpaulins with the exports going up from Rs. 5 Crore to Rs. 17 Crore in last five years

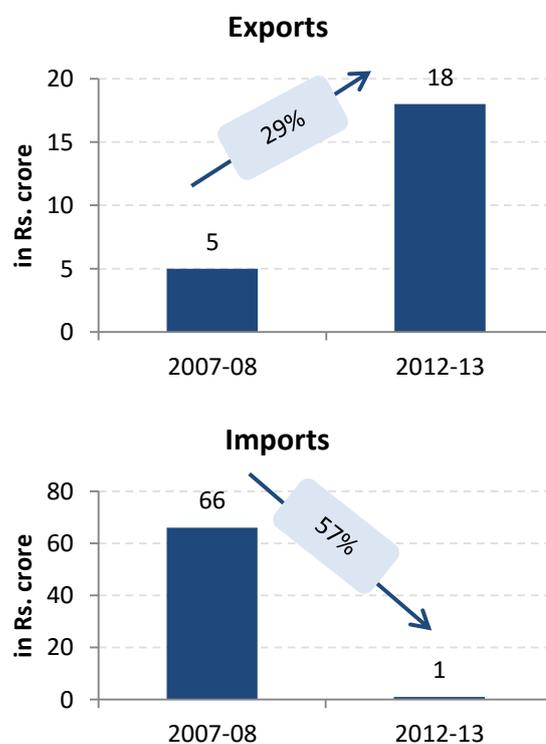
Exhibit 231: Export Import trends

HS code family	HS code description	HS codes	2012-13
Imports			
5901	Prepared painting – canvas	59011020	Rs. 1 Crore
5907	Other textile fabrics	59070099	
6306	Jute tarpaulins Tents of other fabrics	63061910 63062910	
Exports			
5901,	Prepared painting – canvas	59011020	Rs. 17.5 Crore
	Other textile fabrics	59070099	
6306	Jute tarpaulins	63061910	
	Other tents Tents of other fabrics	63061990 63062990	

*source: DGFT, industry, IMAcS Analysis, DGCI

The export import trend for canvas tarpaulins is as shown in the following exhibit:

Exhibit 232: Import export trend



Source: IMAcS analysis, DGFT, DGCI

The major countries to which India exports canvas tarpaulins are:

1. United States of America (USA)
2. Canada
3. United Kingdom (UK)
4. Germany
5. Sri Lanka

Machinery Details

The domestic manufacturers/suppliers of coating lines are:

- ATE Pvt. Ltd
- Harish Enterprises
- Kuster Calico Machinery Ltd.
- Shreeji Engineering and Marketing Services
- Stovec Industries Ltd.

HDPE Tarpaulins

Polyethylene tarpaulin is also known as HDPE Tarpaulin, Laminated Tarpaulin, Plastic Tarpaulin, etc. Polythene Tarpaulins are made of High Density Polythene woven fabric laminated on both sides with low density polythene. The advantages of PE tarpaulins are that they are very economic compared to cotton canvas tarpaulins. PE tarpaulins with HDPE woven fabric and LDPE lamination on both the sides are 100% waterproof. PE tarpaulins have the capability to adopt wide range of colours unlike the canvas tarpaulin which makes it more usable and a preferred product all over the world.

Product characteristics

The polyethylene tarpaulin usually ranges from 70-500 gsm. The most popular characteristics in tarpaulins are listed below:

Parameter	Characteristics
GSM	: From 100 to 350 gsm
Mesh	: From 8 X 8 to 14 X 14
Denier	: From 700 up to 1200
Width	: 6ft and above
Length	: 6 ft and above
Lamination	: LDPE Lamination on both sides
Color	: Blue, Yellow, Black, Silver/Blue, Silver/White, Silver/Black

The density of tarpaulin depends on the layers. A three layer tarpaulin can have density from 72 GSM up to 200 GSM and a five layer tarpaulin; it can go up to 300 GSM, giving it higher strength and durability. HDPE tarpaulins are generally available in standard sizes of 15ft X 12ft, 18ft X 12ft, 18ft X 15ft, 24ft X 18ft, 24ft X 16ft and 30ft x 30ft. UV stabilization can also be done on the tarpaulin.

Market Size and Trade Trends

HDPE tarpaulins finds application in a number of industries like for truck tarpaulins, raffia industry and for water proof covers for tents and other outdoor arrangements.

Market Size Estimate

HDPE tarpaulins are a major part of the raffia industry. The domestic market of HDPE tarpaulins is estimated to be 1.24 lakh MT worth Rs. 1434 Crore in 2012-13 with exports worth Rs. 2 crore. The total market size is estimated to be Rs. 1436 crore

[Exhibit 233: Domestic Market size estimate](#)

	2012-13
Quantity (in '000 MT)	124
Value (in Rs. Crore)	Rs. 1436 Crore

**source: IMAcS analysis, industry sources*

Key growth drivers and Inhibitors

The market of Tarpaulins is dependent on user industries like trucking and raffia industry. While the trucking industry is growing at 16%, raffia industry is expected to grow at around 8% in the coming years. These would be main drivers for demand of HDPE tarpaulins. The domestic market is expected to grow at 15% per annum. The export of HDPE tarpaulins is currently very small compared to domestic market and is expected to grow at 10% per annum till 2015-16.

Key Manufacturers

Key manufacturers of HDPE Tarpaulins are:

- Gujarat Craft
- Gujarat Raffia
- Binni Limited
- Mafatlal Industries Ltd.

Import export scenario

India does small foreign trade in HDPE tarpaulins. The export of

[Exhibit 234: Export Import trends](#)

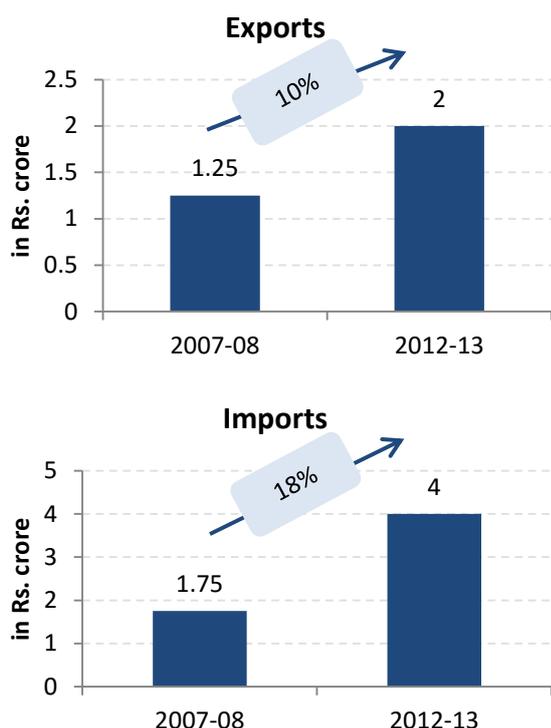
HS code family	HS Code description	Applicable HS codes	2012-13
Imports			
3926	Other articles of plastic	39269099	Rs. 4.2 Crore
6306	Tarpaulins, etc of synthetic fibres	63061200	
	Others	63061990 63062990	
Exports			
3926	Other articles of plastic	39269099	Rs. 2.2 Crore

HS code family	HS Code description	Applicable HS codes	2012-13
6306	Tarpaulins, etc of synthetic fibres	63061200	
	Others	63061990 63062990	

*source: DGFT, DGCIS IMaCS Analysis

The export import trend for HDPE tarpaulins is as shown in the following exhibit:

Exhibit 235: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The top countries supplying HDPE tarpaulins to India are China and South Korea. They account for over 95% of total Indian imports.

The top five countries importing HDPE tarpaulins from India are:

1. Tanzania
2. Kenya
3. United States of America
4. Germany
5. Mozambique

Machinery Details

The main machine required for tarpaulin manufacturing is the 8-10 Wide width Shuttle Loom. The main suppliers of these looms in India are:

- Lohia Starlinger Limited
- J. P. Industries
- Kabra Extrusiontechnik Ltd. (KET) – Kolsite
- Windsor Machines Limited

Quality Standards

IS 7903:2005 is the standard applicable to HDPE tarpaulins

Awnings And Canopies

An awning is a secondary covering attached to the exterior wall of a building. With the addition of columns an awning becomes a canopy, which is able to extend further from a building, as in the case of an entrance to a hotel.

The location of an awning on a building may be above a window, a door, or above the area along a sidewalk. Restaurants often use awnings broad enough to cover substantial outdoor area for outdoor dining, parties or reception. In commercial buildings, an awning is often painted with information such as the name, business, and address, thus acting as a sign or billboard in addition to providing shade from the sun, break from steep winds and protection from rain or snow. The key benefits of an awning or a canopy are weather protection, decoration and identification.

An awning fabric gives an extremely high level of protection from UV radiation. This degree of protection depends on the colour of the fabric. Lighter colours let more UV light through than the dark colours, but they remain as effective as a factor 50 sunscreen (filtering out more than 90% of UV radiation).

Product Characteristics

The fabric for awnings & canopies usually varies from 400-700 gsm, though it can also be higher depending upon the fabric used. Advantages of Awnings and canopies are as shown under:

- Weather protection
- High tear strength
- Long lasting
- Good breaking strength
- Does not get warped
- Weld able
- Good drape
- Aesthetic appeal combined with strength

Most of the awning fabrics are used for development of garden and terrace awnings used primarily in Hospitality and residential segments.

Market Size and Trade Trends

Market Size Estimate

The market of awnings and canopies has been estimated based on inputs from key players. The total market for awnings and canopies is shown in the following exhibit.

Exhibit 236: Domestic Market size estimate

	2012-13
Quantity (in lakh m)	15
Value (in Rs. Crore)	40

*source: IMaCS analysis, industry sources

The market for awnings and canopies has grown on account of increasing usage by the hospitality sector and residential preference for terrace awnings, demand from Indian shop keepers and growth in exports.

Key Growth Drivers and Inhibitors

Growth in the real-estate segment especially hotels, fast food places, sale counters, etc is driving the usage of awnings and canopies in India. With increasing awareness and growing preference for awnings from high end retail establishments, hotels and restaurants, the domestic market is expected to grow at 30% per annum up to 2015-16. The exports, although at a very nascent stage currently is also expected to grow at 10% per annum up to 2015-16.

Key Manufacturers

SRF and Systems India Pvt. Ltd. are the key players in the awning fabric market in India. Players like Alps Industries and Khosla Profils also manufacture awning fabrics.

Import Export Scenario

The import of awning and canopies in India has increased over years. Yet due to the specialised nature of the product, the total market for foreign trade remains small.

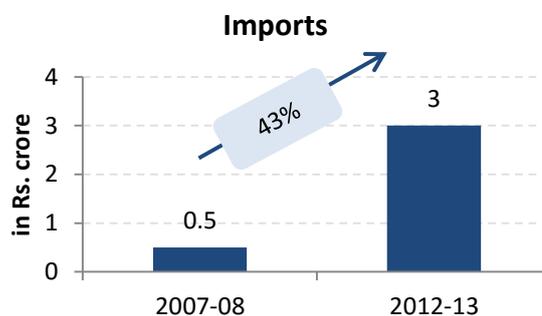
Exhibit 237: Export Import trends

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
3926	other article of plastic nes	39269099	Rs. 2.8 Crore
5407	other woven fabrics from strip/the like	54072090	
5512	woven fabric, other containing acrylic/mod-acrylic >=85%	55122990	
6306	Others	63061990	
Exports			
3926	other article of plastic nes	39269099	Rs. 0.8 Crore
5407	other woven fabrics from strip/the like	54072090	
5512	woven fabric, other containing acrylic/mod-acrylic >=85%	55122990	
6306	Others	63061990	

*source: DGFT, DGCI IMaCS Analysis

The export import trend for awning fabrics is as shown in the following exhibit:

Exhibit 238: Import export trend



Source: IMaCS analysis, DGFT, DGCI

The key importers of awning fabric are:

- Systems India Pvt. Ltd – Authorised for Dickson & KITEX (Korea PVC awning)
- Mac Décor Ltd.
- Sujan Impex, Mumbai – Authorised for Serge Ferrari – French company

Machinery Details

Key machinery suppliers for making of awning fabrics and awnings are:

- Yamuna Industries, Umbergaon
- Swatik Industries, Ahmadabad
- Shakti Industries, Mumbai
- Web Processing, UK
- Coatema, Germany
- Zimmer, Germany

Scaffolding Nets

Scaffolding netting is a lightweight fabric used to cover a building under construction in order to improve the safety of construction site. It acts as a bi-fold barrier on a building under construction. The net prevents debris from falling out of building and also hides away unsightly work areas giving a tidier look.

However, the application of scaffolding nets is not limited to just buildings, but people increasingly use them for fencing, car shade covering and as floor matting during functions due to easy and cheap availability of the nets.

The section also covers textile based insect nets for buildings, which are mostly made from high tensile polyester fibres or fibreglass. This forms a very small part of the insect netting market in India which is mostly catered by PVC coated steel nettings or aluminium nettings.

Product Characteristics

Scaffolding nets are knitted from High Density Polyethylene (HDPE) UV stabilized monofilament yarn. The UV stabilizers added to HDPE develop resistance to UV rays thus, increasing the product life. Scaffolding nets are available in different weights and shading factors ranging from 50% to 90%. These nets are low GSM products with GSM of around 270.

Building insect nettings are knitted from high tensile polyester which would provides the firmness to the nettings. These have robust designs, high tensile strength and are easy to fit so that it can be easily installed using velcros or pins on the windows and doors. The size of the mesh is dependent on the requirement; usually smaller size of up to 0.88mm mesh is preferred for protection from mosquitoes and flies.

Market Size and Trade Trends

Scaffolding nets are used to cover scaffoldings used in construction of the building. These are mostly used in making of bridges and large commercial and residential buildings. However, although the awareness for the product has increased over years, the market penetration is still very low and very limited builders mostly in the metro cities use scaffolding nets. As per market insights scaffolding nets contribute to about 20% of the total cost of using scaffolding with scaffolding net.

Market Size Estimate

The market of scaffolding nets including textile based building insect nest has been arrived by mapping the total netting production in India and excluding the nettings used in shade and plant nets.

Exhibit 239: Domestic Market size estimate

	2012-13
Quantity (in '000 MT)	12
Value (in Rs. Crore)	97

**source: iMaCS analysis, industry sources*

Key Growth Drivers and Inhibitors

The growing awareness about use of scaffolding nets for construction is the major driver for the industry. The use is mostly for construction of high rise buildings in the metro cities. Hence the growth of real-estate construction in the key metros would be the major growth driver along with increasing preference for these nets. Secondary drivers would be construction of infrastructure projects like bridges. In addition, the alternate uses of scaffolding nets as a make shift arrangement for tents, fencing, floor covering, etc constitute a major chunk of the market of scaffolding nets. With wide spread awareness in the metro cities and regular use by construction companies and

increasing use of scaffolding nets as alternative to costlier nettings and covers, the domestic market is expected to grow at a rate of 15% per annum during the coming three years.

Key Manufacturers

Scaffolding nets in India is mainly manufactured by the large netting companies like Garware Wall ropes, Rishi Techtex Ltd., Safe nets, Kwality Nets Manufacturing Co. Pvt., Ltd. and Netlon Ltd. However, the manufacturing of scaffolding nets is a very small part of their overall netting business.

Import Export Scenario

There is very little foreign trade of scaffolding nets in India with both imports and exports of less than Rs. 1 lakh

Machinery Details

Scaffolding nets are knitted from High Density Polyethylene (HDPE) UV stabilized monofilament yarn. The UV stabilizers added to HDPE develop resistance to UV rays thus, increasing the product life.

The Rachel knitting machines used for manufacturing nets are mostly imported. GCL India Pvt. Ltd (Bangalore) is one of the local manufacturers of Rachel knitting machines. The key Rachel knitting machinery manufacturers in the world are Karl Mayer (Germany), LIBA Maschinenfabrik GmbH (Germany) and Bruckner Technology Holding GmbH (Germany).

The Indian associates/suppliers of these machineries are:

- ATE engineering (Mumbai) for Karl Mayer
- Bruckner Machinery and Service India Pvt. Ltd (Pune) for Bruckner.

Quality Standards

There are no available quality standards for scaffolding nets.

Wall Coverings

Wall covering items can be classified as following:-

- PVC wall coverings & Printed PVC wall coverings
- Non-woven wall coverings

Wall coverings in India is a very small market, most of which is of PVC coated polyester or PVC wall coverings. Wall covering market in India also faces stiff competition from paper based wall coverings, which is a major share of the total wall covering market.

Product Characteristics

Wall covering are of three types:

1. Vinyl coated paper wall papers: these have paper as substrate and a coating of PVC or vinyl for protection and enhanced features like washability.
2. Paper backed vinyl sheet: these are vinyl wall coverings where in the paper is added as a backing, while vinyl solid layer acts the decorative face. These are very durable and can be scrubbed or peeled off.
3. Fabric backed vinyl: these are fabric based wall papers that have a vinyl decorative face with a woven or a non woven fabric as substrate. These are the only types of wall coverings that can be classified as Technical Textile products due to the use of textiles and non woven as backing.

Key Applications

Wall coverings are increasingly used for decorative purposes in India and abroad. The key applications are in restaurants, hotels, hospitals and lately use for residential purposes is also increasing.

Market Size and Trade Trends

Indian market of wall covering is mostly controlled by paper based vinyl coverings. These products are now extensively being used by the commercial and infrastructure sectors at Hotels, restaurants, Commercial real-estates, major outlets, hospitals and Airports. Due to lower costing the share of paper based wall coverings is very high in the market. The market is in a growing stage with very few players most of whom are organised. However, the share of Technical Textile wall coverings is very small. Obeetee Textiles is the only major player of textile based wall coverings. Other key players in the Industry is Marshalls India enterprise Pvt. Ltd., however, it has major business in paper based wall coverings.

The market has grown at 10% during the last five years mainly driven by the growing domestic demand which has grown at 13% over the last five years. Exports on the other hand have grown at a relatively slower pace at just 5%.

Key Growth Drivers and Inhibitors

These products are now extensively being used by the commercial and infrastructure sectors at Hotels, restaurants, Commercial real-estates, major outlets, hospitals and Airports. Increasing use of these products and growing preference for decorative and better aesthetics which in turn is driven by the growing living standards in India. The preference of vinyl floor covering and wall coverings especially in commercial and office establishment is expected to drive the domestic market at a high rate. This along with the

growing exports is expected to drive the market at 10% per annum during the coming three years

Key Manufacturers

Obeetee textiles is the only major manufacturer of textile based wall coverings.

Import Export Scenario

In absence of key manufacturers, the share of imports of wall coverings is high. India imports a total of Rs. 13 crore worth of wall coverings, a majority of which are paper based wall coverings. The exports of wall coverings stand at Rs. 26 crore.

Exhibit 240: Export import trends

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
3918 , 3920 , 3921 , 3925 & 3926	wall /ceiling cover comb with knitted/ woven fabrics, nonwovens/felts of PVC	39181010	Rs. 13 Crore *
	other polymers of vinyl chloride	39181090	
	wall /ceiling cover comb with knitted/ woven fabrics, nonwovens/felts of other plastics	39189020	
	floor covering of other plastics nes	39189090	
	plates sheets films foil and strip of poly (vinyl acetate) nes	39209919	
	others plate/ sheets etc. of other plastic n.e.s	39209999	
	other plates, sheets, film foil, strip etc, of polymer of vinyl chloride : other	39219029	
	other builder ware of plastics of poly-urethane	39259010	
	other builders ware of plastics	39259090	
	other decorative sheets	39264059	
other article of plastic nes	39269099		
5701 , 5702 , 5703 & 5705	carpets and other textile floor coverings of wool or fine animal hair, knotted	57011000	Rs. 13 Crore *
	carpets and floor coverings knotted other than cotton	57019090	
	carpets	57023110	
	carpets, carpeting and rugs	57023210	
	carpets of wool/fine animal hair	57024110	
	other incl. druggets	57024290	
	100% polyamide tufted velour, cut pile/ loop-pile carpet mats with jute, rubber latex or polyurethane foam baking	57032020	

HS code family	HS code description	Applicable HS codes	2012-13
	Other mats and matting	57032090	
	carpets, carpeting and rugs	57033010	
	100% polypropylene carpet mats with jute, rubber, latex Or PU foam baking	57033020	
	other textile floor coverings of other man-made textile material	57033090	
	other textile floor coverings, w/n made up	57050090	
	Others	floor coverings and mats	
	others	42050090	
	wallpaper and similar wall coverings consisting of paper coated/covered on face side with a grained embossed coloured etc/decorated layer or plastic	48142000	
Exports			
3918, 3920, 3921, 3925 & 3926	wall /ceiling cover comb with knitted/ woven fabrics, nonwovens/felts of PVC	39181010	Rs. 27 Crore*
	other polymers of vinyl chloride	39181090	
	wall /ceiling cover comb with knitted/ woven fabrics, nonwovens/felts of other plastics	39189020	
	floor covering of other plastics	39189090	
	plates sheets films foil and strip of poly (vinyl acetate)	39209919	
	others plate/ sheets etc. of other plastic n.e.s	39209999	
	other plates, sheets, film foil, strip etc, of polymer of vinyl chloride : other	39219029	
	other builder ware of plastics of poly-urethane	39259010	
	other builders ware of plastics	39259090	
	other decorative sheets	39264059	
	other article of plastic	39269099	
5701, 5702, 5703 & 5705 Others	carpets and other textile floor coverings of wool or fine animal hair, knotted	57011000	
	carpets and floor coverings knotted other than cotton	57019090	
	carpets	57023110	
	carpets, carpeting and rugs	57023210	
	carpets of wool/fine animal hair	57024110	

HS code family	HS code description	Applicable HS codes	2012-13
	other incl. druggets	57024290	
	100% polyamide tufted velour, cut pile/ loop-pile carpet mats with jute, rubber latex or polyurethane foam baking	57032020	
	Other mats and matting	57032090	
	carpets, carpeting and rugs	57033010	
	100% polypropylene carpet mats with jute, rubber, latex Or PU foam baking	57033020	
	other textile floor coverings of other man-made textile material	57033090	
	other textile floor coverings, w/n made up	57050090	
Others	floor coverings and mats	40169100	
3918, 3920, 3921, 3925 & 3926	others	42050090	
	wallpaper and similar wall coverings consisting of paper coated/covered on face side with a grained embossed coloured etc/decorated layer or plastic	48142000	

*source: DGFT, iMaCS Analysis DGCIS

*Includes both wall coverings and floor coverings

The major countries which are supplying floor and wall coverings to India are South Korea, Netherlands, Germany, China and Italy

The top countries to which India has been exporting wall coverings are Djibouti, United States of America (USA) and South Korea

Acoustic Fabrics

Acoustic fabrics are polyester based needle punched non woven fabrics used for covering walls and ceilings in multiplexes, auditoriums, music studios, stadiums, etc. These fabrics help in dissipating the kinetic energy of the sound in the form of heat, when the sound passes through the fabric, thereby reducing the noise and sound.

Product Characteristics

Acoustic fabrics are needle punched or thermo bonded nonwoven fabrics mostly made of polyester. Due to its porous nature non woven fabrics act as goods acoustic fabrics. The key parameters defining their sound absorption capacity are:

Fibre parameters: It involves various characteristics of the fibre that makes it a good absorbent

- Fibre type: Different fibres absorb sound differently. Polyester has the highest sound absorbing capacity

followed by cotton, polypropylene and viscose in that order.

- Fibre size: The finer fibres having a denier from 1.5 to 6 denier per filament have a higher sound absorption capacity than coarser ones
- Cross section and surface area: The higher the surface area and cross sectional area, more would be the friction for sound waves. Hence, fibres with larger cross sectional surface areas are better at absorbing sound waves.
- Porosity of fibres is another major parameter, which significantly impacts sound reduction. The more porous the fibre is, higher would be the sound reduction.

Fabric parameters: The key fabric properties that help as acoustic fabrics are:

- Air flow resistance: The higher the follow resistance of the non woven fabric, the greater would be the friction between the sound wave and the fabric leading to increased dissipation of energy as friction. Hence, higher resistance helps the non woven in becoming better acoustic fabric
- Porosity and tortousity: The number, size and type of pours significantly impact the sound reduction capacity of the fabric. Similarly, the impact of internal structure of the fabric on the sound absorption capacity is measured by tortousity. High frequency sound is more easily absorbed by fabrics with high tortousity.
- Thickness: Thickness is a major factor in absorbing low frequency sounds. A fabric acts as the best attenuator, when the thickness of material is close to $1/10^{\text{th}}$ of the sound wavelength.

Similarly, the orientation of the web for non woven, density and coatings also impact sound absorption capacity of the acoustic textiles. For best results the non woven fabric should be placed as vertical lapped layers.

Key Applications

Non woven acoustic fabrics have recently become popular as acoustic fabrics against the traditional glass wool insulators. These are increasingly being used in multiplexes, auditoriums and music studios. However, given the vast scale at which multiplexes are coming, currently the multiplex industry is the major driver for the industry

Market Size and Trade Trends

Majority of acoustic fabrics are being used in multiplexes. With the vast scope in growth of the multiplex industry and rapid launch of new screens by

all the major players in the industry, the demand for acoustic fabrics is expected to grow rapidly. Currently there are 1600 multiplex screens in India and around 350 screens are estimated to be added in 2013. PVR along with Cineplex are leading the growth with close to 80 to 100 new screens planned every year, followed by Big cinemas and INOX which are adding around 50 screens every year. Since the life of the non woven acoustic fabric is close to 10 years, the replacement market has not yet spurred in India.

Market Size Estimate

The market of acoustic fabrics has been calculated using demand side estimation driven through the average requirement of a multiplex. On an average 1.5 MT of acoustic fabric is used for covering 20,000 sq ft of space. The total estimated market for acoustic fabrics in India is 284 MT worth Rs. 11 crore.

Exhibit 241: Domestic Market size estimate

	2012-13
Quantity (in MT)	284
Value (in Rs. Crore)	11

**source: IMACS analysis, industry sources*

Key growth drivers and Inhibitors

The growing life style and demand for entertainment avenues particularly the growth of multiplexes and auditoriums are the critical drivers for the acoustic fabric market in India. With multiplexes growing at 20%, the market for acoustic fabrics is also expected to grow at 15% per year for the next three years.

Key Manufacturers

Acoustic fabric manufacturers in India are mostly the non woven manufacturers who employ needle punch or chemo bonded technology. Ginni Spectra is a major manufacturer of thermal and chemical bonded acoustic non woven fabric. There are also many small non woven manufacturers who would be supplying to this industry.

Import Export Scenario

There is very little foreign trade of acoustic fabrics in India with both imports and exports of less than Rs. 1 crore, as most of the product can be developed locally as non woven fabric.

Quality Standards

There are no available quality standards for acoustic fabrics

18. Clothtech

The technical components of garments, made out of fabric or yarn, which are there to cater to specific functional needs of the garment are termed as cloth Technical Textiles or Clothtech. These include components like zippers, interlinings, industrial sewing threads, laces, elastics and Velcro among others.

List of Products

The major products under Clothtech are as follows:

1. Treated/ coated Laces and tapes
2. Interlinings
3. Zip fasteners
4. Elastic Narrow fabric.
5. Hook and Loop fastener
6. labels and badges
7. Umbrella cloth
8. Industrial Sewing threads



Laces & tapes



Interlinings



Labels and badges



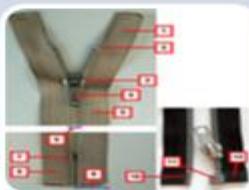
Industrial sewing threads



Velcro & loop fasteners



Umbrella cloth



Zip fasteners



Elastic narrow fabrics

Market Size and Trends

The total estimated market size of Clothtech is around Rs. 4,835 Crore in 2012-13 with domestic market valued at Rs. 4,649 Crore constituting 96% of the total market. Domestic production caters to 89% of the market with imports catering to the other 11%. The product wise market size has been shown in Exhibit 242. The market has grown at 7% during the last five years and is expected to reach a total of Rs. 6,591 crore by 2015-16, growing at 11% p.a. and further to Rs. 8,133 crore by 2017-18

Exhibit 242: Market summary of Clothtech

Clothtech	Unit	2012-13 (All values Rs. Crore)					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Treated/coated Treated/ coated Laces and tapes	Value (Rs. Crore)	478	59	10	527	537	11	590	14	740
	Volume (MT)	4093	506	86	4513	4599	96	5055	120	6341
Interlining	Value (Rs.	485	171	9	647	656	10	692	11	792

Clothtech	Unit	2012-13 (All values Rs. Crore)					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
	Crore)									
	Volume (Mn. Sq. m)	185	65	3	246	250	4	264	4	302
Zip fastener tape (T T Component)	Value (Rs. Crore)	183	3	20	166	186	22	179	28	209
	Volume (Mn. metres)	813	13	89	738	826	100	797	125	929
Elastic narrow tape	Value (Rs. Crore)	829	91	90	830	920	90	955	90	1,263
	Volume (Mn. metres)	2,256	248	245	2,259	2,503	245	2,597	245	3,435
Hook and loop fastener	Value (Rs. Crore)	137	43	1	179	180	1	206	1	272
	Volume (Mn. metres)	264	83	2	345	347	2	396	2	524
Labels and Badges	Value (Rs. Crore)	1,578	94	36	1,636	1,672	40	1,800	48	2,178
	Volume (Mn. pieces)	19,526	1,163	445	20,244	20,690	490	22,269	593	26,945
Umbrella Market	Rs. Crore				1,030			1,030	-	1,030
Umbrella cloth (T T Component)	Value (Rs. Crore)	30	76	3	103	106	3	113	3	137
	Volume (Mn. Sq. m)	3	9	0	12	12	0	13	0	15
Specialised and Industrial Sewing thread	Value (Rs. Crore)	548	30	17	562	578	17	629	17	789
	Volume ('000 MT)	22	1	1	22	23	1	25	1	32
Total	Rs. Crore	4,268	567	186	4,649	4,835	193	5,163	211	6,379

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

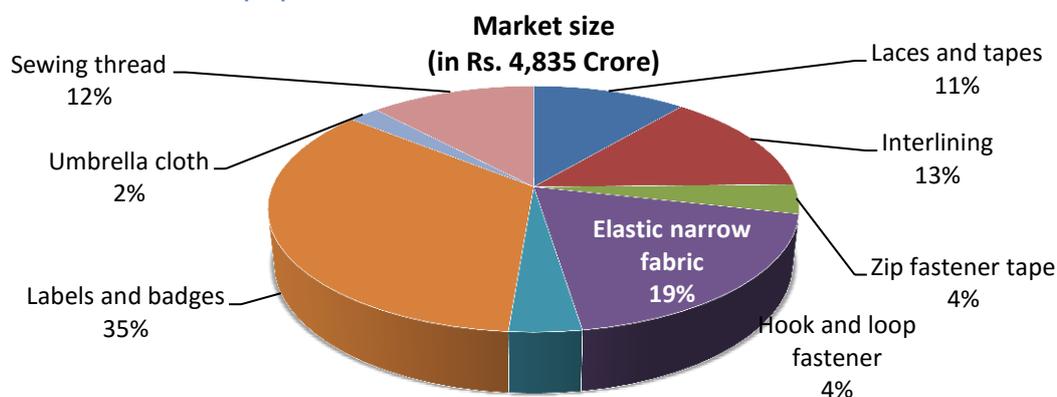
*Source iMaCS analysis

Market size has been calculated as Domestic market + exports

Market sizes of umbrella market and sewing threads are only indicative and have not been considered in total

The market is well distributed across segments, with labels and elastic narrow fabrics having the maximum share of 34% and 18% of entire Clothtech segment. Product segment wise market share has been shown in Exhibit 243.

Exhibit 243: Market size pie product wise - Clothtech



Source: iMaCS analysis

Players & Profitability

The key players of the segment are as follows:

- Ruby Mills
- Bombay Dyeing
- Shri Lakshmi Cotsyn
- YKK India Ltd.
- Sky Industries
- Siddhartha Filaments
- Spica Elastics Pvt. Ltd.
-
- K Nonwovens
- Freudenberg Nonwovens India Ltd.
- S L Benthic Industries
- Mills
- Precot Meridian
- Madura Coats

The profitability of these players is as shown:

Exhibit 244: Profitability of key Clothtech players

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Ruby Mills	50145	48314	15%	29%
Bombay Dyeing	225958	230468	3.2%	2.6%
Shri Lakshmi Cotsyn	215703	232291	-21%	5%
Avery Dennison India Ltd.	-31337	-24974	-1%	-
YKK India	-	17492	-	4%
Sky Industries	1948	2204	-1%	-6%
Spica Industries Ltd.	-	3667	-	10%
Siddhartha Filaments	-	143	-	0%
Yardman Yarn & Threads Ltd.	-	40214	-	9%
Precot Meridian Ltd.	37654	25451	3%	-9%
Madura Coats Pvt. Ltd.	56325	48134	5%	4%

Source: Annual reports, Capitaline, vccedge

High Potential Products

Clothtech is a matured segment of Indian Technical Textile industry growing at a set rate in line with the clothing and textile industry of India. It is also one of the oldest Technical Textile segments of India. While most of the products have already been through their early growth, the rising demand for clothing and new fashion has been driving the industry which is expected

to grow at 7% per annum during the next three years. The high potential product for the segment is:

- **Treated/ Coated Laces and tapes:** Indian laces and tapes market is entirely driven by the consumption in footwear. With the domestic footwear industry growing at 12.5 % and the branded footwear sales expected to grow at 20%, the product sees a decent potential for growth in the coming future. The market for laces and tapes is expected to grow at 12% per annum.

The detailed analysis of each product has been done in the subsequent sections.

Treated/ Coated Laces and tapes

Treated / coated Laces and tapes, hereon referred as laces and tapes are small trimmed narrow fabrics used in the clothing sector. These include – shoe laces, tapes and laces used in apparels in particular ladies dresses.

Shoe laces are the largest component of it accounting for close to 95% of the demand for laces and tapes.

Shoe lace is a band that pulls the shoe together to hold it to the foot. A shoelace consists of two components: a tape that pulls the shoe tightly together, and an aglet, the hardened taped end that fits through the

eyelets on a shoe or boot. Shoe laces are also known as shoestrings or boot laces. Shoe Laces also find application in garments (kids wear), shopping bags, office stationary, home decoration etc. However the consumption in these applications is negligible as compared to that in the footwear industry.

Product Characteristics

Shoe laces are primarily made of Polyester, Cotton and Nylon. Polyester shoe laces dominate the market because of higher durability and better anti-slip properties. Cotton shoe laces are waxed to improve their performance and appearance.

Shoe laces are manufactured in variety of colours, shapes and sizes. Shoe laces are available in colours such as white, black, brown, blue, green, red, orange, yellow, etc. as well as colour combinations and patterns based on customer requirements. The product can be flat, round or oval in shape. Round laces are generally used for leather/formal shoes where as flat laces find majority of its application in sport/casual shoes.

Type of lace	Average Width / Diameter
Flat	8-10 mm
Round	3-5 mm

Source: Industry survey

Shoe laces are manufactured in standard sizes of 24", 30", 36", 48" etc. as well as custom made as per the required length which depends on the application. The 24" and 30" sizes constitute 80% of the market.

Market Dynamics and Key Growth Drivers

Shoe laces are a commodity product. The simple technology level and minimal functionality of the product make it difficult for manufacturers to differentiate their products. Since the product contributes a small share to the total cost of footwear, most footwear manufacturers allow their manufacturing units to source shoe laces locally rather than doing centralised purchase. Thus, cost competitiveness and ability to provide variety of shades are the critical factors for success.

With India being the second largest manufacturer of foot-wears in the world producing 2,065 million pairs in 2012-13, foot-wears are the biggest driver for shoe lace market in India. Export of footwear from India is estimated to be of 115 million pairs.

The Indian footwear retail market is anticipated to surge at a CAGR of 12% during the next three to five years on driven by demand from Mass footwear and economy footwear which are expected to grow at over 30%. With growing preference for casual foot-wears

without laces, the demand for covered foot-wears having laces is estimated to be 650 million pairs.

Market Size Estimate

Market size of laces and tapes is mainly constituted by the demand for shoe laces. The market for shoe laces is estimated through the demand for closed foot-wears in India. The total domestic market of laces and tapes is estimated to be of 4,513 MT worth Rs. 527 Crore with exports market of about Rs. 10 Crore.

Exhibit 245: Total Market size estimate for treated/ coated laces & tapes

	2012-13
Quantity (in MT)	4599
Value (in Rs. Crore)	537

*source: IMaCS analysis, industry sources

The market has grown considerably over the last five years at 25% per annum driven by the growing demand for shoe laces by the footwear industry which is growing leaps and bounds.

Key Growth Drivers and Inhibitors

The market for shoe laces is entirely driven by the footwear industry of India, which is growing at 12% per annum. The demand for shoe laces is expected to grow in line with the closed footwear industry. The replacement market of shoe laces although is declining with quicker replacement of shoes. The market for shoe laces is expected to grow at 12% per annum during the next three years.

Key Manufacturers

The shoe lace manufacturers are predominantly SSI units and are located in the footwear manufacturing clusters of Agra, Chennai, Vellore, Kanpur, Kolkata etc. Some of the manufacturers of shoe laces are:-

- Neelam shoe lace industry (Delhi),
- Indian Shoe lace (Agra). Indian shoe Lace Company has a capacity of manufacturing 25,000 shoe lace pairs per day.

Import Export Scenario

The estimated export and import of laces and tapes has grown over the period. While imports have shown a growth of 31% exports have grown by 21% in the last five years.

Exhibit 246: Import export trends – treated/ coated laces & tapes

HS code family	HS code description	HS codes	2012-13
Imports			
5806	other narrow woven fabrics containing by wt 5% or more of	58062000	Rs. 59

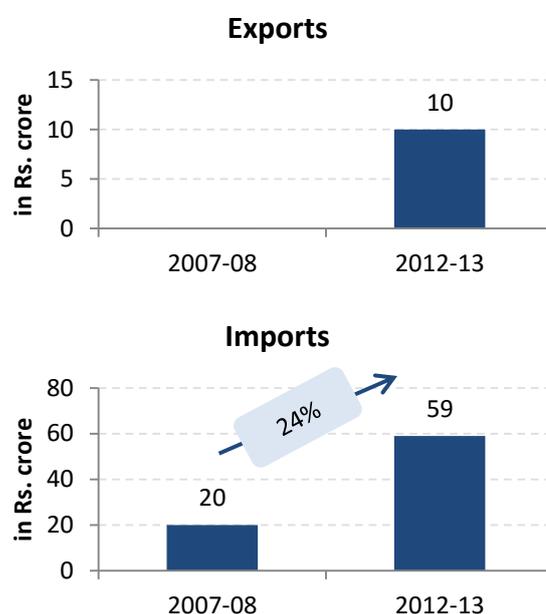
HS code family	HS code description	HS codes	2012-13
	elastomeric yarn/rubber thread		Cror e
	narrow woven fabrics, other than labels & badges; narrow fabrics consisting of warp without weft assembled by means of an adhesive - of cotton - newar cotton	58063 120	
	goat hair puttis tape	58063 910	
	narrow fabrics consisting of warp without weft assembled by means of an adhesive (bolducs) - of other textile material - others	58063 990	
5808	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - braids, in pieces other than of cotton	58081 090	
	Ornamental tapes of cotton	58089 010	
	Ribbons of rayon with ornamental edges	58089 040	
	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - OTHERS	58089 090	
Exports			
5806	other narrow woven fabrics containing by wt 5% or more of elastomeric yarn/rubber thread	58062 000	Rs. 10 Cror e
	narrow woven fabrics, other than labels & badges; narrow fabrics consisting of warp without weft assembled by means of an adhesive - of cotton - newar cotton	58063 120	
	goat hair puttis tape	58063 910	
	narrow fabrics consisting of warp without weft assembled by means of an adhesive (bolducs) - of other textile material - others	58063 990	
5808	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - braids, in pieces other than of cotton	58081 090	

HS code family	HS code description	HS codes	2012-13
		58089	
	Ornamental tapes of cotton	010	
	Ribbons of rayon with ornamental edges	58089 040	
	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - OTHERS	58089 090	

*source: IMaCS analysis, DGCIS

The export import trend for laces and tapes is as shown in the following exhibit:

Exhibit 247: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The top five countries from where laces and tapes are imported into India are Hong Kong, China, Indonesia, Germany, and Taiwan. Amongst these, Hong Kong and China account for majority of imports.

On the export side the major countries to which laces and tapes are exported are USA, Bangladesh, Indonesia, UAE and Saudi Arabia, These five countries account for over 60% of total Indian exports.

Machinery Details

The machinery used for making of shoe laces includes Braining Machine, Tipping machine, Waxing machine

Quality Standards

While there are no quality standards for making of laces and tapes, BIS does specify standard for show laces under IS 6590:1972. However, manufacturers test shoe laces at FDDI.

Interlinings

Interlining is a fabric used between the inner and outer layer of the garment to improve shape retention, strength or bulk. Different types of interlinings have been discussed further:

Product Characteristics

The interlinings are of two types based on how they are placed in the fabric -

- **Fusible interlining** – The interlining which is fused between the fabric by application of heat and pressure are called as fusible interlinings. It is generally a base fabric with coating of LDPE or HDPE. These are commonly seen in readymade garments due to the following reasons:
 - It can be produced at a consistent quality through a production process
 - It allows better crease retention
- **Non fusible interlining** – this type of interlining is either woven between the fabrics or stitched without application of any heat or pressure.

Interlinings can also be classified based on the construct of it as woven and non-woven. Interlining may be woven, knitted or non-woven made out of Cotton, Polyester, Polyester/Cotton or Polyester/Viscose blend. Nonwoven interlining is available in weight ranging from 18 gsm to 70 gsm whereas woven interlining is available in weight ranging from 120 gsm to 250 gsm. Both woven and non woven interlinings are available in fusible as well as non-fusible varieties.

Applications

Interlining finds application in the cuffs, collars and plackets of shirts and in the lapels, fronts, collars and pockets of tailored jackets and blazers, in the waistbands, flaps, pockets and belt loops of men's trousers. Another big market for interlining is the ladies brassieres. Invisible from the outside, interlinings ensures accurate fit and optimum wearer comfort and thus, form an important part of the garment. The kind and type of interlining used depends on the costing of the garment. In addition, interlinings can also be found in shoes and furnishings to provide shape, however garment sector is the largest market for interlining.

Market Size and Trade Trends

The demand for interlining is governed by the demand for garments. Readymade and tailor made shirts account for 80% of consumption of interlining, the balance 20% of interlining being consumed in other garments i.e. trousers, jackets, ladies dresses, suits.

The men's readymade shirt market in India was 537¹² million pieces in 2012-13 with the shirting market of another 2007 million metres, which corresponds to roughly 916² million pieces. Considering the average requirement of interlining per shirt to be 0.15 sq. metres, the total demand for interlining for shirts is estimated to be 197 million sq. metres. This is expected to account for 80% of total interlining market; hence the domestic interlining market is expected to be 246 million sq. metres valued at Rs. 647 Crore.

Market Size Estimate

The market size of interlinings in India for 2012-13 inclusive of exports is estimated to be Rs. 656 Crore equivalent to 250 million sq. m

Exhibit 248: Market size estimate - interlinings

	2012-13
Quantity (in million sq. m)	250
Value (in Rs. Crore)	656

*source: IMAcS analysis, industry sources

The market of interlining fabric has grown at 6% per annum during the last five years driven by the increasing use in shirting fabrics. While the consumption of shirts in India has grown by only 3% per annum, usage of more interlining to provide better value addition has led to higher growth of interlining market.

Key Growth Drivers and Inhibitors

The major growth drivers for the interlining industry in India in the coming future:

- **Apparel Industry** – Apparel industry in particular the Men's shirt segment accounts for 80% of use of interlining. It is a fast growing segment and is expected to grow at 4% to 5% in the coming years. With usage close to 15 to 20 cm per shirt, the interlining industry is expected to grow in line with it. In addition, the growing export of RMG and apparels from India which is expected to grow at 8% to 10% would further act as a growth driver.
- **Women's undergarment** – Interlining are also used in making of brassieres for women, which is also a major driver for interlinings. It has a market size of 60 million pieces and is expected to grow at 15% annually. The high growth rate is going to be a major driver for the industry.

Impediments

- **Price sensitivity in the garment industry** – Indian garment industry is highly price competitive with a

¹² It is extrapolated from annual market data for 2010 taken from National Household survey 2011 – Market for textiles and clothing

majority of readymade garments being sold at lower price points. On an average 65% of the total shirt market is of low price shirts which either do not use interlining or use a cheap interlining. Many of these garments do not use adequate amount and quality of interlining required, thus curbing the market size.

The domestic market for interlinings is expected to grow at 7% per annum during the coming three years, while exports are expected to grow at 6% during the same period.

Key Manufacturers

The interlining market in India is organised one with few key players. The major players of woven interlinings in India are:

- Ruby Mills
- Bombay Dyeing
- Shri Lakshmi Cotsyn
- Talreja Textiles and
- Ashima Syntex

In addition to these the major players producing non-woven interlinings are:

- Supreme Non woven
- Freudenberg Non woven
- K K Non woven

Import Export Scenario

The imports of interlining have grown by 19% per annum during the last five years and stood at Rs. 171 Crore. This growth in imports can be attributed to the low cost cheaper imports from China and the slow capacity addition into Indian manufacturing during the last five years. While domestic demand for interlining grew at 6%, Indian manufacturing of interlining grew at only 3%.

Export of interlining from India has been stagnant over the last five years growing by a mere 1%. The following exhibit shows different HS codes and the total import export statistics for interlinings.

Exhibit 249: Import export trends - interlinings

HS code	HS code description	HS codes	2012-13
Imports			
5407	Other woven fabrics, containing 85% or more by weight of filaments of nylon or other polyamides: dyed: nylon taffeta	5407 4230	Rs. 171 Crore
	Other woven fabrics, containing 85% or more by weight of filaments of nylon or other polyamides: printed: nylon taffeta	5407 4430	
	Woven fabrics containing 85%	5407	

HS code	HS code description	HS codes	2012-13
	or more by weight of other than non-textured polyester filaments	6900	
	other woven fabrics, containing less than 85 % by weight of synthetic - others	5407 8290	
5408	Woven fabrics containing more than 85% or more by weight of artificial filament or strip or the like: dyed woven fabrics of rayon: rayon taffeta	5408 2215	
	Printed - other woven fabrics, containing 85 % or more by weight of artificial filament or strip or the like --rayon taffeta , printed	5408 2415	
	Dyed woven fabrics of artificial filament yarn, including woven fabrics obtained from materials of 67 decitex or more - rayon taffeta ,dyed	5408 3213	
	Printed woven fabrics of artificial filament yarn, including woven fabrics obtained from materials of 67 decitex or more -rayon taffeta	5408 3415	
	Other woven fabrics, dyed containing polyester >= 85% by weight	5512 1910	
5512 & 5513	Woven fabrics of other polyester staple fibres -dyed	5513 2300	
	Man-made filaments or non woven weighing <25 g/sqm	5603 1100	
5603	man-made filament weighing>25g /sqm	5603 1200	
	man-made filament weighing between 70g/sqm and 150g/sqm	5603 1300	
	man-made filament weighing >150g/sqm	5603 1400	
	nonwovens, whether or not impregnated, coated, covered or laminated weighing not more than 25 g/sqm - 'other filament weighing	5603 9100	
	nonwovens, whether or not impregnated, coated, covered or laminated weighing between 25 g/sqm to 70 g/sqm - other filament weighing between 25g/sqm and 70g/sqm	5603 9200	

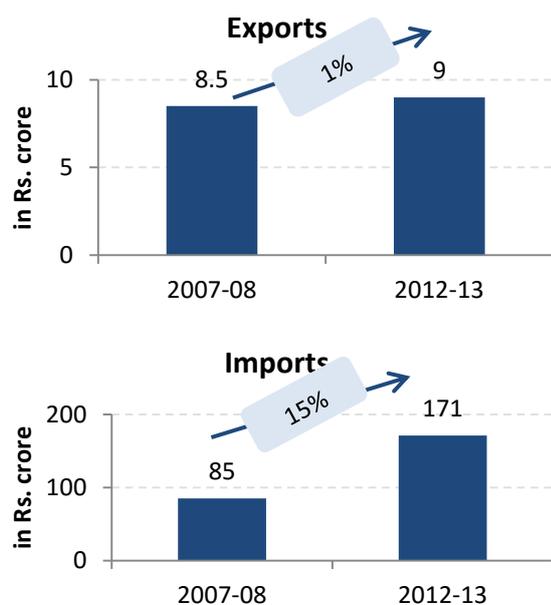
HS code	HS code description	HS codes	2012-13	HS code	HS code description	HS codes	2012-13
	nonwovens, whether or not impregnated, coated, covered or laminated weighing between 70 g/sqm to 150 g/sqm - other filament weighing between 70g/sqm and 150g/sqm	5603 9300			strip or the like --rayon taffeta , printed		
	'nonwovens, whether or not impregnated, coated, covered or laminated weighing more than 150g/sqm - other filament weighing >150g/sqm	5603 9400			Dyed woven fabrics of artificial filament yarn, including woven fabrics obtained from materials of 67 decitex or more - rayon taffeta ,dyed	5408 3213	
5903	Other fabric impregnated, laminated plated and coated with PVC	5903 1090			Printed woven fabrics of artificial filament yarn, including woven fabrics obtained from materials of 67 decitex or more -rayon taffeta	5408 3415	
	cotton fabrics, impregnated, coated etc with other plastics	5903 9010		5512 & 5513	Other woven fabrics, dyed containing polyester >= 85% by weight	5512 1910	
	other fabric plated laminated coated impregnated with other plastics	5903 9090			Woven fabrics of other polyester staple fibres -dyed	5513 2300	
6217	other made up clothing accessories; parts of garments or of clothing accessories - others and trimmings of other textile fibres	6217 9090		5603	Man-made filaments or non woven weighing <25 g/sqm	5603 1100	
Exports					man-made filament weighing>25g /sqm	5603 1200	
5407	Other woven fabrics, containing 85% or more by weight of filaments of nylon or other polyamides: dyed: nylon taffeta	5407 4230			man-made filament weighing between 70g/sqm and 150g/sqm	5603 1300	
	Other woven fabrics, containing 85% or more by weight of filaments of nylon or other polyamides: printed: nylon taffeta	5407 4430			man-made filament weighing >150g/sqm	5603 1400	
	Woven fabrics containing 85% or more by weight of other than non-textured polyester filaments	5407 6900	Rs. 9 Crore		nonwovens, whether or not impregnated, coated, covered or laminated weighing not more than 25 g/sqm - 'other filament weighing	5603 9100	
	other woven fabrics, containing less than 85 % by weight of synthetic - others	5407 8290			nonwovens, whether or not impregnated, coated, covered or laminated weighing between 25 g/sqm to 70 g/sqm - other filament weighing between 25g/sqm and 70g/sqm	5603 9200	
5408	Woven fabrics containing more than 85% or more by weight of artificial filament or strip or the like: dyed woven fabrics of rayon: rayon taffeta	5408 2215			nonwovens, whether or not impregnated, coated, covered or laminated weighing between 70 g/sqm to 150 g/sqm - other filament weighing between 70g/sqm and 150g/sqm	5603 9300	
	Printed - other woven fabrics, containing 85 % or more by weight of artificial filament or	5408 2415			'nonwovens, whether or not impregnated, coated, covered or laminated weighing more than 150g/sqm - other filament weighing >150g/sqm	5603 9400	

HS code	HS code description	HS codes	2012-13
5903	Other fabric impregnated, laminated plated and coated with PVC	5903 1090	
	cotton fabrics, impregnated, coated etc with other plastics	5903 9010	
	other fabric plated laminated coated impregnated with other plastics	5903 9090	
6217	other made up clothing accessories; parts of garments or of clothing accessories - others and trimmings of other textile fibres	6217 9090	

*source: IMaCS analysis, DGCI

The export import trend for interlinings is as shown in the following exhibit:

Exhibit 250: Import export trend



Source: IMaCS analysis, DGFT, DGCI

The top five countries exporting woven interlinings to India are:

For woven Interlinings China, Hong Kong, Republic of Korea, Germany, Singapore

And for non woven interlining the top exporting countries are China, Hong Kong, Taiwan, Republic of Korea, Germany. For both woven as well as non woven China has the lion's share in imports accounting for over 70% of total interlining imports into India.

On the export side the major countries to which woven interlinings are exported to are Bangladesh, Vietnam, Indonesia, Saudi Arabia, and UAE. These five countries account for over 80% of total Indian exports. Non

woven interlining exports from India is insignificant at just 3% of total interlining exports

Machinery Details

Key machinery for making of non-woven interlinings are supplied by A.T.E. Pvt. Ltd, Dhall Enterprise and Engineers Ltd., Hi- tech Engineers

Quality Standards

There are no set quality parameters for interlinings

Zip Fasteners

Zip fasteners are is a fastening device temporarily joining the two edges of fabric. The idea of a fabric fastener was first introduced in 1893 by Whitcomb L Judson, who suggested them as shoe fasteners. However the first type of zip fasteners was introduced only in 1914, when Gideon Sundback came out with the first version of modern zip which he called as the hook-less hooker. It got its name as the zipper in 1922.

Product Characteristics

The zipper has following main components:

- The slider – it slides over the teeth stringer and acts as fastener.
- The teeth stringers – these are attached to the zip fastening tape and act as the element which is fastened by the slider.
- The zip fastening tape - It is the Technical Textile part of the zipper. It is a narrow strip of about 12 mm to 15 mm attaching the zipper to the fabric.

The zip fastener tape is generally made of polyester or cotton mixed with polyester due to its longer life and higher strength. The raw material mostly polyester, is easily available in India with Reliance catering to a major chunk of it. Due to high domestic production, there is negligible import of polyester for zipper making. The zip fastener tape can constitute anything between 1% to 10% of the zipper's value depending on the type of slider and puller used. On an average it is higher for polyester zippers and lower for metallic zippers.

Applications

The usage norm for zip fastener tapes for different types of zippers is:

Exhibit 251: Product characteristics

S. No.	Type of zipper	Avg width of fastener tape	Avg length of fastener tape
1.	Open ended zippers	15 mm	20 to 22 mm

S. No.	Type of zipper	Avg width of fastener tape	Avg length of fastener tape
2.	Close ended zipper	12 mm to 15 mm	7 mm

The major application areas of zippers have been enlisted in the following exhibit:

Exhibit 252: Major application of Zippers

S. No.	Type of zipper	Applications
1.	L type coil	Trousers, Skirts
2.	Spiral coil	Trousers, Skirts, Jackets, Shoes, Luggage, bags
3.	Invisible zippers	Ladies dresses, Leather shoes, skirts
4.	Plastic zippers	Track suits, T shirts, Men's shirts, Jackets
5.	Metallic zippers	Denim , Cotton trousers, Jackets, Industrial wears, Tents, Shoes

Market Size and Trade Trends

The market size of zip fastening tape is completely dependent and directly proportional to the usage of zippers. Apparel and home textiles account for 70% of the zip usage. In apparels, trousers, jeans, cushion covers and ladies frocks account for close to 80% of the use of zippers in textiles. In addition to this the usage of zippers is also prominent in soft luggage industry, leather goods like boots and purses. The market size for zip fastening tape has been estimated based on the current market for apparels.

Market Size Estimate

Based on the consumption of different apparels and home textiles in India as per National Household survey for Market of textiles and clothing, and the consumption norms as per industry discussions, the domestic market for zip fastening tape is estimated to be Rs. 166 Crore equivalent to 778 million metres with exports worth Rs. 20 crore. The total market size is shown in the following exhibit:

Exhibit 253: Market size estimate – zipper tape fabric

	2012-13
Quantity (in Million metres)	826
Value (in Rs. Crore)	186

**source: IMaCS analysis, industry sources*

The market of zip fastening tape has grown at over 10% per annum during the last five years driven by the growing market for jeans and trousers. While other apparels have grown in single digits, the trouser market of India has grown by a phenomenal 22% during the last five years, driving the demand for zip fastening tapes. While the market for apparels is a

matured market and is expected to grow by about 5% to 10% annually, the increasing demand in soft luggage, growing preference for leather boots and purses would help the market grow in the coming years.

Key Growth Drivers and Inhibitors

The major growth drivers for the zipper tape industry in India is the apparel industry

- **Apparel Industry** – Apparel industry which accounts for 80% of use of zippers and is expected to grow at 4% to 5% in the coming years. With usage close to 7 inches per garment, the Zipper fastening tape industry is expected to grow in line with it. In addition, the growing export of RMG and apparels from India which is expected to grow at 8% to 10% would further act as a growth driver. It also provides the seasonal nature to the zipper fastening tape industry with higher demands prior to the sale seasons
- **Leather goods industry – Jackets, Purses & Boots** - This is the fastest growing segment for zipper industry. With the increasing fashion appeal, this segment is bound to grow in double digits, and accounts for close to 10% of zip fastening tape usage.
- **Luggage and bags industry** – The second major driver is the luggage industry of India. Although most of the zippers used here are un-organised this might not be using a zip fastening tape and fabric but any other cheap fabric to bring down the cost. However, if this segment can be targeted for use of Technical Textile tape, it can be a goods future growth prospect.

Impediments

- **Use of normal fabric as fastening tape in un-organised industry** – In the un-organised zipper industry of India, which accounts for close to 80% of zipper production, cost is a major factor. Hence to compete, many players use the normal fabric instead of the Technical Textile zip fastening fabric in zippers. With little awareness about the zip fastening fabric and very small share of the fabric in over all zipper, most such replacement go un-questioned.

The domestic market for zip fasteners in India is expected to grow at 8% driven by the increasing requirement in apparel and soft luggage category. The export demand for zip fastener tapes is mainly driven by increasing exports of zippers, is expected to grow at 12%.

Key Manufacturers

There are only a few major players in the zipper industry of India with close to 80% of the domestic

zipper market being catered by the un-organised players as per industry estimates. In the organised segment YKK India Pvt. Ltd. is the largest player catering to close to 70% of the total organised market. Other major players being Madura Coats, Optics Zippers, Ideal Zippers and Tex Corp Pvt. Ltd. These organised players mainly play in the Ready to wear garment section and Jackets section of the apparel industry and with exports from India, 90% of which is from organised sector. On the other hand, the vast luggage, bags, furnishing and ready to stitch segment is catered mainly by the un-organised small players.

Import Export Scenario

The imports of zippers and zipper tapes have reduced in India over the last five years declining at 22%. The major credit goes to the increasing domestic production by players like YKK India Ltd. YKK India Ltd is also a major exporter of zippers from India. The total export of zipper tape is estimated to be around Rs. 20 Crore for 2012-13.

Exhibit 254: Import export trends

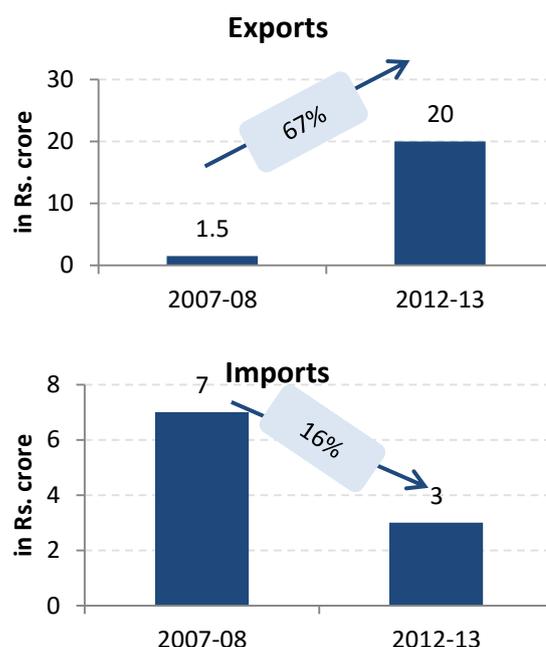
HS code family		Applicable HS codes	2012-13
Imports			
9607	Others	96071190	Rs. 3 Crore*
	Zip fasteners	96071910	
	Slide fasteners made of others - others	96071990	
	Parts of slide fasteners	96072000	
Exports			
9607	Others	96071190	Rs. 20 Crore*
	Zip fasteners	96071910	
	Slide fasteners made of others - others	96071990	
	Parts of slide fasteners	96072000	

Source: iMaCS analysis, DGCIIS

*Above figures have been arrived at by calculating zipper export and imports and taking at 15% share of the value as the value of zipper tape as per industry norm.

The export import trend for zipper fastener tape is as shown in the following exhibit:

Exhibit 255: Import export trend



Source: iMaCS analysis, DGFT, DGCIIS

The top five countries exporting zippers and zipper fastener tapes into India are China, Hong Kong, Turkey, Taiwan, and Japan. Out of these countries China/Hong Kong account for 86% of exports into India. The top countries to which we export zippers and zip fastening tapes are Bangladesh, Pakistan, Sri Lanka, Egypt, and Vietnam

Quality Standards

The main quality standards applicable for the zip fasteners in India are: IS 8894/3184/4829. Other international standards are JIS-S3015 and ASTM D2061-1998

Elastic Narrow Fabrics

Elastic narrow fabrics are used as an input to the garments to provide elasticity to the fabric wherever required. It is an important input to the undergarment industry and are commonly used in other garments i.e. shorts, jackets and skirts, moulded luggage, baby diapers, sports goods, medical goods, etc.

Product Characteristics

Elastic narrow fabrics are made from an elastomeric yarn and yarns made from cotton, polyester and nylon. More than 3000 different varieties of elastic fabrics are manufactured however, based on manufacturing technology they can be classified as woven and knitted. The fabric is expected to have the following properties

- Stretch-ability
- Shrink resistance

- Durability to regular wash
- Soft feel

Knitted elastic tapes are generally available in widths 8 mm, 12 mm, 20 mm and 25 mm. Woven elastic tapes range in widths 25 mm, 32 mm and 38 mm. These elastic tapes are primarily used for undergarments. The narrow fabric is made with or without logo along the length depending on customer's requirement.

Key application areas of elastic narrow fabrics

Elastic narrow fabric find usage in the vast hosiery market of India, particularly in the under wears produced. In addition, elastic narrow fabrics are also used in garmenting industry in particular, children and women wear and in baby diapers.

Market Size and Trade Trends

The market size of elastic narrow fabric is dependent on the hosiery industry in particular the undergarments section which accounts for close to 60% of the elastic narrow fabric market. In addition it is also used in the children and women wear. The average requirement of elastic narrow fabric in under wears is about 90 cm for women undergarments and about 2.5 m for men's undergarment. The total market for undergarments for men and women is estimated to be 1065 million pieces in 2012-13 as derived from the National Household survey on textile and clothing.

Market Size Estimate

The domestic market size of elastic narrow fabrics in India for 2012-13 is estimated to be of 2,259 million metres worth Rs. 830 Crore. Taking into account the export market of Rs. 90 Crore, the total market potential for 2012-13 is Rs. 920 Crore. The table below gives the market size estimates of elastic narrow fabric for 2012-13.

Exhibit 256: Market size estimate – elastic narrow fabric

	2012-13
Quantity (in Million metres)	2,503
Value (in Rs. Crore)	920

*source: IMaCS analysis, industry sources

The market of elastic narrow fabric has grown at over 10% during the last five years. The major part of this growth can be attributed to the domestic market which has grown by 18%, while the export market has been declining at 13% y-o-y. Domestic market has also seen volume growth of 21% indicating the growing demand of elastic fabric in Indian manufacturing sector.

Key Growth Drivers and Inhibitors

The major growth drivers for the elastic narrow fabric industry are:

- **Undergarment Industry** – It is the largest driver of interlining market accounting for nearly 60% of total consumption. In the undergarment industry the men's undergarment make up for 70% of the market growing at a good rate of 11%, while the women's undergarment is the rest 30% growing at a goods rate of 11%. Hence the undergarment industry is expected to grow at around 5% and would be the primary driver for elastic narrow fabrics.
- **Children's clothing – Baba suits** – The children clothing is another major sector using elastic narrow fabrics. It stood at 303 million pieces in 2010 and is expected to grow at a slow rate of 3%.

The domestic market of elastic narrow tapes is expected to grow at 15% during the next three years till 2015-16.

Key Manufacturers

The manufacturing capacity for elastic narrow fabric in India is highly fragmented, with only a very few large players. Spica Elastic Private Limited is the largest manufacturer of narrow elastic fabrics in India with installed capacity of 18 million metres of narrow fabrics per month. The company has vertically integrated production facilities and manufactures broad range of products including men's jacquard elastics for briefs and boxers, men's plain elastics for briefs and boxers, bra strap elastics and ladies panty elastics in 100% Cotton, Nylon and Polyester. In addition to Spica other key players in the organised sector, these are:

- Sky Industries
- B R Elastic
- Siddhartha Filaments
- Premco Global
- Tulip Elastic
- Agarwal elastic
- MP tapes
- JV tapes
- Clifton tapes
- Kumar Elastics
- Kohinoor elastics
- Balaji tapes

The above mentioned players account for 45% to 50% of elastic narrow fabric production in India.

Import Export Scenario

The imports of elastic narrow fabric have grown to Rs. 91 Crore in 2012-13 from Rs. 65 Crore in 2011-12. The rise in import was due to lower production by the industry leaders – Spica Industries. However, from 2007-08 to 2011-12, the imports have remained stagnant indicating that, the entire growth in market was catered by domestic players. During the last five years, the manufacturing of elastic narrow fabrics has also gone up by 12% y-o-y.

The market for exports has seen a decline of 13% during the last five years and is currently pegged at Rs. 90 Crore as compared to Rs. 155 Crore in 2007-08. The table below gives details of import and export HS codes used for international trade.

Exhibit 257: Import export trends

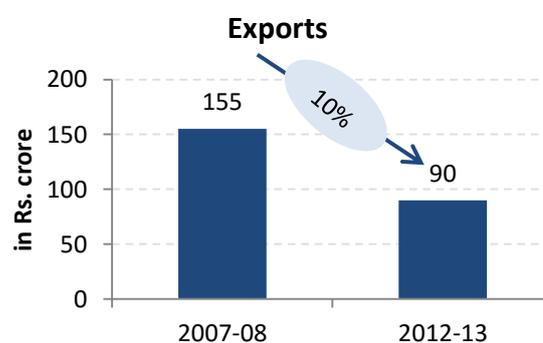
HS code family	HS code description	HS codes	2012-13
Imports			
5806 & 5808	narrow woven pile fabrics (includes terry twilling & similar terry fabrics)and chenille fabrics	5806 1000	Rs. 91 Crore
	looped pile fabrics of man-made fibres	6001 2200	
	knitted or crocheted fabrics containing elastomeric yarn>=5% by wt but not rubber thread	6002 4000	
	knitted or crocheted fabrics of a width not exceeding 30 cm, containing by weight 5 % or more of elastomeric yarn or rubber thread - other knitted or crocheted fabrics of width less than 30 cm	6002 9000	
	warp knitted fabrics of wool or fine animal hair	6005 9000	
	other narrow woven fabrics containing by wt 5% or more of elastomeric yarn/rubber thread	5806 2000	
6001 , 6002 & 6005	narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges - others	5806 3990	Rs. 90 Crore
	braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles of other materials - others	5808 9090	
	narrow woven pile fabrics (includes terry twilling & similar terry fabrics)and chenille fabrics	5806 1000	
	looped pile fabrics of man-made fibres	6001 2200	
	knitted or crocheted fabrics	6002	

HS code family	HS code description	HS codes	2012-13
	containing elastomeric yarn>=5% by wt but not rubber thread	4000	
	knitted or crocheted fabrics of a width not exceeding 30 cm, containing by weight 5 % or more of elastomeric yarn or rubber thread - other knitted or crocheted fabrics of width less than 30 cm	6002 9000	
6001 , 6002 & 6005	warp knitted fabrics of wool or fine animal hair	6005 9000	Rs. 90 Crore
	other narrow woven fabrics containing by wt 5% or more of elastomeric yarn/rubber thread	5806 2000	
	narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges - others	5806 3990	
	braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles of other materials - others	5808 9090	

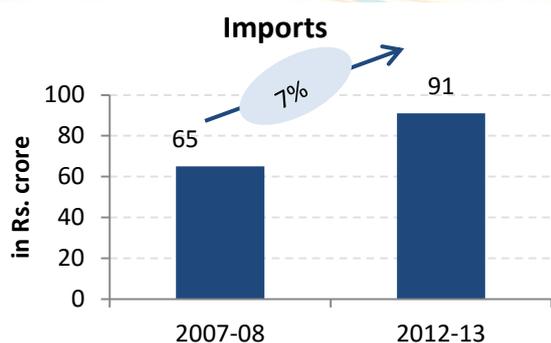
**source: IMaCS analysis, DGCIS*

The export import trend for elastic narrow fabric is as shown in the following exhibit:

Exhibit 258: Import export trend



Source: IMaCS analysis, DGFT, DGCIS



Source: iMaCS analysis, DGFT, DGCIS

The top five countries from where elastic narrow fabrics are imported into India are Hong Kong, Sri Lanka, China, France and Germany

Amongst these Hong Kong and Sri Lanka account for majority of imports, with China slowly catching up.

The major countries to which elastic narrow fabrics are exported are Vietnam, Sri Lanka, Bangladesh, Pakistan and Jordan. Amongst these, Vietnam and Bangladesh are the key importing countries of elastic narrow fabric from India accounting for over 70% of total Indian exports.

Machinery Details

The key machinery suppliers in India are:

Company	Machines supplied
Trikso India Machineries, Ahmedabad	High Speed Needle Looms Festooning machine Warping Machine Elastic finishing machine Measuring & spool winding machine
Susmatex Machinery Ltd., Ahmedabad	Electric Jacquard For Narrow Fabric Loom Needle Loom Warping Machine

Other key suppliers of machinery are A.T.E Pvt. Ltd., Bianca Textile Solutions (I) Pvt. Ltd., and Laxmi Automatic Loom Works, Himson Textile Engineering Industries Pvt. Ltd.

Quality Standards

In absence of any set parameter the manufacturer of the elastic narrow fabric usually follows the breaking strength and elongation specifications given by the customer.

Hook And Loop Fasteners

Velcro is a brand name of the fabric hook-and-loop fasteners however today it is used as a generic term for the product hook & loop tape fasteners. Hook and loop (H&L) fasteners consist of a combination of two

separate woven tapes, one called as hook tape and the other as loop tape. The tapes display excellent fastening properties when placed in contact with each other and thus offer hundreds of potential closure systems (fastening applications) for a wide range of applications.

Product Characteristics

H&L fasteners are generally made of Nylon and Polyester. The product is available in width ranging from 12 mm to 125 mm and length of 25 meters though it can be produced in any length depending upon the customer's requirement. The H&L fastener of 1 meter length and 25 mm of width, weighs 7.5 grams.

Applications and consumption norms

H&L fasteners are easy to use, safe and maintenance free. The effectiveness of the fastener is maintained even after repeated fastening and unfastening. Thus, the product has achieved good penetration in various application areas. H&L fasteners find application in industries such as:

- Leather garments/furnishings
- Surgical and orthopaedic apparatus
- Shoes and footwear manufacturing
- Luggage/bag manufacturers
- Toys
- Plastic goods
- Automobile upholstery and various other industry segments.

The consumption norm and requirement of hook and loop fastener in different applications has been shown in the following exhibit:

Exhibit 259: Consumption norms for H & L fasteners

Application	Consumption norm for H & L fastener
Shoes	5 to 15 cm
Defense clothing	50 to 75 cm
Automobile	50 to 100 cm
Saddlery	75 to 100 cm
Netting	Equivalent to the perimeter of the net
Bags	Varies from 5 to 50 depending on the product
Cushion cover	5 to 25 cm
Sleeping bag	50 cm to 2 meters
Robe	5 to 10 cm

*source: industry insights, secondary research

In addition to the above mentioned common applications hook and loop fastener was used to hold together a human heart during the first artificial heart surgery. It is also used in nuclear power plants and army tanks to hold flashlights to walls. Cars use it to bond headliners, floor mats and speaker covers. It is

used in the home when pleating draperies, holding carpets in place and attaching upholstery, among many other things. It closes backpacks, briefcases and Trapper Keepers, secures pockets and holds disposable diapers on babies. It is used in surfboard leashes and orthopaedic braces. H&L fasteners made of Teflon loops, polyester hooks, and glass backing is used on space shuttles.

Market Size and Trade Trends

H&L fasteners are used as fastening system in a variety of areas. Footwear industry is the major consumer of H&L fastener accounting for around 20-25% of the total consumption. In the footwear industry especially these fasteners are used in the kids and speciality sports category. Defence segment consumes H&L fasteners in clothing and other accessories and is the second largest application area with around 7-10% usage. Other important segments which consume around 10% of H&L fasteners are nettings, automobile and saddlery segment. Other applications include orthopaedic goods, sports goods, leather goods, abrasives, stationary, luggage etc. The price of H&L fasteners is indirectly related to the oil prices as the raw material (nylon/polyester) is a petroleum product. However the price variations are not proportionate and are experienced after a long time lag.

Market Size Estimate

The market for hook and loop fasteners has been estimated using the manufacturing of the major suppliers – Sky Industries and Siddhartha filaments who together account for close to 75% of organised market. The market size of hook and loop fasteners in India for 2012-13 inclusive of exports is estimated to be of 347 million metres valued at Rs. 180 Crore.

Exhibit 260: Market size estimate – Hook & loop fasteners

Description	2012-13
Quantity (in Million metres)	347
Value (in Rs. Crore)	180

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth driver for hook and loop fasteners has been the growing demand for Velcro based foot-wears and the soft luggage industry. The foot wear market is growing at 12% per annum which is expected to drive the growth in coming years. In addition to that, the soft luggage industry would be a major driver for the hook and loop fastener in the near future. Currently, soft luggage industry is estimated to be valued at Rs. 2600 Crore and is expected to grow at 16.5% per annum. The overall growth of hook and loop fasteners is

estimated to be around 15% y-o-y during the next three years till 2015-16.

Key Manufacturers

The manufacturing of hook and loop in India is mostly done by a few large players in the organised sector. Sky industries Pvt. Ltd. is the largest manufacturer of hook and loop fasteners in India commanding more than 50% share of total production. It has a production capacity of 103 million metres. Other key players are Siddhartha Filaments Pvt. Ltd. and Magic fasteners Pvt. Ltd.

Import Export Scenario

The import of hook and loop a fastener has grown at 30% y-o-y from 2007-08 to 2011-12 and was Rs. 20 Crore in 2011-12. However, due to lower production of Sky Industries, the leading H&L manufacturer in 2012-13, the import demand in 2012-13 grew to Rs. 43 Crore almost double of what it was in 2011-12. Growing exports indicate growing acceptability of Indian hook and loop in international markets. On the other hand the import demand for H&L fasteners has gradually gone down to Rs. 1 Crore from Rs. 5.5 Crore in 2007-08, indicating the increasing competitiveness of Indian manufacturing.

Exhibit 261: Import export trends – Hook & Loop fasteners

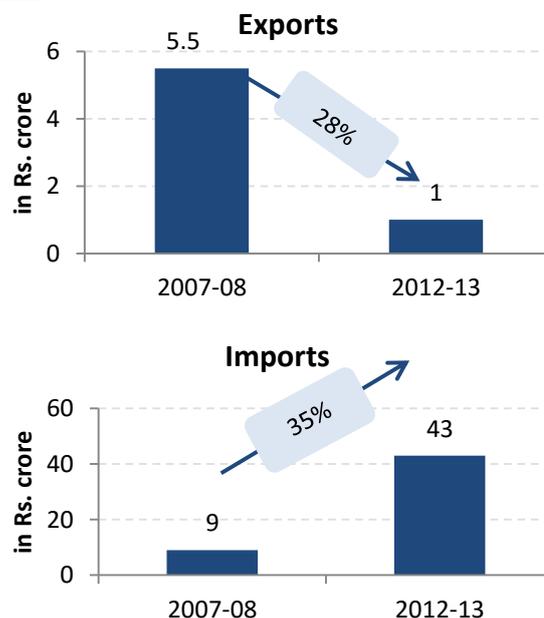
HS code family	HS code description	Applicable HS codes	2012-13
Imports			
5806 & 5808	Narrow woven pile fabrics(including terry twilling & similar terry fabrics)and chenille fabrics	5806 1000	Rs. 43 Crore
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials of cotton - others -narrow fabrics etc, other	5806 3190	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other man made textile materials - others	5806 3200	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges - others	5806 3990	
	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted	5808 9090	

HS code family	HS code description	Applicable HS codes	2012-13
	or crocheted; tassels, pompons and similar articles of other materials - OTHERS		
5906 & 5911	Rubberised textile fabrics of other materials except rubberised knitted/crocheted goods	5906 9990	
	Textile products and articles suitable for industrial use - for technical uses - others	5911 9090	
Others	Other articles of plastics and articles of other materials	3926 9099	
Exports			
5806 & 5808	Narrow woven pile fabrics(including terry twilling & similar terry fabrics)and chenille fabrics	5806 1000	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials of cotton - others -narrow fabrics etc, other	5806 3190	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other man made textile materials - others	5806 3200	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges - others	5806 3990	
	-	5806 9190	
	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles of other materials - OTHERS	5808 9090	
5906 & 5911	Rubberised textile fabrics of other materials except rubberised knitted/crocheted goods	5906 9990	
	Textile products and articles suitable for industrial use - for technical uses - others	5911 9090	
Others	Other articles of plastics and articles of other materials	3926 9099	

Rs. 1
Crore

The export import trend for hook and loop fasteners is as shown in the following exhibit

Exhibit 262: Import export trend



Source: IMAcS analysis, DGFT, DGCIS

The top five countries from where hook and loop fasteners are imported into India are Vietnam, Hong Kong, China, USA, Malaysia. Amongst these, Vietnam alone accounts for over 50% of total imports.

On the export side the major countries to which the product is exported to are USA, Canada, Denmark, Germany, and Netherland. Amongst these, USA and Canada account for over 85% of total exports from India.

Machinery Details

The Hi speed needle looms used for making H&L fasteners are mainly supplied by KY Taiwan and Mueller

Quality Standards

The main quality standards applicable to hook and loop fasteners are:

- IS-8156-1994
- Oeko-Tex Standard 100 (Product Class II)

Labels

Label is a piece of material attached to an object to show its contents, ownership, use or destination. Labels are used in garments, home furnishing, stuffed toys, soft luggage, shoes etc. Though manufacturers use different type of labels to create a distinct identity,

Labels in general can be classified into the following varieties:

*source: IMAcS analysis, DGCIS

Exhibit 263: Classification of labels

Type of label	Purpose	Typical Size
Size label	Shows the size of garment i.e. small (S), medium (M), large (L), extra large (XL) etc.	12mm x 25mm
Pocket label	Label stitched on to the pocket	Width ranging from 15mm to 30mm
Main label	Contains information like Brand name and Logo	Width ranging from 16mm to 50 mm ; may go up to 100 mm
Wash care label	Contains the washing instructions for the garment.	Width ranging from 25mm to 40mm

Product Characteristics

There are two primary categories of labels – Printed and Woven. Printed labels are often printed on materials such as satin, acetate, polyester, nylon and cotton twill. These labels are available in a variety of sizes, colours, and printing options. Printed labels though inexpensive, are unable to withstand the standard wear. These labels fade either through washing or as a result of skin oils reacting with the print which reduces the branding aspect of the label. Woven Labels also available in a variety of finishes and fabric choices i.e. damask, semi-damask, satin, and taffeta. Woven labels have better durability to regular wearing and cleanings. Amongst the variety of woven labels damask and damask mixed fabrics are the most reliable and comfortable labels. Damask is a tighter weave fabric that remains soft even with finished edges and provides the best finish with a smoothness that reflects style and comfort and thus, is the most preferred amongst quality conscious customers. Semi-damask has many qualities of damask at a slightly lower price point and hence, is a mid line choice when it comes to labels. Satin is the most popular choice but the fabric is thin and can snag easily. Taffeta is stiffer than satin and can stand up to a bit more snagging. However, with both satin and taffeta the finished edges of the labels can be stiff, leading to a prickly feeling.

Clothing labels come in a variety of styles. The product is available in the following formats:

- Continuous tape in Roll Form
- Cut Seal
- Cut Fold in End fold, Centrefold and Mitre fold
- Filled / Stuffed labels
- Die-cut / Laser cut labels

- Ready-to –stick labels (backside double adhesive tape)

Application

Labels have major application in garments where the labels are expected to have smooth feel and durability to regular wear and washing as well as they should not snag

Market Size and Trade Trends

Apparels including hosiery garments and home furnishing sectors account for 80 – 85% of the consumption of labels. The number of labels per garment/home furnishing varies from one to four. Considering the label requirement of various product categories i.e. shirts, trousers, uniforms, inner wear, children wear, skirts, t-shirts, bed sheet, towel etc. the average consumption of label per product is computed as 2 labels/garment and 1 label per home furnishing product. The average price per label is around 80 paise.

Exhibit 264: Consumption norm for labels

Particulars	
Average label per garment	2
Average label per home furnishing product	2
Average price of a label	Rs 0.81

In addition, labels are also used for shoes, soft toys, luggage, etc. The usage of labels in these applications is around 20% of the total usage.

Market Size Estimate

The market size of labels has been calculated by estimating the demand from the garmenting sector for different types of labels. The estimated total market including exports for 2012-13 is 20.6 billion pieces valued at Rs. 1,672 Crore with domestic market of Rs. 1,636 crore.

Exhibit 265: Market size estimate - labels

	2012-13
Quantity (in Billion pieces)	20.6
Value (in Rs. Crore)	1,672

**source: IMaCS analysis, industry sources*

The total market of interlining fabric has grown at 6% y-o-y during the last five years. The market has grown uniformly with both domestic as well as exports growing stably at 6% and 7% respectively. However, the growth in domestic market is more because of inflation with the volume of sales growing by just 2% on a y-o-y basis.

Key Growth Drivers and Inhibitors

Key growth drivers for label industry are the growing garmenting industry and apparel exports from India. With the growing organised retail, the demand for

labels would increase, as the usage of label per garment would increase. The demand for label is directly pegged with the apparel industry of India. With the growing share of organised retail the demand of label per clothing is increasing, this along with the growth of apparel sector is expected to drive the domestic market at 10% per annum during the next three years. The exports are also expected to grow at 10%.

Key Manufacturers

Indian Woven-labels industry is concentrated in the several key cities like Bangalore, Delhi, Tirupur, Mumbai, Ahmedabad, Kolkata and other cities of North and North-east.

Key manufacturers of labels are K K Non woven, Premco Global, Arex Industries, Uniroyal India and Unique Tags.

Import Export Scenario

The import of labels has remained stagnant over the last five years growing at just 2% y-o-y. Exports on the other hand, have slow but stable growth growing at 8% y-o-y reaching a total of Rs. 36 Crore.

Exhibit 266: Import export trends - labels

HS code family	HS code description	HS codes	2012-13
Imports			
5801 & 5806	Woven pile fabrics and chenille fabrics of cotton, other than fabrics of terry and narrow elastic -'OTHERS	58012 290	Rs. 94 Crore
	Narrow woven pile fabrics (including terry twilling & similar terry fabrics)and chenille fabrics	58061 000	
	Narrow fabrics etc, other	58063 190	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges	58063 990	
5807 , 5808 & 5809	Woven labels badges & the like of cotton	58071 010	
	Label badges etc of man-made fibre woven	58071 020	
	Woven labels badges etc of other textile materials	58071 090	
	Other labels badges & similar articles of felt or non-woven	58079 010	
	Other labels badges & similar articles	58079 090	
	Braids in the piece; ornamental trimmings in the	58089 090	

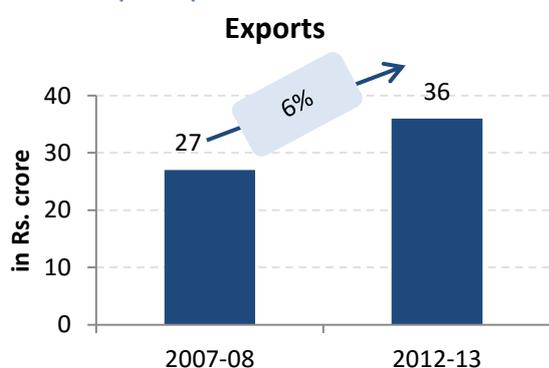
HS code family	HS code description	HS codes	2012-13
	piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - others		
	Woven fabrics of metal thread and woven fabrics of metallised yarn of heading, of a kind used in apparel, as furnishing fabrics or for similar purposes, not elsewhere specified or included	58090 090	
Others	Other made up clothing accessories; parts of garments or of clothing accessories - others and trimmings of other textile fibres	62179 090	
	Garments and accessories thereof, foot-wear and headgear for dolls representing humans - as per 2007 HS code	95029 100	
	Buttons, press-fasteners, snap-fasteners and press-studs, button moulds and other parts of these articles; button blanks - others	96062 990	
Exports			
5801 & 5806	Woven pile fabrics and chenille fabrics of cotton, other than fabrics of terry and narrow elastic	58012 290	Rs. 36 Crore
	Narrow woven pile fabrics(including terry twilling & similar terry fabrics)and chenille fabrics	58061 000	
	Narrow fabrics etc, other	58063 190	
	Narrow fabrics consisting of warp without weft assembled by means of an adhesive of other textile materials excluding labels and badges - OTHERS	58063 990	
5807 , 5808 & 5809	Woven labels badges & the like of cotton	58071 010	
	Label badges etc of man-made fibre woven	58071 020	
	Woven labels badges etc of other textile materials	58071 090	
	Other labels badges & similar articles of felt or non-woven	58079 010	

HS code family	HS code description	HS codes	2012-13
	Other labels badges & similar articles	58079090	
	Braids in the piece; ornamental trimmings in the piece, without embroidery, other than knitted or crocheted; tassels, pompons and similar articles - others	58089090	
	Woven fabrics of metal thread and woven fabrics of metallised yarn of heading, of a kind used in apparel, as furnishing fabrics or for similar purposes, not elsewhere specified or included	58090090	
Others	Other made up clothing accessories; parts of garments or of clothing accessories - others and trimmings of other textile fibres	62179090	
	Garments and accessories thereof, foot-wear and headgear for dolls representing humans - as per 2007 HS code	95029100	
	Buttons, press-fasteners, snap-fasteners and press-studs, button moulds and other parts of these articles; button blanks - others	96062990	

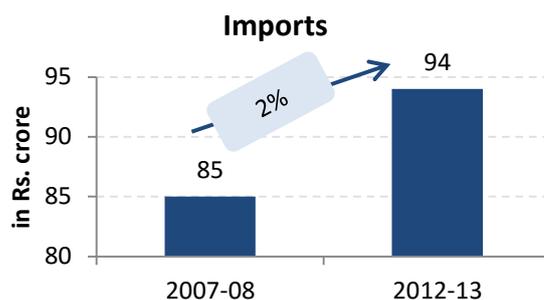
*source: IMaCS analysis, DGFT, DGCIS

The export import trend for labels and badges is as shown in the following exhibit:

Exhibit 267: Import export trend



Source: IMaCS analysis, DGFT, DGCIS



Source: IMaCS analysis, DGFT, DGCIS

The top five countries from where the product is imported into India and where India exports are:

Sl. No.	Top imports	Top exports
1	Hong Kong	Bangladesh
2	China	Sri Lanka
3	France	United Arab Emirates (UAE)
4	Italy	China
	Japan	United Kingdom (UK)

Machinery details

Machines used for manufacturing Woven labels are:

- Flexible Rapier Weaving Machines equipped with electronic jacquard
- Needle Looms
- Warping machines
- MuCAD designing systems.
- Ultrasonic slitting machine.
- Cut fold machines
- Laser cutting machine
- Label finishing machine
- Label stuffing devices

The main suppliers of these machines are

- Jakob-Mueller (Switzerland)
- Kong River (Hong Kong)
- Willy (Italy)
- Viable (USA)
- AG Frick

Printed labels are made using the screen printing or offset printing technology. Machines used for Printed labels are:

- Flexo Fabric Printing Machines
- Letter Press Machines
- Sonic Cutting Machines
- Cold Cut Machines
- Hot Cut Machines

Quality Standards

There are no set quality parameters for labels. However, the quality of labels depends on specific buyer requirements since different buyers have their own standards related to product, environment, social

etc. However, wash fastness test and dimensional stability test are usually carried out for all labels.

Umbrella Cloth

Umbrella fabric is a medium weight, plain weave taffeta fabric used for manufacturing Umbrellas. Umbrellas are used primarily in rainy seasons. They are also used for protection against Sun however such usage is majorly in regions which encounter extreme sunshine especially the regions close to the equator. Earlier umbrellas were manufactured using cotton fabric coated with waterproofing agent. With advent and extensive usage of synthetic material the umbrella fabric used these days is polyester and nylon taffeta fabric.

Product Characteristics

Umbrella fabric is made of polyester filament yarn or nylon filament yarn in varying constructions i.e. 150T, 160T and 190T where T indicates the thread density. The umbrella fabric is expected to be water-proof for the rainy season, should maintain physical form during extreme ultraviolet exposure in the summer season, and should have high tear resistance and high abrasion resistance. The GSM of umbrella fabric typically ranges from 110 to 280 based on type of umbrella.

Market Size and Trade Trends

The demand for umbrellas depends upon climatic conditions, population, usage of umbrella for advertisement and social outlook. The umbrella market generally grows slowly due to reuse of old umbrellas. The market is growing on account of growing fashion in use of umbrellas, where in people prefer to have printed fashionable umbrellas, which are now also common with kids. Umbrellas for kids with fancy and contemporary designs are also a growing market. As per survey of NSSO for 2010-11, the market for umbrella and rain coats is growing at 18%.

Market Size Estimate

The market of umbrella fabric has been estimated using the consumption statistics of umbrella in India across Urban and Rural areas based on the reports of NSSO. The estimated market size for umbrella fabrics is Rs. 109 Crore for 2012-13 in India with a domestic market of Rs. 103 Crore. The market has grown at 8% y-o-y over the last five years.

Exhibit 268: Market size estimate – umbrella fabric

	2012-13
Quantity (in million sq. metres)	11.9
Value (in Rs. Crore)	106

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

While the demand for umbrella is being replaced by rain coats and wind cheaters in the urban areas, the use of fashionable printed umbrellas is expected to drive the demand further. In the rural areas with higher penetration and preference for umbrellas, the market is expected to grow in line with the growing households in the key areas facing heavy rainfall. The domestic market for umbrella cloth is expected to grow at 10% per annum during the coming three years till 2015-16.

Key Manufacturers

The manufacturing of umbrella fabrics is done mostly by SME and MSME industries with very limited large scale players. Key manufacturers in India are:

- S L Banthia Industries
- Coated Sales Company
- Citizen Umbrella Manufacturers

Import Export Scenario

India is an importer of Umbrella fabrics. Due to large domestic manufacturing the import of umbrella fabric is just around Rs. 3 Crore.

Exhibit 269: Import export trends – Umbrella fabric

HS code family	HS description	code	Applicable HS codes	2012-13
Imports				
5407	Unbleached umbrella cloth panel fabrics		54071014	Rs. 76 Crore
	Bleached umbrella cloth panel fabrics		54071024	
	Dyed umbrella cloth panel fabrics		54071034	
	Printed umbrella cloth panel fabrics		54071044	
	Other umbrella cloth panel fabrics		54071094	
Exports				
5407	Unbleached umbrella cloth panel fabrics		54071014	Rs. 3 crore
	Bleached umbrella cloth panel fabrics		54071024	
	Dyed umbrella cloth panel fabrics		54071034	
	Printed umbrella cloth panel fabrics		54071044	
	Other umbrella cloth panel fabrics		54071094	

*source: IMAcS analysis, DGCIIS

The export import trend for umbrella fabrics is as shown in the following exhibit:

Exhibit 270: Export trend – umbrella fabrics

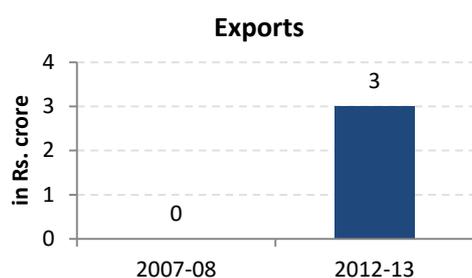
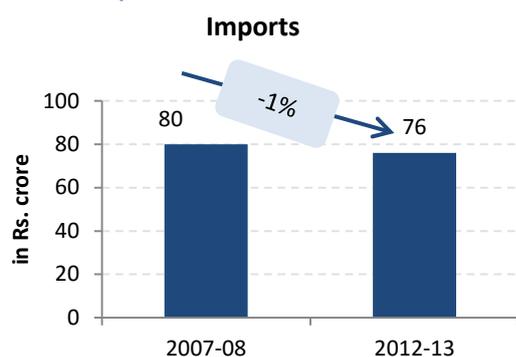


Exhibit 271: Import trend - Umbrella fabric



Source: iMaCS analysis, DGFT, DGCI

Umbrella fabric is imported into India from two major countries – China & Taiwan. The export of umbrella fabric from India is very small.

Quality Standards

The requirements for complete umbrella are prescribed in IS: 2920/1964.

Sewing Threads For Specialised/Industrial Purposes

Sewing threads are cabled yarn made out of natural fibre or synthetic fibre used for stitching and holding the fabric together in different applications like garments, shoes, leather products, quilts and mattresses, upholstery and any other product made of fabric or textile related items.

The history of sewing threads goes back to the very beginning of mankind, when slowly people learn to use plant fibres and old man's beard as thread. However, modern day thread came into existence only in 1730 when for the first time cotton was spun by machinery in England. Later in 1955 synthetic threads of polyester was commercially started and it spread across like wild fire becoming more popular than traditional threads by 1970s.

Sewing threads can be made from Natural fibres like cotton as well as synthetic fibres. In Natural fibres cotton fibre is most preferred due to its easy sew-ability, as compared to silk or linen which is much

costlier. Sewing threads from Natural fibres can be of three types –

1. **Threads with soft finish** – These do not require any processing and are relatively cheaper but have low strength and high shrinkage.
2. **Threads with gassed finish** - The cotton sewing thread is passed through flame in high speed to reduce the fuzz and increase sheen.
3. **Threads with glazed finish** – These are treated with wax and a chemical to provide the glossy finish. These have higher tensile strength and are harder. These are used for seeing of heavy materials like tents, canvas and leather.
4. **Mercerized thread** – These threads are treated with caustic soda to make them smooth, long and lustrous with high strength. These are, mostly used in cotton and other garments.

In addition to these, synthetic fibres like Nylon and Polyester are often used as threads due to their high tensile strength, high abrasion resistance and lesser shrinkage. Most of these are missed with cotton to create combination threads that have high strength as well as better sew-ability of cotton. Different types of synthetic sewing threads used for common applications are:

1. Poly propylene sewing threads
2. Polyester continuous filament threads
3. 100% spun polyester threads
4. High tenacity lubricated polyester braids
5. Nylon 6 sewing threads
6. Nylon 6, 6 sewing threads

Sewing threads used in cloth-tech industry have four common types –

1. **Twisted threads** - Twisted threads are sewing threads having a balanced twist. Here the staple is first twisted together to form a single ply thread, two or more of which are then twisted together in reverse direction to make the balanced twisted sewing thread.
2. **Core spun threads** – Here a continuous filament of polyester is sheathed in either polyester or cotton to make a single ply thread, two or more of which are then twisted together in reverse direction to make sewing thread
3. **Monofilament Threads** – these are a single filament or nylon or polyester without any processing used as it is for cheap low cost garmenting or blind hemming. These are uncomfortable and come in natural colour of nylon or polyester.
4. **Textured Threads** – These are made of multi filaments that have been crimped, twisted and untwisted to provide the thread with elasticity, strength and goods coverage.

The essential properties for sewing threads are:

1. Uniform diameter and surface lubricity
2. Balanced twist
3. Resistance to needle heat
4. Free of knots and breakages
5. High abrasion resistance and shrink resistance
6. High elasticity and strength
7. High durability

The common applications and specifications for specialised sewing threads have been mentioned in the following exhibit –

Exhibit 272: Industrial Applications of sewing threads

Application	Tex	Application	Tex
Premium leather	60,40,20	Soft luggage	40,30,20
Economy leather	60,40,20	Mattress & quilting	60,40
Canvas	60,40,20	Saddlery	25,15
Sole stitching	8,7	Outdoor application	40,20,15
Apparels(leather)	75,50,36	Filter cloth	40
Accessories(leather)	75,50,36	Compressor winding	8
Automotive upholstery	60,40,20	Curtain and tents	40

Sewing threads for specialised and industrial uses include threads used in footwear, bags, saddler, industrial uses in factories, high temperature and high pressure and threads for polypropylene based shopping bags, leno bags and jumbo bags

Market Size and Trade Trends

Only the sewing threads used for specialised and industrial purposes like the ones for bags, footwear, saddler, large polypropylene based carry bags and jumbo(FIBC) bags along with specialised threads for core industrial applications are protective applications (Nomex and Kevlar threads) are considered as Technical Textile products due to their specialised functional use.

Market Size Estimate

The market size of sewing thread has been estimated using the consumption norms and requirements for different applications and then triangulated using demand side information. The estimated market size for specialised and industrial sewing thread industry in India is Rs. 578 Crore with a domestic market of Rs. 562 Crore.

Exhibit 273: Market size estimate – sewing thread

	2012-13
Quantity (in '000 MT)	23
Value (in Rs. Crore)	578

*source: IMAcS analysis, industry sources

Key growth drivers and Inhibitors

Footwear and PP woven bags are the key drivers for the specialised sewing thread market. With the footwear industry growing at 12% and the demand for polypropylene woven bags growing at 8%, the overall specialised sewing thread domestic market is expected to grow at around 12% per annum for next three years till 2015-16.

Key Manufacturers

Key manufacturers of sewing thread in India are:

- Vardhaman Mills.
- Madura Coats
- Precot Meridian

However, when it comes to specialised sewing threads there are no major manufacturers other than Reliance Industries. However there are many small players who provide polypropylene and polyester based threads for use in Polypropylene woven sacks and FIBC bags. The major importer for specialised threads is DuPont which imports both Kevlar and Nomex threads in India.

Import Export Scenario

The imports of sewing threads have seen tremendous growth in the last five years reaching a total of Rs. 300 Crore. The exports on the other hand have seen a stable growth at 4% per annum reaching a total of Rs. 165 Crore. However, the share of specialised sewing thread in it is limited to just around 10% most of which are polyester and polypropylene threads used for high capacity bags

Exhibit 274: Import export trends – sewing threads

HS code	HS code description	HS codes	2012-13
Imports			
5204	Cotton thread, sewing, containing any synthetic staple fibre	52041110	Rs. 300 Crore
	Embroidery cotton thread (HS code of containing 85% or more by weight of cotton: embroidery cotton thread)	52041130	
	Cotton sewing thread not containing any synthetic staple fibre	52041140	
	Cotton sewing threads having 85% or more of cotton by weight - others	52041190	
	Sewing thread containing less than 85% by weight of cotton not put up for retail sale	52041900	
	Cotton thread, sewing, containing any synthetic staple	52042010	

HS code	HS code description	HS codes	2012-13
	fibre		
	HS code of put up for retail sale: cotton thread, darning	5204 2020	
	Embroidery cotton thread (HS code of put up for retail sale: embroidery cotton thread)	5204 2030	
	Cotton sewing thread not containing any synthetic staple fibre	5204 2040	
	Other cotton sewing thread	5204 2090	
54 01	Sewing thread of synthetic filaments	5401 1000	
	Sewing thread of artificial filaments	5401 2000	
Exports			
5204	Cotton thread, sewing, containing any synthetic staple fibre	5204 1110	
	Embroidery cotton thread (HS code of containing 85% or more by weight of cotton: embroidery cotton thread)	5204 1130	
	Cotton sewing thread not containing any synthetic staple fibre	5204 1140	
	Cotton sewing threads having 85% or more of cotton by weight - others	5204 1190	
	Sewing thread containing less than 85% by weight of cotton not put up for retail sale	5204 1900	Rs. 165 Crore
	Cotton thread, sewing, containing any synthetic staple fibre	5204 2010	
	HS code of put up for retail sale: cotton thread, darning	5204 2020	
	Embroidery cotton thread (HS code of put up for retail sale: embroidery cotton thread)	5204 2030	
	Cotton sewing thread not containing any synthetic staple fibre	5204 2040	
	Other cotton sewing thread	5204 2090	

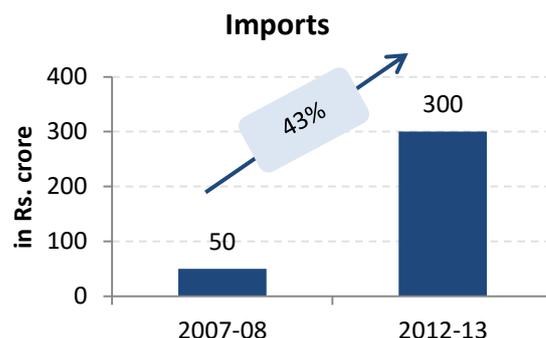
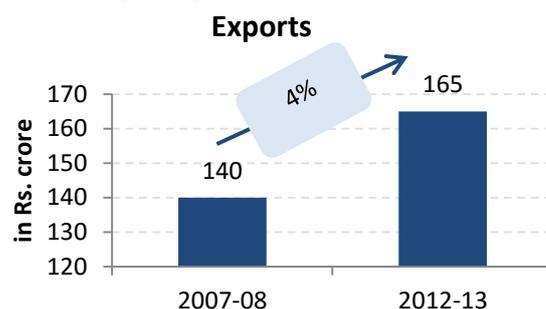
HS code	HS code description	HS codes	2012-13
5401	Sewing thread of synthetic filaments	5401 1000	
	Sewing thread of artificial filaments	5401 2000	

*source: IMaCS analysis, DGCIIS

*Export import for all sewing threads

The export import trend for sewing threads is as shown in the following exhibit:

Exhibit 275: Import export trend



Source: IMaCS analysis, DGFT, DGCIIS

The top five countries from where the product is imported into India are China, Germany, Sri Lanka, Italy and Japan.

The top five countries to which the product is being exported to are United States of America (USA), Brazil, Morocco, Turkey and Italy.

Quality Standards

The relevant BIS standards are: IS 1066: 1980, IS 1376: 1998, IS 1720: 1978, IS 2196: 1985, IS 4229: 1992, IS 9543: 1980.

19. Hometech

The Hometech segment of Technical Textiles comprises of the textile components used in household applications. These products range from blinds used in the houses to the filter products used in the vacuum cleaners. They are an important component in the mattress and pillows as well. They are made of both natural and synthetic fibres. For example, carpet backing cloth is made from jute as well synthetic fibres.

List of Products

The major products under the segment are as follows:

- Fiberfil
- Mattress and pillow components
- Carpet backing Cloth (Jute & Synthetic)
- Stuff Toys
- Blinds
- Filter fabrics for HVAC and Vacuum cleaner
- Nonwoven wipes
- Mosquito nets
- Furniture fabrics and other coated fabrics



Market Size and Trends

The total estimated market size of Hometech is estimated to be Rs. 6,249 Crore in 2012-13. 88% of the total market is comprises of the domestic consumption with exports accounting for other 12% of the market. Most of the market is catered by domestic production with imports catering to only 7% of the market. The segment is projected to grow to Rs, 9,274 crore in 2015-16 growing at 14% CAGR and further to Rs. 12,145 crore by 2017-18.

The product wise market size has been shown in the following exhibit.

Exhibit 276: Market summary of Hometech

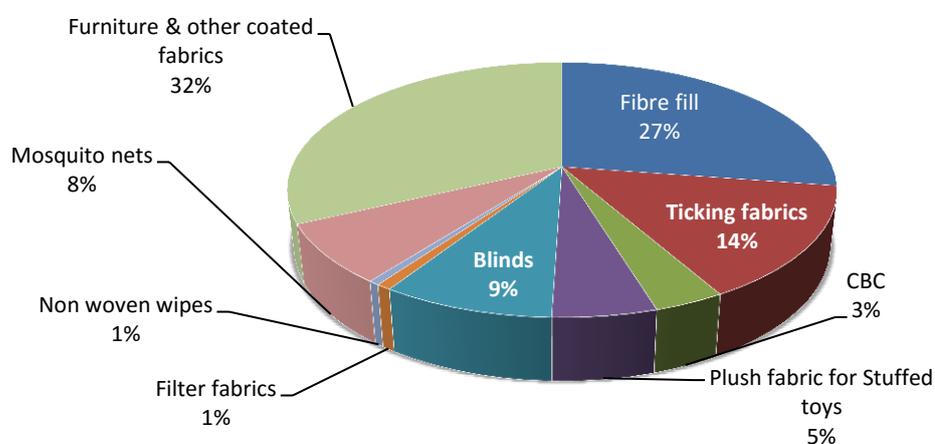
Hometech		2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	Import	Export	Domes-tic	Total	Export	Domes-tic	Export	Domes-tic
Fibre fill	Value (in	1,170	-	130	1,580	1,710	150	1,896	198	2,730

Hometech		2012-13 (All values in Rs. Crore)					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
	Rs. Crore)									
	Volume (in '000 MT)	210	-	16	194	210	18	233	24	335
Ticking fabric	Rs. Crore	902	-	-	902	902	-	992	-	1,200
	Mn. Sq. m	120	-	-	120	120	-	132	-	160
CBC	Rs. Crore	217	3	-	220	220	-	229	-	247
	Mn. Sq. m	16	0	-	16	16	-	17	-	18
Stuff toys	Rs. Crore	1,057	23	405	675	1,080	466	776	616	1,026
	Mn pieces	64	1	24	41	65	28	47	37	62
Plush fabric (TT comp. of stuff toys)	Rs. Crore	314	10	122	202	324	141	232	186	307
	Mn. Metres	14	0	6	9	15	6	11	8	14
Blinds	Rs. Crore	537	1	-	538	538	-	602	-	755
	Mn. Sq. m	10	0	-	10	10	-	11	-	14
Filter fabric - HVAC & Vacuum cleaner	Rs. Crore	40	7	-	47	47	-	54	-	71
	Mn. Sq. m	3	1	-	4	4	-	4	-	6
Nonwoven Wipes	Rs. Crore	32	2	-	34	34	-	38	-	48
	Mn pieces	717	45	-	762	762	-	853	-	1,070
Mosquito Nets	Rs. Crore	434	37	1	470	471	1	541	1	715
	Mn. Sq. m	145	12	0	157	157	0	180	0	238
Furniture Fabrics & other coated fabrics	Rs. Crore	1,629	375	522	1,482	2,004	585	1,660	733	2,082
	Mn. Sq. m	120	28	39	110	148	43	123	54	154
Total	Rs. Crore	5,814	435	775	5,474	6,249	876	6,243	1,118	8,156

*Source: Annual reports, websites, secondary reports, ITTA, IMaCS analysis
Market size is calculated as exports + domestic market

The market is mainly constituted by furniture fabrics having 36% share, fibre fill having 31% share with other products having less than 10% of the total segment size. Product segment wise market share has been shown as follows:

Exhibit 277: Clothtech market share product wise



Source: IMaCS analysis

Players & Profitability

The key players of the segment are as follows:

- Reliance Industries Ltd.
- Ganesha Ecosphere Ltd.
- Global Textile Alliance – Tirupur
- Hanung Toys and Textiles Ltd.
- Hunter Douglas India
- Alps Industries
- Khosla Profils Pvt. Ltd.
- Ginni Filaments
- Pristine Care Products
- Flocksur India Ltd
- Chiripal Industries
- Jasch Industries

The profitability of key players is as shown:

Exhibit 278: profitability of key players of Hometech

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Reliance Industries Ltd.	26608300	24758400	6%	6%
Ganesha Ecosphere Ltd.	21763	12664	5.5%	5.3%
Hanung Toys and Textiles	121836	122775	4%	8%
Alps India Ltd.	57401	58449	-15%	-41%
Hunter Douglas India Ltd.	-	4079	-	8%
Khosla Profils Pvt. Ltd.	-	4029	-	4%
Dinesh Mills	13846	14001	3%	6%
Ginni Filaments Pvt. Ltd.	29836	31411	2%	-6%
Gujarat Flotex Pvt. Ltd.	2283	2452	4%	2%
Mayur Uniqouters	12667	9195	11%	10%

Source: Annual reports, IMaCS analysis, Capitaline, VCCedge, MCA

High Potential Products

Homotech is a growing segment of the Technical Textile industry, with growth potential due to the changing lifestyle of the domestic market. The market is expected to grow at 14% per annum during the next three years. The key product in the segment that show very promising prospects are:

- **Plush Fabric for Soft Toys:** Indian soft toy market has a low penetration and is fast growing with the changing landscape of urban households. The increasing preference of soft toys for the children by parents has helped the market grow substantially. The market is expected to grow at

15% and even the exports present a significant opportunity, with players like Hanung making a mark in the export market. The overall market for soft toys and plush fabric is expected to grow at 15% per annum

- **Non Woven Wipes for Home Use:** Non woven wipes are a new entry into the Indian markets and in short span of time have taken a considerable share of the market at Rs. 32 crore growing at 26% during the last five years. The market is expected to grow at 12% during the next three years. With only a few brands currently having a lion's share in the market, there is a potential for new player to enter the market.

The detailed analysis of each product is presented in the subsequent sections.

Fibre Fill

Fibre fill is basically Polyester Staple Fibre (PSF) used as fillings for home furnishing items like mattresses, pillows, cushions, sleeping bags, insulated quilts and garments and stuff toys.

Product Characteristics

Fibrefill is available in deniers ranging from 2 to 20 however the most common types of fibrefill used for stuffing purpose are 6 D and 15 D. The fibres are available in cut lengths of 32mm, 40mm, 44mm, 51mm, 64mm, 76mm, 88mm, 108mm and 128mm.

However, the normal cut lengths used for filling are 32mm (for blow filling), 51mm and 64mm. The specification of fibrefill along with their tentative usage has been mentioned further:

1. For filling in Mattresses - 6 Denier to 15 Denier
2. For Carpet Manufacturers - Around 15 Deniers
3. For non woven - 40 Denier
4. For utensil cleaning applications - 70 Denier

Fibrefill can be broadly classified as based on nature of production, cross section and finish as follows

Classification of Fibre fill

Based on Manufacturing Process	Based on Cross section	Based on Finish
<ul style="list-style-type: none"> • Virgin PSF • Regenerated PSF • Conjugated PSF 	<ul style="list-style-type: none"> • Hollow • Solid 	<ul style="list-style-type: none"> • Siliconised • Non siliconised

Virgin fibre fill is prepared from virgin polyester produced from cracking of hydrocarbons and hence the name. Whereas, regenerated is produced from recycled PSF produced from PET bottles re-cycling. Reliance is the only major player of Virgin PSF in India while regenerated is produced by many small players located mostly in Delhi/ NCR and Uttar Pradesh.

Solid and hollow is classification based on cross section. Hollow fibre fill is lighter and occupies same area with 15% to 20% lesser weight. It is also more comfortable and softer than solid PSF and hence is preferred over solid fibre fill which is heavier. Conjugated is the third kind of fibre fill which is slowly gaining market due to its longer life and very comfortable feel. Currently only Reliance supplies conjugated fibrefill under its brand Recron.

Key Applications

The common applications for fibrefill is mostly as filling for mattresses, pillows, cushions, soft toys and winter wears like jackets. While Cotton has been the traditional filling material being used in India, fibrefill has many advantages over cotton and hence is slowly gaining market over cotton fillings. These are:

- Better filling and greater softness than cotton and other fibres of equivalent weight. The filling quantity required with fibrefill is 70-80 % of the filling quantity with cotton
- Moisture and mildew resistance which avoids infestation. Hence fibrefill has a much longer life as compared to cotton.
- Enhanced air circulation (especially for hollow PSF)

- Better bounce and does not become flat with repeated usage.
- Durability
- Washability (hollow PSF retain bulk and shape after wash)
- Fibrefill is not affected by moisture and hence there are lesser chances of an infection through fibrefill. Along with this, lower weight of conjugated fibre fill makes it the most suitable filling for soft toys.

Market Size and Trade Trends

Based on the inputs from key players, the market including exports for fibre fill in India is estimated to be 210,000 MT worth Rs. 1,710 Crore with a domestic market of 194,000 MT worth Rs. 1,580 Crore.

Exhibit 279: Market size estimate - fibre fill

	2012-13
Quantity (in '000 MT)	210
Value (in Rs. Crore)	1,710

*source: IMaCS analysis, industry sources,

Key Growth Drivers and Inhibitors

The major growth drivers for the Fibre fill industry in India in the coming future:

- **Increasing preference for fibrefill** - with the growing living standard, many people mostly in urban areas are preferring fibrefill over cotton fillings, as a result market for fibrefill is expected to increase in the coming future. This is expected to be a major driver for fibre fill industry
- **Soft toys Industry** - The soft toy industry although a small part of the entire toy industry, is slowly gaining momentum with many children preferring soft toys related to Disney and other cartoon characters. With the growth rate of soft toy industry expected at 20%, fibre fill demand would also increase hand in hand with it.

Impediments

- **Usage of cotton as substitute to fibrefill** - Although market for fibre fill is growing, cotton still remains as the most preferred filler in the rural areas, hence creating a barrier for expansion of fibre fill in the vast rural market.
- **Higher demand for Polyester yarn** - As fibre fill and polyester yarn can both be produced from PSF. The higher demand and better returns in the yarn industry is a major deterrence for fibre fill, as many manufacturers provide preference to production of polyester yarn as compared to fibre fill.

The domestic market of PSF fibrefill is expected to grow at around 20% per annum during the next three years, owing to increasing preference of soft toys and mattresses and pillows. The exports are

also expected to grow at 15% during the same period as key players like Reliance are planning to add capacities to cater to both domestic and export markets.

Key Manufacturers

Key manufacturers of fibre fill in India are:

- Reliance Industries Ltd
- Ganesha Ecosphere Pvt. Ltd
- Nirmal Fibres
- KK Fibres

Import Export Scenario

Export of fibre fill from India has increased considerably over time almost reaching double of what it was in 2007-08. The high growth in 2012-13 can be attributed to the favourable exchange value of dollars with respect to rupee that incentivised manufacturers to go for exports.

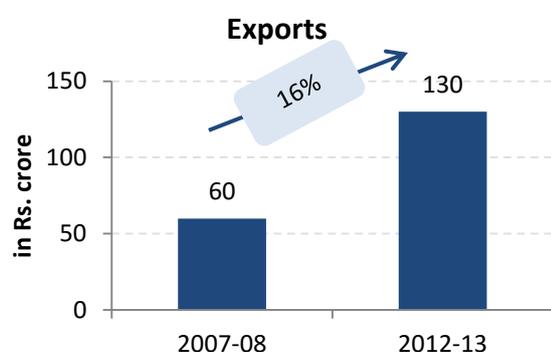
Exhibit 280: Import export trends – fibre fill

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
5503	Man-made staple fibres, Synthetic staple fibres, not carded, combed or otherwise processed for spinning. -Of polyesters	5503200	Insignificant
Exports			
5503	Man-made staple fibres, Synthetic staple fibres, not carded, combed or otherwise processed for spinning. -Of polyesters	5503200	Rs. 130 Crore

*source: IMaCS analysis, DGCIS

The export import trend for fibrefill is as shown in the following exhibit:

Exhibit 281: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

China is the only country having a significant share in Nation's fibre fill imports. The major countries where fibrefill is exported from India are United States of America (USA), Morocco, Portugal, Belgium and Israel

Quality Standards

There are no set quality standards for fibrefill in the BIS

Ticking Fabrics

A mattress is a mat or pad usually placed atop a bed. Mattresses can be broadly classified as:

- Foam mattresses
- Coir mattresses
- Spring mattresses

Mattresses are made of a filling material like coir, foam etc which provides support to the body. Traditional Indian mattresses are thick quilts made up of cotton stuffing. The protective fabric cover which encases the mattress is called ticking. Ticking fabric holds the filling material in place. It is usually made of cotton and comes in a wide variety of colours and styles. The GSM of the fabric varies from 80 to 200.

Product Characteristics

The typical sizes of mattresses are given in the following table:

Mattress sizes			
Class	Dimensions in inches	Class	Dimensions in inches
Divan	72"X30"	Queen	72"X60"
	75"X30"		75"X60"
	78"X30"		78"X60"
Single	72"X36"	King	72"X72"
	75"X36"		75"X72"
	78"X36"		78"X72"
Twin	72"X48"		
	75"X48"		
	78"X48"		

The most commonly available mattresses are 72" X 36" in Northern India and 78" X 36" in rest of the country. The typical value and quantity wise break up of a mattress is given in the following table.

Raw Material	% by Value	Average Weight per Mattress
Foam	75%	Ranges from 5-6 Kg (Foam only) to 10-15 Kg*(Foam & Coir)
Coir	10%	1-2 Kg
Fabric	15%	1-2 Kg
Packaging and Others		

*Depends on the ratio of foam and coir used in the mattress and the density. Sleep well manufactures the mattresses with densities varying between 10 and 85. Density of 1 indicates that the material carries 1 Kg weight per cubic meter. Generally 60:40 Coir: Foam ratio is used since this reduces the product price and also helps save excise

duty as coir based products (i.e. products with more than 50% by weight of Coir) are exempted from excise duty.

Pillows can be made of variety of filling material like cotton, feathers and foam etc. Pillows are available in variety of sizes i.e. 21"X14", 24"X16" and 26"X17". The ticking fabric used for pillow is also generally made of cotton with a GSM lesser than that of the fabrics used for mattresses.

Market Size and Trade Trends

The market for ticking fabrics has been derived from the estimated market for mattress and pillows using NSSO figures for monthly per capita consumption. The different usage norms considered for calculations are as listed:

Parameter	Value
Mattresses	
Ticking fabric	5 square metre
Price per sqm of ticking	Rs 120 per square meter
Tape	13 meter
Price per sqm of ticking tape	Rs 50 per square meter
Pillows	
Ticking fabric	0.6 square metre
Price per sqm of ticking	Rs 120 per square meter

Market Size Estimate

The estimated market size for ticking fabric and tape for 2012-13 estimated to be Rs. 516 Crore for ticking fabric and Rs 386 Crore for ticking tape.

Exhibit 282: Market size estimate – ticking fabric

	2012-13	
	Ticking fabric (in Mn. Sq. mtrs)	Ticking tape (in Mn. Mtrs)
Quantity	43	77
Value (in Rs. Crore)	516	386

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

The demand for ticking fabric is directly related to the market demand for Mattresses. The growth of organised mattress industry is the largest driver for ticking fabric industry, as it promotes use of ticking fabric instead of any normal fabric which is generally used in local production. Lack of awareness about the benefits of ticking fabric over normal fabric is another reason why local manufacturers often go for normal fabric in order to reduce manufacturing costs. Growth of the organised sector with proper awareness about ticking fabric is expected to drive the market in the coming future. The domestic market is expected to grow at 10% per annum during the next three years.

Key Manufacturers

The largest manufacturer of ticking fabrics in India is Global Textile Alliance – GTA. Besides GTA the industry is constituted by mostly Small scale players.

Import Export Scenario

The import and export of ticking fabric from India is insignificant

Exhibit 283: Import export trends – ticking fabric

HS code family		Applicable HS codes	2012-13
Imports			
5208 & 5209	Bed ticking - domestic (HS Code of Plain weave (85% cotton by wt .), weighing more than 100 g/m2 but less than 200 g/m2)	520832	50
	HS Code of Plain weave, weighing not more than 100 g/m2: Bed ticking, domestic	520841	40
	Bed ticking - domestic (HS Code of Plain weave, weighing more than 100 g/m2: Bed ticking, domestic)	520842	50
	Bed ticking, domestic	520843	30
	Plain weave: Bed ticking, domestic (Harmonized Codes of Woven fabrics of cotton, containing 85% or more by weight of cotton, weighing more than 200 g/m2)	520951	60
5305	HS Code of Coconut, abaca (Manila hemp or Musa textiles Nee), ramie and other vegetable textile fibres, not elsewhere specified or included, raw or processed but not spun; two, noils and waste of these fibres (including yarn waste and garneted stock): Coir mattress fibre	530500	20
	Curled coir fibre/machine twisted fibre	530500	30
6306	Pneumatic mattresses	630640	00
	Pneumatic mattresses of cotton	630641	00
	Pneumatic mattresses of other textile material	630649	00
Exports			

HS code family		Applicable HS codes	2012-13
5208 & 5209	Bed ticking - domestic (HS Code of Plain weave (85% cotton by wt .), weighing more than 100 g/m2 but less than 200 g/m2)	520832	50
	HS Code of Plain weave, weighing not more than 100 g/m2: Bed ticking, domestic	520841	40
	Bed ticking - domestic (HS Code of Plain weave, weighing more than 100 g/m2: Bed ticking, domestic)	520842	50
	Bed ticking, domestic	520843	30
	Plain weave: Bed ticking, domestic (Harmonised Codes of Woven fabrics of cotton, containing 85% or more by weight of cotton, weighing more than 200 g/m2)	520951	60
	5305	HS Code of Coconut, abaca (Manila hemp or Musa textiles Nee), ramie and other vegetable textile fibres, not elsewhere specified or included, raw or processed but not spun; tow, noils and waste of these fibres (including yarn waste and garneted stock): Coir mattress fibre	530500
Curled coir fibre/machine twisted fibre		530500	30
6306		630640	
	Pneumatic mattresses		00
	Pneumatic mattresses of cotton	630641	00
	Pneumatic mattresses of other textile material	630649	00

*source: iMaCS analysis, DGCIIS

Quality Standards

The relevant BIS standards are given in the following table

Exhibit 284: Standards for Mattresses

BIS Code	Description
IS 7933: 1975	Specification for Flexible Polyurethane Foam for Domestic Mattresses
IS 9491: 1980	Specification for mattress, air

BIS Code	Description
IS 13013: Part 1: 1990	Code of practice for packaging thermal insulation materials: Part 1 Slabs, mattresses and pipe-sections made of fibrous materials
IS 13489: 2000	Textiles - Bed Mattress - Specification

Carpet Backing Cloth (CBC)

A carpet is any loom-woven, felted textile or grass floor covering. The global carpet market for domestic and industrial end use is dominated by several varieties of carpet such as Hand Knotted Carpets, Hand Woven Carpets, Tufted carpets; Needle felt carpets, Flat weave carpets, etc. Carpet Backing Cloth (CBC) is used as the backing material for both woven and tufted carpets as depicted in the figure below:

CBC is generally classified into two categories:

- **Primary Carpet backing:** The base fabric on which pile yarns are tufted and anchored to make a carpet
- **Secondary Carpet backing:** Fabric bonded on the backside of the carpet forming an underlay.

Primary backing is used for making the carpet in which yarn is woven or tufted. Carpet after being dyed is sent for secondary backing. Here the surface is smoothed and backing is applied. Latex is applied on the back of the carpet by passing the carpet through the puddle of latex. Latex is forced down by the blade around all the yarn on the back of the carpet, which locks the yarn into the backing. A second coat of latex is applied thereafter which holds the secondary backing onto the tufted material. The secondary backing provides dimensional stability while locking individual tufts in place.

Product Characteristics

Primary backing is manufactured mainly from synthetic fabric. Secondary backing is made of both jute and woven polypropylene. Jute carpet backing cloth is approximately 104" wide with gsm varying between 180 and 407. Jute backing has certain limitations such as potential for browning and rotting. Thus, the secondary backings used today are majorly woven polypropylene made of a leno weave of slit film and spun olefin yarns that forms a stretchable secondary backing fabric. Synthetic carpet backing cloth is available in many varieties of which some are:

Application	Fabric characteristics	
Primary Backing Fabric	spun polyester warp, spun polyester weft; 40 ends per 10 cm and 40 picks per 10 cm	149 gsm
Primary Backing	spun polyester warp, spun polyester weft; 70 ends per 10	266 gsm

Application	Fabric characteristics	
Fabric	cm and 70 picks per 10 cm	
Secondary Backing Fabric	polypropylene warp, acrylic weft; 32 ends per 10 cm and 40 picks per 10 cm weft	78 gsm
Secondary Backing Fabric	cotton yarn nm 40/2 warp, nm 3.6/1 weft; 35 x 2 ends per 10 cm warp and 32 picks per 10 per cm	135 gsm

Carpet backings without latex are also being produced by some manufacturers. This system eliminates delamination and thus, such carpets are light weight, more flexible, easier to install and can be recycled easily. This also eliminates the "new carpet odour".

Market Size and Trade Trends

CBC is used as primary and secondary backing for carpets. Thus, growth in the carpet industry is the key demand driver for CBC. The Indian carpet industry is driven by exports. Around 95% of the carpets made in India are being exported. The carpet export witnessed a decline in recent years because of rupee appreciation against dollar. As per discussions with industry experts and key industry players the carpet exports is expected to remain stagnant in future thus, limiting the growth potential of CBC. However, marginal growth is expected in the synthetic CBC only because of replacement of jute by the synthetic category.

In the last few years, the demand for CBC as primary backing has minimized as artisans are increasingly using fabric as primary backing to minimize costs. In light of this, the market size of CBC has been calculated considering usage in secondary backing only.

Market Size Estimate

CBC is used in machine tufted carpets and not in hand knotted ones. With the coming of synthetic backings, the use of jute backing has declined over a period of time to less than 10% of total backing. Taking the total production of carpets in India as per the statistics at National Jute board and working report on handicrafts, the market of carpet backing cloth (CBC) has been estimated.

Exhibit 285: Market size estimate - CBC

	2012-13
Quantity (in Mn. sqm)	16
Value (in Rs. Crore)	220

**source: iMaCS analysis, industry sources*

The market for CBC has de-grown by 6% because CBC is no longer used as primary backing for the carpets.

Key Growth Drivers and Inhibitors

- The key driver for CBC industry is the growing export demand for Indian carpets. As 95% of the

carpet made in India is exported, the entire market is dependent on export demand.

- The industry also faces stiff competition from use of latex as carpet backing. While synthetic backing replaced jute due to price considerations, the industry faces similar competition from latex.

The market of CBC is expected to grow at a slow rate of 4% per annum driven primarily by the carpet industry of India.

Key Manufacturers

Key manufacturers of CBC are Auckland International, Gloster Jute Mills, Chev-Jute and Champadany Industries Limited. Besides these are a number of SME Players in the industry.

Import Export Scenario

Although the import and export of CBC was very small, over years it has seen a declining trend. The import of carpet backing has declined over the last five years at 18% y-o-y and currently is just Rs. 3.3 Crore. Exports of CBC in 2012-13 was insignificant

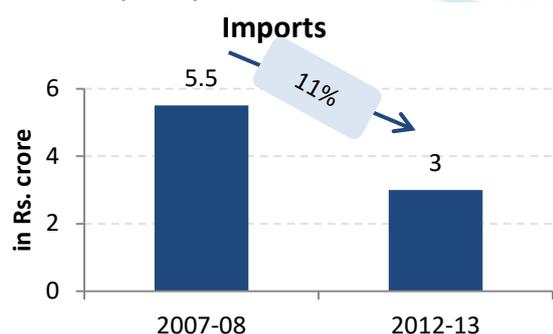
Exhibit 286: Import export trends - CBC

HS code family	HS code description	HS codes	2012-13
Imports			
5301	Woven fabrics of jute or of other textile bast fibres excluding flax, true Hemp & Ramie	53011011	Rs. 3 Crore
5407	Woven fabrics of synthetic filament yarn, including woven fabrics obtained from materials of 67 decitex or more	54072010	
Exports			
5301	Woven fabrics of jute or of other textile bast fibres excluding flax, true Hemp & Ramie	53011011	-
5407	Woven fabrics of synthetic filament yarn, including woven fabrics obtained from materials of 67 decitex or more	54072010	

**source: iMaCS analysis, DGCIIS*

The export import trend for carpet backing cloth is as shown in the following exhibit:

Exhibit 287: Import export trend



Source: IMAcS analysis, DGFT, DGCIS

While exports from India is negligible,, carpet backing cloth has been imported in small quantities mostly from Saudi Arabia, which is the only major exporter of carpet backing cloth to India.

Quality Standards

There are no set quality parameters for carpet backing cloth.

Stuff Toys

Stuff toys are soft knitted fabrics in different appealing shapes filled with either cotton or fibre fill. These are usually available in shape of some cartoon characters or in shape of animals and plants appealing mainly to kids in lower age group. These are often used as a decorative at homes.

Product Characteristics

The outer fabric is generally made of fur, fleece or flock fabric with most of the fillings of fibrefill, paper foam or cotton depending on the costing. The stuffed toys come in a variety of sizes varying from 6 cm to 200 cm with a price range from Rs. 50 to a few thousands based on the construct and material used as filling and fabric.

Market Size and Trade Trends

The purchase of stuffed toys is mostly done by women. As most purchases are done for kids and infants, the hygiene level of the filling material and the fabric becomes a major decision factor. It is an impulse buy product, and looks as well as feel of the product play a major role in making the decision. The market for stuffed toys is generally driven by repeat purchases by a very small segment of the society. New customers are very few. Another major factor governing the market is that people tend to prefer quantity over quality. Hence, one would prefer many cheap stuffed toys rather than a single costly one

Market Size Estimate

The market of stuff toys has been estimated based on inputs from the industry. Stuff toys constitute nearly 12% to 15% of the total toys market of India. Considering the production figures of major players like Hanung Toys and Textiles and the market size of toy industry as per Assocham reports, the market for stuff toys is estimated to Rs. 1080 Crore. However the value of Technical Textile component in it, which is the plush fabric, is only Rs. 324 crore

Exhibit 288: Market size estimate – Stuffed toys

Product	Unit	Market Size 2012-13
Stuffed toys	Mn. Pieces	65
	Rs. Crore	1080
Plus fabric (T T Component)	Mn. Metres	15
	Rs. Crore	324

*source: IMAcS analysis, industry sources

The market has grown at 27% owing to the increasing preference for life style products.

Key Growth Drivers and Inhibitors

The major growth drivers for the Soft toys industry in India in the coming future are:

- **Increasing income levels** – with the growing living standard and income standards, many people mostly in urban areas prefer to buy stuffed toys of better quality and filling as compared to others, particularly purchasing the same from reputed stores and are willing to pay higher for better quality. This is a major growth driver for the organised stuffed toys industry, which is expected to grow at 20% owing to increasing purchases.
- **Increasing reach of cartoon characters through Television** – With the plethora of cartoon characters attracting the children, the scope of different designs of stuffed toys have increased. In addition, with the current penetration level of cartoons, many children are interested in buying stuffed toys of cartoon characters giving a boost to the market.

Impediments

- **Poor piracy laws** – Stuffed toys industry is mostly driven by cartoon characters. Due to poor piracy laws, it is very easy for an un-organised player to copy a high selling design and sell it at a much lower price, thereby increasing stiff price competition.
- **Competition from China** – China is a major supplier of toys to India be it stuffed toys or otherwise. With heavy competition from China, most Indian manufacturers find it hard to produce stuffed toys at a price point that is cheap and profitable.
- **Lack of shelf space** - Stuffed toys are impulse purchases which require a frontal position on the shelf. However, due to their voluminous shapes, they are generally kept at the back, with the shelf space

given to remote control cars and electronic toys, which are a high demand segment of the toys industry.

Both the domestic and export market for soft toys is expected to grow at 15% per annum during the next three years, owing to the increased usage as life style products in domestic industry and growing exports by the industry leaders like Hanung toys.

Key Manufacturers

Hanung toys and Textiles is the largest manufacturer of stuffed toys producing 27.5 million pieces per annum. Besides Hanung players like Pal plush and Archie also manufacture stuff toys.

Import Export Scenario

The import of stuff toys has been increasing on account of cheaper products from China, which has increased competition in Indian markets. Imports have gone up from Rs. 5.5 Crore to Rs. 23 Crore* in a span of last five years. The export market has also increased over the last five years reaching Rs. 4 Crore

Exhibit 289: Import export trends – Stuffed toys

HS code family	HS code description	HS codes	2012-13
Imports			
9503	DOLLS OF WOOD (HS Code of Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds: Of wood)	95030010	Rs. 23 Crore*
	DOLLS OF PLASTIC (HS Code of Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds: of plastic)	95030030	
	OTHER -HS Codes of Other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds	95030090	
	HS code of stuffed toys -	950341	

HS code family	HS code description	HS codes	2012-13
	(Family head - Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds)	00	
	others -HS Codes of Other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds	95034990	
	Toys, games and sports requisites; parts and accessories there of - Festive, carnival or other entertainment articles, including conjuring tricks and novelty jokes. In Particular Articles for Christmas festivities - 'ARTICLES FOR CHRISTMAS FESTIVITIES	95051000	
Exports			
9503	DOLLS OF WOOD (HS Code of Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds: Of wood)	95030010	Rs. 405 Crore
	DOLLS OF PLASTIC (HS Code of Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds: of plastic)	95030030	
	OTHER -HS Codes of Other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds	95030090	
	HS code of stuffed toys -	950341	

HS code family	HS code description	HS codes	2012-13
	working or not; puzzles of all kinds		
	HS code of stuffed toys - (Family head - Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds)	950341	00
	others -HS Codes of Other toys; reduced-size ("scale") models and similar recreational models, working or not; puzzles of all kinds	950349	90

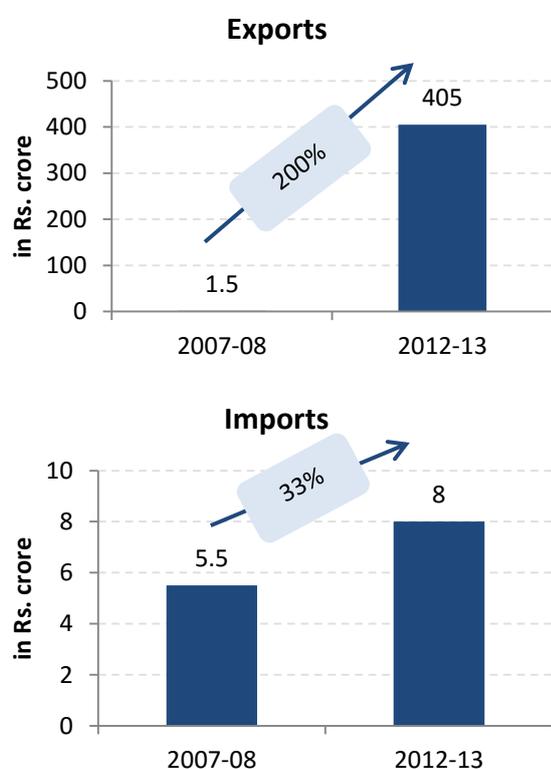
*source: IMAcS analysis, DGcIS

The above data depicts import of soft toys and not plush fabric

*As per analysis of DGcIS & inputs from key players

The export import trend for stuff toys is as shown in the following exhibit:

Exhibit 290: Import export trend



Source: IMAcS analysis, DGFT, DGcIS

The top five countries from where the product is imported into India are:

1. China
2. United States of America (USA)
3. United Kingdom (UK)
4. Japan
5. Germany

The top five countries to which the product is being exported to are:

1. United States of America (USA)
2. Denmark
3. Canada
4. Australia
5. United Kingdom

However, most of the exports occur in the form of finished stuff toys and not of the plush fabric.

Quality Standards

The stuffed toys should be Azo free and also free from harmful substances like lead and cadmium which can be very harmful to the kids. The quality standards applicable to stuffed toys are:

BIS Code	Description
IS 9873: Part 1: 2001	Safety Requirements for Toys - Part 1: Safety Aspects related to Mechanical and Physical Properties
IS 9873: Part 2: 1999	Safety Requirements for Toys - Part 2: Flammability Requirements
IS 9873: Part 3: 1999	Safety Requirements for Toys - Part 3: Migration of Certain Elements

In addition, the standards applicable to the toy industry are EN-71, ASTM, BS-5665, AS1647, CPSC etc.

Blind And Blind Fabrics

Window blinds are blinds used for covering and shading of windows so as to allow optimum amount of light as required. These are substitute of curtains made up of blind fabric, threads and supporters made of wood, metal or plastic components. The fabric used in blinds is termed as blind fabric and it is the Technical Textile component of the window blind. These fabric special properties of temperature control, opacity and or fire retarding properties either due to the virtue of the raw material used or through technical coatings on the fabric.

Product Characteristics

The blind fabric is then fabricated into strips of 25 cm width which are used along with slate and string to prepare the final blind. These strips can be cut to any length based on the requirement. Window blinds are mainly of three types:

1. Vertical blinds – these have longitudinal strips of fabrics which can be rotated to up to 90 degree for exposure of light. These are now less commonly used and are quickly being replaced by roller blind which is in fashion.
2. Roller blinds: - These have horizontal strips of blind fabrics supported by strings. These are now commonly used due to its ease of operation and better lighting.
3. Venetian blinds – Venetian blinds are window blinds have wood strips instead of fabrics. These are commonly used for aesthetic places like restaurants.

Blinds are made of variety of materials; the material chosen depends on the aesthetic and functionality required. The desired functional performance include light and glare control, desired outside view, ease in handling and maintenance, acoustic performance, etc. The most common window blinds are Slat blinds, which consist of many horizontal slats, usually of metal or vinyl, connected with string in such a way that they can be rotated to allow light to pass between the slats, rotated up to about 170 degrees to hide the light, or pulled up so that the entire window is clear. Vertical blinds consist of slats of stiffened fabric, plastic, or metal hanging by one end from a track. Like the horizontal versions, the slats can be rotated 90 degrees to allow light to pass through or to fold up on one side of a door or window. Vertical blinds exhibit better control over the extent of natural or exterior light entering the room because of the ability of slats to close tightly.

Venetian blinds have horizontal slats, one slat above another. They are suspended by strips of cloth called tapes or by cords which are able to tip them each at the same time up to 180 degrees. There are also lift cords passing through holes in each slat. When these cords are pulled, the bottom of the blind moves upward causing slats to rest on each other as the blind is raised. Venetian blinds are basic slatted blinds made of metal or plastic; wooden slats are sometimes used but these are usually referred to as wood blinds or bamboo blinds. Slat width varies between 16 mm and 120 mm, the most common width being 50 mm.

Other varieties of window blinds include Mini blinds (venetian blinds with very narrow slats usually 25 mm wide), Micro blinds (with slats usually 12 mm wide), Louvers (fabric or poly vinyl), Jalousies, Brise Soleil, Holland blinds, Pleated blinds, Honeycomb blinds (similar to pleated shades except that there are two or more layers joined at the pleats to form compartments that trap air, providing insulation), Roman shades, and roller shades. The Louvers vary in width from 50 mm to 125 mm, but the most popular ones are the 100 mm louvers.

Market Size and Trade Trends

Market for blinds is mainly dependent on the institutional demands from Hotels, hospitals, office complexes and institutions. The total market for blinds has been estimated using the growth of office real-estate in India and its estimated blind requirement. The total domestic market for blinds is estimated to be Rs. 538 Crore.

Exhibit 291: Market size estimate – Blind fabric

	2012-13
Quantity (in Mn. Metres)	9.8
Value (in Rs. Crore)	538

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The commercial establishments like offices, hospitals, hotels etc. account for majority of domestic demand for blinds. Vertical blinds are the most popular in offices whereas Roman blinds are used in hotels. Roman blinds are also preferred for farm houses. The growth in domestic demand for blinds is expected to be driven by the infrastructure development planned in the country. The domestic market for blind fabric is expected to grow at 12% per annum during the next three years, with increase in penetration and growth of commercial real estate market.

Key Manufacturers

Key manufacturer of blind fabrics in India are Hunter Douglas India, Alps Industries, Mac Decor and Aerolux India Ltd

Import Export Scenario

Import of blinds and blind fabrics in India has considerable reduced over time indicating growth of indigenous manufacturing. The exports have also declined during the last five years.

Exhibit 292: Import export trends – Blind fabric

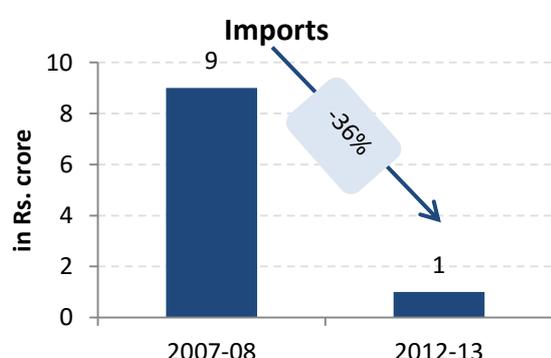
HS code family	HS code description	Applicable HS codes	2012-13
Imports			
5407	Woven fabrics obtained from high tenacity yarn of nylon or other polyamides or of polyesters - bleached other polyester fabrics	54071029	Rs. 1 Crore
5806	narrow fabrics consisting of warp without weft assembled by means of an adhesive (bolducs).- Of cotton - 'narrow	58063190	

HS code family	HS code description	Applicable HS codes	2012-13
	fabrics etc, other of cotton		
7019	HS Codes of Glass fibres (including glass wool) and articles thereof (for example, yarn, woven fabrics) Slivers, roving, yarn and chopped strands - made of 'other woven fabrics	70195900	
Exports			
5407	Woven fabrics obtained from high tenacity yarn of nylon or other polyamides or of polyesters - bleached other polyester fabrics	54071029	
5806	narrow fabrics consisting of warp without weft assembled by means of an adhesive (bolducs).- Of cotton - 'narrow fabrics etc, other of cotton	58063190	-
7019	HS Codes of Glass fibres (including glass wool) and articles thereof (for example, yarn, woven fabrics) Slivers, roving, yarn and chopped strands - made of 'other woven fabrics	70195900	

*source: IMaCS analysis, DGCIIS

The export import trend for blind fabrics is as shown in the following exhibit:

Exhibit 293: Import export trend



Source: IMaCS analysis, DGFT, DGCIIS

The top countries from where the product is imported into India are:

1. China
2. United States of America (USA)
3. Republic of Korea
4. Malaysia

Export of blind fabrics from India is insignificant

Filter Fabrics - HVAC And Vacuum Cleaner

Filter fabrics are used in home products like air conditioning, vacuum cleaner and HVAC – Heating Ventilation and Air Conditioning System, commonly known as Air Handling units (AHU). AHU is used to provide cooling and heating solutions for large spaces like offices, shopping malls, institutions, etc.

The HVAC filters include pre filters, medium efficiency filters and or High Efficiency Particulate Air (HEPA) filters. HEPA filters are high efficiency filters capable of removing 99.97% of airborne particles of 0.3 micrometers (µm) diameter. Filters capable of removing 99.999% of dust, pollen, moulds, bacteria and any airborne particles of size 120 nano metres or larger from the air are categorised as ULPA or Ultra Low Penetration Air filter

Vacuum cleaners have a filter to remove the dust from the exhaust air. The dust is collected in a paper bag which can be disposed off. Some of the vacuum cleaners also use HEPA filters.

Product Characteristics

Filter media used in air filters are nonwoven fabrics laid perpendicular to the air flow to arrest the solid particulate matter. Air filters can be either mechanical filters or electrostatic filters (electro statically enhanced filters). Most of the filters fall under the category of mechanical filters and depend on four primary filtration mechanisms - sieving, impaction, interception, and diffusion. Filters are characterized by their filtration efficiency, MERV rating and Micron size.

Filtration efficiency: Filtration efficiency can be calculated using the following formula

$$\text{Filter Efficiency} = 1 - \left(\frac{\text{Particles Downstream}}{\text{Particles Upstream}} \right)$$

MERV Rating or Minimum Efficiency Reporting Value is a number from 1 to 16 that is relative to an air filter's efficiency. The higher the MERV, the more efficient the air filter is. A higher MERV creates more resistance to airflow because the filter media becomes denser as efficiency increases. The table below gives the application areas of various types of filters.

Exhibit 294: Filter fabric applications

Filter Efficiency	MERV ratings	Application
95%	>14	Final filter in hospital and other clean room HVAC systems.
85%	>13	Commercial applications like research Labs.
65%	>11	Standard commercial buildings, such as office space.
25%	>6	Pleated panel filters, used in office environments, and as pre-filters.
<20%	1 to 5	Pre filters, used in window and split air conditioners

Micron size: The micron size is indicative of the size of particles which can be removed by a particular type of filter. Based on this filters can be classified as follows:

Exhibit 295: Filter fabric classification

Micron size	Classification
>10	Pre filter
5 to 10	Medium efficiency filters
< 5	High efficiency filters

The filter media should have appropriate anti static properties to prevent build up of static charge due to dust particles which can lead to an explosion. The pre filters are generally re-usable as they can be washed when the filter medium gets choked. The HEPA filters on the other hand are disposable type.

Market Size and Trade Trends

The demand for filter fabrics is mainly driven by HVAC filters and room AC filters. The demand for vacuum cleaner filters on the other hand is relatively much smaller. The market for filter fabrics is derived from the demand of HVAC systems. The HVAC industry can be broadly classified into the following two segments:

Split And Window Type Air Conditioners

The type of filter used varies with each manufacturer. Most of the air conditioners use pre filters. The manufacturers have to balance the conflicting objectives of minimizing the power consumption and maintaining the air quality.

Centralized Air Conditioners

The demand for centralized air conditioning is derived from various commercial and industrial buildings .Not much attention is given to the quality of air in most cases; cost minimization is the primary goal and hence

pre filters are used. HEPA and microbe filters find application in Pharmaceuticals & Electronics industries, nuclear installations, and hospitals etc where the quality of air is critical.

In a centralized air conditioner the filters are housed in the Air handling unit. An air handler, or air handling unit (often abbreviated as AHU), is a device used to condition and circulate air as part of a heating, ventilating, and air-conditioning (HVAC) system. Usually, an air handler is a large metal box containing a blower, heating and/or cooling elements filter racks or chambers, sound attenuators, and dampers. Air handlers usually connect to ductwork that distributes the conditioned air through the building, and returns it to the AHU. The AHU can have different combinations of pre filter, medium and high efficiency filters .The pre filters remove the large sized particles hence the higher efficiency filter is subject to lesser load.

Air conditioning products are now considered more as a necessity rather than a luxury. The rising disposable incomes and awareness among the people of the respiratory diseases, allergies etc indicate a huge potential for the industry.

Vacuum Cleaner Filters

The demand for vacuum cleaner filters is driven by the demand for vacuum cleaners. The use of vacuum cleaners is mainly concentrated in the urban areas. The demand for vacuum cleaners is triggered by increasing urbanisation & disposable incomes, increasing health awareness, unavailability and rising cost of domestic help and increasing number of working women. As per industry sources the demand is also getting a boost because of number of offices and households using carpets which necessitates use of vacuum cleaners.

Market Size Estimate

The market size estimates for filters used in Room air conditioning, HVAC and vacuum cleaners are as shown in the following exhibit.

Exhibit 296: Market size estimate – filter fabrics

	2012-13			
	Filter in Room AC	Filter in HVAC	Filter in vacuum cleaners	Total
Quantity	2.8 Mn sq. m	0.7 Mn sq. m	0.138 Mn sq. m	3.8 Mn sq. m
Value	Rs. 35 Crore	Rs. 11 Crore	Rs. 1.73 Crore	Rs. 47 crore

**source: IMAcS analysis, inputs from key players awaited*

Key Growth Drivers and Inhibitors

The demand for room ACs and vacuum cleaners which are expected to grow at over 15% per annum and

HVAC is expected to grow at 8% per annum. The overall domestic market of filter fabrics is expected to grow at 15% per annum up to 2015-16.

Key Manufacturers

The major manufacturers of split and window type air conditioners are LG, Samsung, Videocon, Voltas, Blue star etc .Blue star and Voltas are also the leaders in centralized air conditioning industry with Blue star having a market share of around 30%. Some of the major manufacturers of Air filtration products are

- Khosla Profils Pvt. Ltd.
- Thermadyne Private Limited (Faridabad),
- Spectrum Filtration Pvt. Ltd (Kolkata),
- Anfilco Limited(Gurgaon),
- CRE Industries (Delhi),
- John Fowler (Bangalore)

The filter manufacturers source the filter media from outside. Nonwoven filter media requirement is primarily met by imports. Some of the indigenous manufacturers /suppliers are

- Dinesh Mills,
- Supreme Nonwoven,
- Mech Tech Industries (Ahmedabad),
- Biyani Industrial Fabrics (Indore)

Import Export Scenario

Filter fabric is only imported in India. The import of filter fabric in India has declined at 12% y-o-y since 2007-08.

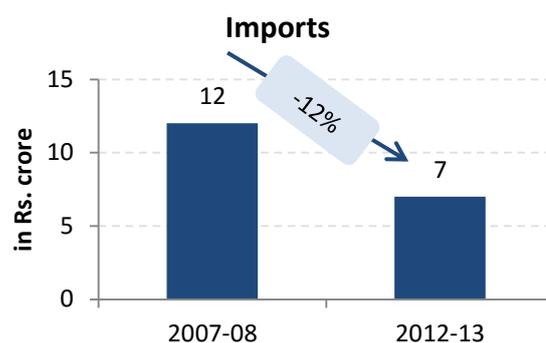
Exhibit 297: Import export trends – Filter fabrics

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
5603	man-made filament weighing between 70g/sqm and 150g/sqm	56031300	Rs. 7 Crore
	other filament weighing >150g/sqm (HS codes of nonwovens, whether or not impregnated, coated, covered or laminated- HS code for manmade filament)	56039400	

*source: IMaCS analysis, DGCIS

The export import trend for filter fabrics is as shown in the following exhibit:

Exhibit 298: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The top countries from where the product is imported into India are:

1. Germany
2. China
3. United States of America (USA)
4. Republic of Korea
5. Taiwan

Export of filter fabrics from India is insignificant

Quality Standards

The relevant BIS standards is

Exhibit 299: Quality Standards - Filter fabrics

Standard	Description
IS 7613: 1975	Method of testing panel type air filters for air conditioning and ventilation purposes

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards are also relevant for the Indian market.

Non Woven Wipes For Home Use

A wipe is a small piece of cloth used for the purpose of cleansing or disinfecting. Wipes could be woven, knitted or nonwoven. Nonwoven wipes have recently gained popularity on account of their excellent absorption and softness. The product is available as dry wipe as well as wet wipe wherein the nonwoven fabric is impregnated with a solution.

Wet wipes are designed for specific application e.g. Baby wipes, Facial wipes, Cleansing wipes, Hand & body wipes, Moist towelettes, Personal hygiene wipes, Feminine hygiene wipes, Antibacterial wipes and Medicated wipes. The usage of baby wipes is considered as a convenient, portable, hygienic way to keep babies clean. Antibacterial wipes help to sanitize shopping trolleys, restaurant tables, etc. to reduce the exposure to germs. They also provide an easy way to maintain clean hands more effectively. Personal care

wipes are specifically designed to carry cleansing crèmes with specific ingredients to help remove makeup. Wipes also find application in manufacturing and service industries especially in food service and health care. The success of nonwoven wipes is driven by their ease-of-use, disposability, portability and reduced risk of cross-contamination.

Product Characteristics

Non-woven wipes are made from viscose, polyester and polypropylene and are available in variety of sizes ranging from 2 X 5 square cm to 30 X 40 square cm. Majority of nonwoven wipes are manufactured by Spun lace technology. The wipes are expected to have the following properties:

- Smooth and soft texture
- Good absorbance characteristics

Good moisture retention properties

These wipes usually come in a pack of 80 wipes.

Market Size and Trade Trends

Busy lifestyle and high disposable income are the key factors for the acceptance of wipes. Wet wipes obviate the need for the use of separate 'wet and dry' combinations in cleaning tasks thus, allowing people to perform daily tasks in substantially less time. Currently the demand for wipes is limited in India but with growing number of middle class families, increasing disposable income and changing lifestyle the demand for wipes is expected to increase in the urban areas. Moreover, product innovations are further likely to boost the demand. Consumption of wipes in foodservice and health care applications is also expected to grow because of heightened health and hygiene concerns

Market Size Estimate

The market of non woven wipes for home use has been estimated using key inputs from wipe manufacturers in India. As per industry sources, Ginni Filaments is one of the largest players producing non-woven wipes in India. Other key producer is Pristine Care products. In addition to these, Precot Meridian and Birla Cellulose have recently entered the wipe market. In addition to that Proctor and Gamble is also in process of opening a manufacturing centre for wipes and baby products in India. Earlier the market was mostly driven by imports, but with recent capacity additions, the share of imports in the market has reduced. Kimberly Clarke Unilever Ltd. is the largest seller of non woven wipes for home use, in India with more than 70% market share. However, the company is not involved in production of wipes and most of its demand is catered either by other suppliers like Ginni Filaments or through exports. Based on inputs of industry members,

the market of non woven wipes is estimated to be of Rs. 35 Crore.

Exhibit 300: Market size estimate – Non woven wipes

	2012-13
Quantity (in Mn. pieces)	762
Value (in Rs. Crore)	34

*source: IMAcS analysis, industry sources

The market of wipes has grown by 14% over the last five years. However, it is only within last one year that many new players have come into the market by setting up their own production facilities in for non woven wipes.

Key Growth Drivers and Inhibitors

The transition of Indian consumer towards easier and leisure products like wipes is occurring in a big ways, with many young people preferring the hassle free way of having a onetime use and throw wipes. The market has grown considerable in the last few years, encouraging many manufacturers to set up production units. The increased sense of hygiene and personal and skin care is a leading driver for growth of wipes industry. The industry also faces steep competition from paper based wipes in the dry wipe segment. The market for non woven wipes is expected to grow at 12% per annum during the next three years.

Key Manufacturers

Ginni Filaments is the largest manufacturer of non woven wipes in India. Other key manufacturers in the industry are Pristine Care products and Precot Meridian.

Import Export Scenario

India is an importer of non woven wipes. However, due to substantial capacity addition in the last one year in India the import of wipes has gone down from Rs. 15 Crore in 2011-12 to Rs. 2 Crore in 2012-13.

Exhibit 301: Import export trends – Non woven wipes

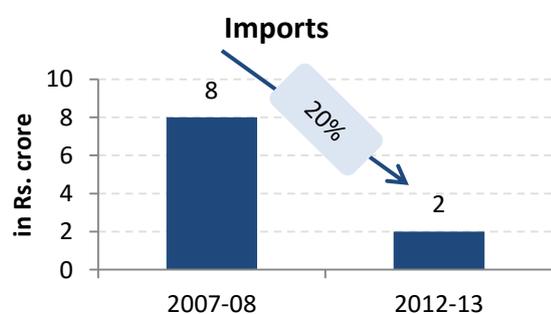
HS code family	HS code description	Applicable HS codes	2012-13
Imports			
4818	Handkerchiefs, cleansing or facial tissues and towels - handkerchiefs, cleaning/facial tissue & towels	4818 2000	Rs. 2 Crore
	Paper and paperboard; articles of paper pulp, of paper or of paperboard // Toilet paper and similar paper, cellulose wadding or webs of cellulose fibres, of a kind used for household or sanitary purposes, in rolls of a	4818 9000	

HS code family	HS code description	Applicable HS codes	2012-13
	width not exceeding 36 cm, or cut to size or shape; handkerchiefs, cleansing tissues, towels, tablecloths, serviettes, bed sheets and similar household, sanitary or hospital articles, articles of apparel and clothing accessories, of paper pulp, paper, cellulose wadding or webs of cellulose fibres of others - OTHR ARTCLS OF PAPP,PAPR PLP,CLLS WDNG ETC		
5603	Nonwovens, whether or not impregnated, coated, covered or laminated weighing between 25G/SQM and 70 G/SQM - MAN-MADE FILMNT WGHNG>25G/SQM	5603 1200	
	Nonwovens, whether or not impregnated, coated, covered or laminated weighing between 70G/SQM and 150 G/SQM - MAN-MADE FILMNT WGHNG BETWN 70G/SQM AND 150G/SQM	5603 1300	
6307	Floor-cloths, dish-cloths, dusters and similar cleaning cloths made of others- OTHERS	6307 1090	
	Other made up articles, including dress patterns of other materials - 'OTHR MADE UP ARTCLS OTHR THN COTTON	6307 9090	

*source: IMaCS analysis, DGCIIS

The export import trend for non woven wipes is as shown in the following exhibit:

Exhibit 302: Import export trend



Source: IMaCS analysis, DGFT, DGCIIS

The top five countries from where the product is imported into India are:

1. China
2. United Kingdom (UK)
3. United Arab Emirates (UAE)
4. United States of America (USA)
5. Taiwan

Machinery Details

Over 50% of the nonwoven wipes are manufactured by Spun lace technology. The web formation for Spun lace production line utilizes carded web making technique. The key machinery used for production of wipes is given below:

- Blow room
- Injection Cards
- Spun lace hydro entanglement line
- Dryer
- Winder
- Slitter
- Folding and cutting line
- The key machinery suppliers are:
- Reiter Perfojet, France
- Fleissner GmbH & Co. (Germany)

Quality Standards

There are no BIS standards for non woven wipes.

Mosquito Nets

The Mosquito net is an essential item used all over the country for protection from mosquitoes; therefore the market of the item exists throughout the year. As other precautions in practice like Mosquito Repellent Mats, Ointment and coils have various side effects; people prefer the use of Mosquito Nets therefore the demand is increasing day by day.

Product Characteristics and Consumption Norm

Nylon net constitutes around 96% of the raw material cost of the mosquito net. The process of manufacture of Nylon Mosquito Net is very simple. A piece of Net cut in rectangle size as per required size. The required rectangle size Net along with Cotton Tape is spread on sewing Machine and stitch from one corner to the end. On an average, around 10 metres or 1.5-2 kg of nylon net is used for manufacturing 1 mosquito net.

Market Size and Trade Trends

The market size estimate for mosquito nets has been arrived through analysis of data on usage of mosquito nets as per the Survey report of NSSO. The industry is very fragmented with many small players. The total estimated market value for mosquito net is estimated to be Rs. 471 Crore. The market has grown by 20% during the last five years.

Exhibit 303: Market size estimate – Mosquito Nets

	2012-13
Quantity (in Mn. metres)	157
Value (in Rs. Crore)	471

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The domestic demand has increased from 90 million metres in 2007-08 to 157 million metres in 2012-13, growing at over 20%. Domestic demand is expected to grow at 15% up till 2015-16.

Key Manufacturers

Mosquito nets in India are manufactured by small scale and cottage industries. The industry is clustered at Karoor in Tamil Nadu which accounts for production of 170 MT to 180 MT.

Import Export Scenario

The import of mosquito nets has increased at 49% from Rs. 7.5 Crore to Rs. 37 Crore while the exports have declined indicating the growing Indian market.

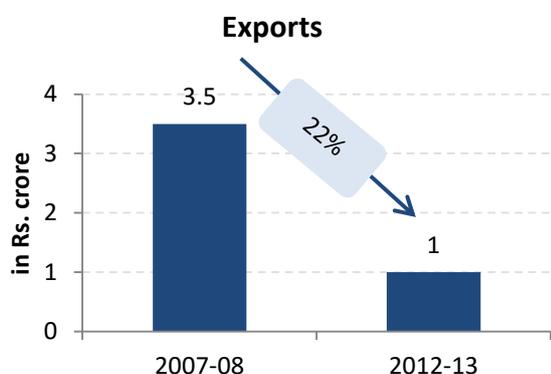
Exhibit 304: Import export trends – Mosquito nets

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
6304	Mosquito nets of cotton, knitted/crocheted	63049270	Rs. 37 Crore
Exports			
6304	Mosquito nets of cotton, knitted/crocheted	63049270	Rs. 1 Crore

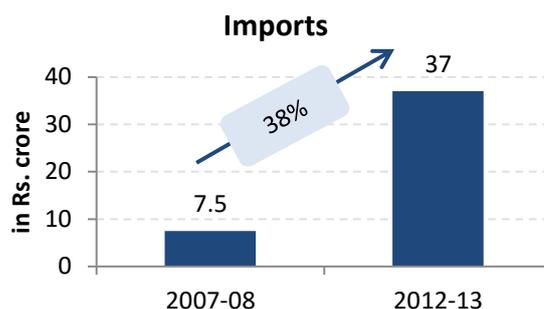
*source: IMAcS analysis, DGCIS

The export import trend for mosquito nets is as shown in the following exhibit:

Exhibit 305: Import export trend



Source: IMAcS analysis, DGFT, DGCIS



Source: IMAcS analysis, DGFT, DGCIS

The top five countries which export mosquito nets to India are:

1. Democratic republic of Vietnam
2. China
3. Thailand
4. Malaysia
5. Taiwan

The top countries where mosquito nets are exported from India are:

1. Australia
2. Germany
3. Tanzania
4. Netherlands
5. United Kingdom

Quality Standards

The standards for mosquito nets are mentioned under BIS standard – IS 9886:1990 and IS 10054:1996.

Furniture Fabrics & Other Coated Fabrics

Indian Furniture industry can be segmented as Home furniture, Office furniture and Contract furniture (majorly the hospitality segment). Fabrics are mainly used in furniture made for seating purposes. Hair, fibre, flock, foam rubber, down, and kapok are used for padding in modern upholstery whereas woven fabrics, plastics, leather and synthetic leather serve as coverings. Other coated fabrics include fabrics coated with amylase and other chemicals mostly used for book covers or as canvas for paintings and protective coverings.

The key furniture fabrics are Flock and velvet fabrics, artificial leather fabrics, jacquard, shanil and other coated fabrics.

Product Characteristics

Woven fabrics including flock and velvet are the most widely used furnishing fabrics in furniture. Both plain and printed flock fabrics with an average GSM of 145 are used for the purpose. Jacquard and Shanil have also gained customer preference as these fabrics are

dust resistant. Artificial leather is another very widely used material for furniture. The popular characteristics of artificial leather (PVC/PU Coated fabric) are given in the following table:

Particulars	Characteristics
Design	Plain, embossed and printed
Backing	High strength PU/ PVC knitted or dyed
Thickness	0.7 mm to 1.2 mm

Home furniture is the largest segment in the Indian furniture market, accounting for about 65% of the furniture sales. This is followed by the Office furniture segment with a 20% share and the Contract segment with a 15% share. Indigenously manufactured furniture dominates the Indian market with around 62% market share of which upholstered home furniture constitutes 30%. Wooden furniture comprises the largest share (about 65%) of the furniture in India followed by metal furniture with a 25% share and plastic furniture with a 10% share. Furnishing fabric finds application majorly in the wooden furniture segment.

Steady growth in the Indian economy and the consequent rise in living standard has significantly influenced the Indian furniture industry. The key demand drivers for the industry include changing consumer demographics, real estate/housing boom and growth in tourism/hospitality industry. Increased propensity to spend on lifestyle and consumer products, driven by trends like increase in number of double income families, ease of financing for consumer durables and exposure to global products has also positively impacted the furniture sector. These factors are expected to drive demand for furniture and thus, furniture fabric in the future. Moreover, hotel industry is witnessing an increase in the capacity at a rate of 15% per annum which also augurs well for the industry.

Market Size and Trade Trends

Furnishing fabrics are used in a variety of applications. Artificial leather and flock fabrics have become the leading segments within furniture fabrics. The use of artificial leather as furniture fabrics accounts for roughly 10% to 12% of total artificial leather industry. The market size has been arrived considering inputs of various key manufacturers. Only artificial leather, coated fabrics, velvets, flock fabrics and other coated fabrics have been considered, while the normal furnishing fabrics like polyester meshes, jacquard and shanil fabrics have not been considered as part of Technical Textiles.

Market Size Estimate

The estimated market size of furniture fabric and other coated fabrics in 2012-13 is of 148 million metres

worth Rs. 2,004 Crore with domestic market of 110 million metres worth Rs. 1,482 crore and exports of Rs. 522 crore.

Exhibit 306: Market size estimate – Furniture & Other coated fabrics

	2012-13
Quantity (in Mn. sqm metres)	148
Value (in Rs. Crore)	2,004

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

Growing furniture industry of India is the strongest driver for furniture fabrics in India. In the furniture segment the home furniture account for close to 65% of all furniture requirements. It is the main driver for furniture fabric industry. However, in recent years, the import of furniture has picked up and organised retailing of furniture is slowly catching up. As more and more imported furniture come to India, the scope of value addition on the furniture by placing furniture fabrics decline resulting in lower demand for furniture fabrics in India. The market is expected to grow at 12% per annum during the coming three years.

Key Manufacturers

Key manufacturers of furniture fabrics in India are: Flock fabric manufacturers – Chiripal Group, Gujarat Flotex and Flocksur India Pvt. Ltd. and that of artificial leather are Jasch industries limited, Mayur Uniquoters and Fenoplast. In case of velvet fabrics, Raymond is the key organised manufacturer across India.

Import Export Scenario

India is a major importer and exporter for furniture fabrics. In the last five years, the import of furniture fabric in to India has gone down by 11% while the export has grown by close to 34%.

Exhibit 307: Import export trends – Furniture & Other coated fabrics

HS code	HS code description	Applicable HS codes	2012-13
Imports			
5801	VELVET	58013140	Rs. 375 Crore
	HS code - 07'Warp pile fabrics, épinglé (uncut) of others - 'OTHERS	58013490	
5806	Jute webbing	58063920	
	Other narrow fabrics of jute	58063930	
	Fabrics consisting of warp without weft assembled by	58064000	

HS code	HS code description	Applicable HS codes	2012 -13
	means of an adhesive(bolducs)		
5901	Textile fabrics coated with gum etc used for outer book covers, cotton	59011 010	
	Prepared painting canvas (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like: prepared painting canvas)	59011 020	
	Others (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like: others)	59011 090	
	Others (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like; tracing cloth; prepared painting canvas; buckram and similar stiffened textile fabrics of a kind used for hat foundations: others)	59019 090	
5903	Imitation leather cloth of cotton laminated plated etc with PVC	59031 010	
	textile fabrics impregnated, coated, covered or laminated with plastics with PVC - other fabric impregnated, laminated plated and coated with PVC	59031 090	
	Imitation leather cloth of cotton laminated plated, coated, etc with polyurethane	59032 010	
	textile fabrics impregnated, coated, covered or laminated with plastics with PU - other fabrics impregnated laminated plated and coated with polyurethane	59032 090	
5907	Textile fabrics covered with textile flocks on the base fabrics of cotton	59070 011	

HS code	HS code description	Applicable HS codes	2012 -13
	textile fabrics covered with textile flocks on base fabrics of man-made textile material	59070 012	
	textile fabrics covered with textile flocks on base fabrics of other textile material	59070 019	
Exports			
5801	VELVET	58013 140	
	HS code - 07'Warp pile fabrics, épinglé (uncut) of others - 'OTHERS	58013 490	
5806	Jute webbing	58063 920	
	Other narrow fabrics of jute	58063 930	
	Fabrics consisting of warp without weft assembled by means of an adhesive(bolducs)	58064 000	
5901	Textile fabrics coated with gum etc used for outer book covers, cotton	59011 010	
	Prepared painting canvas (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like: prepared painting canvas)	59011 020	
	Others (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like: others)	59011 090	
5903	Others (textile fabrics coated with gum or amylaceous substances, of a kind used for the outer covers of books or the like; tracing cloth; prepared painting canvas; buckram and similar stiffened textile fabrics of a kind used for hat foundations: others)	59019 090	
	leather cloth of cotton laminated plated etc with PVC	59031 010	
	textile fabrics impregnated, coated, covered or laminated with plastics with	59031 090	

Rs. 522 Crore

HS code	HS code description	Applicable HS codes	2012-13
	PVC - other fabric impregnated, laminated plated and coated with PVC		
	Imitation leather cloth of cotton laminated plated, coated, etc with polyurethane	59032010	
5907	textile fabrics impregnated, coated, covered or laminated with plastics with PU - other fabrics impregnated laminated plated and coated with polyurethane	59032090	
	Textile fabrics covered with textile flocks on the base fabrics of cotton	59070011	
	textile fabrics covered with textile flocks on base fabrics of man-made textile material	59070012	

*source: IMaCS analysis, DGCIIS

The export import trend for is as shown

Exhibit 308: Import export trend

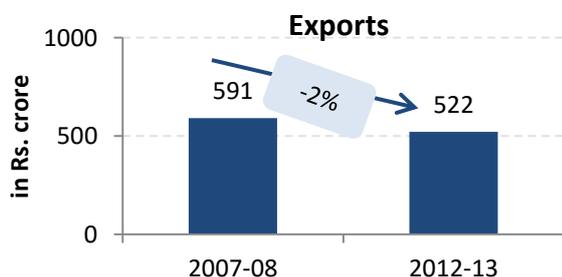
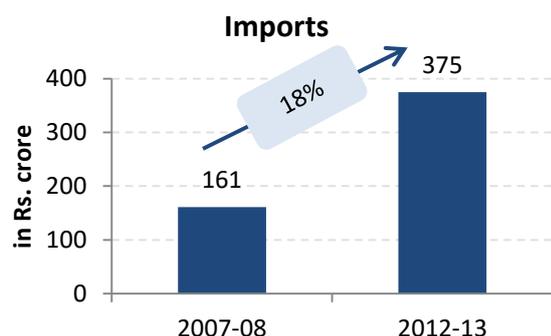


Exhibit 309: Import trend - coated fabrics



Source: IMaCS analysis, DGFT, DGCIIS

The top five countries which export furniture fabrics to India are:

1. China
2. Republic of Korea
3. Taiwan
4. United Kingdom
5. Italy

The top countries where furniture fabrics are exported from India are:

6. Saudi Arabia
7. United States of America (USA)
8. United Arab Emirates (UAE)
9. Sri Lanka
10. Nigeria

Machinery Details

The machinery required for making of coated fabrics and furniture fabrics includes coating line, mixers, printing machines, embossing machines, etc. Major suppliers of these machines are listed below:

- Isotex, Italy
- Matex Italy
- Web Processing, UK
- Coatema, Germany
- Zimmer, Germany

Suppliers of Coating and Flock printing machines:

- A.T.E. Private. Limited
- A.T.E. Enterprises Private Limited
- Harish Enterprise Pvt. Limited
- Kusters Calico Machinery Limited
- Shreeji Engineering & Marketing Services
- Stovec Industries Limited

Quality Standards

The upholstery fabric is tested for basic parameters like Tensile Strength, Tear Strength, Elongation and GSM. Some materials undergo tests to check their stain resistance and flame resistance. In many cases Weather meter is also used to check the UV degradation due to sunlight and ageing.

20. Protech

Protective Technical Textiles are speciality textiles that provide protection to the person wearing in hazardous situations like fire, chemical exposure, protection from bullets and explosions and extreme temperatures and other extreme atmospheric conditions.

List of Products

The major products under the segment are as follows:

- Bullet Proof Jackets
- Fire retardant Apparels
- Fire retardant Fabrics
- Nuclear and Biological Suits
- Chemical Protective Clothing
- High visibility clothing
- Industrial gloves
- High Altitude Clothing
- Other Protective clothing – Wind cheater and rain coats



Bullet proof jackets



Fire retardant clothing and fabrics



Nuclear and Biological suits



Chemical protective clothing



High visibility clothing



High altitude clothing



Industrial gloves



Fire retardant fabrics

Market Size and Trends

The total estimated market size of Protech is estimated to be Rs. 1988 Crore in 2012-13 including export potential. The entire market is catered mostly by domestic production with imports limited to just 5%.

The segment is projected to reach Rs. 2,722 crore by 2015-16 growing at 9% CAGR and further to Rs. 3,139 crore by 2017-18. The product wise market size has been shown in the following exhibit.

Exhibit 310: Market summary of Protech

Protech		2012-13					2013-14 (E)		2015-16 (P)	
Product	Unit	Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Bullet Proof Jackets*	Rs. Crore	522	1	54	469	523	57	525	63	658
	lakh nos.	2	0	0	2	2	0	2	0	3
FR Apparel	Rs. Crore	158	1	122	36	158	147	43	211	62
	lakh. nos.	14	0	11	3	14	13	4	19	6
FR Fabrics for furnishings	Rs. Crore	223	-	-	223	223	-	241	-	281
	lakh mtrs	63	-	-	63	63	-	68	-	80
Nuclear & Biological Protective Clothing	Rs. Crore	9	6	-	16	16	-	18	-	22
	nos.	6,502	4,470	-	10,972	10,972	-	12,289	-	15,415
Chemical Protective clothing	Rs. Crore	15	4	-	19	19	-	23	-	33
	lakh nos.	1	0	-	1	1	-	1	-	2
High visibility clothing	Rs. Crore	76	-	-	76	76	-	81	-	91
	lakh mtrs	59	-	-	59	59	-	62	-	70
Industrial gloves	Rs. crore	1,263	-	1,010	253	1,263	1,162	290	1,536	384
Industrial gloves (T T component)	Rs. Crore	189			189	189	-	189		288
High Altitude clothing	Rs. Crore	420	189	-	609	609	-	658	-	768
	lakh pieces.	4	2	-	6	6	-	7	-	8
Other protective clothing	Rs. Crore	145	29	72	102	174	83	112	110	136
	lakh. nos.	58	11	28	41	70	33	45	44	54
Total	Rs. Crore	1,757	231	248	1,739	1,988	286	1,890	383	2,339

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Market size is calculated as Domestic market + Exports

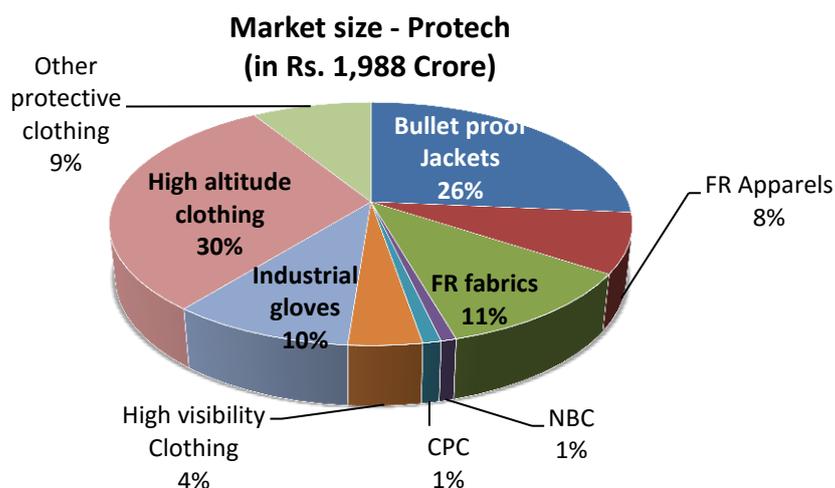
*Market of Industrial glove components as been estimated as 15% of total industrial glove exports. Import of gloves is Rs. 7 Crore.

#estimated market is based on 20% of total raincoat and windcheater exports

§ Estimation of ordinance factory production considered

Bullet proof jackets, High altitude clothing, industrial gloves and fire retardant apparels and fabrics are the biggest component of the segment. Other key segments are outer protective clothing and high visibility clothing. Product segment wise market share has been shown in the following exhibit.

Exhibit 311: Market size pie product wise



Source: IMaCS Analysis

Key players of the industry

The key players of the segment are as follows:

- Ordinance factories
- JCT Ltd
- Tata Advanced Materials Ltd.
- Entremonde Polycoaters
- S M Group
- Kusumgar Corporates
- MKU Pvt. Ltd
- Tara Lohia Pvt. Ltd.
- Shri Lakshmi Cotsyn Defence
- Mallcom India Ltd.
- Tencate India Ltd.
- Rajda Exports
- Rajasthan Spinning and Weaving Mills
- Reflectosafe
- .

The profitability of the key players has been shown in the following exhibit:

Exhibit 312: Profitability of key Protech players

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Tata Advanced Materials Pvt. Ltd.	22647	24727	-70%	-79%
MKU India Pvt. Ltd.	7430	6796	6.2%	3.4%
SMPP Pvt. Ltd.	3163	3634	-	-
Rajasthan Spinning & weaving Mills Ltd	111266	115956	3%	-1%
JCT Ltd.	-	24766	-	-9%
Arvind Ltd.	327141	278568	7%	12%
Mallcom India Ltd.	4408	4139	2%	3%
Tara Lohia Pvt. Ltd.	115	167	-5%	0%
Entremonde Polycoaters	-	1122	-	1%
Kusumgar Corporates	-	7377	-	2%
Rajda Exports	-	1200	-	2%
Alok Industries Ltd.	-	1479498	-	6%
Loyal Textile Mills	71013	77310	0%	0%
Shri Lakshmi Cotsyn Defence	215703	232291	-21%	5%

Source: Annual reports, IMaCS analysis, Capitaline, VCCedge, MCA

High Potential Products

Protech is a growing segment of the Indian Technical Textile industry having and is expected to grow at 10% during the next three years. The key products in the segment that show very promising prospects are:

- **Fire Retardant Apparels:** With the growing awareness and the new draft policy for amendment in the factories act which would instruct the factory owners to provide adequate protective clothing to workers, the demand for fire retardant apparels in India is expected to grow. The product mostly caters to the oil and gas and steel and industries wherein workers have to work in hazardous and high temperature environments. The market has grown at 16% during the last five years and is expected to grow at 20% during the coming years. The exports of Fire retardant apparels have also seen a significant

rise in last three years and present a good potential for growth.

- **Personal Protective Jackets:** Another segment showing high potential for growth is the personal protective jackets, which have grown at 16% during the last years and are expected to grow at 12% during the coming years. The demand for personal protective jackets has seen a surge with high value tenders coming in play from local decentralised tenders. There is also a vast demand which has not been supplied to by both the Indian players and imports. This presents a significant opportunity for new players to enter. However, the industry is also constrained by the fact that most of the purchases are by institutional players which happens via tender approach

The detailed analysis of each product has been done in the subsequent sections

Bullet Proof Protective Jackets - BPF

Personal protective clothing is comprised of the bullet proof vests and executive body armours. This is one of the oldest industries the world has known. However, it was only during the World wars that extensive research was done in this field and the traditional body armour comprising of steel plates was replaced by ballistic nylon in 1940s. It stayed in fashion for the next 30 years, till 1965, when Stephaine Kwolek a scientist working with DuPont, succeeded in producing the polymer **Poly Para Phenylene Teraphthamide** through polymerisation. In today's world it is commonly known as Kevlar and is the base fibre for most of the body armour being woven today. In addition to Kevlar, today non-woven Spectra shields are also being used as body armour.

Product Characteristics

The bullet-proof jackets are made from Aramid, Nylon 66, UHMPE, Carbon fibres or PBO. Each jacket weighs about 5 kilograms and is expected to have the following properties:

1. Light weight
2. Comfortable to wear
3. Facilitate body movement
4. Ability to spread the projectile energy efficiently

Each jacket has about 0.6 square metres of non-woven material weighing around 750 GSM. Bulk of the jacket is made from woven material as the combination of weave and the fibre characteristics influence the energy absorption characteristics of bullet-proof

jacket. The synthetic fibre (Aramid) used in production of bullet-proof jackets is primarily imported (DSM Netherlands/DuPont etc) with the exception of carbon glass fibre. The average life of a bullet proof jacket is about 7 years.

Market Size and Trade Trends

With the rising trend of crime, violence and terrorism, the demand for bullet-proof jackets is rising as well. The major customers of bullet-proof jackets are Defence, Paramilitary forces engaged in counter terrorism/insurgency operations and Law enforcement agencies (police). Despite high demand, there are only a few suppliers in the market. Most of the purchase of bullet proof jackets is done via tenders floated by Ministry of Home affairs – for police and paramilitary requirement, Ministry of Defence – for requirements of Indian armed forces and by respective states in small lots. A major chunk of the demand from armed forces is catered by the Ordinance equipment factories. Last three years has seen an upsurge in demand of Bullet proof jackets from various government organisations especially with tenders of big value being floated. In 2009-10, Ministry of Home Affairs floated a tender for procurement of 59,000 bullet proof jackets. This was the first tender of such a big value. Recently in 2011-12, Ministry of Defence has floated a similar tender for procurement of 1.86 lakh jackets the largest procurement tender ever to come out in India. In addition to these, every State floats its own tender for procurement of BP jackets; however these are of relatively smaller quantity ranging from 500 to 1000 jackets at a time. Besides this there is also retail demand for BP jackets. Close to 90% of the tenders are

for procurement of BP jackets of quality standard III A, which is sufficient for protection against A K 47 bullets.

Market Size Estimate

The total domestic market for Bullet proof jackets in India is estimated to be of 1.87 units worth Rs. 469 Crore. In addition India also does exports to the tune of Rs. 54 Crore. The total market is of 2.09 lakh units worth Rs. 523 crore.

Exhibit 313: Market size estimate – Bullet Proof Jackets

	2012-13
Quantity (in lakh nos.)	2.09
Value (in Rs. Crore)	523

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Key growth drivers for market of bullet proof jackets are:

- **Increasing terror threat:** With the increasing terror threat, the requirement for bullet proof vests and jackets for VIPs and VVIPs have increased in goods numbers. In Addition, to that, the use of bullet proof jackets in non-active field areas by the security forces has also increased, leading to the growth in market for Personal protective jackets.
- **Demand from security forces:** Indian Army, Reserve services and Police services have a very high demand for bullet proof jackets. Given the size of Indian Army, it is mandated that Indian Army should have close to 3.5 lakh bullet proof jackets at a time, however, Indian armed forces currently has just around 1.5 lakh jackets. With an attempt to bridge this gap, the Government is going for large scale purchases of bullet proof jackets which are driving the market forward. As a result the overall requirement of personal protective jackets in the security forces has increased.

With increased focus on protective jackets and large volume tenders being floated by the Government agencies, the domestic market is expected to grow at 12% per annum during the next three years.

Key Manufacturers

Other than ordinance factories, Bullet proof jackets are manufactured by selects other industry players. The major manufacturers are

- Tata Advanced materials Ltd (TAML)
- MKU Pvt. Ltd
- SM Fabric Pvt. Ltd. – SMPP Pvt. Ltd.
- Anjani Technoplast Pvt. Ltd.

Import Export Scenario

India is a net exporter of bullet proof jackets. The total export of bullet proof jackets in 2012-13 was of 34,000

units valued at Rs. 57 Crore. Exports have grown rapidly from Rs. 4.2 Crore in 2007-08 Imports on the other hand was insignificant at just Rs. 65 lakh.

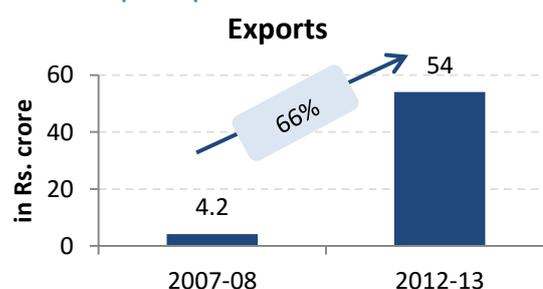
Exhibit 314: Import export trends – Bullet Proof Jackets

HS code family	HS code description	Applicable HS codes	2012-13
Imports			
6210	Personal protective garments (e.g. bullet proof jackets, bomb disposal jackets etc)	621040 10	Rs. 1 Crore
Exports			
6210	Personal protective garments (e.g. bullet proof jackets, bomb disposal jackets etc)	621040 10	Rs. 54 Crore

*source: IMaCS analysis, DGCIS

The export import trend for Bullet proof jackets is as shown in the following exhibit:

Exhibit 315: Import export trend



Source: IMaCS analysis, DGFT, DGCIS

The imports of bullet proof jackets into India is mainly from United Kingdom and Singapore which together account for 80% of total imports. Other key countries are Spain, USA and Switzerland.

The top five countries to which India exports bullet proof jackets are:

1. Egypt
2. United Arab Emirates
3. Nepal
4. Bangladesh
5. Tunisia

Egypt and UAE together account for close to 90% of exports.

Quality Standards

The Quality standards and testing for bullet proof vests is done at the Terminal Ballistic Research Lab (TBRL) of DRDO in India since 1970s. It follows U.S National Institute of Justice (NIJ) Standard 0101.06 for evaluation of bullet proof jackets. However TBRL does not certify any bullet proof vests. To test the bullet proof jackets in addition to the perforation resistance testing, Perforation and Back Face signature (P-BFS)

test is performed. In this test, the measure of the energy delivered to the tissue by a non-perforating projectile is taken to identify the amount of injury and trauma that it would cause to the weaver. Based on the standard bullet proof vests can be classified into five types enumerated in the following exhibit:

Exhibit 316: Quality standards for Bullet proof jackets

S. No	Type of Armour	Ammunition used for testing	Ammunition weight for testing	Ammunition velocity for testing
1.	Armour Type IIA	9mm full metal jacket rounded .40 S&W full metal jacket bullet	8gm 11.7 gm	373 m/ s + - 9.1 m/s 352 m/ s +- 9.1 m/s
	Armour Type II	9mm full metal jacket rounded .357 Magnesium jacketed soft point bullet	8gm 10.2 gm	398 m/ s + - 9.1 m/s 436 m/s+- 9.1 m/s
3.	Armour Type IIIA	.357 SIG full metal Jacket flat nose bullet .44 Magnesium semi jacketed hollow point bullet	8.1 gm 15.6 gm	448 m/ s +-9.1 m/s 436 m/s+- 9.1 m/s
	Armour Type III	7.62 mm full metal Jacket steel Jacketed bullet	9.6 gm	847 m/ s +-9.1 m/s
5.	Armour Type IV	0.3 caliber armour piercing bullet	10.8 gm	878 m/ s +-9.1 m/s

Fire Retardant Apparels

The fire/flame retardant apparels have an industrial need as they offer protection from fire and other heat intensive tasks. Flame, heat and splashes of molten metal etc. are hazards in many heavy engineering working conditions. The fire retardant apparels are used in refineries, iron and steel plants, aluminium plants and welding industries.

Product Characteristics:

The typical characteristics of fire retardant (FR) apparel are:

1. Flame resistance – must not catch fire
2. Should be breathable
3. Easy to wear

4. Light weight
5. Should have high abrasion resistance

FR Apparel can be developed in two ways:

1. **Chemical coating of cotton fabric with FR chemical.** The chemical generally used for coated fire retardant fabric is PYROVATEX® from Huntsman International. The apparel made from coated fabric generally has a basis weight of 250-350 GSM. The fabric used could be either woven or knitted. The coated fabric which accepted worldwide could have flaws due to incomplete coverage of fire retardant chemical on the fabric surface which would pose threat with aging.
2. **Apparel made from inherent FR fibre:** FR fibres are fibres having the technical properties, where in the molecules swells when in presence of heat, providing the person, longer protection from fire. The advantage of apparels made from FR fibres, is that the resistance to fire does not degrade after washing. Following are a few fibre retardant fibres used of this production of apparel:

Exhibit 317: Fibres having fire resistant properties

Generic name	Fibre	Manufacturer
Aramid (Meta)	Nomex	DuPont
Aramid (Para)	Kernel/Kevlar/Twaron	Rhone-Poulence/DuPont/Akzo (Holland)
Mod-acrylic	SEF/Kanecaron	Monsanto (Italy)/Kaneka (Japan)
Polyamide	P84	Lenzing (Austria)
Vinal	Vinex FR9B	Westex

Source: Industry sources

Market Size and Trade Trends

The market of fire retardant apparels is primarily driven by increased awareness, international level of safety standard in industrial workplace and mandatory safety norms for protection of workers. The fire retardant apparels are generally used in industries where operations have to be done in high temperature zones or industries where highly inflammable products are being handled. The key industries requiring FR apparels are:

1. Iron and Steel industry for use in Blast furnace.
2. Welding industry
3. Oil Refineries and Oil drilling stations.

In addition to these, defence establishments and fire department also procures FR apparels.

Market Size Estimate

The market size for FR apparels has been estimated using the inputs from the supply side. Mallcom India Ltd, Tarasafe International, Tara Lohia and Chandramukhi Impex are the leading manufacturers of FR apparels in India. The estimated total market size of FR apparels in India is of 14.3 lakh pieces valued at Rs. 158 Crore in 2012-13. While domestic market has grown at a moderate pace, the potential and market for exports have grown tremendously to Rs. 122 Crore.

Exhibit 318: Market size estimate – Fire Retardant Apparel

		2012-13
FR Apparel	Quantity (in Nos.)	14.3 Lakh
	Value (in Rs. Crore)	Rs. 158 Crore
FR Fabric required	Quantity (in lakh metres)	43 Lakh
	Value (in Rs. Crore)	Rs. 116 Crore

*source: IMaCS analysis, industry sources

Key Growth Drivers and Inhibitors

Currently the market is being driven by the growing demand for export, which has grown by leaps and bounds. The domestic market is driven by the usage in oil and gas industry and chemical industry. The recent legislation bill for amendment of factories act 2014 proposes a new section - “35 A” which states that occupier of the factory has to supply suitable protective work wear in goods and hygienic conditions to the workers as necessitated by the hazardous exposure. These protective work wears should adhere to either Indian or International standards. With this amendment coming in the factories act, the domestic demand for FR apparels is expected to grow at 20% per annum in the next three years. The export demand for FR apparels from India has seen a significant growth in the last five years and is expected to grow at 20% during the coming years.

Key Manufacturers

Major manufacturers of FR apparel in India are Mallcom India Limited, Tarasafe International, Tara Lohia Pvt. Limited and Chandramukhi Impex.

Import Export Scenario

While imports of FR apparels are insignificant, export of FR apparels has grown tremendously from Rs. 4.4 Crore in 2007-08 to Rs. 122 Crore in 2012-13. The HS codes under which exports were made can be seen in the following exhibit.

Exhibit 319: Import export trends – Fire Retardant Apparel

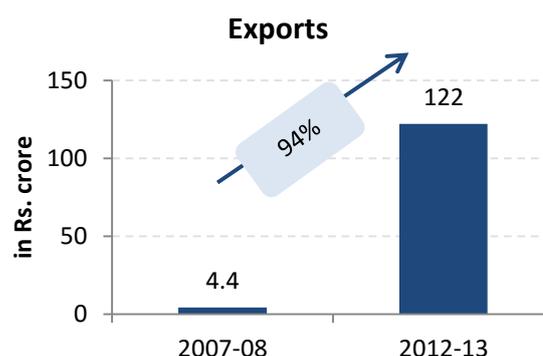
HS code family	HS code description	Applicable HS codes	2012-13
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HS code family	HS code description	Applicable HS codes	2012-13
Imports			
6210	Garments made up of non woven fabric or felts that are coated, laminated or impregnated	62101 000	Rs. 0.66 Crore
	Articles of apparel and clothing accessories, not knitted or crocheted // Garments, made up of fabrics suitable for Industrial use or of non woven or felt and wades -other personal protective garments	62104 090	
Exports			
6210	Garments made up of non woven fabric or felts that are coated, laminated or impregnated	62101 000	Rs. 122 Crore
	Articles of apparel and clothing accessories, not knitted or crocheted //Garments, made up of fabrics suitable for Industrial use or of non woven or felt and wades -other personal protective garments	62104 010	

*source: IMaCS analysis, DGCIS

The export import trend for fire retardant apparels is as shown in the following exhibit:

Exhibit 320: Import export trend - Fire Retardant



Source: IMaCS analysis, DGFT, DGCIS

The top countries importing FR apparel from India are:

1. Saudi Arabia
2. United Arab Emirates (UAE)
3. Malaysia

Quality Standards

Fire retardant apparels are covered under BIS: IS: 13501:1992 and IS: 11871:1986 and IS: 12777:1989. In addition to these following standards under BIS are applicable on fire retardant fabrics:

- IS 12467: 2005
- IS 15589:2005
- IS 15590:2005
- IS 15612:2005
- IS 15727:2005
- IS 15741:2007
- IS 15748:2007
- IS 15758:2007
- IS 15764:2007 & 2008
- IS 15768:2007
- IS 15781:2007
- IS 15782:2007

The companies in India also follow the European Standard like EN 512 based on the level of protection need to be offered to the person wearing the apparel Fire retardant Fabrics

Fire retardant fabrics are either synthetic fabric made of fibres that have inherent fire retardant properties or fabrics having a coating of fire resistant chemicals. These fabrics have properties that delay the spread of fire or provide insulation against heat and flame thereby providing crucial extra time to the person using it.

Fabrics With Fire Resistant Coatings

Fire retardant clothing and fabrics saw its beginning in early 1700s when Obadiah Wyld of the then Great Britain developed first fire retardant coating for fabrics. However, the development of fire retardant fabrics took momentum only after 1912 when William Perkins using Stannic oxide developed a fire retardant coating that could withstand up to two years of washing. Based on his research the chemical Tetra (Hydroxymethyl) Phosphonium Chloride (THPC) was developed in 1953 for commercial use as flame retardant coating. Further research led to identification of PNBEs which are currently used as fire retardant coating chemicals. These chemical delay the spread of fire in the following ways:

1. Promotion of char formation
2. Conversion of volatile gases into non-ignitable gases through chemical reaction in presence of heat.
3. Forming a glaze on the surface of the fabric
4. Free radical termination in the gaseous phase

Fabrics With Inherent Fire Resistant Properties:

Fabrics with inherent fire retardant properties are the ones that are made up of fibres that resist combustion. Although it is a misnomer to call them fire retardant, but they take a longer time to catch fire and hence help in applications where fire retardant is required. These fibres in particular aramids swell when due to heat providing a cushion to the wearer.

Common types of inherent fire retardant fabrics used are:

Exhibit 321: Different FR fibres

Generic name	Fibre	Manufacturer
Aramid (Meta)	Nomex	DuPont
Aramid (Para)	Kernel/Kevlar/T waron	Rhone-Poulence/ DuPont/ Akzo (Holland)
Mod-acrylic	SEF/ Kanecaron	Monsanto (Italy)/ Kaneka (Japan)
Polyamide	P84	Lenzing (Austria)
Vinal	Vinex FR9B	Westex

Market Size and Trade Trends

The market for FR fabrics in India is driven by institutional demand from Railways and Airways. It is estimated that railways has a requirement of around 10 to 15 lakh metres of Railways. However the market for FR fabric for usage in seat covers of airlines has declined recently as many airlines are now purchasing furnished air craft's. In addition to the above mentioned requirement, demand of FR fabric for use in auditoriums, multiplexes and commercial places is also growing at a slow rate.

Market Size Estimate

The market size estimate for the market of FR fabrics has been estimated using the supply side inputs. The total market size of FR fabric in India for 2012 – 13 is estimated to be of 63 lakh metres valued at Rs. 223 Crore.

Exhibit 322: Market size estimate – Fire Retardant Fabric

	2012-13
Quantity (in metres)	63 Lakh
Value (in Rs. Crore)	Rs. 223 Crore

**source: IMAcS analysis, industry sources*

The market has grown at 5% mostly due to inflationary price change. The overall market in volume terms has seen a very trivial change in the last five years.

Key Growth Drivers and Inhibitors

The key industries which drive the off-take of fire retardant fabric are given below:

- All building and constructions need to get fire safety clearance from the fire department. However these clearances are more from the construction perspective rather than furnishing perspective. With boom in retail and real estate there has been rapid emergence of shopping complex, malls, cinema multiplex etc. There is need of fire retardant fabrics in these areas from the security point of view.
- Airlines, Railways and Ships are another key market

- Office furnishings and hospitals and another key sector

The fabrics find application in curtains, sheers, upholstery, stage curtains, blankets, bedding, wall coverings and blinds. However the awareness of these materials is low and there is no regulation on usage of these materials from the safety perspective which hinders the market off-take. As a result the market of institutional and office building is still largely un-tapped with very low penetration. The market is expected to grow at 8% per annum during the coming three years.

Key Manufacturers

Key manufacturers of FR fabrics in India are:

- Arvind Mills
- JCT Ltd.
- RSWM Ltd.
- JayaShree Textiles
- Delkon India Pvt. Ltd.

Import Export Scenario

International trade of fire retardant fabrics is insignificant; however, the key chemical used for

Nuclear Biological And Chemical Protection (NBC) Suits

Hazardous material (Hazmat) suits were designed to protect users handling hazardous waste material such chemicals, radioactive material etc. A more specialized variety of these suits are NBC (Nuclear Biological and Chemical) suits. Developed to protect soldiers, these are designed to protect the user in a hostile environment with chemical/biological agents and against radioactive fallout dust. The suits are designed to be worn for extended periods while continuing to operate in a combat environment.

Product Characteristics

The Nuclear Biological and Chemical protection suit consists of a trouser and jacket and can be used directly over the under garments. The suit is permeable and allows evaporation of sweat (breathable). The suits are made in different sizes, generally these sizes are: small, medium, large and extra-large.

The suit is made of three layers:

1. Inner layer: Fabric cotton
2. Middle layer: Active charcoal treated non-woven
3. Outer layer: Fabric with chemical and fire retardant fibres (inherently retardant). The outer fabric has disruptive printing to

making coated FR fabrics – Pyrovatex, a brand of Huntsman International is mostly imported into India.

Quality Standards

Fire retardant furnishing fabrics are covered under BIS: IS: 13501:1992 and IS: 11871:1986 and IS: 12777:1989. In addition to these following standards under BIS are applicable on fire retardant fabrics:

- IS 12467: 2005
- IS 15589:2005
- IS 15590:2005
- IS 15612:2005
- IS 15727:2005
- IS 15741:2007
- IS 15748:2007
- IS 15758:2007
- IS 15764:2007 & 2008
- IS 15768:2007
- IS 15781:2007
- IS15782:200
- In addition to these major manufacturers of FR fabrics also adhere to British and other European standards. camouflage the soldiers and the base material for this coated fabric is polyester

The physical characteristics of the NBC suit are given below:

1. Fire/Heat/Cold/Water repellent outer fabric
2. Breathable
3. Effective in the temperature range of -35°C to +55°C
4. Resistance to wear and tear – high abrasion resistance
5. Can be decontaminated at least two times
6. Washable

The major manufacturing of NBC suits in India is done by Ordinance factory. DRDE, Gwalior has been involved in research and development of NBC suits in India. Currently India manufactures **NBC suit category MK IV**.

The salient features of the same are:

- Weight of up to 3 kg
- Biological protection of up to 24 hours
- Life of three wash cycles
- Shelf life of five to seven years

DRDE is currently involved in development of advanced version of this suit **NBC suit MK V**. The new product would be very similar to the German counterpart - CBRN suits which is currently being imported in India.

The salient features of the same are:

- Weight of less than 2.5 kg
- Biological protection of more than 24 hours
- Life of up to six wash cycles

The product is expected to be in production in by 2014.

Market Size and Trade Trends

Total of 41145 NBC MK IV suits has been produced by Ordnance factory till date costing a total of Rs. 41.9 Crore. At an average life of five years, the market for indigenous production of ordinance factory is estimated at Rs.8.4 Crore. There has been no import of NBC suits in 2012-13. With the development of new NBC MK V suits, Indian Army has already put up request for 40,000 new suits, which would be priced at Rs. 25,000.

Market Size Estimate

The estimated market for NBC suits in India is shown in the following exhibit:

Exhibit 323: Market size estimate – Nuclear & Biological protection clothing

	2012-13
Quantity (in Nos.)	10,972
Value (in Rs. Crore)	Rs. 16 Crore

**source: iMaCS analysis, industry sources*

Key Growth Drivers and Inhibitors

With the increase in biological and nuclear threats, Indian Armed forces are gearing up for better protection. As armed forces are the major buyer of NBC suits, the usage norm and requirement of Armed forces is expected to drive the market in the coming years. With Army gearing up to purchase new MK V suits once they are in production, the market is set to rise in the coming years. However, the growth in market would be sporadic and for the next three years it is expected to be around 12% per annum.

Key Manufacturers

Ordnance Factory is the key manufacturer of NBC suits. However lately private organisations like Entremonde Polycoaters and Sri Lakshmi Cotsyn Defence have also started production of NBC suits in India. Companies like Entremonde Polycoaters and Kusumgar are involved in developing breathable fabrics and other fabrics for NBC suits.

Import Export Scenario

Advanced NBC suits are generally imported from Germany. Those are called CBRN suits. The import of CBRN suits is estimated to be roughly about 20% of the supply from Ordnance factories. For 2012-13 the imports are estimated to be of Rs. 6.4 crore. The CBRN suits in India are imported mostly from Germany.

Quality Standards

The quality standard for NBC suits is set by DRDE Gwalior who is the main researching body for development of NBC suits in India.

Chemical Protective Clothing (CPC)

Chemical Protective Clothing (CPC) is used for protection from chemical and physical hazards. The chemicals get absorbed into the human body by two ways:

- Physical contact-The chemicals gets absorbed through the skin
- Inhalation: The chemicals in gaseous state get absorbed in to the body through breathing.

Chemical protective clothing is used for protection of the whole body against toxic chemicals which manifest their effect by absorption through skin.

Product Characteristics

The CPC suits can be classified into two categories:

- Durable:** The durable Chemical protective clothing is made of non-permeable textile fabrics (PVC/Rubber coated fabrics).The protection is achieved by blocking the penetration and permeation of the chemicals through the fabrics in the clothing. This is an effective method for providing sufficient protection to professionals from contact of toxic chemicals. These fabrics do not allow air or moisture permeability which leads to stress and drop in productivity.
- Disposable:** The disposable Chemical protective clothing (CPC) is made of non woven fabric and can be used for 3-4 times .The disposable CPC provide better air and moisture permeability. Permeable type of clothing is preferred over impermeable type due to low heat stress and comfort, enabling use for a longer duration. The carbon-containing material developed so far includes carbon-coated non-woven fabric, carbon-impregnated polyurethane foam, hard carbon microsphere-adhered woven fabric and activated charcoal cloth.

The non woven fabrics are also used as overalls in various industries and the demand of such products is picking up. The CPC clothing includes gas masks, hoods etc to prevent against airborne toxic agents.

Market Size and Trade Trends

The demand for Chemical protective clothing (CPC) in India is almost entirely of the durable type. Typically PVC coated fabrics are used. The base fabric is made up of cotton or a mix of polyester cotton. The demand of CPC is from Chemicals and Chemical Products, Paints, Dyestuff, Petroleum industries etc. These suits are required by the workers engaged in the chemical handling section. The demand from Chemicals and Chemical Products industry accounts for 70 % of the total demand of the chemical protection suits. In

addition to that anti grease CPC are used in Oil and Petroleum industry. These suits are coated with neoprene rubber as other coated fabrics are not suitable. The other fabrics swell after repeated exposure to oil. The key demand drivers are the growth of chemical and chemical product industry and increasing awareness of occupational health and safety issues

Market Size Estimate

The total market potential for Chemical protective clothing (CPC) in India has been shown in the following exhibit.

Exhibit 324: Market size estimate – Chemical Protective Clothing

	2012-13
Quantity (in Lakh nos.)	0.96
Value (in Rs. Crore)	19.2

*source: IMaCS analysis, industry sources

*Inputs from key players are awaited

Key Growth Drivers and Inhibitors

As Chemical Industry of India is the major consumer of Chemical protective clothing (CPC) followed by Petroleum Industry, the growth of these industries would be a major driving force for the industry in India. Along with this, formation of norms and regulations for usage of Chemical protective clothing (CPC) in hazardous working environment would give a boost to the industry. In this regard the latest amendment proposed in factories act in 2014 which suggests that suitable protective work wear in goods and hygienic condition has to be supplied by the occupier of the factory to the workers, would help boost the market. The domestic market is expected to grow at 20% per annum.

Key Manufacturers

Key manufacturer of Chemical protective clothing (CPC) in India are:

- Sai Synergy Ltd.
- Intech Safety Pvt. Ltd
- Venus Safety Equipments

Import Export Scenario

India has been importing Chemical protective clothing (CPC) since 2011-12. The estimated import of CPC is Rs. 4.4 Crore.

Exhibit 325: Import export trends – Chemical Protective Clothing

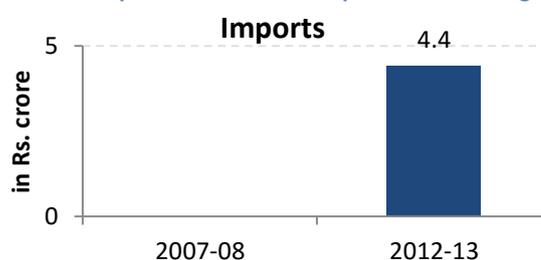
HS code family	HS code description	Applicable HS codes	2012-13
Imports			

HS code family	HS code description	Applicable HS codes	2012-13
6210	Garments made up of non woven fabric or felts that are coated, laminated or impregnated	62101000	Rs. 4.4 Crore
	Articles of apparel and clothing accessories, not knitted or crocheted // Garments, made up of fabrics suitable for Industrial use or of non woven or felt and wades -other personal protective garments	62104090	
Exports			
6210	Garments made up of non woven fabric or felts that are coated, laminated or impregnated	62101000	-
	Articles of apparel and clothing accessories, not knitted or crocheted // Garments, made up of fabrics suitable for Industrial use or of non woven or felt and wades -other personal protective garments	62104010	

*source: IMaCS analysis, DGCIIS

The export import trend for chemical protective clothing is as shown in the following exhibit:

Exhibit 326: Import trend – Chemical protective clothing



Source: IMaCS analysis, DGFT, DGCIIS

The top countries exporting chemical protection suits to India are Canada, China, United Kingdom, United States of America (USA) and Netherlands

Quality Standards

BIS specifies the CPC clothing parameters in under the codes of IS 5071: 2002 and IS 15758: 2007.

High Visibility Clothing

High visibility clothes (also known as Reflective-wear) have become very essential for the protection of people working in poorly lit environments like mines, highways, airport runways, cyclist etc. In the dark, the high visibility clothing increases the ability to spot working and guiding personnel

Product Characteristics

There are broadly three types of high visibility clothing:

- Reflection materials which shine when struck by light
- Photo luminescent material which give yellow light in dark
- Fluorescent material which is more visible even during the day

Photo luminescent materials absorb the artificial light and emit green-yellow light in the darkness. Zinc Sulphide crystals which are not radioactive and non toxic pigments. Fluorescent materials convert energy from non-visible UV rays into visible. These are useful during daylight but offer little protection in the dark as they do not emit or reflect light.

The high visibility clothing is available in two classes:

- Suits with plastic tapes
- Suits with glass beads – or retro-reflective tapes – these give visibility up to 600 meters. Retro-reflective tapes are based on the principle that if the incident rays of light fall on concave glass, the reflected rays travel back in the same direction. This enhances the visibility of the person wearing garments consisting of retro reflective tapes. The technology involves coating of highly reflective glass beads with density as much as 50,000 tiny glass beads per square inch light.

Ideal high visibility apparel should have the following characteristics

- Light weight
- Both day and night visibility.
- Air and moisture permeability to ensure wearer comfort (Breathing perforated cloth mesh allows air and moisture through, enabling the vest to be worn over clothing in any weather.)
- Universal one-size-fits-all design features so that jackets/Vests can be shared by the employees working n different shifts.
- Hemmed edges for durability and neatness

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- Universal one-size-fits-all design features so that jackets/Vests can be shared by the employees working n different shifts.
- Hemmed edges for durability and neatness

Market Size and Trade Trends

The key driver for high reflective clothing is the requirement of personnel visibility in ill-light areas of work both from service delivery and safety perspectives. The awareness of these products is low however is growing gradually with usage is airport, police, municipality, mining construction etc. The market in India is nascent and almost all the products are imported and marketed in India.

Market Size Estimate

The market of High visibility has been estimated through supply side mapping. Reflectosafe is the largest player in the Industry having about 40% market share, with a production of 2.35 million metres per annum. The total market for high visibility clothing is estimated to be Rs. 76 Crore.

Exhibit 327: Market size estimate – High Visibility Clothing

	2012-13
Quantity (in Mn. metres)	5.85
Value (in Rs. Crore)	76

**source: IMaCS analysis, industry sources*

Key Growth Drivers and Inhibitors

The growing use in construction companies and traffic police clothing is helping the market grow. The use of reflective vest however is not controlled by any government guidelines, which has prevented strong enforcement of use of high visibility clothing. The market is expected to grow as the employment in construction and infrastructure development industry

increases. The market has been growing moderately and is expected to grow at 6% during the next three years.

Key Manufacturers

The high visibility clothing manufacturers source the clothing and tape and fabricate the jacket/vest. There are no manufacturers of these fabrics in India and these are sourced from Korea and China.

Some of the key suppliers of high visibility clothing are given below:

- Reflectosafe, Mumbai
- Loyal Textiles, Chennai
- Intech Safety Private Limited, Kolkata
- Safety Solution Inc., Bangalore
- Delkon Textiles Pvt. Ltd., Faridabad

Delkon manufactures woven base fabric of safety jackets (as per EN 471) and then fabricates safety jackets. They have supplied them to Govt. Organisations in the past. The retro-reflective tape used during fabrication is usually imported. They have a capacity to manufacture and fabricate 3 lakh safety jackets as per EN 471 per year.

Import Export Scenario

Import and export of high visibility clothing from India has been insignificant.

Quality Standards

There are no set quality standards for high visibility clothing

Industrial Gloves Components

Industrial hand gloves are a part of personal protective equipments, serving as an item of protective apparel for workers in factories. They are classified under Cut-Slash Protection as well as Thermal Protection. Gloves are best for protection from rough objects, sparks and heat, and for cushioning from blows in heavy-duty work requirements. Hand gloves come in different sizes of 14 inches, 16 inches and 18 inches. The different types of industrial gloves and their respective usage have been mentioned in the following exhibit:

Exhibit 328: Types of industrial gloves

S.No	Type of glove	Benefits	Applications
1.	Nitrile Gloves	Resistance to cut, puncture and snag	For Dry grip
2	PVC impregnated textile gloves	High abrasion resistance	For Dry, wet and oily grip
3	Leather	High	For use in high

S.No	Type of glove	Benefits	Applications
	gloves with Kevlar or p-aramid layer	temperature and abrasion resistance	temperature applications and for handling sharp equipments
4.	Rubber gloves (Not a Technical Textile)	High electrical resistance	Used in applications where electrical equipments and wirings need to be handled and for surgeries and medical applications

The typical characteristics in industrial gloves are as given below:

1. Mild heat resistance
2. High abrasion protection
3. Better grip with anti slip coating
4. Comfortable and durable
5. Protection against cut and hot splash
6. For gloves made from Aramid (para) – temperature tolerance ranges from 250 to 750 Centigrade

Industrial gloves are usually made of three base fabrics - cotton, nylon or polyester. Each of these is used specific to the operation condition and the coating of either Nitrile or PVC is impregnated as required. Besides, these, some gloves meant for specific industrial use may also have addition layer of special fabrics like Kevlar, Nomex, spectra or p-aramid to provide better temperature resistance, fire resistance, cut resistance, etc.

Market Size and Trade Trends

India is a major exporter of Industrial gloves to the world. More than 80% of the production of industrial gloves is exported. In the domestic market industrial gloves are used in applications where cut and temperature protection needs to be present. However, due to lack of any enforcing agency or guidelines, the use of industrial gloves is limited to a few hazardous industries only.

Market Size Estimate

Based on the export of industrial gloves from India, the total production of gloves in India and hence the market size has been estimated. Industrial gloves market in India is estimated to be Rs. 1,263 Crore, with exports accounting for Rs. 1,010 Crore. The Technical Textile component in the industrial gloves is limited to

just 15%. Hence total market of Technical Textile component in industrial gloves is Rs. 189 Crore.

Exhibit 329: Market size estimate – Industrial gloves (T T Component)

	2012-13	
	Industrial gloves	T. T component
Quantity (in Mn. pairs)	166	
Value (in Rs. Crore)	1,263	189

*source: IMaCS analysis, industry sources

The domestic market has grown by 31% y-o-y while exports have shown exponential growth.

Key Growth Drivers and Inhibitors

- The market of work gloves or industrial gloves is primarily driven by increased awareness, international level of safety standard in industrial workplace and mandatory safety norms for protection of workforce. Some of the key end-use applications are:
- Iron and steel industry, where some of the big steel producers such as TISCO, SAIL, Ispat Industries and Essar Steel have been investing further.
 - Welding applications
 - Oil Refineries
 - Construction
 - Pharmaceuticals and Chemical Industries

The awareness and usage level of these gloves in the Indian industry is limited compared to International worker safety standards. Majority of the Indian production gets exported with little demand from domestic market. The export market of industrial gloves has shown tremendous growth and is expected further to grow at 15% during next three years.

The latest proposed amendment in factories act which suggests that suitable protective work wear in goods and hygienic condition has to be supplied by the occupier of the factory to the workers, would help boost the domestic market which is expected to grow at 15% during the next three years.

Key Manufacturers

Key manufacturers of industrial gloves in India are:

- Mallcom India Ltd.
- Rajda exports
- Lumen India

Import Export Scenario

India is a leading exporter of gloves with glove exports of Rs. 1010 Crore in 2012-13.

Exhibit 330: Import export trends - Industrial gloves (T T Component)

HS code	HS description	HS code	2012-13	
Imports				
4015	Industrial gloves	40159030	Industrial glove import Rs. 7.6 Crore	-
4203	Gloves for use in industry	42032910		
6116	Gloves mittens and mitts impregnated coated/ covered with plastic/ rubber, knitted/ crocheted	61161000		
Exports				
4015	Industrial gloves	40159030	Industrial glove export Rs. 1010 Crore	Value of TT component Rs. 151 Crore
4203	Gloves for use in industry	42032910		
6116	Gloves mittens and mitts impregnated coated/ covered with plastic/ rubber, knitted/ crocheted	61161000		

*source: IMaCS analysis, DGCIS

The export import trend for industrial gloves is as shown in the following exhibit:

Exhibit 331: Import export trend - Industrial gloves (T T Component)

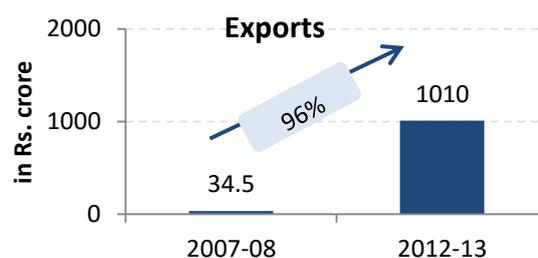
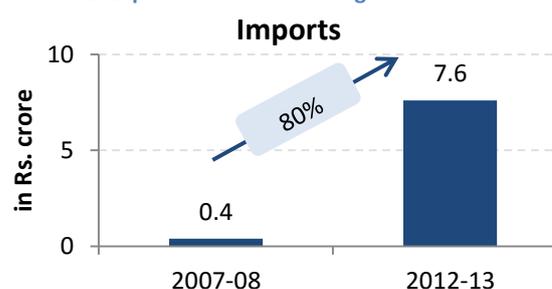


Exhibit 332: Export trend - Industrial gloves



Source: IMaCS analysis, DGFT, DGCIS

Key countries where industrial gloves are exported are Germany, United States of America, Chile, Netherlands and Italy.

Quality Standards

The companies in India follow the EN or the European Standard like EN 512 based on the level of protection need to be offered to the person wearing the gloves

High Altitude Clothing

High altitude clothing are used for protection against extreme weather conditions like extremely low temperature, high velocity winds, snow fall etc. especially in critical combat areas which are on average 12000 ft above sea level like Siachen. The clothing at high altitudes needs to meet both functional and comfort properties.

Product Characteristics

The high altitude clothing consists of jacket and windcheater, waist coat, trousers, glacier cap, rappelling gloves and glacier gloves. The gear typically weight of special clothing is around nine to ten kilograms. The typical characteristics of high altitude clothing are:

1. Hydrophilic - Waterproof and moisture resistant
2. It has a breathable membrane of Poly Utherane
3. Abrasion resistance
4. Maintain high integrity

The material used for these clothing is typically hydrophilic polyurethane coating or PTFE coating, Gore-Tex coating or Sympatex coating. The hydrophilic properties are introduced by these coatings or laminates. Micro-porous coatings or laminates can be produced by mechanical fibrillation, phase separation, solvent extraction or solvent exchange. The inner jacket is usually made of fleece and rest of the items are 100% polyester. The general specification of products is:

- Jackets are usually about 2.4 kg in weight and are made of fleece and polyester, having waterproof coatings and a thermal vest.
- Trousers are usually 1.2 kg in weight again made of 100% polyester

Market Size and Trade Trends

The major market for high altitude clothing is from the defence services, in particular Indian Army. In addition to the defence, High altitude clothing is also required by high altitude mountain climbers. However, this is a very small part of the entire market. Currently Indian Army has 1.325 million soldiers in active field area.

Assuming that 20% of these would require high altitude clothing, the estimated demand for high altitude clothing is roughly 2.65 lakh. Approximately 10% of the total demand is of clothing for very high altitude.

Currently Ordnance factories are the major producer of HAL clothing producing 2.5 lakh ECWCS jackets and close to 4 lakh Extreme Weather Clothing (EWCS) trousers. Other than Ordnance factories few specialised private players like Shri Lakshmi Cotsyn Defence have also started production of HAL clothing. However, these are still in pilot phase. In addition to this, imports have been increasing to cater to the demand of very high altitude clothing which domestic production is unable to cater to.

Market Size Estimate

The estimated market for high altitude clothing in India is about 6.1 lakh units worth Rs. 609 crore with imports contributing 31% to the total market.

Exhibit 333: Market size estimate – High Altitude clothing

	2012-13
Quantity (in Lakh nos.)	6.1
Value (in Rs. Crore)	609

**source: IMaCS analysis, industry sources*

Key growth drivers and Inhibitors

The key growth driver for high altitude clothing is the Indian Army and its consumption trends. In the last five seven years, the quality standards of the clothing being supplied to the Indian Army personnel has improved a lot. More sets are being provided with higher quality. Based on this trend the market is dependent on how the scale of clothing of high altitude operations would vary. In addition to that, the continuously increasing size of the Armed forces is expected to impact the market in a proportional manner. Secondly, although a very small part, the growth of mountaineering as a sport in India would also provide a boost to the manufacturers specially the private ones, it seems to be in a distant future. The market is expected to grow at 8% per annum during the next three years, on account of growing demand from armed forces.

Key Manufacturers

The key manufacturers of high altitude clothing are given below:

1. Ordnance Factory, Shahjahanpur
2. Shri Lakshmi Cotsyn Defence – The Company has started the trial productions of High altitude clothing after its capacity expansion in 2011. It aims to become a major player in this segment in the near future.

In addition to these there are many Technical Textile players who supply the key raw materials to the Ordnance factories for production of HAL clothing. These are Entremonde Polycoaters - suppliers of breathable membrane fabrics, SRF, S Kumar's, Reliance, Kusumgar and Ginni Spectra.

Import Export Scenario

Currently exports from India are insignificant. However, High altitude clothing is being imported into India to cater to the demand of very high altitude. The imports are in the tune of around 52,600 units worth Rs. 189 crore. However due to absence of well specified HS codes for depiction of high altitude clothing, data is not available.

Quality Standards

Quality standard for the products of ordinance factories is taken care of by DRDO.

Outer Protective clothing

Outer protective clothing includes products like wind cheaters and rain coats made out of fabrics. These clothing items provide protection to the person from extreme weather, wind and are water resistant to keep the person dry.

Product Characteristics

Rain jackets and wind – cheaters come in various types. These products are constructed in a way to protect the person from rain as well as strong winds. Each type utilizes different materials to choose from, as well as varying levels of protection and breathability. Rain jackets also come in a variety of colours and shapes to allow women to remain fashionable while being protected. The different types of rain coats available are:

- Breathable water proof rain coats – The waterproof/breathable type of rain jacket provides wearers with the protection from precipitation while the breathability of the fabric allows perspiration vapours to escape. It is recommended for use in Mountaineering, bird watching and other application where the wearer needs to put the jacket on for a longer time.
- Breathable water resistant jackets – Water Resistant rain jackets do not prevent rain from penetrating through the material, but they do delay it from happening. These are commonly known as wind cheaters, as the lamination of the fabric prevents strong winds to pass through the fabric. These are recommended for use in areas which face light rainfall.

- Hybrid soft shell jackets - This style of jacket offers a waterproof/breathable laminate that provides the same level of protection as the waterproof/breathable rain jackets. The advantages to purchasing this type of jacket is that they are extremely stretchy and offer protection if stranded in a downpour. These rain jackets are recommended for use by climbers, day hikers, and skiers in spring conditions, backpackers, fitness runners, and trail runners.
- Waterproof non- breathable jackets - This style of rain jacket is made from fully coated materials. This means that rain cannot get in, but sweat cannot escape either. They are meant for emergency use, or extremely minimal activity. This type of rain coats are commonly made of rubber and hence have not been included as a part of the segment.

Market Size and Trade Trends

The market for rain coats in India is mostly concentrated in areas having heavy rainfall like the North East and the Western Ghats. The preference of a rain coat is still very low over umbrellas due to the longer life of an umbrella and easy usability. The market is mostly concentrated in the urban regions.

Market Size Estimate

The market size of protective jackets – rain coats and windcheaters has been estimated using the average per capita spending on such items as per the NSSO survey done in 2011-12. The total market is estimates are as shown in the following exhibit.

Exhibit 334: Market size estimate – Outer protective clothing

	2012-13
Quantity (in Lakh nos.)	70
Value (in Rs. Crore)	174

**source: IMAcS analysis, industry sources*

Key Growth Drivers and Inhibitors

With very limited export of textile rain coats, the market is mainly dependent on the domestic consumption. While the preference of plastic and rubber rain coats is very high in the children segment and the rural areas due to the price factor, textile based rain coats and wind cheaters are preferred by sports person for mountaineering and application where the wearer has to put on a rain coat for longer time duration. The key driver would be the increasing preference for these rain coats due to the comfort that they provide, which is expected to grow as the living standard and per capita income of the Nation rises. The domestic market is expected to grow at 10% per annum during the next three years. The export of raincoats from India has grown at over 20% in the last

three years growing from Rs. 2500 crore to over Rs. 5200 crore. Considering the limited share of textile based raincoats, it is expected that the overall export market would grow at 15%.

Key Manufacturers

Most of the rain coat manufacturers in India belong to the small and Medium scale industry. Key Manufacturers of rain coats in India are:

- Tulsi Corporation – Bangalore

Import Export Scenario

India exported rain coats and wind cheaters valued at Rs. 1.5 Crore and imported rain coats and wind cheaters valued at Rs. 6.1 Crore. However, a majority of these are of plastic or rubber and not based on textiles. The import statistics are:

Exhibit 335: Import export trends - Outer protective clothing

HS code	HS code description	Applicable HS codes
	Imports 2012-13 - Rs. 29 Crore	
6201	Overcoats, Raincoats, Car-coats, Capes, Cloaks And Similar Articles Of Wool/ Fine Animal Hair Not Knitted Or Crocheted	62011100
	Raincoats Of Cotton Not Knitted Or Crocheted	62011120
	Rain coat, windcheaters and there similar articles of cotton	62011290
	Raincoats Of Man-Made Fibres Not Knitted Or Crocheted	62011310
	Rain coats windcheater and similar articles of other fibres	62019990
6202	OVERCOATS,RAINCOATS ETC &SIMILAR ARTICLES OF COTTON	62021200
	Overcoats,raincoats,carcoats,capes,cloaks and similar articles of man made fibres	62021300
	Women's Or Girls' Wind & Ski-Jackets, Wind Cheaters Of Wool Or Fine Animal Hair Not Knitted Or Crocheted	62029110
	Women's Or Girls' Wind & Ski Jackets, Wind Cheaters Of Cotton Not Knitted Or Crocheted	62029210
	Women's Or Girls' Wind & Ski-Jackets, Wind Cheaters Of Man-Made Fibres Not Knitted Or Crocheted	62029310
	Women's Or Girls' Wind & Ski Jackets Of Silk Of Silk Not Knitted Or Crocheted	62029911

HS code	HS code description	Applicable HS codes
	Overcoats,raincoats,carcoats,capes cloaks and similar articles of other textile Materials other than silk	62029990
6210	Outer Garments Of Rubberized Textile Fabrics For Women's Or Girls' Overcoats, Car-Coats, Capes, Cloaks, Anoraks, Wind-Cheaters, Wind Jackets And Similar Articles Other Than Those Of Heading 6202 Not Knitted Or Crocheted	62102010
	Outer Garments For Women's Or Girls' Overcoats, Car-Coats, Capes, Cloaks, Anoraks, Wind-Cheaters, Wind Jackets And Similar Articles Other Than Those Of Heading 6202, Of Fabrics Impregnated, Coated, Covered Or Laminated With Preparations Of Cellulose Derivatives And Other Artificial Plastic Materials Not Knitted Or Crocheted	62102020
	Outer Garments, Men's & Boys' Of Textile Fabrics, Otherwise Impregnated Or Coated Not Knitted Or Crocheted	62102030
	Other Outer Garments For Men's & Boy's Not Knitted Or Crocheted	62102090
	Other Outer Garments For Men Or Boys Of Textiles Impregnated, Coated, Covered Or Laminated With Preparation Of Cellulose Derivatives And Other Artificial Plastic Materials Not Knitted Or Crocheted	62103010
	Outer Garments, Men Or Boys' Of Rubberised Textile Fabrics Not Knitted Or Crocheted	62103020
	Outer Garments, Men & Boys' Of Textile Fabrics, Otherwise Impregnated Not Knitted Or Crocheted	62103030
6307	Life jackets and life belts of cotton	63072010
	Life jackets & life belts of others	63072090
	Exports 2012-13: Rs. 72 Crore	
6201	Overcoats, Raincoats, Car-coats, Capes, Cloaks And Similar Articles Of Wool/ Fine Animal	62011100

HS code	HS code description	Applicable HS codes
	Hair Not Knitted Or Crocheted	
	Raincoats Of Cotton Not Knitted Or Crocheted	62011120
	Rain coat, windcheaters and their similar articles of cotton	62011290
	Raincoats Of Man-Made Fibres Not Knitted Or Crocheted	62011310
	Rain coats windcheater and similar articles of other fibres	62019990
6202	OVERCOATS,RAINCOATS ETC & SIMILAR ARTICLES OF COTTON	62021200
	Overcoats,raincoats,carcoats,capes,cloaks and similar articles of man made fibres	62021300
	Women's Or Girls' Wind & Ski-Jackets, Wind Cheaters Of Wool Or Fine Animal Hair Not Knitted Or Crocheted	62029110
	Women's Or Girls' Wind & Ski Jackets, Wind Cheaters Of Cotton Not Knitted Or Crocheted	62029210
	Women's Or Girls' Wind & Ski-Jackets, Wind Cheaters Of Man-Made Fibres Not Knitted Or Crocheted	62029310
	Women's Or Girls' Wind & Ski Jackets Of Silk Of Silk Not Knitted Or Crocheted	62029911
	Overcoats,raincoats,carcoats,capes cloaks and similar articles of other textile Materials other than silk	62029990
6210	Outer Garments Of Rubberized Textile Fabrics For Women's Or Girls' Overcoats, Car-Coats, Capes, Cloaks, Anoraks, Wind-Cheaters, Wind Jackets And Similar Articles Other Than Those Of Heading 6202 Not Knitted Or Crocheted	62102010
	Outer Garments For Women's Or Girls' Overcoats, Car-Coats, Capes, Cloaks, Anoraks, Wind-Cheaters, Wind Jackets And Similar Articles Other Than Those Of Heading 6202, Of Fabrics Impregnated, Coated, Covered Or Laminated With Preparations Of Cellulose Derivatives And Other Artificial	62102020

HS code	HS code description	Applicable HS codes
	Plastic Materials Not Knitted Or Crocheted	
	Outer Garments, Men's & Boys' Of Textile Fabrics, Otherwise Impregnated Or Coated Not Knitted Or Crocheted	62102030
	Other Outer Garments For Men's & Boy's Not Knitted Or Crocheted	62102090
	Other Outer Garments For Men Or Boys Of Textiles Impregnated, Coated, Covered Or Laminated With Preparation Of Cellulose Derivatives And Other Artificial Plastic Materials Not Knitted Or Crocheted	62103010
	Outer Garments, Men Or Boys' Of Rubberised Textile Fabrics Not Knitted Or Crocheted	62103020
	Outer Garments, Men & Boys' Of Textile Fabrics, Otherwise Impregnated Not Knitted Or Crocheted	62103030
	Overcoats, Raincoats, Car-coats, Capes, Cloaks And Similar Articles Of Wool/ Fine Animal Hair Not Knitted Or Crocheted	62011100
6307	Life jackets and life belts of cotton	63072010
	Life jackets & life belts of others	63072090

**source: IMACS analysis, DGCIS*

**Above data includes all types of raincoats and windcheaters – textiles, plastic and rubber, etc based on DGCIS & input from key players*

Other than the above mentioned HS codes the product is also shipped in HS code family – 3924 & 3926 and 6100

The top countries from where outer protective clothing like raincoats and windcheaters are being imported are: China, Canada, Spain, Denmark, United States of America

The top five countries where protective clothing like raincoats, wind cheaters, etc are exported from India are:

United States of America, Japan, Mexico, Ghana, United Arab Emirates

Quality Standards

There are no set quality parameters of rain coats and win cheaters. However, manufacturers follow the quality parameters as requested by the buyer

21. Geotech

Geotech segment comprises of Technical Textile products used in Geotechnical applications pertaining to soil, rock, earth etc. This class of products is loosely called Geo-textiles. However Geo-textiles specifically refers to permeable fabric or synthetic material, woven or non-woven, which can be used with Geotechnical engineering material).

The principal functions performed by Geo-textiles are confinement /separation, reinforcement, filtration and drainage, and protection. Application areas include Civil Engineering (roads and pavements, slope stabilization and embankment protection, tunnels, rail-track bed stabilization, ground stabilization and drainage etc), Marine Engineering (Soil Erosion control and embankment protection, breakwaters) and Environmental Engineering (landfills and waste management).

Other specialized Geotech products comprise Geo-grids (plastics filaments and tapes etc formed into a very open, grid like configuration having large apertures), Geo-nets (extruded polymer ribs set in net like fashion with small apertures), Geo-membranes (impermeable fabric as barrier), gabions (used to prevent landslides) and Geo-composites (products using two or more Geo-textiles e.g. Pre-fabricated Drains-PVD).



Non woven geo textiles



Woven geo textiles



Geo grids



Gabions



Geo cells



Geo tubes



Geo bags



Prefabricated Vertical Drains (PVDs)

Market Size

The total Geo-textiles Market in India including exports is still in its very nascent stage at just Rs. 683 Crore for 2012-13, 72% of which is based on demand from exports. The market size of geo textiles has been arrived by supply side mapping taking considerable inputs from different key players, secondary sources and associations. The market size of geo-textiles is as shown in the following exhibit. The domestic market is growing at a slow pace and is expected to grow at 8% during the next three years, while the export market has been the key driver for the segment and is expected to grow at 15% per annum during the same period. The market is projected to grow to Rs. 991 crore by 205-16 at 13% CAGR and further to Rs. 1,275 crore by 2017-18.

Exhibit 336: Market summary of Geotech

Geotech	Unit	2012-13					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Geotextiles	Rs. Crore	583	100	503	180	683	578	194	764	227
	in '000 MT.	49	8	42	15	57	48	16	64	19

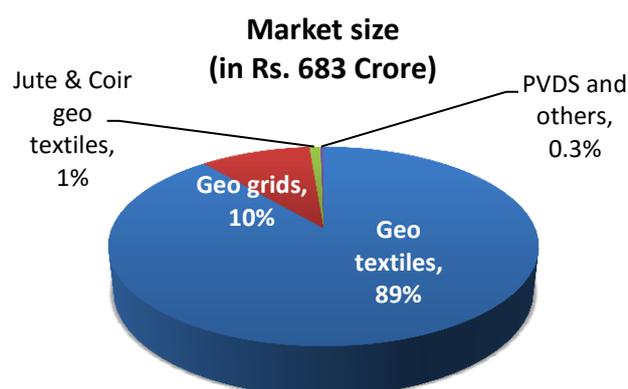
*Source: Annual reports, websites, secondary reports, ITTA, ImaCS analysis

*Does not include geo-membrane market size

The market is mainly constituted by woven and non –woven geo-textiles which make up for 85% of the market. Other key product is geo-grids which make up for 15% of the market. Other products that are increasingly consumed include jute and coir based geo textiles, PVDs and gabions driven by the needs of roads in hilly terrains and dams to prevent landslides. However, most of the gabions used in India are steel gabions and hence they have not been considered as part of Technical Textiles. Other products like geo-tubes, geo-cells, geo-membranes and PVD drains have not penetrated in a big way in Indian markets constitute a very small part of the total market. The market of geo-grids and non woven geo bags and tubes are expected to grow in the coming years. The domestic market for geo-textiles is expected to grow at 8% per annum.

The product wise share in total geo-textile market is as shown in the following exhibit.

Exhibit 337: Market size pie product wise



Source: ImaCS analysis

Profitability of Key Players

Exhibit 338: Profitability of key players - Geotech

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Shri Ambica Polymers	-	-	-	-
Techfab India Industries Limited	5561	5044	4.1%	2.4%
Strata Geosystems Pvt. Ltd	-	2302	-	8%
Neo Corp Ltd.	38717	33077	4%	6%
SKAPS Pvt. Ltd.	-	-	-	-
Terram Geosynthetics Pvt. Ltd.	6129	6368	-57%	-
Garware Wall ropes	31404	31484	4%	4%
Kusumgar Corporates	-	7377	-	2%

Key Players

The key players of the segment are:

- Techfab India Ltd.
- Strata Geosynthetics Ltd.
- SKAPS Ltd.
- Maccaferri Environmental Solutions
- Terram India Ltd.
- Ambica Polymers

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
Flexituff International Limited	49418	42462	4%	6%
Jagdamba Polymers Ltd.	2841	2570	4%	3%
Maccafferi	-	-	-	-
SVM Non woven	-	505	-	14%
CTM Technical Textiles Ltd.	674	542	1%	4%

Source: Annual reports, IMaCS analysis, Capitaline, VCCedge, MCA

Functions of Geo-Textiles

Geo-textiles can be defined as any permeable fabric or synthetic material, woven or non-woven, which when can be used in association with soil, rock, earth or any other Geotechnical engineering related material. The principal functions performed by Geo-textiles are confinement /separation, reinforcement, filtration and drainage, and protection. These functions can be described thus:

a) Confinement / Separation:

Confinement provides a media between the aggregate and the subsoil which absorbs the load in the form of tension and prevents change in alignment of the aggregate. Geo-textile economically helps the separation concept of keeping two dissimilar materials apart to maximise the physical attributes of each of those materials. The object of separation by geo-textiles is to prevent a well defined material or rich material from penetrating the sub-grade or the poor soil. If the separating media of geo-textiles is absent, the infiltration of the sub-grade decreases permeability of the aggregate to the point where it cannot adequately transport the water reaching it. Suitable geo-textile fabric with good puncture/tear resistance when used as a separator media - eliminates the loss of costly aggregate material into subsoil, prevents upward pumping of subsoil, eliminates contamination and maintains porosity of different levels. This kind of function finds application in construction of road s and railways tracks, where a geo-textile layer is put beneath the road, to prevent the gravel from mixing into the soil, thus increasing the life of the road by two to three times. For separation purposes, both woven / nonwoven geo-textiles may be used.

b) **Reinforcement:** The purpose of geo-textiles in the reinforcement function is to reinforce the weak sub-grade or subsoil. It helps to strengthen the soil surface and to increase the soils ability to stay put especially on the slopes. Due to this the slopes are stabilised either permanently or temporarily and creep stops or at least diminishes. Further, it helps in preventing water from permeating a slope and

controlling the amount of infiltration that occurs during various rain events. Reinforcing aspect of geo-textiles can be used for roads, temporary roads, pavements, air strips, stabilised road slopes, retaining walls, containment systems, controlling reflective cracking, fibre or fabric reinforced concrete etc. Asphalt impregnated geo-textile is used as a paving fabric, relieving stress and acting as moisture barrier. For reinforcement synthetic woven fabric or spun-bond is preferred. Reinforcement is further enhanced by use of geo-grids or geo-nets.

Filtration:

The purpose of geo-textiles with reference to drainage and filtration is simply to retain soil while allowing the passage of water. When geo-textiles are used as drains, the water flow is within the plane of the geo-textile itself i.e., they have high lateral permeability. At the same time, geo-textiles must possess adequate dimensional stability to retain their thickness under pressure. The life of pavement of highways/air fields etc is affected by the time for which the water remains under the structural section and its drainage system which is responsible for the removal of free water which is fed directly from the stone base course beneath the structure. Needle punched nonwoven is the preferred geo-textile for such applications where primary requirement is filtration.

c) Drainage:

The use of geo-textiles in drainage has made significant strides in changing the conventional procedure of using graded filters. Outstanding advantages of geo-textiles in drainage are:

- It eliminates the filter sand with the dual media backfill.
- In some cases, it eliminates the need for perforated pipes.
- In situations where only sand backfill is available, it is possible to wrap the drainage pipe with fabric to act as a screening agent. The fabric, thereby, prevents the sand from entering perforation in the pipe.
- With Geo-textiles, trench excavation is considerably reduced.

- Many times the use of geo-textiles eliminates the need for trench shoring.

Needle-punched nonwoven geo-textile is preferred where drainage is the primary functional requirement.

d) Protection:

Lining is used for cushioning and protection of membrane used for applications such as land fill and waste containment from puncture or training by sharp stone or stress. Geo-textiles can also be impregnated with polymeric or mineral sealing materials such as bentonite clay to provide flexible barriers to mixture. Usually spun bond or needle-punched nonwovens are preferred for such applications.

Each of these functions calls for highly specific textile performance characteristics. As the functional requirements are to be met over many years of the life of the civil construction, durability is often a very key requirement. Many applications require several of the above functions to be met simultaneously. Further, the cost of the Geotechnical solution is also an important factor to be taken into account in evaluating solutions.

Further, specialized geo-textile products designed for a specific function are discussed as follows:

- **Geo-grids** represent a rapidly growing segment within the geo-textiles area. Geo-grids are plastics filaments, roving, and tapes etc formed into a very open, grid like configuration having large apertures, unlike woven, nonwoven or knit textiles. These apertures may vary in size from 1 to even more than 10 cm. They can be mono-axial or bi-axial i.e. be stretched in one or two directions for improved physical properties. Geo-grids are mainly used for reinforcement – beneath aggregate in unpaved roads, reinforcement of embankment fills/earth dams, repairing slope failures/landslides, as inserts between geo-textiles/geo-membranes etc.
- **Geo-nets** constitute another specialized segment within the geo-synthetic area. Geo-nets are usually formed by a continuous extrusion of parallel sets of polymeric ribs at acute angles to one another. When the ribs are opened, relatively large apertures are formed into a netlike configuration. Geo-nets are made of polypropylene (PP) or Polyethylene (PE). Geo-nets are used almost exclusively for their drainage capability for applications like water drainage behind retaining walls, seeping rock slopes, beneath sport fields, building foundations; leachate drainage of landfill side slopes, above landfill liners and surface water drainage within landfill caps.
- **Geo-membranes** are impermeable membranes, used where the primary function is to have an impervious barrier for fluids. However, as the possibility of punctures or tears is high in many areas of use, it is common to protect these membranes by use of Geo-textiles. Often the geo-textiles also perform other functions besides protection of the membrane. Geo-membranes are made from continuous polymeric sheets that are very flexible, but can also be made by impregnation of geo-textile with asphalt or elastomeric sprays or bitumen composites. Geo-membranes are used in applications such as liners for water canals, waste canals, solid-waste landfills, covers for solid-waste landfills, waterproofing within tunnels, to control odours in landfills, to prevent infiltration of water in sensitive areas, and beneath asphalt overlays as a waterproofing layer.
- **Geo-composites** consist of two or more geo-synthetic products put together to increase the combinations ability to optimally address the specific application (say filtration/ reinforcement etc) at minimum cost. The best features of different materials are combined in such a way that the benefit/cost ratio is maximized. An example of this is known as wick drains in the U.S. and prefabricated vertical drains, PVDs, in Europe. These consist of a 100 mm wide by 5 mm thick polymer cores, for conducting water, with a geo-textile acting as a filter and separator socked around the core.
- **Gabions** are rectangular or cylindrical containers fabricated from polymer/metal meshes, usually filled with stone and used for structural purposes (retaining walls, slope and embankment protection etc). These have been used in India since 70s. However, the gabions used in India are mostly steel gabions and hence they have not been considered as part of Technical Textiles

Product Characteristics

In general, the vast majority of Geo-textiles are made from polypropylene (PP), polyethylene or polyester formed into fabrics based on type of process. The mechanical and hydraulic properties vary widely depending on type of application designed for. Depending on type (woven/non-woven), process (thermal bonded/resin bonded), desired performance specifications (load bearing ability, tear resistance etc), Geo-textiles can range from under 40 GSM to over 3000 GSM (used in landfill applications). Geo-grids are usually knitted and PVC coated. Products are designed to be resistant to mildew, bacteria, soil acids (PP) and alkalis (PP, PES) and most chemicals.

Apart from the above, Agro based Geo-textiles (woven textiles based on Jute, Coir) are also a niche but growing segment. These have the advantage of being bio-degradable as well as being cheaper. As a result in

low cost projects of shorter life span, natural fibre based geo-textiles mostly coir and Jute geo-textiles are used. Recently, use of Jute geo-textile in making of village levels roads is being tested in Karnataka. Another breakthrough has been the preference for coir based geo-textile for use along with the railway track laying.

Key Applications

Key applications of geo-textiles include the following:

- **Roadways:** Geo-textiles help in improving the longevity of a road by about 2 to 2.5 times. Geo-textiles can be used for base reinforcement, separation and draining functions. Different applications are as follows:

- Geo-textile is used for providing a separation layer between the ballast and the soil layer, thus preventing sinking of ballast into the soil, and increasing longevity of the road.
- Geo-textiles also provide a porous membrane beneath the road, which lets the water to pass through into the soil and thus preventing road damage through water coagulation. This has been a major issue for the Roadways in the Himalayan regions having high snowfall, where roads have to be repaired almost on a yearly basis due to damage from the water after the snow melts.

While use of synthetic geo-textiles is increasingly being done for construction of major roads – Highways and expressways, use of coir geo-textiles which is cheaper and bio-degradable is being proposed for district level and village level roads. A pilot project of construction of roads using coir geo-textile has been taken up by nine states. Roadways, continues to be the largest consumer of geo-textiles in India.

- **Railways:** Geo-textiles can be used in Railways for track bed design and increasing the stability of the surface, protection of erosion of slope and for protection against rock falls. The key applications in railways are as discussed below:

- About 700 km of Indian railways is built on weak formation of soil, which requires regular repairs. Use of geo textiles as a base would help in spreading the load across the soil while preventing sinking of the track ballast, thus reducing the repair requirements of the track. This would also make the track more stable and suitable for higher axle load traffic, the kind which is being planned in the proposed in the Delhi- Mumbai corridor.
- Gabions are used along the railway tracks in hilly areas for protecting rock fall.
- AS Reinforced Earth Embankments: Geo-textiles are used to hold RE embankments along the

railway track where the soil layer is loose and chances of landslides are higher. Along the Udhampur- Jammu route, near the bridge on Tawi river, Railways has constructed a similar embankment of 35 m height.

- Use of biaxial geo-grids is being tested for use in pilot projects in four divisions of Indian railways – NF railways, N railways, EC railways and SC railways.
- Prefabricated Vertical drains (PVDs) can be used to expedite soil consolidation in weak soil clayey regions, where the top soil is non porous and weak thus, increasing risk of ground sinking.

While the use of geo-textiles is increasing, more tests and pilot projects are being done to see the advantages of geo-textiles for Indian railways. The market is expected to increase at a growing pace in the coming years.

- **Major Ports and river banks:** Geo tubes, Geomembranes and geo-bags are often used at ports to prevent shore line erosion by water at ports. A geo-tube sea wall is being constructed at Upadda village in East Godavari District of Andhra Pradesh for prevention of erosion by sea. Geo-tubes are also being used at Kolkata Port on an experimental basis. While the penetration of geo-textiles is not significant at present, the preference for use of geo-textiles for ports is growing and market is expected to grow at a goods rate in the coming ten years.
- **Urban Infrastructure:** PVDs can be used for construction of roads and settlements at areas having weak clayey soil. PVDs increase the rate of water flow through the soil and help the consolidation to occur in just months instead of years, thus making the construction far more stable.

In addition to these, geo textiles can also be used to provide base reinforcement in the power sector and airport runways. However, such specialised applications are not currently being done in India.

Market Trends and Growth Drivers

The market of geo-textile in India is mainly dependent on the investments coming in the road infrastructure sector and the railway infrastructure sector. With the pressing need of having adequate infrastructure in terms of roadways, railways and ports infrastructure, Government has been doing substantial investment towards infrastructure building. Due to limited penetration and various trial programmes going on in different states, the use of geo-textiles is limited to just expressways and National Highways. The proposed investment for the XIIth plan for Infrastructure development in key sectors and the potential for use of

geo-textiles in these sectors is shown in the following exhibit:

Exhibit 339: Demand estimation for geo-textiles

In Rs. Crore	2012-17 - Proposed Investment	Projects with potential of using geotech	Penetration of Geotech	Spending on geo tech during five years	Spending on geo-textile for 2012-13
Roads (Excl – state)	483,323	338,326	33,833	338	85
Railway	273,083	218,466	32,770	328	82
Ports	180,626	144,501	28,900	434	87
Airports	17,500	8,750	875	4	1
Power	354,260	106,278	5,314	53	11
Urban Infrastructure	10,000	2,000	400	8	2
Other Infrastructure	4,099,239	409,924	20,496	410	41
Total					307

Source: Various working group reports for XIIth five year plan
 Working group report on roads under central govt. for 2012-17
 Working group report on railways for 2012-17
 Working group report on Ports sector for 2012-17
 Working group report on power sector for 2012-17
 Working group report on Civil Aviation -2012-17
 Working group report on Urban Infrastructure 2012-17
 Discussion paper on financial requirement for infrastructure and industry – Sept. 2012

The proposed investment for the XIIth five year plan is significantly higher than the XIth five year plan indicating the government is more concerned about development of adequate infrastructure in the country. This is expected to act as a booster for various industries associated with infrastructure development like geo-textiles.

Another key growth factor for geo-textiles is the fact that the benefits of using geo-textiles are now being widely acclaimed across the infrastructure sector of India and the Government is keenly exploring opportunities for use of geo-textiles in infrastructure projects. Various trials for use of geo-textiles in ports sector, railways and roadways are underway. This is expected to help the geo-textile industry to grow at a significant rate of 8% during the next three years.

Key Manufacturers

Key manufacturers of geo-textiles in India have already been discussed in the introductory section.

Import Export scenario

While imports of geo-textile has been stagnant in the last five years, Export of geo textile from India has grown significantly reaching Rs. 503 crore in 2012-13. Players like Ambica Polymers and SKAPS are export oriented units. The export and import statistics has been shown in the following exhibit:

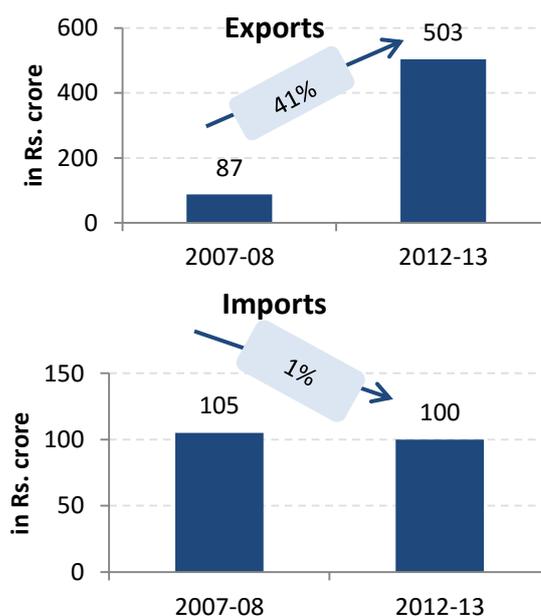
Exhibit 340: Import export trends - Geotech

HS code family	2007-08	2012-13
Imports		
3920, 3923, 3925 & 3926	Rs. 105 Crore	Rs. 100 Crore
5310 & 5311		
5402 & 5407		
5602 & 5603		
5701		
5903, 5906, 5907 & 5911		
6301, 6305 & 6307		
6806, 6807 & 6815		
7308 & 7311		
Exports		
3920, 3923, 3925 & 3926	Rs. 87 Crore	Rs. 503 Crore
5310 & 5311		
5402 & 5407		
5602 & 5603		
5701		
5903, 5906, 5907 & 5911		
6301, 6305 & 6307		
6806, 6807 & 6815		

*source: IMaCS analysis, DGCIIS

The export import trend for geotextiles is as shown:

Exhibit 341: Import export trend - Geotech



Source: IMaCS analysis, DGFT, DGCIIS

The key HS codes under which geo-textiles are being traded are shown in the following exhibit:

Exhibit 342: HS codes for geo-textiles

HS code family	HS Code	Description
3824	38244090	Others
3901	39011090	Other polyethylene having a specific gravity < 0.94
3917	39174000	Fittings for tubes pipes and hoses of plastic
3920	39201012	Sheets of polyethylene: flexible, plain
	39201019	Other sheets of polyethylene
	39201092	Other plates, sheet etc of polymers of ethylene flexible, plain
	39201099	Other plates, sheet of polymers of ethylene nes
	39205999	Other sheets etc of other acrylic polymer nes
	3923	39232990
3925	39259090	Other builders ware of plastics nes
3926	39269099	Other article of plastic nes
5310	53101013	Hessian cloth containing 100% by wt of jute
	53101099	Other woven fabrics containing jute >= 50%
	53109099	Others
5311	53110015	Of coir including log form and geo textiles
	53110019	Other woven fabrics of other veg textile
	53110029	Other woven fabrics of paper yarn
5407	54023300	Textured yarn of polyester
	54071019	Unbleached other polyester fabrics
	54071039	Other dyed polyester fabrics
	54072090	Other woven fabrics from strip/the like
	54077200	Woven fabrics, containing 85% or more by wt of other synthetic filaments, dyed
	54077400	Woven fabrics containing 85% or more by wt of other synthetic filaments, printed
	54079110	Other synthetic woven fabrics – unbleached
5603	56021000	Needle loom felt and stitch bonded FIBR fabrics

HS code family	HS Code	Description
	56022990	Other textile felt
	56031100	Man-made filament weighing
	56031200	Man-made filament weighing >25g /sqm
	56031300	Man-made filament weighing between 70g/sqm and 150g/sqm
	56031400	Man-made filament weighing >150g/sqm
	56039300	Other filament weighing between 70g/sqm and 150g/sqm
	56039400	Other filament weighing >150g/sqm
5701 & 5702	57019020	Of coir including geo textile
	57022020	Coir carpets and other rugs
5903	59031090	Other fabric plated laminated coated impregnated with other plastics
5911		Textile fabrics felt and felt-industrial woven fabrics coated covered with rubber etc for card clothing and similar fabrics for other technological properties including nara
	59111000	
	59119090	
6305	63051080	
	63053900	Jute soil savers
6307	63079090	Other made up articles other than cotton
	68079090	Other roofing in other form

**iMaCS analysis*

The top five countries importing geotextiles from India are USA, Germany, Japan, Poland and Australia

The top five countries exporting geo textiles to India are Malaysia, Germany, United Kingdom, China and Italy.

Manufacturing Process and Type of Raw Materials

Geo-textiles are manufactured from polypropylene, polyester or polyethylene which can be either woven or non-woven. Manufacturing process for Woven products includes Weaving / Knitting and Coating (PVC). Products can be - woven multi-filament, woven slit-film monofilament and woven slit-film multifilament. The non-woven Geo-textiles can be made from heat bonding or needle-punching. Geogrids are knitted, while Geonets and Geomembranes are extruded from HDPE.

Key Machinery

Most units surveyed used Sulzer looms for manufacturing Woven Geo-textiles. Knitting machines from Karl Mayer are also used. Nonwoven needle-punching lines from Hunter, Dilo Group and Trutzschler are used. In India, the leading machinery vendors are represented by ATE and Voltas.

Quality Standards

Most manufacturers follow Indian as well as ASTM and European codes. Indian standards for geo-textiles are as shown below:

- IS 13162:1991
- IS 13321:1992
- IS 13325:1992
- IS 13326:1992
- IS 14294:1995
- IS 14324:1995
- IS 14706: 1999
- IS 14714: 1999
- IS 14715: 2000
- IS 14715: 2013
- IS 14716: 1999
- IS 14739: 1999
- IS 14986: 2001
- IS 15060: 2001
- IS 15868:2008
- IS 15869: 2008
- IS 15871: 2009
- IS 15909 & 10: 2010
- IS 16090: 2013

22. Oekotech

Oekotech segment refers to use of Technical Textiles in Environmental Engineering. The primary segment in this is Landfill waste management. This refers to the use of Geosynthetic products to secure landfills against leakage of municipal or hazardous waste. Other areas include secondary protection in Chemical/Oil Industries (ground covers and the like around process tanks for secondary containment should the tanks leak).

A modern engineering landfill has the following components - a basal lining system to prevent the contamination of soil, and ground water by pollutants, a capping system to seal the waste when the capacity of the landfill is exhausted, an impervious sealing layer which prevents the entry of pollutants in the ground, a leachate collection system for the collection and transmission of leachates to a collection pit, a secondary leachate collection/leak detection system.

Oekotech application segment includes concepts in environmental protection, waste disposal and recycling. The most well known concept is the use of geosynthetic products (discussed earlier in Geotech) in Landfill management. Secure landfills are considered to be the best available technical option for the safe disposal of large volumes of solid waste/slurry. Waste management (both Municipal and Hazardous) has become a major environmental issue in India as well as other countries.

A modern engineering landfill has the following components - a basal lining system to prevent the contamination of soil, and ground water by pollutants, a capping system to seal the waste when the capacity of the landfill is exhausted, an impervious sealing layer which prevents the entry of pollutants in the ground, a leachate collection system for the collection and transmission of leachates to a collection pit, a secondary leachate collection/leak detection system.

Exhibit 343: Geo membranes - used for soil lining in waste disposal



Exhibit 344: Market summary of Oekotech

In India, Oekotech is constituted by geo –membranes, which are primarily used for landfills. The Oekotech market is currently of 10,000 MT worth Rs. 120 crore. The table below shows the Oekotech market in India and its Growth prospects. There is little export of geo-membranes from India. Due to limited awareness, the market is expected to grow at 10% during the coming three years and is projected to grow to Rs. 160 crore by 2015-16 at 10% CAGR and further to Rs. 193 crore by 2017-18.

Product	Unit	2012-13					2013-14 (E)		2015-16 (P)	
		Production	Import	Export	Domestic	Total	Export	Domestic	Export	Domestic
Oekotextiles	Rs. Crore	120			120	120	-	132		160
	in '000 MT	10			10	10	-	11		13

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

The key manufacturers of geo-membranes in India are Mahrshee Geo-membrane Pvt. Ltd. located at Vadodra Gujarat and Pragma Polmers located at Kolkata.

Introduction to Products

Geo-synthetics are extensively used in the design of both base and cover liner systems of landfill facilities. The products include:

- Geo-grids: It can be used to reinforce slopes beneath the waste, reinforce walls as well as to reinforce cover soils above geo-membranes;

- Geo-nets, which can be used for in-plane drainage;
- Geo-membranes, which are relatively impermeable sheets of polymeric formulations that can be used as a barrier to liquids, gases and/or vapours; provide the critical functions of leachate containment, protection of ground water

and Landfill Gas (LFG). They are also used in landfill caps.

- Geo-composites, which consist of two or more geo-synthetics, can be used for separation, filtration or drainage;
- Geo-synthetic clay liners (GCLs), which are composite materials consisting of Bentonite and geo-synthetics that can be used as an infiltration/hydraulic barrier; they find application not only in landfills/waste management but also for mine rehabilitation, tunnels, secondary containment e.g. of petrochemicals, landscaping etc.
- Geo-pipes, which can be used in landfill applications to facilitate collection and rapid drainage of the leachate to a sump and removal system
- Geo-textiles, which can be used for filtration purpose or as cushion to protect the geo-membrane from puncture.

Product Characteristics

Both woven and non-woven geo-synthetics are used. Geo-synthetic clay liners consist of non-woven fabric layers of 180-250 GSM with an intermediate layer of Bentonite mineral (Unit Mass: 1-5 kg/sq m). Geo-textiles used for filtration/cushion are typically high GSM (285 – 3000) non-woven fabrics. HDPE geo-membranes are manufactured using approximately 97% high molecular weight polyethylene, 2 to 3% carbon black, and 0.5 to 1.0% stabilizers and antioxidants. Some salient features of HDPE geo-membrane include chemical resistance, low permeability and ultraviolet resistance. The thickness of this geo-membrane is 2 mm.

Market Size and Trade Trends

Issue of waste management has seen rising public and government awareness over the years. Waste can be categorized as Municipal Solid Waste (MSW) and Hazardous Waste (HW).

The per capita MSW generated in India ranges from above 100 grams in small town to over 600 grams in large cities. The total MSW generated in India during 2009 to 2012 was estimated to be of 1.27 Million MTPA as per the status report of CPCB. These wastes are either recycled or land-filled or incinerated. In India these are collected by respective municipalities and transported to disposal sites which are normally low lying areas outside the city. While focus on recycling is increasing, the preference for land-filling of these waste is decreasing due to the increased cost of land filling as the land filling sites are quickly occupied due to the increase waste production. Given the limited

revenues of municipalities, most bodies have not been able to afford the treatment and disposal of MSW required under environmental guidelines. Not surprisingly, many urban waste sites pose a serious health hazard for the semi-urban/rural communities nearby. Municipal Solid Wastes (Management & Handling) Rules, 2000 (MSW Rules) are applicable to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solid. Only the seven metro cities in India generate MSW in excess of 1000 MTPA with highest generation from Delhi and Chennai. Due to the high cost of land filling site and its operation and management, currently engineered land filling sites are available only at these places.

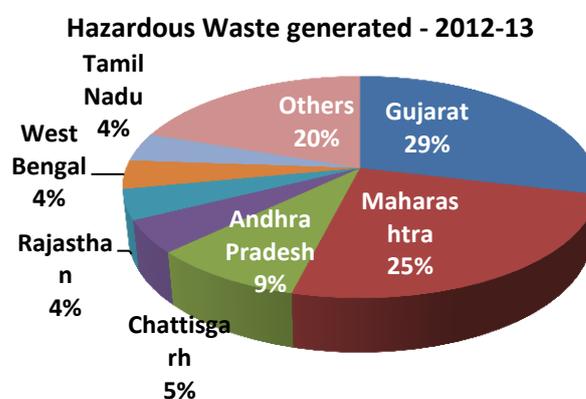
Hazardous waste consists of corrosive, reactive, ignitable and toxic wastes. India produces about 2.7 million MT of land-fillable Hazardous Waste every year, as per CPCB report of 2009. The findings of the same are as tabulated in the following exhibit.

Exhibit 345: Hazardous waste generation

Sl. No.	Hazardous waste category	Waste generated (in mn. MTPA)	Percentage share
1	Land-fillable hazardous waste	2.72	44%
2	Inenarrable hazardous waste	0.42	7%
3	Recyclable hazardous waste	3.09	49%
	Total	6.23	

Source: National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India – CPCB – Feb 2009

Gujarat and Maharashtra are the top two Hazardous waste generating states in India accounting for over 50% of Hazardous waste generated. Seven states shown in the exhibit account for over 80% of the Hazardous Waste generated in India.



Source: National Inventory of Hazardous Wastes Generating Industries & Hazardous Waste Management in India – CPCB – Feb 2009

Common Treatment, Storage and Disposal Facilities (TSDF) are developed for the disposal of land disposable HW at 22 different places in 10 States in Gujarat and Maharashtra. The list of waste disposal facilities across states is as shown in the following exhibit

Exhibit 346: Distribution of TDSF for HW disposal

Sl. No.	State	No. of TDSF
1	Gujarat	7
2	Maharashtra	4
3	Uttar Pradesh	3
4	Andhra Pradesh	2
5	Himachal Pradesh	1
6	Madhya Pradesh	1
7	Punjab	1

Sl. No.	State	No. of TDSF
8	Rajasthan	1
9	Tamil Nadu	1
10	West Bengal	1
Total		22

Total waste handling capacities (disposal capacity) of these facilities is 1.5 million MTPA which is just 55% of the present generation of 2.7 million MTPA of land-disposable Hazardous waste. Therefore nearly 1.2 million MTPA of capacity requires to be created for disposing waste in landfills. This clearly indicates that in future the land-fillable waste disposal capacity is expected to increase to almost double the current size, indicating goods prospects for use of geo-textiles for Oekotech purposes

23. Indutech

Indutech includes Technical Textile products used in the manufacturing sector. The Technical Textile products covered under Indutech are as follows:-

- Conveyor belts (TT component)
- Drive belts (TT component)
- Cigarette filter rods
- Decatising cloth
- Bolting cloth
- AGM glass battery separators
- Coated abrasives (TT component)
- Ropes & cordages
- Composites (Technical Textiles component)
- Printed circuit boards (TT component)
- Computer printer ribbon
- Paper making fabrics
- Filtration Products
- Industrial slings and webbings
- Acoustic textile used in cell phones
- Industrial hoses and pipes (TT component)



Conveyor belting



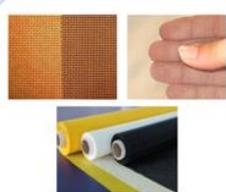
Drive belts



Cigarette filter cloth



Decatising cloth



Bolting cloth



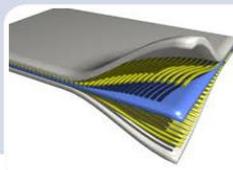
AGM glass battery separators



Coated abrasives



Ropes and cordages



Composites



PCBs



Printer ribbon fabric



Filtration product



Technical Textiles consumption under Indutech in India is estimated at Rs 5,550 Crore in 2012-13. Market size of Indutech, taken to be the sum of consumption and exports value is Rs. 6,625 Crore in 2012-13. The single largest contributor to the market size of segment of Indutech is the ropes and cordages with a market size of 1,717 Crore and accounting for 26% of the market size of Indutech. The domestic consumption for ropes and cordages stands at Rs. 1,008 Crore. The other two major segments that along with ropes and cordages constitute almost 60% of market size are Indutech are composites and coated abrasives accounting for 21% and 11% of the market size respectively. Overall, exports for segments of Indutech are estimated to be of Rs. 1,075 Crore. The domestic consumption stands at Rs. 5,550 Crore and imports at Rs. 1,442 Crore which accounts for 26% of the domestic consumption. The segment is projected to grow to Rs. 9,929 crore by 2015-16 at 14% CAGR and further to Rs. 13,127 crore by 2017-18.

The imports, exports, domestic consumption and market size of all products segments have been summarized in the following exhibit.

Exhibit 347: Market summary of Indutech

Indutech	2012-13						2013-14(P)		2015-16 (P)	
	Product	Unit	Production	Imports	Exports	Domestic	Market Size	Export	Domestic	Export
Conveyor belts (TT component)	'000 MT	12	2.6	3.3	11.2	14.6	3.5	12.9	3.98	17.1
	INR Crore	300	76	84	292	376	89	336	100	444
Drive belts(TT component)	'000 MT	5,118	400	341	5,177	5,518	362	5,953	407	7,873
	INR Crore	199	33	19	213	232	20	245	23	325
Cigarette filter rods	Mn nos	19,874	2	1,391	18,485	19,876	1,808	19,779	3,055	22,645
	INR Crore	421	2	29	394	423	38	421	64	482
Decatising cloth	mn metres	2	0.06	-	2	2	-	2	-	2
	INR Crore	35	6	-	41	41	-	43	-	48
Bolting cloth	000 sqm	339	432	38	734	772	38	807	40	977
	INR Crore	14	18	2	30	32	2	33	2	40
AGM glass battery separators	Mn Sqm	9	59	0	68	68	0	82	0	118
	INR Crore	50	325	0	375	375	0	450	0	648
Coated abrasives(TT component)	'000 MT	53,092	1,410	278	54,224	54,502	289	65,069	312	93,699
	INR Crore	711	48	9	750	759	9	900	10	1,296
Ropes and cordages	'000 MT	122.5	11.7	37.1	97.1	134.2	44.5	108.7	64.1	136.3
	INR Crore	1,646	71	709	1,008	1,717	851	1,129	1,225	1,416
Glass fabrics as a part of composites (TT component)	'000 MT	81.8	46.5	14.3	114	128.3	15.2	131.1	17.1	173.4
	INR Crore	924	499	202	1,221	1,423	214	1,404	240	1,856
Printed circuit	Mn Sqm	-	32	-	32	32	-	38	-	51

Indutech		2012-13					2013-14(P)		2015-16 (P)	
Product	Unit	Production	Imports	Exports	Domestic	Market Size	Export	Domestic	Export	Domestic
boards(TT component)	INR Crore	-	29	-	29	29	-	34	-	46
Computers printer ribbon	mn metres	1,099	332	7	1,425	1,431	7	1,453	7	1,512
	INR Crore	220	66	1	285	286	1	291	1	302
Filtration products	Mn Sqm	5	1	0	6	6	0	7	0	9
	INR Crore	407	6.4	2	411	414	2	473	2	625
Paper making fabrics		860	395	43	1,212	1,256	52	1,394	75	1,844
	INR Crore	147	67	7.4	207	214	9	238	13	314
Industrial webbings and slings	MT	4,080	5,043	325	8,798	9,123	358	9,678	433	11,710
	INR Crore	102	194	8.2	288	296	9	317	11	383
Others		-					-	-	-	-
	INR Crore	7	1.4	2	6	8	2	7	3	8
Values	INR Crore	5,183	1,442	1,075	5,550	6,625	1,246	6,320	1,694	8,235

*Source: Annual reports, websites, secondary reports, ITTA, iMaCS analysis

Key Players of the Industry

The key players of the segment are as follows:

- SRF Ltd.
- Garware Wall Ropes Ltd.
- Khosla Profil Pvt. Ltd.
- Owens Corning India Pvt. Ltd
- U.P.Twiga Fiberglass Limited
- Masturlal Fabrichem Pvt. Ltd
- Green Field Material Handling Pvt. Ltd.
- Pix transmissions Ltd.
- Fenner Conveyor Belting Pvt. Ltd.
- Grindwell Norton
- Carborundum Universal Limited (CUMI)

The profitability of the key players has been shown in the following exhibit:

Exhibit 348: Profitability of key Indutech players

Company Name	Capital Employed (in Rs. lakh)		Net Profit Margin (in %)	
	2012-13	2011-12	2012-13	2011-12
SRF Ltd.	285590	265350	7.8%	11.0%
Garware Wall Ropes Ltd.	31404	31484	4.1%	4.1%
Khosla Profil Pvt. Ltd.	-	4029	--	3.5%
Owens Corning India Pvt. Ltd	-	263	--	-497.7%
UP Twiga Glass Fibre	8847	7700	6.6%	9.8%
Voith Paper Fabrics Ltd	11067	10250	21.7%	21.8%
Wire and Fabriks Pvt. Ltd.	8127	9175	1.9%	6.1%
Greenfield	52	-156	3.6%	5.1%
Pix transmissions	13480	20601	-11.8%	0.3%
Fenner Conveyor Belting Pvt. Ltd.	1124	1477	0.1%	6.5%
Grindwell Norton	28976	20070	10.3%	11.4%
CUMI	50499	46640	6.8%	11.7%
Sanrhea Technical Textiles	996	986	0.6%	2.7%

Source: Annual report, MCA, VCCedge, Capitaline

High Potential Products

Indutech is a growing segment of the Indian Technical Textile industry having and is expected to grow at 10% during the next three years. The key products in the segment that show very promising prospects are glass fabrics as a part of composites, filtration products and ropes and cordages. Acoustic textiles used in cell phones are a very small at present but are expected to grow fast.

The detailed analysis of each product has been done in the following sections.

Conveyor Belts

Belt Conveyor system is a fastest, environment friendly & economical mode of bulk transportation. The conveyor belt is used to move unit loads individually and bulk loads continuously.

Product Description

A Conveyor belt consists of three components: Cover, Carcass and Insulation – the bonding medium for the carcass. Belting fabrics are used for reinforcing these conveyor belts.

The carcass is sandwiched between two covers, the face cover for the carrying side and the back cover for the pulley side with the face cover being thicker as it is subject to more wear and tear. The quality of cover will depend on the material to be handled, its abrasive quality and lump size and the service conditions. The carcass provides the strength for transmitting the power to drive the conveyor and to support the load carried on the belt. The belt strength is determined by the combined strength of the plies (Generally two- or three- ply belting). The insulation medium within the carcass of any belt separates the plies to prevent chafing; permits the belt to flex, imparts good adhesion to bind the carcass, supports the load; absorbs energy on impact at the loading point and properties for the application – resistance to heat, oil or fire.

Conveyor belts can be classified as rubber conveyor belts and PVC conveyor belts. Rubber based belting can be textile reinforced or steel reinforced. Textile reinforced belts are primarily of Nylon, polyester. Most of the steel cord belts are used in the mining sector. The belts can be classified based on their application as General Purpose, Heat-resistant, Fire-resistant, Oil-resistance, Food grade etc.

Market Size and Trade Trends

Market Size Estimate

The production of textile reinforced conveyor belting in India is estimated at 12,000 MT. The domestic consumption for reinforcement material is estimated to be 11,246 tonnes which amounts to Rs 292 Crore up from the estimate Rs 105 Crore for 2007 – 08 registering a CAGR of 23%. The exports as mentioned

in the following section are estimated at Rs. 84 Crore, bringing the total market size to Rs.376 Crore.

Exhibit 349: Market size estimate for TT component of conveyor belts

	2012-13
Domestic consumption Quantity (in MT)	11245.78
Domestic consumption Value (in Rs. Crore)	292.10
Exports (in MT)	3344.96
Exports (in Rs. Crore)	84.16
Market size (in MT)	14590.74
Market size (in Rs. Crore)	376.26

**source: IMAcS analysis, industry sources*

Key Growth Drivers and Inhibitors

The key growth driver of the conveyor belting industry is infrastructure development in the country. The key consumer and thus, driver industries for conveyor belts are the steel industry, power industry, cement industry, ports, fertilizers and soda ash. An overall economic boost that lifts all these sectors and facilitates large scale investments in these sectors will automatically boost demand for conveyor belting and the related Technical Textile consumption of the country. With significant push expected in the infrastructure sector, the domestic consumption for Technical Textiles component of the conveyor belts is expected to grow by 15% in the near future. Exports are expected to grow at 6% year on year.

Key Manufacturers

The key manufactures of conveyor belting solutions are:

- Madura Industrial Textiles
- Sempertrans Nirlon
- International Conveyor Belting Ltd.
- Fenner India Pvt. Ltd
- Jonson Rubber Industries Ltd.
- Sanrhea Technical Textiles Limited
- SRF Ltd.
- Forech India
- NRC

Import Export Scenario

The import export scenario of the conveyor belts has been captured in the following exhibit.

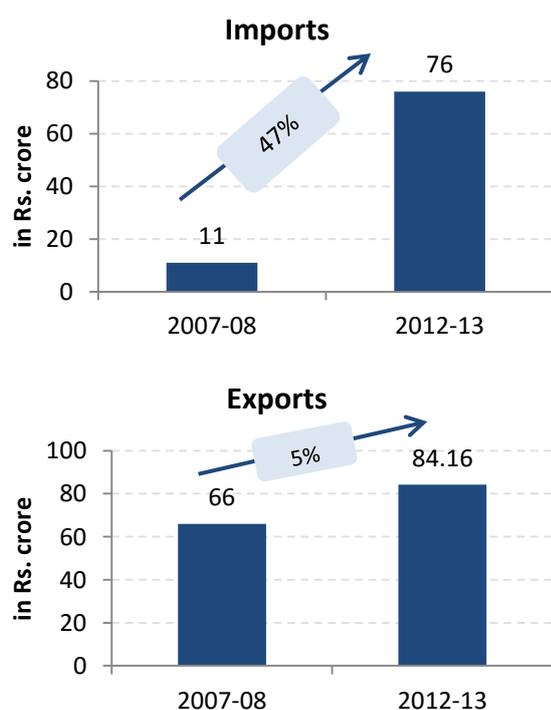
Exhibit 350: Export Import for conveyor belt fabric

HS code family	HS codes		(2012-13)
Imports			
3926,	39269010,	39269099,	Rs. 76.26 Crore
4010,	40101210,	59069920,	
5906,	59069990,	59100020,	
5910	59100030,	59100060,	
	59100090, 59119090		
Exports			
3926,	39269010,	39269099,	Rs. 84.16 Crore
4010,	40101210,	59069920,	
5906,	59069990,	59100020,	
5910	59100030,	59100060,	
	59100090, 59119090		

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Key export destinations are Canada, USA, UK, Hungary and Thailand. Key countries from where we import are China, United Kingdom, Germany, Japan and U S A. Imports and exports both have kept pace with times. Imports have grown from 11 Crore in 2007-08 to 76 Crore in 2012-13. Exports have also grown from Rs. 66 Crore to Rs. 84 Crore in 2012-13.

Exhibit 351: Import and export trends for conveyor belts TT component t- 2012-13 vs. 2007-08



source: IMAcS analysis, industry sources, DGFT, DGCIS

Drive Belts

A belt drive is a method of transferring rotary motion between two shafts. A belt drive includes one pulley on each shaft and one or more continuous belts over the two pulleys. The motion of the driving pulley is, generally, transferred to the driven pulley via the friction between the belt and the pulley.

Product Description

The transmission belts can be classified as Flat, Vee, Poly-Vee, Timing/synchronous belts etc. Vee belts (or V Belts) are the most widely used belts. V belt drives replaced flat belt drives for many applications because higher power could be transmitted with more compact drive arrangements. V Belt Drives achieve drive efficiencies of about 95%.

V belts are used in alternators, air conditioning compressors, power steering pumps and water pumps, apart from fans in automobiles as well as a number of industries. There are different types of V-belts; some of them are wedge section V belts; high capacity narrow V-belts; hexagonal V-belts; multi rib poly V-belts; automotive timing belts; auto wrapped belts in wedge and classical types; and variable speed drive belts for two wheeler applications. Generally three types of V belts are commonly used: raw –edged, v-ribbed, and wrapped. They come in five standard sizes A, B, C, D and E. The top width of A is 12.7 mm (1/2 in) and that of E is mm (1) and the thickness varies between the different sizes. When power transmitted is heavy multiple belts are used in pulleys having a number of grooves as required.

The selection of the type of V belt depends on the power capacity of the drive and the small pulley's shaft speed (rev/s), acceptable limits of the speed ratio, pitch length of the belt(s), and diameters of the two pulleys etc. When correctly specified, V belts can be expected to deliver 25000 hours of service (around 3 years continuous, or 5 years normal use) before belt replacement is required.

Market Size and Trade Trends

Market Size Estimate

The domestic consumption of drive belts is estimated to be at Rs 711.40 Crore and 6.9 Crore pieces. The corresponding Technical Textile component is pegged at a quantity of 5177 MT worth Rs. 213 Crore, indicating a CAGR growth of 21% over the 2007-08 estimates of Rs. 84 Crore. With exports at Rs 19 Crore and 341 MT, the market size for Technical Textile component in drive belts is Rs. 232 Crore and 5,518 MT.

Exhibit 352: Market size estimate of drive belts

	2012-13
Domestic consumption of drive belts (in Crore pcs)	6.9
Domestic consumption of drive belts Value (in Rs. Crore)	711.40
Domestic consumption in quantity of TT component in drive belts (in MT)	5,177
Value of Domestic consumption of TT component in drive belts (in Rs. Crore)	213
Exports in quantity of TT component in drive belts (in MT)	341
Exports of TT component of Drive belts (in Rs Crore)	19
Market size of TT component in drive belts(in MT)	5,518
Market size of TT component in drive belts(in Rs. Crore)	213

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

V belts find applications in textile industry (textile machinery, textile spinning, texturing, weaving units), chemical and fertilizer industry, steel, engineering, railways, pharmaceuticals, cement and paper industry (printing & packaging, paper conversion) among others. The market for V belts can be broadly divided into two segments- industrial and automotive. The industrial belts account for 55-60 % of the total market. The future growth for the product segment, thus, depends on the economic growth and cascading push to each of these industries. Automotive sector growth trajectory shall also be a key determinant. With auto sector expecting to retain 12%-15% growth in the near future and the new Government's proactive commitment to the economy the domestic consumption of transmission belts is expected to grow at 15% in the immediate short term horizon.

Key Manufacturers

Key manufacturers of drive belts include: Fenner India, Pix Transmissions and Good Year

Import Export Scenario

The import export scenario for drive belts has been captured in the following Exhibit 353.

Exhibit 353: Export Import trends for drive belts

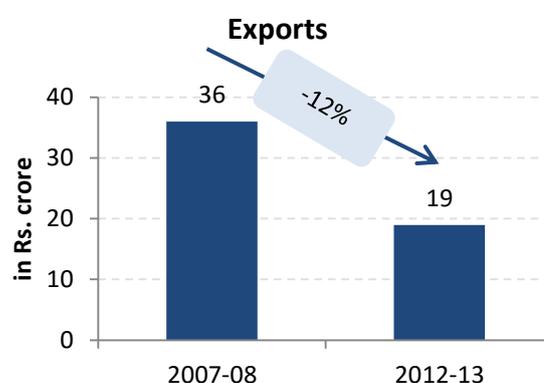
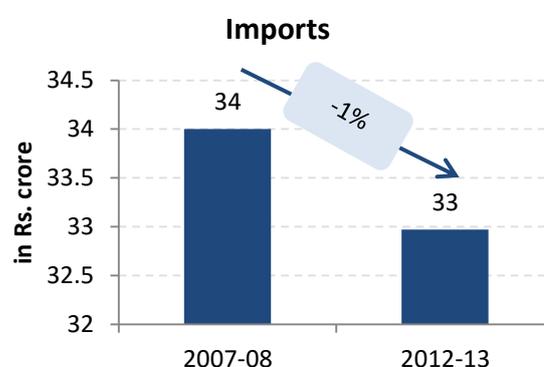
HS code family	HS codes	(2012-13)
Imports		
4010	40103110, 40103190, 40103210, 40103290, 40103310, 40103390, 40103410, 40103490, 40103510,	Rs. 32.97 Crore

HS code family	HS codes	(2012-13)
	40103590, 40103610, 40103690	
Exports		
4010	40103110, 40103190, 40103210, 40103290, 40103310, 40103390, 40103410, 40103490, 40103510, 40103590, 40103610, 40103690	Rs. 18.94 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Key import sources are Japan, Indonesia, Thailand, China and Korea. Key export destinations are Germany, UAE, Panama, Sudan, Singapore and USA. The trend of exports and imports over 2007-08 have been captured in the following exhibit.

Exhibit 354: Import and export trends of Drive belts - 2012-13 vs. 2007-08



source: IMAcS analysis, industry sources, DGFT, DGCIS

Cigarette Filter Rods

Cigarette filter reduces harshness of tobacco smoke by reducing the amount of tar, smoke and other fine particles during combustion of the tobacco portion. The filter is primarily made-up of cellulose acetate fibres known as tow. The fibres are bonded together with a hardening agent, tri-acetin plasticizer, which helps the filter to keep its shape. The filter is wrapped in paper and sealed with a line of adhesive.

Market Size and Trade Trends

The total size of the filter cigarette industry in India is around 121 billion cigarettes. ITC Limited has a near monopoly with around 90.71% value market share followed by Godfrey Philips and Vazir Sultan Tobacco (VST) at 6.89% and 2.14% respectively.

Market size estimate

The domestic consumption of cigarette filter rods is estimated to be at 18,485 Million rods worth Rs 393.82 Crore growing at a CAGR of 21%. The exports at 1391 million rods and Rs. 29.20 Crore peg the market size for cigarette filter rods at 19,876 million filter rods and Rs. 423.02 Crore.

Exhibit 355: Market size estimate of cigarette filter rods

	2012-13
Quantity of domestic consumption of cigarette filter rods (in million numbers)	18,485
Value domestic consumption of cigarette filter rods (in Rs. Crore)	393.82
Exports (in million numbers)	1,391
Exports (in Rs Crore)	29.20
Market size of cigarette filter rods (in million numbers)	19,876
Market size of cigarette filter rods (in Rs Crore)	423.02

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

A sluggish growth in the cigarette market can be attributed to the discriminatory and punitive taxation coupled with a growing incidence of smuggling and illegal manufacture. These are the biggest challenges confronted by the domestic cigarette industry. Smoking in public places was prohibited nationwide from 2 October 2008. These challenges were further compounded during the year by the steep increase of excise duty on cigarettes which has been increased to 72% on cigarettes of length not exceeding 65 mm and to 11-21% for cigarettes of other lengths in the Annual budget for FYE15. The domestic consumption is thus, expected to grow at only 7% in the immediate future. However, exports shall lead the growth maintaining the 30% growth observed in the past.

Import Export Scenario

The import export scenario for cigarette filter rods has been captured in the following exhibit.

Exhibit 356: Export Import trends of cigarette filter rods

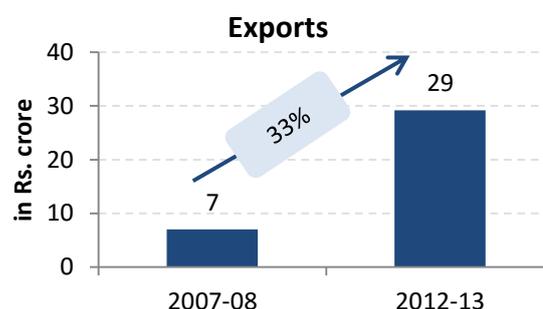
HS code family	HS codes	2012-13
Imports		
5601	56012110, 56012190,	Rs. 1.81

HS code family	HS codes	2012-13
Imports		
	56012200, 56012900	Crore
Exports		
5601	56012110, 56012190, 56012200, 56012900	Rs. 29.20 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Exports for the product have grown over the years from Rs. 7 Crore in 2007-08 to Rs. 29.20 Cores in 2012-13 registering a CAGR of 33%. Key export destinations include UAE, Tartu, Indonesia, Iran and Cambodia.

Exhibit 357: export trends for cigarette filter rods



Decatising Cloth

Decatising cloth, also known as *Decatising wrapper* is an industrial fabric used in Decatising machines. The fabric is an integral part of both Open Decatising and Kier Decatising machines that are majorly used for mechanical finishing of woven fabrics.

Product Characteristics

Decatising cloth is a polyamide/cotton or polyester/cotton blended woven fabric available in weights ranging from 400 gsm to 600 gsm.

Market Size and Trade Trends

Market Size Estimate

The domestic consumption for decatising cloth is estimated to be 1.8 Million metres and Rs. 41.10 Crore growing at CAGR of 6.50% from the 2007-08 consumption of Rs 30.0 Crore. The exports for decatising cloth are negligible and thus, we have the market size to be the same as the domestic consumption.

Exhibit 358: Market size estimate of decatising cloth

	2012-13
Quantity of decatising cloth (in Mn metres)	1.80
Value (in Rs. Crore)	41.10

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

Decatising cloth is mainly consumed by shirting and suiting pieces, with suiting bringing in the higher share of value. Thus, the growth of this segment is tied with the growth of suiting market in India which is luke warm given the tropical climate of the country. The domestic consumption and exports are both expected to grow only at 5% in the near future.

Key Manufacturers

Key manufacturers of decatising Cloth include:

- Hrishikesh Textiles
- Noor Textiles, Panipat
- Marino Textile
- Bombay Dyeing

Import Export Scenario

The import scenario of decatising fabric has been tabulated below in Exhibit 359. Exports of the fabric are negligible.

Exhibit 359: Import trends for decatising cloth

HS code family	HS codes	(2012-13)
Imports		
5911	59111000, 59113290, 59119090	Rs. 5.85 Crore

*source: IMAcS analysis, industry sources

Machinery Details

Sulzer machines are used to manufacture decatising cloth.

Quality Standards

The parameters tested for decatising wrapper along with the test method are mentioned in the table below:

Exhibit 360: Parameters tested for decatising wrapper

Parameter	Test Method
Air Permeability	IS 11056:1984
Strength	IS 1969-1985, ASTM D 5035-95
GSM	IS 1964-2001, ASTM D 3776-96
EPI/PPI	IS 1963-1981, ASTM D 3775-03

Bolting Cloth

Bolting cloth is a mesh fabric used primarily for screen printing in Textile industry. The fabric also has applications in filtration in pharmaceutical industries and in filtering oil.

Product Characteristics

Bolting cloth is a woven fabric manufactured from polyester and nylon yarns and is available in a variety of mesh sizes.

Market Size and Trade Trends

Market Size Estimate

Based on discussions with the industry experts, the domestic consumption for bolting cloth is estimated at Rs 30 Crore and 734 thousand square metres. Export of Rs. 1.54 Crore and 38,000 sqm sets the market size for decatising cloth at Rs. 31.54 Crore and 772,000 sqm that is only marginally higher than the consumption in 2007-08. It has grown at a CAGR of 4% from 2007-08.

Exhibit 361: Market size estimate of bolting cloth

	2012-13
Quantity of bolting cloth (in '000 sqm metres)	772
Value (in Rs. Crore)	32

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

Bolting cloth is majorly used for screen printing in textile processing industry. The advent of new printing technology in India has reduced the use of screen printing, thus, impacting the demand for this fabric negatively. The domestic consumption on a low base is expected to grow at 10% with exports only slowing down further to a 2% growth.

Key Manufacturers

The manufacturers of bolting Cloth are:

- Bombay Bolting Centre, Mumbai
- Surat Bolting, Surat
- Khanna Bolting, Surat
- Mithil Corporation, Mumbai
- Biyani Industrial Textile (P) Limited, Indore
- Deekay Nylobolt Industries Pvt. Ltd., Pune
- Tejas Fabrics, Surat
- Sur Syntex Pvt. Ltd., Surat

In addition, many filter manufacturing units in Surat also manufacture bolting cloth.

Import Export Scenario

The import export scenario of bolting cloth is captured in as follows:

Exhibit 362: Export Import trends of bolting cloth

HS code family	HS codes	(2012-13)
Imports		
5911	59112000, 59119090	Rs. 17.67 Crore
Exports		
5911	59112000, 59119090	Rs. 1.54 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Bolting Cloth for fine suiting is imported from Switzerland, China, Germany, Malaysia and Japan.

Absorbent Glass Mat Battery Separators

Battery separator is a porous sheet placed between the positive and negative electrodes in a liquid electrolyte, a gel electrolyte or a molten salt battery. Its function is to prevent physical contact of the positive and negative electrodes while serving as an electrolyte reservoir to enable free ionic transport. According to the structure, the separator can be divided as micro porous and non-woven.

Product Characteristics

An ideal battery separator should have the properties of high porosity, small mean pore diameter, oxidation resistance, puncture resistance, thermal dimensional stability and freedom from harmful chemical contaminants, favourable voltage characteristics, retardation of antimony transfer, electrochemical compatibility and prevention of dendrite growth.

The battery separators are made of PVC, PE and non-woven glass mats (Absorbent glass mats or AGM). The glass mats are known as AGM (Absorbable Glass Mat). The battery separator market is dominated by PVC although there is a gradual migration to PE separators. In India, the storage battery industry is slowly shifting from PVC separators to Polyethylene separators. Glass mat with PVC or polyethylene is mostly used in all industrial batteries and in a few cases in automobile batteries depending on the function, customer requirement and price.

Market Size and Trade Trends

Market Size Estimate

The market size for absorbent glass mats battery separators is estimated to be Rs 375.32 crore. The domestic consumption of 68.41 million sqm accounts for Rs. 375 crore of it. Exports are insignificant.

Exhibit 363: Market size estimate of AGM for battery separators

	2012-13
Quantity of domestic consumption of absorbent glass mats for battery separators (in Mn sqm)	68.41 Million sqm
Value of domestic consumption of absorbent glass mats for battery separators (in Rs. Crore)	Rs. 375.18 Crore
Exports of absorbent glass mats for battery separators (in Rs. Crore)	Rs. 0.14 Crore
Value of market size of absorbent glass mats for battery separators (in Rs. Crore)	Rs. 375.32 Crore

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The growth can be largely attributed to the relative spurt in the automotive sector from the base of 2007-08. Drawing on it, the domestic consumption for the product segment is expected to grow at 20% in the near term considering the growth in automotive segment as well as growing demand of UPS from households.

Key Manufacturers

The major manufacturer of battery separators is Raman FibreScience Private limited, which was recently acquired by US-based Hollingsworth & Vose Company (H&V). However significant part of domestic consumption, is being catered through imports.

Import Export Scenario

The export and import scenario of absorbent glass mats used in battery separators is captured in the Exhibit 364. The product is mostly imported Key countries from where we import AGM for battery separators are China, Thailand, U.S.A, France and United Kingdom.

Exhibit 364: Export Import trends for absorbent glass mats for battery separators

HS code family	HS codes	(2012-13)
Exports		
7019, 8507, 8546	70191900, 70193100, 70193200, 70195900, 70199010, 70199090, 85079010, 85079090, 85469090	Rs. 0.13 Crore
Imports		
7019, 8507, 8546	70191900, 70193100, 70193200, 70195900, 70199010, 70199090, 85079010, 85079090, 85469090	Rs. 325.32 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Coated Abrasives

An abrasive material is used to finish a work piece through rubbing the surface of the work piece. Abrasives are primarily used in industrial applications like grinding, polishing, buffing, honing, cutting, smoothening etc. The coated abrasives are classified into two broad categories: Woven coated abrasives and Non-woven coated abrasives.

Product Characteristics

The base fabric used is cotton, polyester and polyester blends, processed to obtain a suitable coated abrasives backing. These backings have special characteristics as weight, tensile strength and flexibility. The type of backing cloth used is Jeans cloth called "J" weight cloth, Drills cloth called "X" weight cloth and Sateen called "S" weight cloth. Jeans cloth is lighter and more

flexible, while Drills cloth is stronger and used in the manufacturing of coated abrasives to work under medium and heavy duty pressures.

There are two sides of the drill cloth which are different from each other. One side bears a net of fine lining if seen carefully and this side is called drilled side of the cloth. Drill side is filled with fillers. The other side of the cloth is called the coating side.

"J" weight cloth typically has a weight of about 130-195 GSM. "X" weight cloth typically has a weight of about 200-245 GSM and "Y" weight cloth typically has a weight of about 270-330 GSM.

The non-woven coated abrasives are made from abrasive grade fibres and made available for usage in various sizes and forms.

Market Size and Trade Trends

Market Size Estimate

The market size of coated abrasives is estimated to be about Rs. 759 Crore with Rs. 750 Crore of this being accounted by domestic consumption.

The abrasives market is estimated to be at Rs. 2,500 Crore in 2012-13¹³. CUMI and Grindwell Norton contribute to about 70% of the market together. 60% of the abrasives market is coated abrasives.

Exhibit 365: Market sizing of coated abrasives

	2012-13
Domestic consumption of coated abrasives (in MT)	54,224
Value of domestic consumption (in Rs. Crore)	750.00
Exports of coated abrasives (in MT)	278
Value of exports of coated abrasives (in Rs. Crore)	8.56
Market size of coated abrasive cloth (in MT)	54,502
Market size of coated abrasive cloth (in Rs. Crore)	758.56

Source: Industry Survey, iMaCS Analysis

Key Growth Drivers and Inhibitors

The Abrasives business caters to a number of industries such as Steel, Automobiles, Auto components, General Metal Fabrication and Woodworking. The Abrasives Market is clearly evolving from two major players to multi-players. With growing demand and capacities to meet and augment it, the domestic consumption of coated abrasives in the country is expected to grow by 20% Y-o-Y.

Key Manufacturers

The key manufactures of coated abrasives are Carborundum Universal, Grindwell Norton and Wendt India with their sales revenue from abrasives tabulated below.

Exhibit 366: Major players in coated abrasives and their revenue from abrasive products

Company Name	Revenue (in Crore of INR)
Carborundum Universal (CUMI)	802.29
Grindwell Norton	653.90
Wendt India	661.31

Source: Capitaline, Annual reports

Import Export Scenario

The import export scenario for coated abrasives has been captured in the following exhibit.

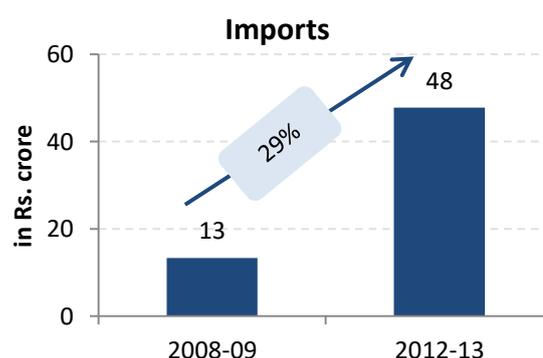
Exhibit 367: Import Export trends of coated abrasives

HS code family	HS codes	(2012-13)
Imports		
5903, 6805	59031090, 59039090, 68051010, 68051090	Rs. 47.77 Crore
Exports		
5903, 6805	59031090, 59039090, 68051010, 68051090	Rs. 8.56 Crore

*source: iMaCS analysis, industry sources, DGFT, DGCI

Imports of coated abrasives in the past five years as show in the following exhibit whereas the exports have dipped marginally on a low base. Key countries that we import coated abrasives from are China, Republic of Korea, Germany, Mexico and Japan.

Exhibit 368: Import trend for coated abrasives 2012-13 vs. 2008-09



Machinery Details

The backing cloth is made from polyester, rayon and cotton fibres. The fabrics are generally woven at 90 degrees to each other; another method of manufacturing backing cloth is stitching together an overlay of fibre placed 90 degrees to each other. The

¹³ Source: Industry report

key machinery used for manufacture of backing cloth is rapier looms.

Ropes And Cordages

Synthetic ropes and cordages are substitutes to traditional ropes and cordages made from jute and cotton. The synthetic ropes and cordages are primarily made from polypropylene and polyethylene. The 3-Strand and 4-Strand ropes required for fisheries, electricity boards, defence, ports and shipbuilding yards, stevedoring companies, steel pipe industries, sugar factories, engineering and oil exploration. The company also makes 8-Strand ropes that are ideal for marine applications like mooring lines, towing lines, messenger lines and on-board oil rigs. These products are manufactured to desired specifications.

Product Characteristics

The ropes are generally available in 3-strand, 4-strand and 8-strand with standard lengths of length 110, 220, 330 and 440 metres and other customer specifications. The diameter of the ropes varies from ½ inch to 7 inches. The functional specifications of ropes are

- Excellent strength
- Controlled elongation
- Abrasion resistance
- Heat resistance
- Non-corrosive
- Light weight
- High flexibility
- Inert to chemicals

The ropes are made from polypropylene and HDPE polymer fibres.

Market Size and Trade Trends

Market Size Estimate

The market size of ropes and cordages is estimated to be at Rs. 1,717 Crore. The domestic consumption of ropes and cordages is estimated to be Rs.1,008 Crore and 97,103 MT growing at a CAGR of about 9%.

Exhibit 369: Market Sizing estimated of ropes and cordages

	2012-13
Quantity of domestic consumption of ropes and cordage (in MT)	97,104
Value of domestic consumption of ropes and cordage (in Rs. Crore)	1,008
Exports of domestic consumption of ropes and cordage (in Rs. Crore)	709
Market sizing of domestic consumption of ropes and cordage (in Rs. Crore)	1,717

Source: Industry Survey, iMaCS Analysis

Key Growth Drivers and Inhibitors

Cordages industry is mainly driven by the infrastructure sectors growth and momentum. One of the key levers for demand for cordages is the logistics and freight sector, which in turn again heavily depends on infrastructure and industrial growth. With heavy infrastructure spending being shown in the pipeline, the domestic consumption of ropes and cordages is expected to easily grow at a 12% in the near three to five year horizon. Exports are expected to maintain its growth momentum at 20% every year.

Key Manufacturers

Key manufacturers of synthetic ropes and cordages are:

- Garware Wall Ropes Ltd.
- Axiom cordages which is an export oriented unit
- Tufropes Pvt. Ltd.

Import Export Scenario

The import export trends in the cordages segment has been captured in Exhibit 370.

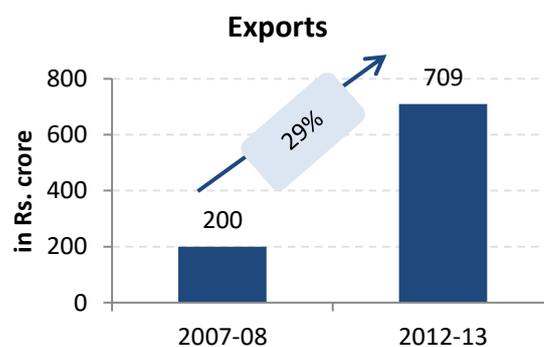
Exhibit 370: Import Export trends of ropes and cordages

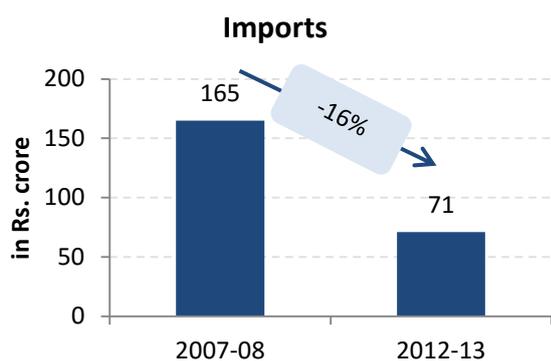
HS family	code	HS codes	(2012-13)
Imports			
5607, 5608		56074900, 56075040, 56079090, 56089090	Rs. 70.55 Crore
Exports			
5607, 5608		56074900, 56075040, 56079090, 56089090	Rs. 709 Crore

*source: iMaCS analysis, industry sources, DGFT, DGCIS

Exports have shown good growth in the past five years. The trend for this has been captured in the following exhibit.

Exhibit 371: Exports of cordage -2012-13vs2007-08





Source: IMaCS analysis,

Key export destinations are Indonesia, Singapore, UAE, USA and Turkey.

Key countries of import are Nepal, China and Bangladesh.

Machinery Details

The key machineries employed in manufacture of synthetic ropes are

- Extrusion - J P Industries, Lohia Starlinger, Kabra Machines
- Twisting and Winding - LMW, Coimbatore

Composites (TT Component – Glass Fabric)

Composites are produced by reinforcing a resin matrix (thermoplastic/thermoset) with fibres like glass fibre, aramid, carbon fibre and/or natural fibres. Unlike conventional materials like steel, aluminium etc. properties of the composite material can be designed for the required structural and functional aspects. Properties of composites like stiffness; thermal expansion etc. can be varied continuously over a broad range of values using appropriate fibre, resin and fabrication mechanism. The Technical Textile material in the composites is the fibre glass, aramid and carbon fibre.

Product Characteristics

Composites are able to meet diverse design requirements despite being light-weight and have a high strength-to-weight ratio as compared to conventional materials. Some advantages of composite materials over conventional one are mentioned below

1. Tensile strength of composites is four to six times greater than that of conventional materials like steel, aluminium etc.
2. Improved torsion stiffness and impact properties
3. Higher fatigue endurance limit (up to 60% of the ultimate tensile strength)

4. 30-45% lighter than aluminium structures designed for the same functional requirements

5. Lower embedded energy

6. Composites are less noisy while in operation and provide lower vibration transmission

The key material of choice for composites is Glass fabric. Fibre glass dominates the composites industry as a preferred reinforcement fibre, with a share of around 85%-90%. Other reinforcement fibres like carbon fibre and aramid fibre are sparingly used in India owing to its patented technology and high costs. Fibre glass is made of fine solid rods of glass each with thickness less than one twentieth the width of human hair. Glass fibres are loosely packed together into a mass which can serve as heat insulators. They are also used like wool or cotton fibres to make glass yarn, tape, cloth and mats. Fibre glass also has applications in electrical insulation, chemical filtration and fire fighter suits. Combined with plastics, fibreglass is used for airplane wings and bodies, automobile bodies, wind mill blades and boat hulls. In this section, we assume that the key contributor to the market of composites is Glass fabric.

Market Size and Trade Trends

The domestic consumption of glass fabric for composites is pegged at 1,14,000 MT and Rs. 1220.57 Crore. India exports 14342 MT of glass fabric worth of Rs. 202 Crore. This brings the total market size of glass fabric to Rs. 1423 Crore and 1,28,343 MT.

Exhibit 372: Market size estimate of glass fabric – composites

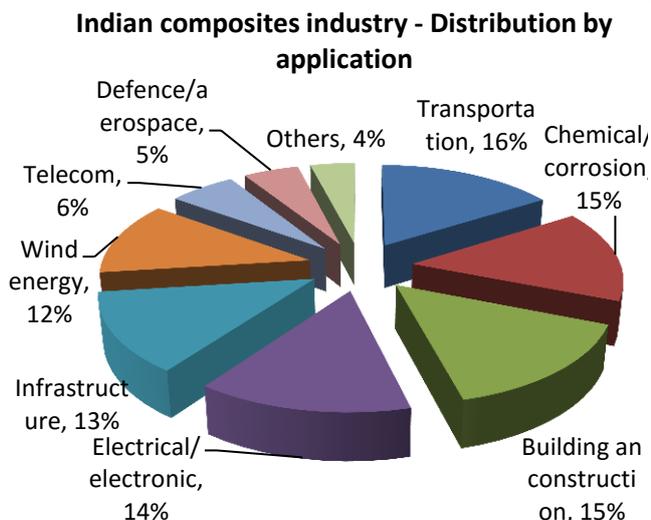
	2012-13
Quantity of domestic consumption of glass fabric (in MT)	114,000
Value of domestic consumption of glass fabric (in Rs. Crore)	1,221
Exports of glass fabric (in MT)	14,342
Exports of glass fabric (in Rs. Crore)	202
Market sizing of glass fabric (in MT)	128,342
Market sizing of glass fabric (in Rs. Crore)	1423

*source: IMaCS analysis, industry sources, DGFT, DGCI

Key Growth Drivers and Inhibitors

The market for fibre glass is driven by the application industries such as Transportation, Building and Construction, Chemical/Corrosion, Infrastructure, Wind energy and Electrical and electronics

Exhibit 373: Indian composites industry - distribution by application



*source: FRP Institute

Growth across these segments would push the market size for composites. An active focus on wind energy as a large untapped potential and growing penetration of glass fabric in numerous applications is expected to drive the domestic consumption by 15% year on year in the near future. Exports shall grow at a more temperate rate of 6% with Government initiatives like Make in India paving way for capacities and quality in due time.

Key Manufacturers

Key manufacturers of composites in India include:

- Owens Corning India
- UP Twiga Glass fibres
- Goa Glass fibre
- Sintex Industries Ltd, Kalol
- Mahindra composite
- TATA Automotive Ltd
- L & T, Vadodara,
- Permal Wallace, Indore
- Mobility Solutions Ltd. Chandigarh
- Agni fibre Board Pvt. Ltd, Vadodara,
- Kinenco Private Limited
- Suzlon India Ltd.,
- Anearcon India DAMAN,
- Tata Advanced Materials Limited

Import Export Scenario

Most of import and export for composites occurs under the head of glass fabric and has been captured in the following exhibit

Exhibit 374: Export import trends for glass fabric

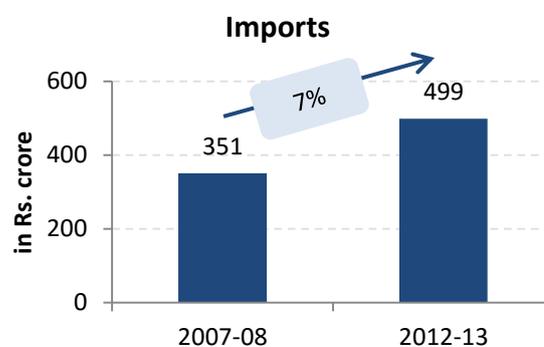
HS family	code	HS codes	(2012-13)
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HS family	code	HS codes	(2012-13)
Imports			
7019	70191900,	70193200,	Rs. 498.56 Crore
	70199010,	70199090,	
	70195900,	70193100,	
	70191100,	70195100,	
	70195200		
Exports			
7019	70191900,	70193200,	Rs. 201.78 Crore
	70199010,	70199090,	
	70195900,	70193100,	
	70191100,	70195100,	
	70195200		

*source: IMAcS analysis, industry sources, DGFT, DGCIS

For composites, we rely a lot on our trade links. 41% of our domestic consumption is catered by imports and 14% of the market size contributed by exports. Exports have declined over time, and imports have grown at a 7% CAGR. This points to an indigenous capacity enhancement as the market has grown sizeably. The export trend has been capture in the following exhibit. Key countries from where we import are Malaysia, U.S.A, China, U.K., Germany and Belgium. Key export destinations are Germany, U.S.A, U.A.E, and Brazil and Belgium.

Exhibit 375: Import trend for composites - 2012-13 vs., 2007-08



Composites

Composites used in automobiles are a very wide variety of products. Composites such as glass wool and carbon are used in auto motives. This is however, very specific to the mode of transport considered, i.e. composites used in conventional automobiles, railways, shipping industry and aviation differ from each other significantly.

Product Characteristics

Composites used in auto motives are used mainly for two attributes – high strength and light weight. Both these attributes are mostly contributed by aramid and carbon fibres and find heavy application in the shipping

and aviation industry. Other than these, glass fibres used in the automotive sector are used in railways and in luxury buses.

Market Size and Trade Trends

Shipping And Aviation Industry

Shipping and aviation industries use carbon and aramid composites. None of these are manufactured in India as of now. Aramid composites because of their quality of impact resistance find applications in armoured vehicles and Navy boats. Carbon composites find application in commercial aviation industry and to a limited extent in the civil application for re-strengthening a structure.

Automobiles

In road automobiles, glass fibres are the only composites used. These too are utilized mainly in high end luxury buses and not commercial vehicles. This is due to high cost of glass wool involved. In luxury buses, these are used mainly in the front, rear, engine covers, dashboards, battery boxes and air conditioning covers.

Railway Coaches

In railway coaches, glass fibres is the only Technical Textile composite used so far. This is used in the lining of coaches. Delhi Metro has been the only locomotive operation that has used composites other than these. The consumption of composites by luxury buses and railway coaches has been summarized as below:

Exhibit 376: Market size estimate glass fabric

	2012-13
Domestic consumption of glass fabric in luxury buses(in MT)	240
Value of Domestic consumption of glass fabric in luxury buses (in Crore)	2.88
Domestic consumption of glass fabric in railway coaches (in MT)	505.44
Value of Domestic consumption of glass fabric in railway coaches (in Crore)	4.55

Printed Circuit Boards

The Printed Circuit Board (PCB) is a mechanical device used to electrically connect and hold electronic components. The Technical Textile used in the manufacture of printed circuit board is the woven glass fibre fabric which is used as reinforcement along with the epoxy resin. The glass fibre impregnated resin called 'prepregs' is used to bind the copper foils to give copper laminated boards, called laminates. These

laminates are further cut into various sizes based on the requirement.

Product Characteristics

The glass fabric used affects the performance of final electronic circuitry built on the PCB. The "fibre weave effect" or FWE is one of the central issues associated with the influence of the glass reinforcement fibre on the electrical performance of the PCB.

The glass fabric used for PCB is generally Style 1080 however there are various styles specified by IPC. The standard construction of this style of fabric involves 60 yarns per inch in the warp or machine direction and 47 yarns per inch in the weft or cross-machine direction. The thickness of the fabric is typically, 2.1mil (0.053mm).

The desired properties of the glass fabric required for PCB applications are as follows:

1. Dimensional stability
2. Surface smoothness
3. Ability to withstand laser and mechanical drilling
4. Superior conductive anodic filament (CAF) resistance
5. Uniform dielectric constant (range of 6.6-6.9)
6. Lower dissipation factor (0.006)
7. Reduced signal skew and improved signal integrity

Market Size and Trade Trends

Market Size Estimate

The printed circuit board industry in India is yet to catch up with the rest of the World. India's share of production of the world PCB market is at a miniscule 0.3% - 0.5%. The PCB industry in India stands at a revenue of Rs. 57.12 Crore and thus, is still a nascent industry given the export import trends outlined in the following section.

The Technical Textile component of Printed circuit board industry in India is estimated to be about Rs. 28.89 Crore at 32.10 Million sqm. As per our interaction with industry association IPCA, a major chunk of this demand is catered to by imports. The Technical Textile component of printed circuit board comprises a very small fraction (0.2%) of its value.

Exhibit 377: Market size of PCB - TT component

	2012-13
Market sizing of Technical Textile component used in PCBs (in Mn sqm)	32.10
Market sizing of Technical Textile component used in PCBs (in Rs. Crore)	28.89

Key Growth Drivers and Inhibitors

The key driver for Technical Textile used in PCBs is directly the printed circuit board consumption of India. This in turn is closely tied with the PCBs used in

consumer durable equipments and electronic industry. So, we can expect the market to grow at a healthy rate of 17%, however whether the demand is taken up by imports or domestic production of Technical Textile remains to be seen.

Key Manufacturers

Key manufacturer in the country for glass fibres to be used in PCB is AT &S Limited.

Import Export Scenario

The export import trend of the printed circuit board industry is captured in the following exhibit

Exhibit 378: Import export trends of Printed Circuit Boards

HS code family	HS codes	(2012-13)
Imports		
8534	85340000	Rs. 29 crore
Exports		
8534	85340000	-

*source: IMaCS analysis, industry sources, DGFT, DGCIS and input from industry

Key countries from where we import PCBs are China, Taiwan, Hong Kong, Republic of Korea and Japan. Key export destinations for our relatively smaller export of PCBs are Austria, U.S.A., Germany, Singapore and U.K.

Machinery Details

The raw material used for glass fibre fabric is monofilament glass fibres. The filaments are further processed to produce yarn which is used for weaving the reinforcement fabric.

The key machinery used for weaving glass fibre fabric is air-jet weaving machine the major producers of these air jet machines are as given below:

1. Sulzer Textil, Switzerland
2. SMIT SpA, Italy
3. Lindauer Dornier GmbH, Germany
4. Picanol, Belgium

Quality Standards

The standards for manufacturing glass reinforcement fabric are set forth by IPC. The standard followed for manufacturing glass fibre fabric is IPC-4412.

Filtration Products

Filtration products are broadly classified based on the key application area. The broad classification based on applications is given below:-

- **Industrial filters** - Industrial filters include vacuum filters, pressure filters, and dust collection equipment like bag filters. Industrial filters are further classified into Dry and wet filters on the basis of their applications. Dry filters are

consumed by industries like Cement, Steel and Energy plants (chiefly waste to energy plants). Wet filters are employed more in the Pharmaceutical and Chemical industries.

- **Automotive filters** - Automotive filters are primarily of three types - Oil filter, Air filter and Fuel filter. The filters clean the oil, air and fuel by blocking dirt and other unwanted particles from entering the vehicle system. The Technical Textile used in the filters is cellulose and polyester non-woven filter paper.

The filtration products can be classified into two major categories.

- Liquid solid separation
- Air-solid separation.

The filter media used for Air-solid separation is primarily non woven fabric whereas Liquid solid separation involves woven filter media.

Exhibit 379: Filter media fabric properties

Woven Filter Media				
Fabric type	WEIG HT / SQ. MTR.	TENSILE STRENGTH (KGS.)		AIR PERMEA BILITY (CU.FT/S EC)
		WA RP	WEF T	
Polypropylene spun fabric	280 - 650	200 426	140 350	0.97 - 0.20
Polypropylene		295	145	
Multi filament fabric	275 - 450	- 500	- 400	0.5 - 0.13
Polyester spun fabric	360 - 670	- 600	- 308	0.20 - 0.109
Nylon filament fabric	330 - 450	- 548	- 414	0.60 - 0.23
		135	110	
Cotton fabric	400 - 830	- 320	- 225	0.30 - 0.08

The different properties of non woven filter media are captured in the following exhibit:

Exhibit 380: Non woven filter media properties

Non Woven Filter Media	We ight (GS M)	Thic kne ss (M m)	Break ing* Stren gth (Kgf)	Burst ing Stren gth (Kg/ Cm ²)	Ma x. Te mp . (C ^o)	Air Perm e- abilit y

Non Woven Filter Media	Weight (GSM)	Thickness (Mm)	Breaking* Strength (Kgf)	Bursting Strength (Kg/Cm ²)	Max. Temp. (C ^o)	Air Permeability
Polyester & Polyester	300 - 550	1.7 - 2.3	30 - 70	15 - 30	150	160 - 750
Polypropylene & Polypropylene	400 - 700	1.8 - 3.0	70 - 150	30 - 40	90	100 - 200
Polyester - Acrylic & Polyester	500	202	70	30	120	200
Polyester - Viscose	220	1.8	16	4	130	550

Product Characteristics of Industrial Filters

Filter bags employed for very consumer industry, depend on the size of the particulate emission. There are well established norms for cement and steel plants that they must adhere to. The cement industry in general prescribes a 50 gsm bag.

Product Characteristics of Automotive Filters

The characteristics of the filter are based on the specification of the original equipment manufacturers: permeability, corrugation depth, bursting strength, pore size, volatile content, resin content and width and height. All the three filters are required for proper functioning of internal combustion engine. The Technical Textile used in the filters is polyester and cellulose non-woven fabric of around 120-150 GSM.

Market Size and Trade Trends

Market Size Estimate

The domestic consumption of filters is estimated to be 5.87 million sqm and Rs. 411.22 Crore. Exports of filters stand at 0.02 million sqm and Rs. 2.29 Crore, pegging the market size of filters at 5.89 Mn sqm and Rs. 413.51 Crore.

Exhibit 381: Market size estimate of filtration

	2012-13
Domestic consumption of filters (in Mn sqm)	5.87
Value of domestic consumption of automotive filters (in Rs. Crore)	411.22
Exports of filter (in Mn sqm)	0.02
Exports of filter (in Rs Crore)	2.29

	2012-13
Market size of filters (in Mn sqm)	5.89
Market size of filters (in Rs Crore)	413.51

Key Growth Drivers and Inhibitors

Taking into account that industrial filters constitute a significant chunk of the filtration media market, it is growth in the end user industries such as Cement, Steel and Environmental that will drive the growth of this segment. The primary growth driver for automobile filters is the automotive industry (including the replacement market).

For industrial filters, each industry has its set pattern of consumption although one similarity is retained across categories. Each industry has an initial plant set up requirement and replacement requirement of filters once in operation. Thus, the consumption of filters is directly driven by the capacity utilization of existing plants and new capacity addition across the industries of cement, steel and power. These industries, in turn, are closely intertwined with the macroeconomic health of the country. Thus, with a boost in industrial growth and infrastructure development, the industry can only grow. Taking cue from the current upbeat investment climate, the domestic consumption of the product is expected to grow at 15% in the immediate horizon.

Key Manufacturers

Key manufacturers of filtration media include:

- Khosla Profil Pvt. Ltd.
- Masturlal Chemfab
- Industrial filters Ltd.
- Supreme Industries Ltd.
- SVM Nonwovens
- BWF India

Import Export Scenario

The import export scenario for filtration is captured in below. Given the magnitude of the product segment, imports and exports are a small share of the market.

Exhibit 382: Import export trends of filtration

HS family	code	HS codes	(2012-13)
Imports			
5603, 8421	5911,	56031300, 56031400, 59111000, 59112000, 59113190, 59119090, 84219900	Rs. 6.48 Crore
Exports			
5603, 8421	5911,	56031300, 56031400, 59111000, 59112000, 59113190, 59119090,	Rs. 2.29 Crore

HS family	code	HS codes	(2012-13)
		84219900	

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Key countries from where India imports are China, Germany, Finland, Denmark and U.S.A.

Key Machinery Used

The machinery used for processing paper into filter paper is given below:

1. Filter paper impregnation machine
2. Pleating machine – Blade/Rotary type
3. Perforation machine
4. Curing machine

Computer Printer Ribbon

The computer printer cartridge of a Dot matrix printer (DMP) consists of a cassette and inked fabric called the printer ribbon. The cartridge is replaced when no further prints can be availed, however in order to save on costs only the ribbon portion is changed which is called the refill.

Product Characteristics

The Nylon 6 yarn is woven into a fabric which is cut to required size for making computer printer ribbons. The properties essential for this fabric is

1. High tensile strength
2. Good absorption capacity and capillary action
3. Smudge resistance
4. Scratch resistance
5. Good heat resistance

These properties enable the ribbon to carry the ink and undergo stress during printing. The fabric is prepared from nylon yarn. It is then cut into required dimensions, soaked in ink which is of the consistency of wax or crayon, and packed in rolls.

Market Size and Trade Trends

Market Size Estimate

The market size for computer printer ribbons is estimated to be at Rs. 286.24 Crore. The domestic consumption of printer ribbons is estimated to be 1,424.62 Million metres worth Rs. 284.92 Crore. The exports contribute a minor Rs. 1.32 Crore to the market size.

Exhibit 383: Market Sizing of printer ribbons

	2012-13
Domestic consumption of computer printer ribbons (in Million metres)	1,424.62
Value of Domestic consumption of computer printer ribbons (in Rs. Crore)	284.92

	2012-13
Volume of export of computer printer ribbons (in Million metres)	6.61
Value of export of computer printer ribbons (in Rs. Crore)	1.32
Market size of computer printer ribbons (in Million metres)	1431.23
Market size of computer printer ribbons (in Rs. Crore)	286.24

Source: Industry Survey, IMAcS Analysis

Key Growth Drivers and Inhibitors

The industry for computer printer ribbons in only further expected to decline because of rise and rapid adoption of laser and ink jet printers. Essentially, the sales of computer printer ribbons are driven by only institutional sales where the printers are expected to sustain very heavy frequencies of printing and life like railways and banks. Thus, a slow but steady growth of 2% in the domestic consumption of computer printer ribbons is expected in the near future.

Import Export Scenario

The import export scenario for computer printer ribbons is outlined in the following exhibit. The imports constitute a bulk of the consumption.

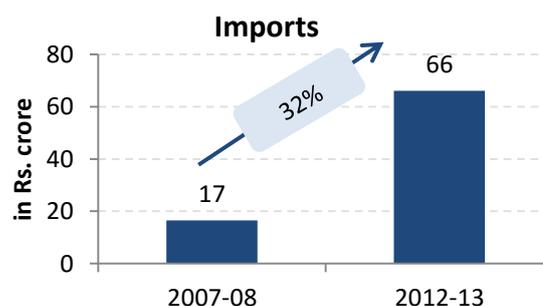
Exhibit 384: Import Export trends of computer printer ribbons

HS family	code	HS codes	(2012-13)
Imports			
5806, 9612		58063110, 58063200, 96121010	Rs. 66.48 Crore
Exports			
5806, 9612		58063110, 58063200, 96121010	Rs. 1.32 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Imports have grown in the past five years at a CAGR of 32% as depicted in the figure below. Key countries from where India imports printer ribbons are Singapore, Japan, China, Mexico and Vietnam.

Exhibit 385: Trend of imports for computer ribbons - 2012-13 over 2007-08



Source: IMAcS analysis, industry sources, DGFT, DGCIS

Paper Making Fabrics

Paper machine clothing consists of large continuous belts of custom designed and custom manufactured, engineered fabrics that are installed on paper machines and carry the paper stock through each stage of the paper production process – pulp created and pressed to a mesh, dewatered, heated, and dried by paper-making machines to make paper web. The types of fabrics are as follows:

- Forming fabric - single-layer and double layer fabrics, two-and-half layer designs.
- Press fabrics - comprising single-base and multi base fabrics.
- Dryer fabrics - which consist of woven mesh dryers fabrics, needled woven mesh dryers, spiral link dryer fabrics, and needled spiral link dryer fabrics.

The demand for these fabrics is primarily driven by paper mills. With the advent of technology synthetic material is being used to replace wire fabrics.

Product Characteristics

The paper making fabrics are made from polyester and polyamide wires which are woven to produce the fabric. Paper making fabric should have the following functionalities:

1. Dewatering ability or good drain ability
2. Transferability of wet paper web - transfer wet paper web safely to the next position by adhering the wet paper web to the felt.
3. Run-ability - avoid undesirable conditions as snaking, deviation, vibration and wrinkling.
4. Wear resistance and resistance to hair shedding
5. Compaction resistance
6. Paper surface smoothness - avoid any felt or roll markings.
7. Uniformity
8. Sustain high speeds of movement on paper making machine

These vary according to the grades of paper, types of paper-making machines and the positions where the felts are used. In short, each position of the paper-making machine requires different felts.

Market Size and Trade Trends

Market Size Estimate

The market size of paper insulation felts is estimated to be Rs 213.95 Crore and 1255.51 MT. Domestic consumption of paper making fabrics is estimated to be Rs. 206.56 Crore and exports add another Rs. 7.39 Crore to the market size.

Exhibit 386: Market Size of paper making fabrics

	2012-13
Domestic consumption (in MT)	1212.16
Domestic consumption Value (in Rs. Crore)	206.56
Exports of paper making fabric (in MT)	43.35
Exports Value (in Rs. Crore)	7.39
Market size of paper making fabric (in MT)	1255.51
Market size of paper making fabric Value (in Rs. Crore)	213.95

Source: Industry Survey, IMAcS Analysis

Key Growth Drivers and Inhibitors

The key growth driver for this segment is the paper industry which is pegged to be growing at a rate greater than the GDP rate of the country. The domestic consumption of paper making fabric is expected to grow at 15% in the near future with exports growing at 20% further bolstering growth of the market size.

Key Manufacturers

Key manufacturers in the segment are Voith paper fabrics ltd and Wire and fabriks SA Ltd.

Import Export Scenario

The import export scenario of paper making fabric felts is tabulated in Exhibit 387.

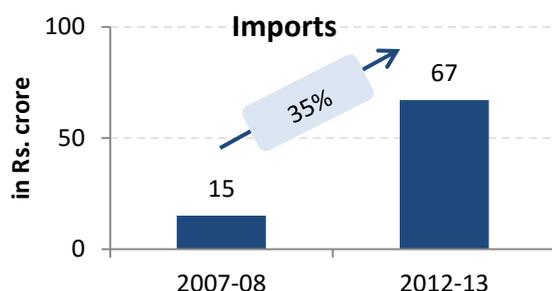
Exhibit 387: Import Export trends of paper making fabrics

HS family	code	HS codes	(2012-13)
Imports			
5911	59111000,	59113190,	Rs. 67.33 Crore
	59113210,	59113250,	
	59113290, 59119010, 59119090	59119090	
Exports			
5911	59111000,	59113190,	Rs. 7.39 Crore
	59113210,	59113250,	
	59113290, 59119010, 59119090	59119090	

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Imports of paper making fabrics have grown rapidly in the past five years as depicted in the Following exhibit. Exports have largely remained at the same levels. Key countries from where India imports paper fabrics are China, Republic of Korea, Switzerland, Germany and Malaysia.. The key contries to wich India exports are Singapore, Japan, China, Mexico and Vietnam.

Exhibit 388: Import trend for paper making fabric 2012-13 vs. 2007-08



Source: DGCIS, DGFT, IMAcS Analysis

Machinery Details

The key machineries used for paper making fabrics are Warp penetration machines, Weaving machine and Finishing and head setting machine

Industrial Webbing And Slings

Industrial webbings and slings are used in lifting heavy equipment. These find applications in logistics, construction and freight handling. These are critical components in the industries as product failure can lead to loss of life also, especially in weight lifting applications.

Product Characteristics

Slings are made out of high tenacity polyester and are thus 100% Technical Textile.

Market Size and Trade Trends

The market size of industrial slings and webbings is estimated at Rs. 296.23 Crore. Domestic consumption of slings and webbings is estimated to be Rs. 288.11 Crore and 8798.00 MT. Exports for industrial webbings and slings contribute Rs. 8.13 Crore and 325.03 MT to the market size.

Exhibit 389: Market size estimate - slings & webbings

	2012-13
Domestic consumption of slings and webbings (in MT)	8798.00
Value of Domestic consumption of slings and webbings (in Crore)	288.11
Exports of slings and webbings (in MT)	325.03
Exports of slings and webbings (in Rs Crore)	8.13
Market size of slings and webbings (in MT)	9123.03
Market size of slings and webbings (in Rs Crore)	296.23

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The key driving segment for this product is the logistics, freight and infrastructure sector. More the constructions and heavier movement/installation of heavy machinery/equipment more would be the demand of these products. Thus, a tempered growth estimate of this product can be assumed to be 10% although the infrastructure sector that drives this product is expected to grow at faster rate in the coming short term horizon.

Key Manufacturers

Key manufacturers include Greenfield, Ferretero, Protherm

Import Export Scenario

The import export scenario for slings and webbings has been captured in the following exhibit. Imports are greater than exports and most of these happen from China, Sri Lanka, Hongkong and Korea. Key export destinations are Vietnam, Sri Lanka, Pakistan, Bangladesh and Italy.

Exhibit 390: Import and Export trends of TT component webbings and slings

HS family	code	HS codes	(2012-13)
Imports			
5806,5911		58062000, 58063200, 59111000	Rs. 194.23 crore
Exports			
5806,5911		58062000, 58063200, 59111000	Rs. 8.13 crore

*source: IMAcS analysis, industry sources, DGFT,

Others

Under this head we have covered two new product segments that were suggested by the PIC but have very small market sizes at the moment. They have been, thus, clubbed together under "Others". The two product segments included here are acoustic textiles used in cell phones and Technical Textiles used in hoses and pipes. The corresponding market sizing has been explained in the following sections.

Acoustic Textiles used in Cell Phones

Acoustic textiles used in Cell phones are a very niche class of Technical Textiles that merit a mention because of their fast moving nature though volume and value wise this is a very small number.

Product Characteristics

These membranes are hydrophobic and are designed to have longevity against weather.

Market Size and Trade Trends

The market size of acoustic textiles used in cell phones is estimated at Rs. 1.93 Crore. Imports make up 0.66 Crore of this market with heavy imports being sourced from Switzerland and China.

Exhibit 391: Market size estimate for acoustic textile for cell phones

	2012-13
Market size (in Rs Crore)	1.93
Market size (in sqm)	25,284.00

*source: IMAcS analysis, industry sources

Key Growth Drivers and Inhibitors

The key driver for this product is the mobile phone sales and consumption which is on an upward trajectory. The consumption moves in tandem with cell phone sales and is expected to grow at 12% in keeping with the trend of growing sales of mobile phones in India.

Key Manufacturers

Key manufacturers include Sefar, Saati and Nitto Denko Private Ltd.

Import Export Scenario

The import scenario for slings and webbings has been captured in the following exhibit. Imports mostly come from Switzerland and China in large measures. Export against this product class is negligible.

Exhibit 392: Import and Export trends

HS code family	HS codes	(2012-13)
Imports		
5911	59112000	Rs. 0.66 crore

*source: IMAcS analysis, industry sources, DGFT,

Industrial Hoses (TT Component)

A **hose** is a flexible hollow tube designed to carry fluids from one location to another. Hoses are also sometimes called *pipes*, or more generally *tubing*. Hoses are used for a transportation of a variety of fluids ranging from normal water to high pressure fluids and corrosive ones, or even gases. A hose is designed depending upon the nature of fluid that is to be transported. One of the components included in designing hose is Technical Textile reinforcement.

A Technical Textile component is employed in a hose to withstand higher pressure, to alter permeability or lend greater strength to the hose. The nature and amount of Technical Textile reinforcement used again is dictated most y application and thus varies widely.

Product Characteristic

Technical Textile reinforcement used in industrial hoses and pipes may be of rayon or high tenacity

polyester again depending on application and end usage conditions.

Market Size and Trade Trends

Market Size Estimate

The market size of Technical Textiles used in industrial hoses and pipes is estimated to be at Rs. 6.68 Crore and 371.07 MT. The domestic consumption of TT reinforcement in industrial hoses and pipes stands at Rs. 4.50 Crore and 250 MT.

Exhibit 393: Market Sizing estimated of ropes and cordages

Description	2012-13
Quantity of domestic consumption of TT reinforcement in industrial hoses (in MT)	250.00
Domestic consumption of TT reinforcement in industrial hoses (in Rs. Crore)	4.50
Exports of TT reinforcement in industrial hoses (in MT)	121.07
Exports of TT reinforcement in industrial hoses (in Rs. Crore)	2.18
Market size of TT reinforcement in industrial hoses (in MT)	371.07
Market sizing of TT reinforcement in industrial hoses (in Rs. Crore)	6.68

Source: Industry Survey, IMAcS Analysis

Key Growth Drivers and Inhibitors

The hoses industry is mainly driven by the infrastructure, chemical and fertilizer industry. A growth momentum across these sectors would significantly drive the consumption of this product segment. A growth of 8% in short term in line with the GDP guidance can be expected for this products segment.

Key Manufacturers

Key manufacturers of TT reinforcement in hoses are Reliance Industries Ltd and Century Enka Ltd.

Import Export Scenario

The import export trends of the TT component used in hoses has been captured in Exhibit 394 below.

Exhibit 394: Import Export trends of TT component of hoses

HS family	code	HS codes	(2012-13)
Imports			
4009		40093100	Rs. 1.66 Crore
Exports			
4009		40093100	Rs. 2.18 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCI, Includes only TT component

24. Non-Woven

Introduction

Nonwoven fabrics are broadly defined as sheet or web structures bonded together by entangling fibre or filaments (and by perforating films) mechanically, thermally or chemically. They are flat, porous sheets made directly from separate fibres or from molten plastic or plastic film. They are not made by weaving or knitting and do not require converting the fibres to yarn

Nonwovens are defined by ISO standard 9092 and CEN EN 29092. These two documents, identical in their content, are the only internationally acknowledged definition of Nonwovens. As industry, trade and technology have evolved since their publication in 1988; these standards are being updated by ISO experts to better reflect what the present understanding of Nonwovens is. The following text has recently been proposed to the International Standardization Organization by EDANA and INDA.

Wet-laid webs are nonwovens provided they contain a minimum of 50% of man-made fibres or other fibres of non vegetable origin with a length to diameter ratio equals or superior to 300, or a minimum of 30% of man-made fibres with a length to diameter ratio equals or superior to 600, and a maximum apparent density of 0.40 g/cm. Nonwoven fabrics are engineered fabrics that may be a limited life, single-use fabric or a very durable fabric. Nonwoven fabrics have various functions such as stretch-ability, flame resistance, wash-ability, strength, absorbency, liquid repellence, resilience, softness, cushioning, filtering, bacterial barrier and sterility. These properties are often combined to create fabrics suited for specific jobs.

Production Process

The production of nonwovens takes place in three stages (Some stages may be overlapping or run simultaneously). The three stages are:

- Web Formation
- Web Bonding
- Finishing Treatments

Web Formation

Nonwoven manufacture starts by the arrangement of fibres in a sheet or web. The fibres can be staple fibres packed in bales, or filaments extruded from molten polymer granules.

Four basic methods are used to form a web are

- a. Dry-laid
- b. Spun-melt
- c. Wet-laid
- d. Other techniques

• Dry-laid

There are two methods of dry-laying:

- Carding
- Air-laying

A carding machine is a rotating drum or series of drums covered in fine wires or teeth. Carding is a mechanical process starting with the opening of fibre bales which are blended and conveyed to the next stage by air transport. They are then combed into a web by a carding machine. The exact configuration of cards depends on the fabric weight and fibre properties needed. The web can be parallel-laid, or can be random-laid. Typical parallel-laid carded webs result in good tensile strength, low elongation and low tear strength in the machine direction and the reverse in the cross direction. Relative speeds and web composition can be varied to produce a wide range of fabrics with different properties.

In air-laying, usually short fibres are fed into an air stream. From there it goes on to a moving belt or perforated drum, where they form a randomly oriented web. Air laid webs offer great versatility in terms of the fibres and fibre blends that can be used. Compared with carded webs, air laid webs has lower density, greater softness and the laminar structure is absent.

• Spun melt

Spun melt is a generic term describing the manufacturing of nonwoven webs directly from thermoplastic polymers.

It consists of two processes Spun laid and Melt blown
In spun laid process (also known as spun bonded) polymer granules are melted and then the molten polymer is extruded through spinnerets. Then the continuous filaments are cooled and deposited on to a conveyor to form a uniform web. In the spun laid process, the raw material flexibility is more restricted but it gives the nonwovens greater strength. Co-extrusion of second components is used in several spun-laid processes, usually to provide extra properties or bonding capabilities.

In melt blown web formation, on leaving the spinneret, low viscosity polymers are extruded into a high velocity airstream. This scatters the melt, solidifies it and breaks it up into a fibrous web.

• Wet-laid

The method of wet-laying is similar to paper manufacturing but with synthetic fibres. Dilute slurry of water and fibres is deposited on a moving wire screen and drained to form a web. Then with the help of pressing between rollers the web is dewatered, consolidated and then dried. Impregnation with binders is often included in a later stage of the process.

- **Other Techniques**

This includes a group of specialised technologies, in which the fibre production, web structure and bonding usually occur at the same time and in the same place.

Flash spun webs are made by dissolving a polymer in a suitable solvent and then spraying it into a vessel which is held at reduced pressure. The solvent evaporates (flashes off) creating a cloud of fibres, which are collected and bonded. Other variants of web forming techniques include different methods of fibrillation such as electrostatic spinning.

Processes are emerging where two or more web forming techniques are used simultaneously. For example the spun-laid/melt blown process, in which one or more melt blown webs and spun laid webs are combined.

Web Bonding

Webs, other than spun-laid, have little strength in their unbonded form. The web must therefore be consolidated in some way. The choice of method is a vital decision determining the ultimate functional properties.

There are three basic types of bonding Chemical, Thermal and Mechanical

- a. **Chemical bonding**

Chemical bonding or adhesion bonding mainly refers to the application of a liquid based bonding agent to the web. Three groups of materials are commonly used as binders Acrylate polymers and copolymers, Styrene-butadiene copolymers and Vinyl acetate ethylene copolymers.

There are water based binder systems (most widely used), powdered adhesives, foam and in some cases organic solvent solutions, which are used.

The binder can be applied uniformly by impregnating, coating or spraying or intermittently, like print bonding. Print bonding is used when specific patterns are required and where it is necessary to have the majority of fibres free of binder for functional reasons.

- b. **Thermal bonding (cohesion bonding)**

This method is based on the thermoplastic properties of certain synthetic fibres to form bonds under controlled heating. Here a low melt fibre or bi-component fibre is introduced at the web formation stage to perform the binding function later in the process but the web fibre itself can be used.

There are several thermal bonding systems in use:

- Calendaring welds the fibre webs together using heat and high pressure applied through rollers at speed.
- Through-air thermal bonding makes bulkier products by the overall bonding of a web containing low melting fibres. This takes place in a carefully controlled hot air stream.

- Drum and blanket systems apply pressure and heat to make products of average bulk.

- When the molecules of the fibres held under a patterned roller are excited by high frequency energy producing internal heating and softening of the fibres, sonic bonding takes place.

- c. **Mechanical bonding**

In mechanical bonding the strengthening of the web is achieved by inter-fibre friction as a result of the physical entanglement of the fibres.

There are three major types of mechanical bonding- Needle-punching, hydro-entanglement and stitch-bonding

Needle-punching is most commonly used. Specially designed needles are pushed and pulled through the web to entangle the fibres. Webs of different characteristics can be needled together to produce a gradation of properties.

Hydro-entanglement uses high pressure jets of water to cause the fibres to interlace. It is mainly applied to carded or wet-laid webs. The water jet pressure used has a direct bearing on the strength of the web, but system design also plays a part. Hydro-entanglement is sometimes known as spun-lacing.

Stitch-bonding is a third type of mechanical bonding. It can be done with or without the addition of a thread. When no thread is added, the process is often referred to a loop formation.

Finishing Treatments

A variety of different chemical substances are employed before or after binding, or various mechanical processes are applied to the nonwoven after binding for modifying or adding to existing properties.

Nonwovens can be made flame retardant, water repellent, conductive, porous, antistatic, breathable, and absorbent and various other properties discussed before. They can also be coated, printed, dyed, and can be combined with other materials to form complex laminates.

Based upon the industry where it is used different methods are selected from above which will be applied. But mainly the following trends have been observed:

- Traditional textile industry uses Dry Form process
- The synthetic fibre industry uses the Spun-bond and Melt-blown methods
- The paper industry uses the wet process

Key Applications

Non woven fabric manufacturers usually manufacture the fabric in a roll form. It is then sent to various other industries where it has end applications, where it is cut

and given different form depending upon the use. Non-woven Technical Textiles have diverse applications across various segments of Technical Textiles like automotive, geo-textiles and health/hygienic sectors in various product categories like:

- Personal Care & Hygiene
- Healthcare
- Home Furnishings
- Leisure & Travel
- Clothing
- Automotive
- Construction
- Geo-textiles
- Industrial
- Agriculture and horticulture

Personal Care Products

Nonwovens due to their properties like softness, hygiene, ease of use and strength are ideal for personal care. Modern disposable absorbent hygiene products (AHPs) have become very popular in today's world. Similarly disposable personal hygiene wet wipes products are also gaining importance. Here, mostly needle-punched/thermal bonded or hydro-entangled nonwovens are used.

Main technologies used are Air-laid, Carded non-woven, Spun-melt Non woven of SMS and spun-bond.

Household

Nonwovens are used in a multitude of household applications ranging from cleaning and filtering to adding an aesthetic touch to the home. The most commonly used nonwoven products in home are the needle-punched carpets. Similarly thermal bonded nonwovens of PP find their application in the form of blinds. They prove to be cost effective over the woven ones. Another popular application is also the wall coverings used in various homes instead of the traditional wall paper. But these applications are not found much in India.

Spun-bonded nonwovens are used as backing fabrics in the furniture. Nonwoven also has various other furniture applications like up-holstered furniture. It is used in mattresses and quilts as well. Nonwoven wadding is also used in pillows.

Main technologies used are Needle punched, spun-bond and wet-laid non woven.

Medical and Healthcare

Nonwovens are extensively used in the medical field and in protection against biological agents in other sectors. New nonwoven materials with improved finishes including liquid repellent, virus proof and bacterial barrier properties have also been developed for applications such as surgical masks, gowns and

drapes etc. For such applications, carded thermal bonds/ spun-bonds / hydro-entangled nonwoven fabrics are used.

Main technologies used are Dry-laid in particular hydro-entangled and melt blown and spun-bond technology.

Clothing, Footwear & Baggage

Nonwovens are being used for many decades in hidden, support functions, such as interlinings and components of shoes and bags. Nonwovens due to their versatility and the ability to engineer many different properties into them, such as shape-retention, adaptation to the characteristics of the out fabric and lightness in weight have become very popular for use in interlinings. India is a large exporter of garments hence there is huge application of nonwoven interlining found here. Another product is the polyester nonwoven wadding which is used in winter clothing materials. It is also used in protective clothing where there is high exposure to certain type of chemicals. In the footwear industry, the inner sole and inside linings of sports shoes are generally non-woven. It has various other applications as well like shoe uppers, stiffeners etc.

Main technologies used dry-laid non woven in particular thermo bonded, needle punched, hydro-entangled and chemically bonded and spun laid and melt blown.

Automotive

The use of nonwovens has increased substantially in recent years. Various automotive parts like carpets, insulations, headliners, door panels, parcel shelf, padding in seats, etc. are made from nonwoven fabrics. Nonwovens help reduce the weight of the car, enhance the comfort and aesthetics and provide advanced insulation, fire resistance, etc. In short they contribute to make cars safer, more comfortable, cost-effective and also attractive.

Due to their versatility and numerous benefits they are also widely used in the design and construction of other vehicles and transportation means like aeroplanes, trains, boats, spacecraft and satellites.

Main technologies used are Dry-laid - Needle punched, Spun-lace, Thermo-bonded and Spun-melt in particular spun bond.

Geo-textiles

Nonwovens are used for filtration, reinforcement and as separators in various civil engineering projects like roadways, railways, runways, drainage, bridges, canals, dams, reservoirs etc. Their main advantage is that they are very strong despite being very light in weight.

Polyester felts are used to make bitumen composites for water-proofing in construction. Rapid developments in infrastructure have led to huge demand for nonwovens in highway, railway, airport and landfill projects. Technologies used Dry-laid and in particular Needle punched non woven and spun-laid non woven.

Industrial

Nonwoven products are used for various insulation and protective applications in the electronics industry. Polyester Nonwovens are used in cable wrapping. Another big application area of nonwovens is in the filtration area. Hi-loft wadding are used for fresh air filter systems. New products are also being developed whereby nonwovens are finding increasing applications in the packaging segment as well.

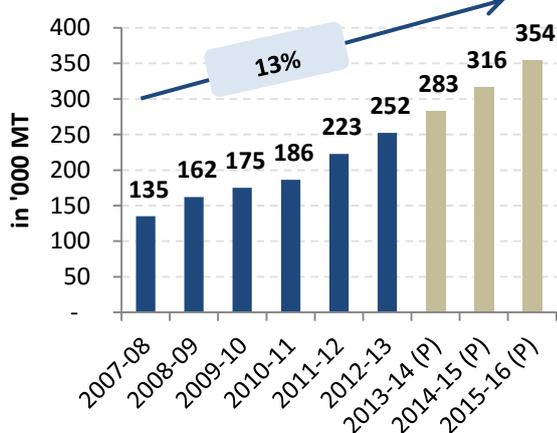
Agriculture and Horticulture

Nonwovens are used effectively for optimising the productivity of crops, gardens and greenhouses. The use of light weight spun-bond nonwoven crop covers on the land increases yields and improves the quality of the crops. It also helps to keep the growth of weeds under control. Usage of nonwoven mulch mat leads to healthy growth of flowers and vegetables. Technologies used in agricultural applications are Needle punched and spun bon non woven.

Market of Non-woven in India

The domestic production of non-woven in India is estimated to be around 2.52 lakh MT for 2012-13 worth approximately Rs. 3,200 crore. The production of non woven in India has been growing at 13% over the last five years. The trend of non woven production in India is as follows:

Exhibit 395: Non woven production trend for India

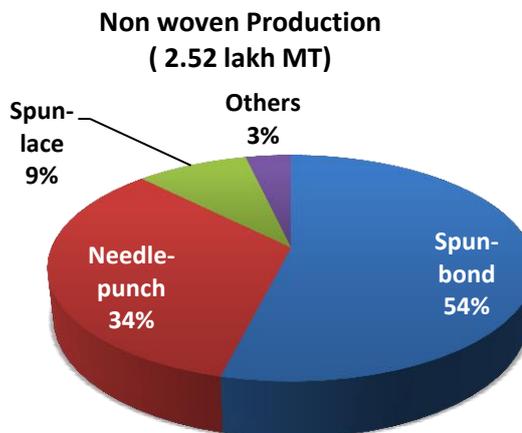


Source: ANFA statistics, primary meetings, iMaCS analysis

More than 50% of non-woven capacity in India is of Spun-bond non-woven followed by needle –punched non woven. The share of different types of non woven

fabric manufactured in India is shown in the following exhibit.

Exhibit 396: Types of non-woven produced in India

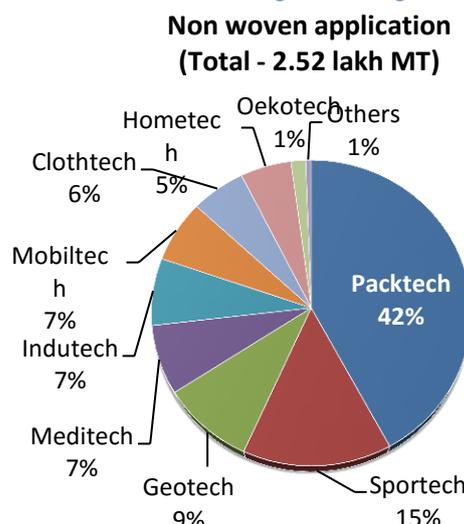


Source: iMaCS analysis, ANFA statistics for nonwoven production in Asia 2012

Key applications:

The key application of nonwovens in India is under Packtech segment; particularly in shopping bags and food grade poly-olefin bags, in Meditech where non woven is used in hygiene products like diapers, under pads as well as surgical disposables and gowns and in geotextiles and oekotextiles. In addition significant share of non woven fabric also goes into making of interlinings in Clothtech and shoe components like eyelets and strobes. The segment wise usage of non woven across the twelve segments of Technical Textiles is shown in the following exhibit

Exhibit 397: Non woven usage across segments



Source: iMaCS analysis

The product life cycle of key products which use non woven is shown in Exhibit 398. The diagram indicates that a majority of the non woven based products are still in its growth phase, showing that the market for

non woven in India still has a lot of potential for growth.

Exhibit 398: Product life cycle of non woven products



Source: INDA, Association of the Nonwoven Fabrics Industry

Raw Material

Close to 60% of the non woven produced in India is based on Polypropylene, which is most commonly used for applications in Packtech, Meditech and Agrotech.

The production of non-woven fabric in India is used across different segments to develop final finished products as well as exported in roll goods form. Many organisations in India are also involved in purchase of non-woven fabric and converting the same into end products. The market for non-woven fabric is dominated by the Technical Textile segment of Mobiltech, Meditech and Agrotech. The demand from automobile sector particularly for non-woven automobile interior carpets and filters is the biggest consumer of non woven fabric in India. It is followed by Meditech products like sanitary napkins, diapers, surgical dressing, surgical disposables and absorbent fabrics. Other than these, usages in non woven wipes, shoe linings and insoles and interlinings are growing due to the cheaper cost of non-woven fabric. In addition, non-woven is also used in several other products like cigarette filters, headliners, airlines disposables, surgical disposables, non-woven abrasives, mulch-mats, crop covers, etc.

Key Manufacturers

Non –woven manufacturing in India has seen a major change in the last few years, with many players going for large capacity additions. The demand of both domestic market as well as growing export has been the major thrust behind the growth of the segment. While the market has grown, most of the production growth has been seen in the production of PP Spun-bond non woven, due to raw material advantage in procurement of poly propylene in India, in particular Gujarat. There are around 100 players in the non woven manufacturing in India. Key manufacturers of

non-woven fabrics in India with their annual production statistics have been shown in the exhibit in the following exhibit:

Exhibit 399: Key manufacturers of Non woven fabrics in India

Sl. No	Company	Estimated Production (in MTPA)	Type of non woven
1	Supreme Nonwovens	12,500	Spun-bond
2	Ahlstrom Fibrecomposites India Pvt. Ltd.	12,000	Spun bond/ Melt spun
3	Uniproducts India Ltd.	12,150	Needle-punched
4	Ginni Filaments	10,000	Spun-lace
5	Techfab India	8,040	Stitch-bond
6	Alfa Foam	7,800	Spun-bond/ melt spun
7	Mohak Carpets	6,432	NW light weights
8	Well Spun	5,000	Spun-lace
9	Paramount Non woven	5,000	Spun bond
10	Surya Textech	4,800	Spun-bond
11	Pratap Synthetics Ltd.	4,500	Spun-bond
12	Pacific Harish	3,600	Needle-punched
13	Fiberweb	3,600	Spun-bond
14	PARK Nonwoven	2,100	Needle-punched
15	Sanhrea Technical Textiles Limited	1800	Spun bond
16	Dharmesh textiles	720	Needle-punched
17	Hitkari Fibers Ltd.	480	NW light weights
18	Rizwan Carpets	432	NW light weights
19	Charminar Nonwovens	144	Spun-bond
20	Parishudh Fibers	108	Needle-punched

*Source: Primary survey, Annual reports, websites, secondary reports, ITTA

Growth Drivers and Inhibitors

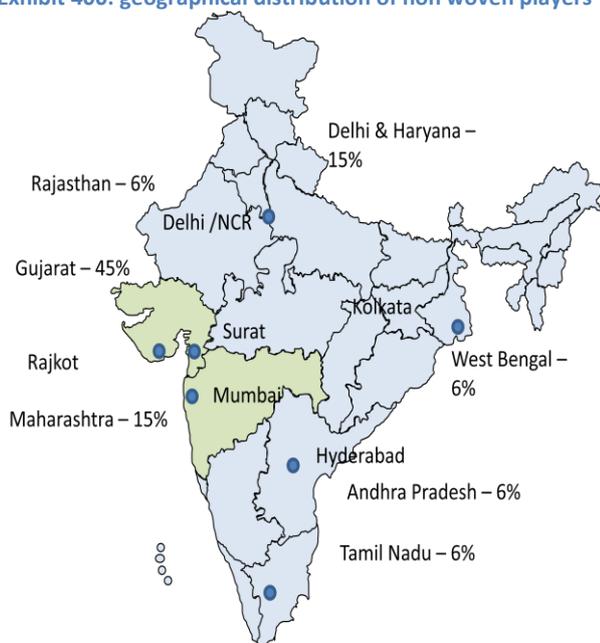
The key advantage is of cheap and easy availability of raw material in particular Poly Propylene (PP), which is used in most of the spun-bond non woven manufactured in India. This has been a boon for India giving organisations the strategic advantage for expanding their operations in India. Along with this, the wide range of applications for Non-woven in

different sectors from rolled goods form to raw materials to intermediate products to end products, helped in diversifying the risks associated with the market in the last few years when both India and the world was facing a recessionary trend and the markets were growing very slowly. In addition to that growth in new product markets in India like that of Non woven wipes, medical textiles, geo-textiles and increased usage in Agro textiles paved the way for a healthy growth of non woven industry in India.

Geographical Distribution Of Non Woven Manufacturers:

There are around 100 non woven manufacturers in India with 45% of them located in Gujarat and Maharashtra and another 20% in National Capital Territory of New Delhi. The distribution of Nonwoven players across India is as shown in the following exhibit

Exhibit 400: geographical distribution of non woven players



Source: IMaCS analysis

Prospects of Nonwoven Sector in India

Nonwovens industry is one of the fastest growing sectors of textiles. The recent year-to-year growth in

the manufacturing sector in India has been close to 15%. More importantly, there has been growth in the non-durable goods sector. Most of the textile based non-durable goods are nonwoven products and this sector has immense potential of growth in India. According to recent statistics from the USA based Association of the Nonwoven Fabrics Industry, due to the explosion in the number of disposable income group in India the nonwoven industry in India is expected to register a growth of over 12.4%. With the increase in disposable incomes, the need for life enhancing products, automobiles etc. increases. These products are a perfect fit for nonwovens.

With a large textile manufacturing base and technical manpower, India has the potential to become the leading exporter of various nonwovens and Technical Textile products. The promotion of nonwovens in India is promising in healthcare as traditional textiles are replaced with single-use disposables, improving agriculture for better crop protection and in geotextiles to meet increasing needs in infrastructure. The nonwovens consumption is directly related to economic development and per-capita income of the population. As over 60% nonwovens usage is in disposable products, the availability of surplus income and increase in hygiene awareness are important factors for growth of nonwoven industry. A significant portion of worldwide nonwoven expansion is due to the rising demand for these materials, In addition the growing economy in India has a huge scope for the growth of non-apparel textiles and applications such as geotextiles, insulation systems and medicated goods.

For development and promotion of Nonwovens sector in India, Ministry of Textiles has designated DKTE'S Textile and Engineering Institute, Ichalkaranji as Centre of Excellence (CoE) in Nonwovens, under the scheme of Technology Mission on Technical Textiles. The main objective of CoE in Nonwoven is to support nonwoven industry by providing necessary technical support, testing services, prototype/product development facilities and other necessary facilities at one place.

25. Speciality Fibres

Speciality yarn is developed through special chemical coating of a general yarn or specialised fibre. These are used for highly specified industrial use and in fire and armour protective clothing.

As per the National fibre policy 23 different types of fibres are classified as speciality fibres. These have been enumerated as follows:

- Meta Aramid
- Para Aramids
- FR Mod-acrylic
- Superabsorbent fibre
- High Density Polyethylene (HDPE) and High Modulus Polyethylene (HMPE)
- Carbon Fibre
- Polyphenylene sulphide Fibres (PPS)
- Glass Fibre
- Flame Retardant (FR) Viscose
- Flame Retardant (FR) Polyester
- High Tenacity/ Super high tenacity Nylon (more than 7 gpd)
- High Tenacity/ Super high tenacity Polyester (more than 7 gpd)
- High Tenacity/ Super high tenacity Polypropylene (more than 7 gpd)
- High Tenacity/ Super high tenacity Viscose (more than 7 gpd)
- Ceramic Fibre
- Polytetrafluoroethylene (PTFE)
- PBI Fibres
- PBO Fibres
- Anti-microbial/Anti-fungal/Anti-bacterial Fibres
- Phenolic Fibre
- Conductive Fibre
- Fibre for concrete re-enforcement
- Alginate fibre

These have been discussed subsequently:

Aramid Fibre

Aramid has the largest share amongst the specialty fibres. These are aromatic polyamides available in different grades with properties to suit various applications. The typical properties of Aramid fibre are low density, high strength, good impact resistance, good abrasion resistance, good chemical resistance, good resistance to thermal degradation and compressive strength similar to E-glass fibres. Aramid fibre has both textile and non textile applications; the key applications of Aramid fibre in Technical Textiles include:

- Ballistic protective applications - bullet proof vests
- Protective apparel such as gloves, motorcycle protective clothing and hunting gaiters, chaps and pants.
- Sails for sailboats, yachts etc
- Belts and hosing for industrial and automotive applications
- As a protective layer in industrial gloves to provide cut/ slash protection.
- In production of inherent FR fibres and fabrics

The demand for aramid fibre is met by imports. USA and Germany account for majority of imports of Aramid to India followed by China. Du Pont is the leading manufacturer of Aramid fibres and is the key supplier of Aramid fibres in India. The company markets its product under the brand name Du Pont Kevlar and DuPont Nomex. Another brand gaining recognition in the Indian market is Spectra developed

by Honeywell. The total import of Aramid in India is 1110 MT worth Rs. 90 crore. 90% of it is imported by DuPont India.

Applications

Aramid fibre is used in Bullet proof jackets, inherent fire retardant fabrics and apparels, in cut proof industrial gloves and high strength threads and yarn used for stitching of aramid fabric. These are schappe-spun aramid sewing threads used for stitching of Kevlar. It has very high strength. It does not melt or support combustion and hence is often used in flame resistant clothing. The tex specification range from 42 to 84 with the breaking strength from 4.8 kg to 10.4 kg.

Fibre Retardant Fibres:

Fire or flame retardancy is the characteristic of a fibre wherein the fibre does not melt during fire and high temperatures and is self exhausting once the flame is removed. Fire retardancy is developed by adhesion of fibre with flame retardant chemicals usually having nitrogen molecules. The commonly used FR fibres are mod –acrylic fibre, FR viscose and FR polyester fibre. The total demand for Fire retardant fibres excluding Nomex is estimated to be of 1615 MT. The different types of FR fibres commonly used in India are as follows:

Mod-Acrylic Fibre: Mod acrylic fibre is composed by mixing fibre with acrylo-nitrile units. It is usually dry or wet spun. It is soft, resilient, abrasion and fire resistant, shape retentive, quick drying and easy to dye which makes it suitable for high-performance protective wears. It is also used in filter fabrics, paint rollers and

stuff toys. Mod-acrylic fibres are mostly imported into India. Jayashree Textiles are a leading player in FR fabrics that use mod-acrylic fibres to develop FR fabrics.

FR Viscose: FR viscose is developed by adding additives like alkyl, aryl, halogenated alkyl or aryl phosphates, phosphazanes and phosphonates. The additives distribute uniformly through the interior of the viscose fibre providing it with flame retardant properties. FR rayon commonly finds application in furnishing and upholstery. Although Grasim and Century Rayon are the leading rayon manufacturers in India, the manufacturing of FR rayon is limited in India.

FR Polyester: FR polyester fibres are developed by adding chemicals to the fibre which increase the thermal stability and char formation of the fibre while reducing diffusion of gases and heat generation. FR polyester is widely used for upholstery and furnishing requirements across industries. The major manufacturer of FR polyester in India is Trevira a German based subsidiary of Reliance primarily into supply of FR polyester fibres.

Glass Fibre

Glass fibre is also used in the form of sewing thread for various industrial uses. The fibreglass yarn is encapsulated by chemical PTFE to provide it high resistance to acids and alkali, increase flexibility of the fibreglass yarn and increase heat resistance. These can withstand temperatures of up to 538 degree Celsius.

Glass Fibre as reinforcement dominates the sector of composites material with a share of 85-90%. The formulation chosen for continuous fibre glass production is generally known as E-glass. Glass fibre finds application in a variety of products in Technical Textiles.

The fibre is produced in India though the Indian manufacturers are facing threat from cheap Chinese imports. The key producers of Glass Fibre in India are:

- Owens Corning (India) Ltd.
- Saertex India Pvt. Ltd.
- Goa Glass Fibre Ltd., subsidiary of Binani Industries
- UP TWIGA Fibre Glass Ltd.
- FGP Ltd
- Deccan Fibre Glass Ltd
- Glass Fibre Division, CEAT Tyres Ltd

Owens Corning (India) Ltd. (OCIL) is the largest fibreglass manufacturer in India. The company has a state-of-art glass-fiber manufacturing facility at Taloja, near Mumbai. OCIL manufactures three main lines of products - chopped strand mat, roving (a slightly twisted strand of fibers) and T-30, used in the

composites industry. OCIL has acquired the manufacturing facilities of Saint Gobain Vetrotex India Ltd. that manufactures E-glass reinforcements for thermoplastics and thermo-sets along with full range of E-glass textile yarns and Cem-Fil (Cement reinforcement) fabrics (both woven and knitted with or without coating). The total estimated manufacturing of glass fibres in India is 114,751 MT.

Application

These find applications in polymer and ceramic matrices and thermal shields used in aerospace applications as well as in industrial applications like furnace linings, gaskets, door seals and tube seals and industrial insulating products. It can also be used in industrial protective clothing.

Carbon Fibre

Carbon fibre is a high-tensile fibre or whisker made by heating rayon or poly-acrylo-nitrile fibres or petroleum residues to appropriate temperature. These are stiff and strong reinforcing fibres of polymer composites. Carbon fibre is second most commonly used composite fibres after glass fibres. It is characterised by:

- High physical strength and light weight
- Good rigidity
- Corrosion resistant
- Electrical conductivity
- Fire resistance
- Excellent EMI shielding properties
- Biological inert

The market for Carbon fibres in India is around 518 MT worth Rs. 129 crore. There are very few manufacturers of carbon fibre in India with Kemrock Industries and Exports Ltd. having the lion's share in the market with a capacity of 400 MTPA. National Aeronautical laboratory (NAL) also has carbon fibre production facility in India with a capacity of 20 MTPA. Lately global giant Toho Tenax has made an alliance with Hindoostan Technical fabrics for production of carbon fibres in India.

Globally, Toray Industries Inc. is the world's largest producer of carbon fibre. Other manufacturers of Carbon fibre are Toho Tenax (Japan), Mitsubishi Rayon (Japan), Zoltek (USA) and Hexcelcorp. (USA).

Application

Carbon fibres are used mostly in defence, extreme automobiles and aerospace sectors as a substitute for steel and aluminium. Carbon fibre is also used to prepare carbon fibre sewing thread. Carbon fibre sewing threads are made of more than thousand carbon fibres of thickness 5 to 8 microns bundled together. It has very high tensile strength and

temperature resistivity of up to 1100 degree Celsius. These have tex specifications from 200 to 1200 and a strength ranging from 3450 Mpa to 4000 Mpa.

High Tenacity Fibres and Super High Tenacity Fibres

High tenacity fibres are special fibres having a tensile strength of 6 to 9 gpd as compared to the normal textile fibres which have a tensile strength of around 3 gpd. These are meant for industrial use like in industrial work wear, conveyor belts, tyre cords, sail cloth, high tensile sewing threads, etc. Super High tenacity fibres have very high tenacity of over 9 gpd. High and super high tenacity fibres can be developed from manmade fibres - nylon, polyester, viscose and polypropylene. The key characteristics of these fibres are High tenacity, Low shrinkage and elongation, Abrasion resistance, High durability.

In India most of the high tensile fibre manufactured is made from polyester and nylon given the wide production base of these fibres in India. The total domestic production of high tensile fibres in India is estimated to be around 27000 MT worth Rs. 372 crore. However, the majority of demand is met through imports. India imported 31,000 MT of high and super high tenacity fibres worth Rs. 494 crore in 2012-13. The total market size of these fibres is estimated to be 58,000 MT with 95% of the market being driven by domestic demand.

The major players of high and super high tenacity fibres in India are Reliance with its brand – “Recron Duratarp”, which are dyed flame retardant high tenacity fibres. In addition to Reliance, Century Rayon is another major player in the industry producing viscose high tenacity fibres. players like Kayavlön Impex Pvt. Ltd. The key manufacturers of high and super high tenacity yarns in India are Reliance Industries Ltd., SRF Industries Ltd. and Sarla Performance Fibres Ltd.

Other Speciality Fibres

Other than the above mentioned major speciality fibres, many other speciality fibres are used in India in small quantities. Most of the requirement of these fibres is catered through imports. These are as discussed below:

- **Super Absorbent Fibre:** Super absorbent fibres are fibres made of acrylic polymers treated to super absorbent coatings or fibres made of super absorbent polymers. Super absorbent fibres can absorb more than five hundred times of the weight of the fibre. These find application in storage of food items, diapers, etc.

- **Ceramic Fibre:** Ceramic fibres are substitutes of asbestos for high temperature and industrial applications. Ceramic fibres have low thermal conductivity resisting up to 2300 degree F temperatures. These have high corrosion resistant and hence find applications in sealing and insulation products for high temperature industrial uses. In India only Unifrax India Ltd. manufactures ceramic fibres and rest of the demand is met via imports which are of the tune of 610 MT.
- **Polytetrafluoroethylene (PTFE):** PTFE coated fibres are chemically resistant, fire resistant fibres which can be used at very low temperatures. The fibre is developed through coating of fibre with PTFE chemical. Although the production of PTFE in India is significant, there are no manufacturers of PTFE coated fibres and the demand is catered through imports. Globally Toray chemicals and W L Gore & Associates Inc. are the leading suppliers of PTFE fibres.
- **PBI Fibres:** PBI fibre is a synthetic fibre with has high thermal and chemical stability. The fibre does not burn in air, drip and retains its strength and flexibility even after exposure to flame. These fibres are used in making of personal protective gears and as membranes in fuel cells. The entire market of PBI in India is catered via imports.
- **PBO Fibres:** It is a high performance fibre developed from isotropic crystal polymer of poly PBO. It has superior tensile strength than aramids and are characterised with having very high chemical, temperature and abrasion resistance. This makes it suitable for various requirements in personal protective and defence applications. PBO is often mixed with aramid to develop defence products. The entire demand in India is met through imports. Globally Only Toyobo Corporation from Japan manufactures PBO fibres.
- **Anti-Microbial/Anti-Fungal/Anti-Bacterial Fibres:** Anti microbial fibres are special fibres which are coated with chemicals that do not promote growth of microbes. The fibre hence does not decompose and has longer life and prevents odour of sweat. The market of anti microbial fibres in India is growing significantly with increasing preference of these fibres in Meditech, Hometech and Sportech applications. Reliance uses anti microbial fibres in its home products as Recron anti microbial fibre fill. It acquires the anti microbial fibres from Trevira its German subsidiary. Currently Trevira is the largest supplier of anti microbial fibres in India.
- **Phenolic Fibre:** Phenolic fibres are fibres made of phenolic resins which are used in the composites industry across the world. They are a key input for making of glass fibre composites.

- **Conductive Fibre:** Conducting fibres are organic or synthetic textile fibres mixed with strands of metal or carbon to promote electrical conductivity. It can also be developed by coating with conductive polymers or fibres of inherently conducting polymers. These fibres have become significant in the last five to ten years. These fibres are often used in making of electromagnetic shielding. It can also be used for signal and power transfer applications. There are no manufacturers of conducting fibres in India.
- **Fibre for Concrete Re-enforcement:** Concrete re-inforcements generally are constituted by a blend of glass fibres, steel and carbon fibres and natural fibres. These also include polypropylene based re-inforcement fibres. The key benefits of re-inforcing concrete with fibres are that it prevents seepage of water through the concrete and prevents the concrete from cracking due to plastic shrinkage and drying shrinkage. The share of fibre in fibre reinforced concrete (FRC) varies from 0.1% to 3%. The key advantages of using polypropylene based fibres are improved mix-cohesion and higher impact resistance and freeze thaw resistance. On the other hand, using steel and glass based fibres improve structural strengths, ductility and provide higher abrasion and impact resistance. Currently polypropylene based fibres for Concrete re-inforcements are being produced in India by only Zenith of polypropylene based fibres for FRC and Tufropes for polyester based Fibres for FRC.
- **Alginate Fibre:** Algininate fibre is developed from the polymer alginate extract from species of brown seaweed and algae. The fibre has high strength and flexibility and provides water content regulation. Alginate fibres are used for different medical applications like in bandages and wound dressings.

Import and Exports

The imports and exports of key speciality fibre for 2012-13 have been shown in the following exhibit:

Exhibit 401: Imports & exports of speciality fibres

Product	HS codes	2012-13	
		Value (in Rs. Crore)	Volume (in MT)
Imports			
Aramid	54021110, 55031100	75.5	928

Product	HS codes	2012-13	
		Value (in Rs. Crore)	Volume (in MT)
Imports			
Fire Retardant fibres	55093100, 55093200, 55096100, 55096200, 55096900	83.7	5334
Glass fibres	70199010	58.9	4173
High Tenacity fibres	54081000, 54021910, 54021990, 54022090	494	30,642
Carbon fibres	68151090, 68159990	82.3	34
Ceramic fibres	69039030	5.9	610
Conductive fibres	68151090, 68159990	-	-
PTFE coated fibres	32100040, 39209941, 39209942, 39209949	13.42	312
Exports			
Aramid	54021110, 55031100	1.4	17
Fire Retardant fibres	55093100, 55093200, 55096100, 55096200, 55096900	267.9	17,037
Glass fibres	70199010	18.7	1,530
High Tenacity fibres	54081000, 54021910, 54021990, 54022090	28.9	2,648
Carbon fibre	68151090, 68159990	5.7	23
Ceramic fibre	69039030	7.15	4,560
Conductive fibres	68151090, 68159990	-	-
PTFE coated fibres	32100040, 39209941, 39209942, 39209949	27.8	1,390

Source: IMaCS analysis, DGFT, DGCIS

26. Composites

Composites are produced by reinforcing a resin matrix (thermoplastic/thermoset) with fibres like glass fibre, aramid, carbon fibre and/or natural fibres. Composites are mainly produced by resin (plastic) impregnation of reinforcement fibre structures. The fibres give strength to the composite structure. The higher the fibre content and the longer the fibres the higher is the strength of the part (or the lower the weight for a required strength). Composites can be segmented by strength bearing potential into:

- A) 'Low performance' (using chopped glass or glass mats as reinforcement) and
- B) 'High performance' (using fabrics or prepregs of Glass, Polyester, Aramid or Carbon fibre as reinforcement)¹⁴

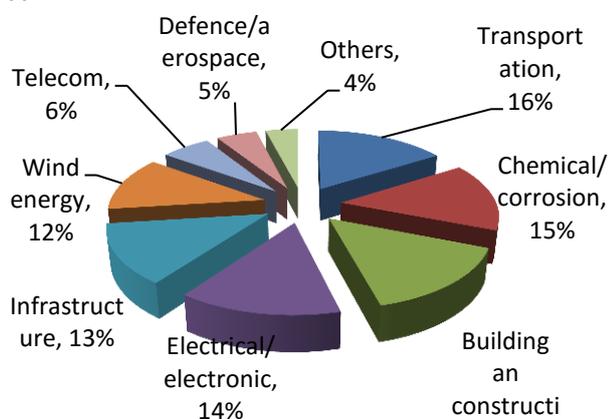
Unlike conventional materials like steel, aluminium etc. properties of the composite material can be designed for the required structural and functional aspects. Properties of composites like stiffness; thermal expansion etc. can be varied continuously over a broad range of values using appropriate fibre, resin and fabrication mechanism. Composites relevant to the context of Technical Textiles are fibre glass composites and carbon composites.

Key Growth Drivers and Inhibitors

The market for fibre glass is driven by the application industries such as:

- Transportation
- Building and Construction
- Chemical/Corrosion
- Infrastructure
- Wind energy
- Electrical and electronics

Exhibit 402: Composites industry - distribution by application

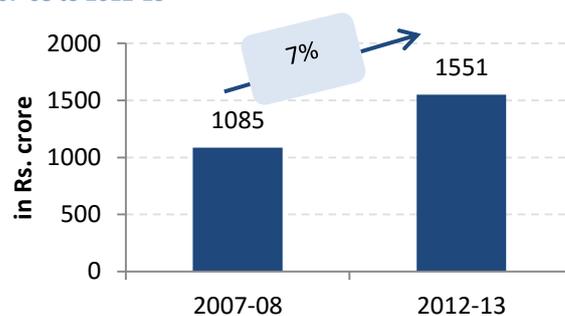


*source: FRP Institute

Growth across these segments would push the market size for composites. Taking into account the

contribution of both glass fibre composites and carbon fibres, the cumulative market size of composites is estimated to be **128,861 MT** and **INR 1,551 Crore**. Imports for composites stand at a total of Rs 507 Crore and almost 46,599 MT. Exports for composites contribute Rs. 207 Crore and 14,365 MT of the total market size. The composites market has grown at a CAGR of 7.41% from Rs 1,085 Crore in 2007-08 to Rs 1,551 Crore in 2012-13. Imports have grown at a much smaller rate of 2.73% for the same horizon due to production enhancements in glass fibre composite production. Going forward, as composites are absorbed to a greater extent in various end user industries the domestic consumption of the market is expected to grow at a healthy 15%, with Government's Make in India programme giving it a significant push. The exports too are expected to grow but at a more moderate rate of 7% Y-o-Y in the near future.

Exhibit 403: Growth of market size of composites from 2007-08 to 2012-13



Composites (Fibre Glass)

Product Characteristics

Composites are able to meet diverse design requirements despite being light-weight and have a high strength-to-weight ratio as compared to conventional materials. Some advantages of composite materials over conventional one are mentioned below

1. Tensile strength of composites is four to six times greater than that of conventional materials like steel, aluminium etc.
2. Improved torsion stiffness and impact properties
3. Higher fatigue endurance limit (up to 60% of the ultimate tensile strength)
4. 30-45% lighter than aluminium structures designed for the same functional requirements
5. Lower embedded energy
6. Composites are less noisy while in operation and provide lower vibration transmission

The key material of choice for composites is Glass fabric. Fibre glass dominates the composites industry as a preferred reinforcement fibre, with a share of

¹⁴ Gherzi Presentation, Techtexil October 2014

around 85%-90%. Other reinforcement fibres like carbon fibre and aramid fibre are sparingly used in India owing to its patented technology and high costs. Fibre glass is made of fine solid rods of glass each with thickness less than one twentieth the width of human hair. Glass fibres are loosely packed together into a mass which can serve as heat insulators. They are also used like wool or cotton fibres to make glass yarn, tape, cloth and mats. Fibre glass also has applications in electrical insulation, chemical filtration and fire fighter suits. Combined with plastics, fibreglass is used for airplane wings and bodies, automobile bodies, wind mill blades and boat hulls. In this section, we assume that the key contributor to the market of composites is Glass fabric.

Market Size and Trade Trends

The domestic consumption of glass fabric for composites is pegged at 114,000 MT and Rs. 1220.57 Crore. India exports 14342.48 MT of glass fabric worth of Rs. 201.78 Crore. This brings the total market size of glass fabric to Rs. 1422.35 Crore and 128342.50 MT.

Exhibit 404: Market size estimate of glass fabric – composites

	2012-13
Quantity of domestic consumption of glass fabric (in MT)	114,000
Value of domestic consumption of glass fabric (in Rs. Crore)	1,220.57
Exports of glass fabric (in MT)	14,342.48
Exports of glass fabric (in Rs. Crore)	201.78
Market sizing of glass fabric (in MT)	128,342.50
Market sizing of glass fabric (in Rs. Crore)	2327.14

*source: IMAcS analysis, industry sources, DGFT, DGCIS

Key Manufacturers

Key manufacturers of composites in India include:

- Owens Corning India
- UP Twiga Glass fibres
- Goa Glass fibre

Import Export Scenario

Most of import and export for composites occurs under the head of glass fabric and has been captured in Exhibit 405. The countries from where we import the maximum of glass fibres are China, Malaysia, USA, Taiwan and UK. Key countries of export of these are Germany, USA, UAE, Belgium, Spain and Czech Republic.

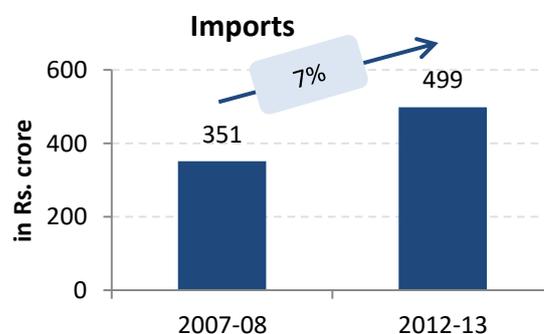
Exhibit 405: Export import trends for glass fabric

HS family	code	HS codes	(2012-13)
Imports			
7019		70191900, 70193200, 70199010, 70199090, 70195900, 70193100,	Rs. 498.56

HS family	code	HS codes	(2012-13)
		70191100, 70195100, 70195200	Crore
Exports			
7019		70191900, 70193200, 70199010, 70199090, 70195900, 70193100, 70191100, 70195100, 70195200	Rs. 201.78 Crore

*source: IMAcS analysis, industry sources, DGFT, DGCIS

For composites, we rely a lot on our trade links. 41% of our domestic consumption is catered by imports and 14% of the market size contributed by exports. Exports have declined over time, and imports have grown at a 7% CAGR. This points to indigenous capacity enhancement as the market has grown sizeably. The export trend has been captured in the following exhibit.



Source: IMAcS analysis, industry sources, DGFT, DGCIS

Carbon Fibres And Carbon Composites

Carbon Fibres

Carbon fibre is a high-tensile fibre or whisker made by heating rayon or poly-acrylo-nitrile fibres or petroleum residues to appropriate temperature. These are stiff and string reinforcing fibres of polymer composites. Carbon fibre is second most commonly used composite fibres after glass fibres. It is characterised by:

- High physical strength and light weight
- Good rigidity
- Corrosion resistant
- Electrical conductivity
- Fire resistance
- Excellent EMI shielding properties
- Biologically inert

The market for Carbon fibres in India is around 518 MT worth Rs. 129 crore. There are very few manufacturers of carbon fibre in India with Kemrock Industries and Exports Ltd. having the lion's share in the market with a capacity of 400 MTPA. National Aeronautical laboratory (NAL) also has carbon fibre production facility in India with a capacity of 20 MTPA. Lately global giant Toho Tenax has made an alliance with

Hindustan Technical fabrics for production of carbon fibres in India.

Globally, Toray Industries Inc. is the world's largest producer of carbon fibre. Other manufacturers of Carbon fibre are Toho Tenax (Japan), Mitsubishi Rayon (Japan), Zoltek (USA) and Hexcelcorp. (USA).

Application

Carbon fibres are used mostly in defence, extreme automobiles and aerospace sectors as a substitute for steel and aluminium. Carbon fibre is also used to prepare carbon fibre sewing thread. Carbon fibre sewing threads are made of more than thousand carbon fibres of thickness 5 to 8 microns bundled together. It has very high tensile strength and temperature resistivity of up to 1100 degree Celsius. These have tex specifications from 200 to 1200 and a strength ranging from 3450 Mpa to 4000 Mpa.

Import Export Scenario

Import and export of carbon fibres has been captured in the following.

Exhibit 406: Import and export of carbon fibre

HS code family	HS codes	(2012-13)
Imports		
6815	68151090,68159090	Rs. 8 Crore
Exports		
6815	68151090,68159090	Rs. 6 Crore

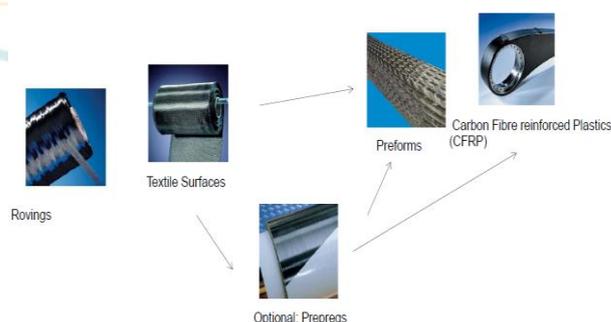
*source: IMAcS analysis, industry sources, DGFT, DGCI

The import of carbon fibres has risen at a rate of 42% CAGR from 2007-08 to 2012-13. The exports of carbon fibres too have risen at a similar rate of 41% CAGR from 2007-08 to 2012-13.

Carbon Composites

Carbon composites are a high potential area of composites. Carbon composites find their usage mostly in high strength applications. These are in industries such as commercial aviation (major consumer) and civil engineering as reinforcements. Bulk of the carbon composites manufacturers in India find their products used in aviation industry. Application of composites in automobiles is yet to catch up in India.

The Composite value added chain can be broken down into five steps (example: Carbon)



- Sintex Industries Ltd, Kalol
- Mahindra composite
- TATA Automotive Ltd
- L & T, Vadodara,
- Permal Wallage, Indore
- Mobility Solutions Ltd. Chandigarh
- Agni fibre Board Pvt. Ltd, Vadodara,
- Kineco Private Limited
- Suzlon India Ltd.,
- Anearcon India DAMAN,
- Tata Advanced Materials
- Aztech Composites

The value of domestic consumption of carbon composites can be estimated at about Rs. 1,412 Crore. The quantity of the same is estimated at 5,044 MT. Imports for the same stand at Rs. 5 Crore and 14 MT whereas the exports are negligible.

Composites - Used in Automotives

Composites used in automobiles are a very wide variety of products. Composites such as glass wool and carbon are used in auto motives. This is however, very specific to the mode of transport considered, i.e. composites used in conventional automobiles, railways, shipping industry and aviation differ from each other significantly.

Product Characteristics

Composites used in auto motives are used mainly for two attributes – high strength and light weight. Both these attributes are mostly contributed by aramid and carbon fibres and find heavy application in the shipping and aviation industry. Other than these, glass fibres used in the automotive sector are used in railways and in luxury buses.

Market Size and Trade Trends

Shipping and Aviation Industry

Shipping and aviation industries use carbon and aramid composites. Aramid composites because of their quality of impact resistance find applications in armoured vehicles and Navy boats. Carbon composites

find application in commercial aviation industry and to a limited extent in the civil application for re-strengthening a structure.

Automobiles

In road automobiles, glass fibres are the only composites used. These too are utilized mainly in high end luxury buses and not commercial vehicles. This is due to high cost of glass wool involved. In luxury buses, these are used mainly in the front, rear, engine covers, dashboards, battery boxes and air conditioning covers.

Railway Coaches

In railway coaches, glass fibres is the only Technical Textile composite used so far. This is used in the lining of coaches. Delhi Metro has been the only locomotive operation that has used composites other than these. The consumption of composites by luxury buses and railway coaches has been summarized as follows:

Exhibit 407: Market size estimate composites

	2012-13
Domestic consumption of glass fabric in luxury buses(in MT)	240
Value of Domestic consumption of glass fabric in luxury buses (in Crore)	2.88
Domestic consumption of glass fabric in railway coaches (in MT)	505.44
Value of Domestic consumption of glass fabric in railway coaches (in Crore)	4.55

There are many benefits that accrue from usage of composites such as weight savings of up to 50% for structural and 75% for non-structural applications brings associated benefits of high-speed, reduced power consumption, lower inertia, less track wear and the ability to carry greater pay-loads.

Composites also provide greater versatility in train design and optimization of train performance (e.g. lowering the centre of gravity to enhance stability). High stiffness from structural materials reduces (even eliminates) supporting framework, increases passenger room, carries fittings readily. A modular construction (interchangeable panels) of composites is easy to handle & install and offers rapid fitting. Due to its fire resistant characteristics, it also allows full safety to the entire system

Composites find major applications in passenger coaches for excellent structural properties and improved aesthetics. Components of coaches are generally made of glass fibre reinforced with polyesters/epoxies, phenolic resins. FRP doors were

also developed for Indian railways in consultation with TIFAC. However, the same have not come into commercial usage¹⁵

Scope of Composites

India Textile Firms entering the Composite market should start with fabric and/or pre pregs. In fabric, one can start with a small number of machines (2 NCF for 3 – 4 machines of different configuration). Also, tapes or braids allow for a low capex entry. Also, a starter as trader of composite industry raw materials is possible.

Another observation that materialized from our interaction with industry players and such association we also have come to understand that a large number of the biggest players of composites industries do not just produce the fabric but also convert the fabric into finished products such as wind blade, aeroplane parts, ship industry and defence purposes.

There is further scope for innovative applications across all industries. In its critical insights shared by ATIRA, Centre of Excellence for composites, a huge scope for composites is outlined in detail in terms of applications. The same has been outlined in the following points with some inputs contributed by TIFAC.

- **Lightweight concept** is the future of all industries be it machinery manufacturing, transportation vehicles, Building construction, civil infrastructure), defense application, aerospace and so-on
- In case of **reinforcing bars** in building construction, the combination of ongoing deterioration and loss of reinforcement properties ultimately, require potentially significant and expensive outlays for repair and maintenance, and possibly the endangerment of the structure itself. The solution is **Rebar**, a composite fibre bar that will never corrode. Usage by civil contractors for building is **very limited** and presently done by only select contractors. Glass fibre roving are passed through a resin polymer and then cast into shape. The advantage – very low in weight with high strength. Besides it will have properties like a) Superior Tensile Strength - composite rebar produced by pultrusion offers a tensile strength up to twice that of steel, b) Thermal Expansion - rebar offers a level of thermal expansion comparable to concrete due to its 80% silica content, c) Electrical and Magnetic Neutrality - contains no metal, and will not interfere with the operation of sensitive electronic devices such as medical MRI units or electronic testing devices, d) Thermal

¹⁵ Source : TIFAC

insulation - highly efficient in resisting heat transfer, such as from building exteriors to interiors and lightweight

- **Housing** which is one of the dire necessities of human being and its demand is ever increasing in India. The solution for the housing sector in India today, modular housing solutions addresses the land issues, affordability in terms of cost, and sustainability in terms of environment friendliness, easy availability and acceptability. For example in Mumbai city alone the demand for housing is 3 lakh per annum but the supply is only 1.5 lakh per annum and around 50% of the populace dwelling in slum and this is expected to go up to 70% in near future. The solution is **modular housing** which is affordable, eco-friendly and sustainable.
- In **Marine transport** application, composites have application in manufacturing of high speed boats and fishing boats and has huge potential demand in India
- **Composite pipes** and tanks are manufactured with Polyester, Vinylester and Epoxy Resins. Pipes made of centrifugally cast glass fibre reinforced plastics (GRP) consist of a combination of polyester resin, glass fiber and reinforcement materials. Such composite pipes boast of properties such as high strength-to-weight ratio, low friction resistance, high temperature strength, low coefficient of thermal expansion, corrosion resistance, resistance to biological attack and low maintenance cost among many others. Composite pipes have huge potential demand and growth due to its features and its application feasibility in various industries. The main requirement is to create right type of standards and test methods. It has potential usage in all high-pressure pipelines.
- Composite materials have wide application in **Machinery manufacturing**. Composite materials can replace most of the metal parts both critical and peripheral parts of machinery due to its strength and lightweight and thus can lead to reduced energy consumption. The cost of manufacturing will be equivalent that of metal parts manufacturing. Composite machinery parts industry has huge growth potential in India due to its applicability in all the machinery parts across all the machinery sectors.
- **Composite cylinders** are widely used in countries such as USA. This product segment too has huge potential in India. Composite cylinders are lightweight but can withstand high internal pressures, have better dimensional stability, higher

fatigue endurance limit with high tensile strength, excellent corrosion resistance and non-toxic.

- **Aerospace industry** in India is estimated to be around Rs 10,000 crore based on composite materials due to their features have wide applications in aerospace vehicle manufacturing. The industry has huge potential demand and growth, more so due to the rider that 20% offset should be from within the country. The offset condition is for purchase of new aircrafts.

Significant scope for composites can also be seen from the fact that some individual states have their own composites associations in place. In addition, there are esteemed research organizations such as ATIRA, FRP institute and TIFAC working actively in the field of research on composites. For example Fibreglass Industries Association of Andhra Pradesh (FIAAP), a non –profit association for the promotion of composites in both Telangana and Andhra Pradesh states. FIAAP is having more than 300 members and is active in promoting composites in these states. It has successfully organized three national conferences in association with FRP Institute. Composite Association, Headquartered in Ahmedabad, has also been formed in Gujarat and has already received interests from more than 50 manufacturers of Indian composite industry.

Fibreglass Industries Association of Andhra Pradesh (FIAAP)

Fibreglass Industries Association of Andhra Pradesh (FIAAP) is a state level organization established in the year 2003. The Association's services are well recognized by some of the national bodies like MSMEDI, SIDBI, AIRPMA, CITD, NIMSME, FRP Institute, TIFAC, Plastindia Foundation, CIPET, Quality Circle of India and state bodies like FAPCCI, APPMA, AIMO, APITCO, State and central universities including reputed engineering colleges in India. The body has been nominated in the governing council of FRP Institute and regional advisory committee of CIPET, Hyderabad.

MSME identified the existing Fibreglass activity in Andhra Pradesh as a potential cluster and came forward to assist the Fibre glass industry with the schemes available with the Ministry. A diagnostic study followed by cluster validation program twice with the cluster players led to start FRP cluster in Hyderabad. This cluster has about 100 units manufacturing various Fibreglass products ranging from helmets to nose cones of rockets, chemical process tanks, automobile parts, microwave transmitting radars and antennae, parts for aerospace and defence applications, building

material. The Government has spent Rs. 10 lakh on soft interventions, and implementation of hard interventions is in progress.

The cluster is located in three industrial estates, namely, Jeedimetla, Balanagar and Cherlapally. Jeedimetla and Balanagar industrial estates are Within 5 kms radius of office whereas Cherlapally industrial estate is 20 kms from office. These industrial estates have good infrastructure.

FRP is usually an enclosure, casing or sheet; they do not have sub components. Hence, all units are manufacturers. There are no assemblers or components manufacturers. The industry can be classified as mechanized or hand-laying. The cluster can be classified as hand-laying type of industry.

There are 300 nos. of units in Andhra Pradesh of which, 100 are located in Hyderabad and Remaining in Visakhapatnam and Vijayawada. Out of 100 units in Hyderabad, about 60 units have good infrastructure and good turnover. These include raw Material suppliers also. Another 40% are very small operating from non-industrial Area.

The cluster manufacturers FRP Roofing sheets, linings, laminates, furniture, Doors, Washing machines, air coolers, axil flow fans, boats, tanks, chemical process Equipments, gratings, Ladders, platforms and host of other products.

The industry employs 5000 persons directly and 10000 persons indirectly. The turnover of cluster was about Rs. 100 crore in 2005-06. A multinational unit is also located in the cluster.

Part C. Technical Textile Industry Analysis

Factor Availability

India has become a major player in the world market for Technical Textiles and the domestic production of Technical Textiles in particular non-woven is increasing at an encouraging rate of over 13%. World over the growth of Non-woven industry in India is amongst the world's top five with China leading the industry. This has become possible due to a number of suitable economic environmental factors and easy availability of key factors governing the Technical Textile industry like supply of raw materials, easy availability of acceptable standard of technology, work force and cheap labour, Infrastructural aspects like power, testing facilities and transport network. In addition to this, a policy and regulatory framework which has been very supportive for new investments, expansion and up-gradation of Technical Textile units has been a major support for development of Technical Textile industry in India. These factors have been discussed in details in the subsequent sections.

27. Raw Material Availability

Key Raw material required for Technical Textile industry is mostly fibre. India is one of the leading producers of both natural and man-made fibres in the world. Easy availability of fibres at a cheaper rate has been a major factor behind the success of Indian textile as well as Technical Textile industry. The major fibres used in Technical Textile industry have been discussed as follows.

Natural Fibres

The key Natural fibres used in Technical Textile industry are Cotton, Jute, Silk and Coir.

Cotton

Cotton is the most important natural fibre being used in India. At 6 million MT of production of cotton fibre, cotton accounted for 82% of fibre production in India at over 54% of entire yarn production in India for 2011-12.

India is world's second largest producer of cotton after China with a production of 28.5 million bales of cotton accounting for 23% of world's production. India has a total of 11.7 million hectares under cotton cultivation growing at 4% per annum. Gujarat, Andhra Pradesh and Maharashtra are the leading producers of Cotton in India. Cotton balance sheet of India is as shown in the following exhibit:

Exhibit 408: Cotton balance sheet for last five years

Description	All figures in lakh MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Stock	6	12	7	8	5
Supply Side					
Domestic production	49	52	58	60	57
Imports	2	1	0	2	2
Total Availability	57	65	65	70	64
Demand side					

Description	All figures in lakh MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
Mill consumption	32	37	38	37	39
Non Mill consumption	3	3	2	2	3
Small spinners consumption	3	4	4	4	3
Total Domestic Consumption	39	44	44	43	46
Exports	6	14	13	22	12
Total utilization	45	58	57	65	58
Closing stock	12	7	8	5	6

Source: Cotton Advisory board

Jute

Jute is a key raw material for making of sacking used in Pack-tech and geo-tech. India is the second largest producer of raw jute after Bangladesh producing 2,053 MT of raw jute in 2012-13 with a total area of 8.27 lakh hectares under Jute cultivation. West Bengal, Bihar and Assam are the leading states producing Jute in India. Jute production India has been growing at 2.4% per annum mainly due to increasing productivity with the area under jute cultivation declining at 2.1% for the last five years. More than 80% of the jute produced in India is used for making of sackings, CBC and other Technical Textile products. Jute balance sheet for India is shown in the following exhibit:

Exhibit 409: Jute Balance sheet

Description	All figures in lakh MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Stock	4	1	2	4	6
Supply Side					
Domestic production of Jute goods	15	16	18	18	17

Description	All figures in lakh MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
Imports	0	1	1	2	1
Availability	19	18	22	24	24
Demand side					
Mill consumption	16	14	16	17	17
Domestic Consumption	2	2	2	2	2
Total Domestic Demand	18	16	17	18	19
Exports	0	0	0	0	0
utilization	18	16	17	19	19
Closing stock	1	2	4	6	5

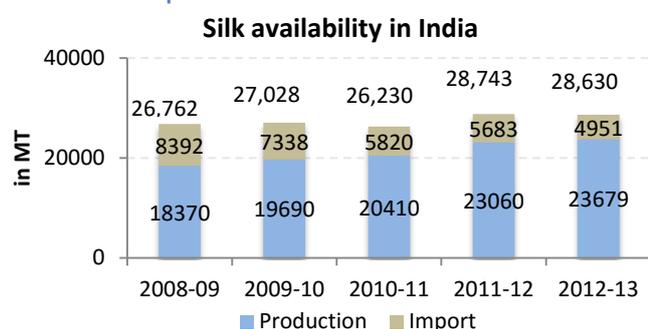
Source: Jute Commission of India

Silk

Silk is used to manufacture some varieties of blinds (Homotech), sutures (Meditech) and sewing threads (Clothtech), though the consumption is limited to high end products.

India is the second largest producer of silk producing 23,690 MT of silk in 2011-12, contributing to 15% of the world production followed by China which accounts for 82% of silk production all over the world. Indian silk production has been growing at 6.5% per annum. The major silk producing centres of India are Karnataka, Tamil Nadu, Andhra Pradesh, West Bengal and Assam. However, the production of silk is not sufficient to cater to the National demand and India is a major importer silk from China. The availability of raw Silk in India has been shown in the following exhibit:

Exhibit 410: Silk production in India



Source: Report on Silk industry & CSB-Dec 2013 at MoT

Coir

Coir, the coconut fibre finds application in mattresses, ropes, cordages and floor coverings. India is world's largest producer of coir fibre accounting for over 60%

of world production. Sri Lanka is the other major coir producer. Together India and Sri Lanka account for more than 90% of coir production across the world. Indian Coir fibre production is estimated to be 6.10 lakh MT in 2012-13. India is the major exporter of coir exporting to 98 countries. The coir industry in India is concentrated in coconut growing States – Kerala and Tamil Nadu, which together account for 90% of Indian coir production.

Man-Made Fibres

Manmade fibres (MMF) and Man Made filament yarns (MMFY) account for around 40% share of the total fibre consumption in the textile industry as a whole. These fibres form a key raw material for the Technical Textile industry especially because of their tailor made properties. The key manmade fibres/filaments and polymers used as raw material in Technical Textile industry is:

- Manmade fibres/filaments
 - Viscose
 - Polyester
 - Nylon
 - Acrylic/Mod-acrylic
 - Polypropylene
- Polymers - HDPE, LLDPE, LDPE & PVC

The segment wise consumption of various man-made fibres/filaments and polymers are given as follows

Natural Fibre	Key segments
Viscose	Clothtech, Homotech, Mobiltech*
Polyester	Buildtech, Geotech, Clothtech, Packtech, Meditech, Agrotech, Sportech, Homotech, Indutech
Nylon	Buildtech, Clothtech, Packtech, Mobiltech, Meditech, Agrotech, Sportech, Indutech
Acrylic/Mod-acrylic	Buildtech, Protech, Meditech, Homotech
Polypropylene	Buildtech, Geotech, Clothtech, Packtech, Mobiltech, Meditech, Agrotech, Sportech, Homotech, Indutech
HDPE	Buildtech, Oekotech, Packtech, Sportech, Indutech
LDPE/LLDPE	Packtech, Agrotech, Sportech,

*Viscose High Tenacity filament yarn finds application in Mobiltech

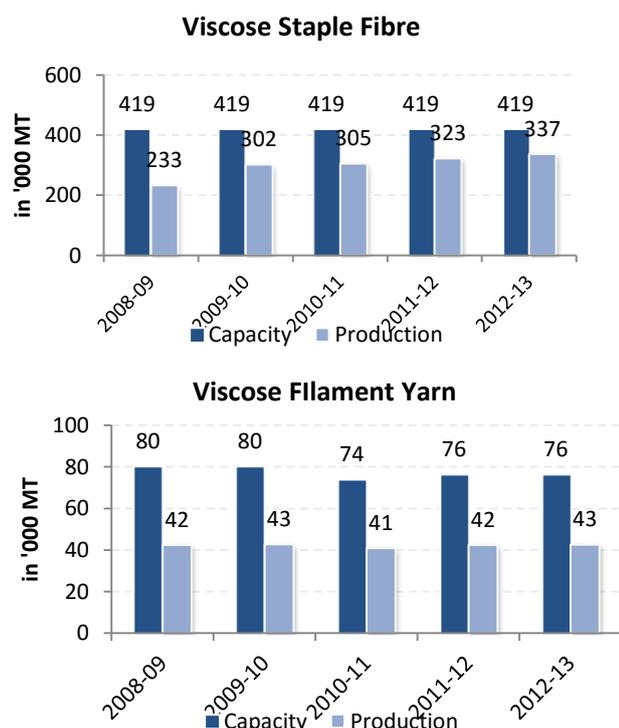
India is a major producer of man-made fibres and filament yarns across the world. A major chunk of this production is clustered in Gujarat. India produced 1,234 million kg of man-made fibres and 1,416 million kg of man-made filament yarn in 2011-12. Details of

major man-made fibres and filament yarn used in Technical Textile industry have been discussed in the subsequent sections.

Viscose Fibre/Filament

Viscose is an important raw material for Clothtech. Viscose also finds application in manufacturing of wipes (Hometech) because of high absorbent properties. A special variety of viscose i.e. Viscose High Tenacity Filament yarn called tyre yarn finds application in Mobiltech. The industry has not seen any capacity addition in the last five years. However, production of VSF has been growing at 10% y-o-y during the last five years as compared to Viscose filament yarn which has remained stagnant over the period. Currently India has sufficient capacity for both VSF and VFY operating at 80% and 56% of the installed capacity respectively. The following exhibit gives details of capacity and production of VSF and VFY in India.

Exhibit 411. Production of VSF



Source: CITI annual report 2012-13

Majority of Viscose produced in India is consumed domestically. The details of production, import, export and consumption of Viscose fibre and filament can be seen in the following exhibit:

Exhibit 412: Viscose balance sheet of India

Description	All figures in '000 MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Stock	14	8	2	2	21
Supply Side					
Domestic Production	233	302	305	323	337
Imports	11	19	14	21	15
Total Availability	258	329	321	346	374
Demand side					
Domestic Consumption	221	268	263	246	249
Exports	28	59	56	79	100
Total utilization	250	327	319	324	349
Closing stock	8	2	2	21	25

Description	All figures in '000 MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
VISCOSE STAPLE FIBRE					
Opening Stock	14	8	2	2	21
Supply Side					
Domestic Production	233	302	305	323	337
Imports	11	19	14	21	15
Total Availability	258	329	321	346	374
Demand side					
Domestic Consumption	221	268	263	246	249
Exports	28	59	56	79	100
Total utilization	250	327	319	324	349
Closing stock	8	2	2	21	25
VISCOSE FILAMENT YARN					
Opening Stock	3	2	2	2	3
Supply Side					
Domestic Production	42	43	41	42	43
Imports	5	12	13	11	9
Total Availability	50	56	56	55	55
Demand side					
Domestic Consumption	45	49	49	45	46
Exports	4	5	6	6	7
Total utilization	49	54	55	52	53
Closing stock	2	2	1	3	2

Source: CITI annual report 2012-13

India consumes majority of the indigenously manufactured viscose. Significant reduction in imports over the years indicates that India is self sufficient with regards both viscose staple fibre/filament.

Grasim Industries is the major manufacturer of regular viscose staple fibre whereas Century Rayon and Indian Rayon and Industries Ltd. are the major manufacturers of viscose filament yarn.

Polyester

Polyester (Polyethylene Terephthalate or PET) is the one of the most widely used synthetic fibre in Technical Textiles. The fibre has variety of applications however, around 40-50% of the polyester produced is used for textile application. Some of the unique features of polyester, making it more desirable in the textile industry, are shrinkage resistance, wrinkle resistance, mildew and abrasion resistance, etc. Polyester is used as a raw material either in form of Polyester Staple fibre (PSF) or Polyester Filament yarn (PFY).

Polyester accounts for 81% of manmade fibre and filament produced in India. While capacity of PSF has remained stagnant in India for the last five years, PFY has seen regular capacity addition with capacity growing at 3% y-o-y. Production trend however paint a different picture with PSF production growing at 6% while that of PFY declining at 2% y-o-y. Currently India has enough capacity for both PSF and PFY. The details of capacity and production can be seen in the following exhibit.

Exhibit 413: Production of PSF and PFY

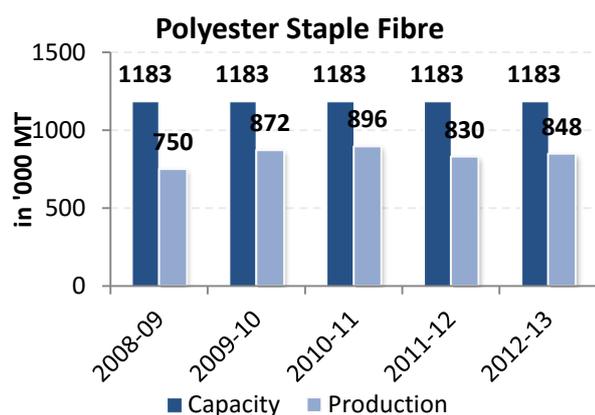
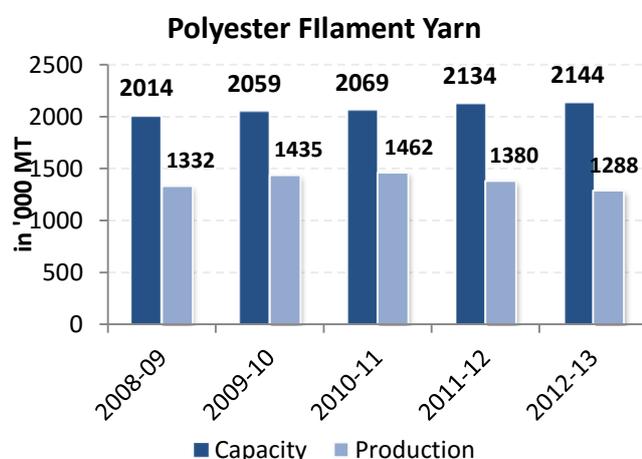


Exhibit 414: Production of PFY



Source: CITI annual report 2012-13

Majority of polyester consumed in India is indigenously produced. Polyester is also imported though the imports have reduced over the years with increasing domestic production and India is a net exporter of Polyester staple fibre/filament. The details of production and consumption of polyester in India can be seen in the following exhibit:

Exhibit 415: Balance sheet for polyester in India

Description	All figures in '000 MT				
	2008-09	2009-10	2010-11	2011-12	2012-13
POLYESTER STAPLE FIBRE					
Opening Stock	33	9	9	18	12
Supply Side					
Domestic Production	750	872	896	830	848
Imports	17	14	32	45	31
Total Availability	799	896	937	892	891
Demand side					
Domestic Consumption	654	726	756	704	711
Exports	136	161	162	176	158
Total utilization	790	887	919	880	869
Closing stock	9	9	18	12	22
POLYESTER FILAMENT YARN					
Description					
2008-09					
2009-10					
2010-11					
2011-12					
2012-13					
Opening Stock	45	23	28	43	44
Supply Side					
Domestic Production	1332	1435	1462	1380	1288
Imports	70	29	19	24	32
Total Availability	1447	1487	1510	1447	1363
Demand side					
Domestic Consumption	1342	1327	1221	1106	942
Exports	82	132	246	297	386
Total utilization	1424	1459	1467	1403	1328
Closing stock	23	28	43	44	35

Source: CITI annual report 2012-13

Reliance is the country's largest manufacturer of polyester and related products. The other major

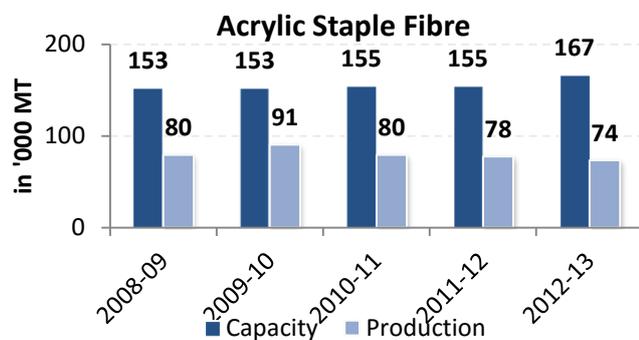
manufacturers of polyester are Century Enka, Indo Rama Synthetics, JBF Industries, JCT Fabrics and Sanghi.

Acrylic / Mod-Acrylic Fibres

Acrylic fibres are defined as those which contain not less than 85% of acrylo-nitrile molecule. Fibres which contain 35-85% acrylo-nitrile molecule are "mod-acrylic" fibres. In addition there are many types of modified acrylic fibres such as animal-like fibres with oval cross-section, thermal resistant fibres, anti-pilling fibres, antibacterial and deodorant fibres, and anti-static fibres. Acrylic fibres are majorly used for manufacturing Blinds and Stuff toys (Hometech). Mod-acrylic fibres find application in manufacturing flame retardant apparel (Protech).

The details about capacity and production can be seen in the following exhibit:

Exhibit 416: Production of ASF



Source: CITI annual report 2012-13

The consumption of acrylic fibre and its production as well as trade trends can be seen as follows:

Exhibit 417: Balance sheet for acrylic fibre in India

ACRYLIC STAPLE FIBRE					
All figures in '000 MT					
Description	2008-09	2009-10	2010-11	2011-12	2012-13
Opening Stock	3	3	2	8	4
Supply Side					
Domestic Production	80	91	80	78	74
Imports	11	11	21	20	26
Total Availability	93	104	103	105	104
Demand side					
Domestic Consumption	89	96	70	86	94
Exports	2	6	25	15	6
Total utilization	90	102	95	101	100

ACRYLIC STAPLE FIBRE					
All figures in '000 MT					
Description	2008-09	2009-10	2010-11	2011-12	2012-13
Closing stock	3	2	8	4	4

Source: CITI annual report 2012-13

The major manufacturers of Acrylic and mod-acrylic fibres in India are India Acrylics Ltd, Pashupati acrylon Ltd. and India Petrochemical Corporation (Reliance).

Polypropylene

Polypropylene is the most widely used raw material for the Technical Textile products because of its special properties. The production and consumption of polypropylene staple fibre has remained stable for the last 3 years. The domestic demand is met by indigenous production.

The demand for Polypropylene filament yarn is partly met by imports though the imports are decreasing over the years. The details of capacity and production of polypropylene in India is as follows:

Exhibit 418: Production of PPSF & PPFY

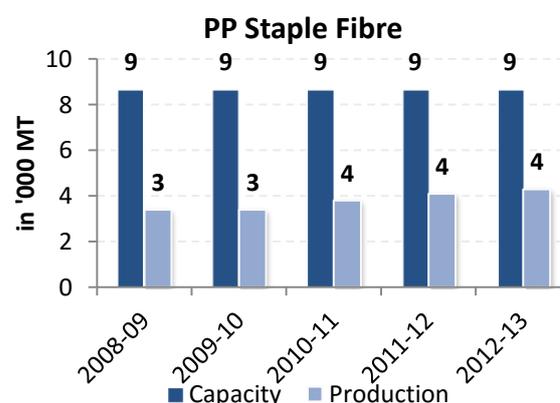
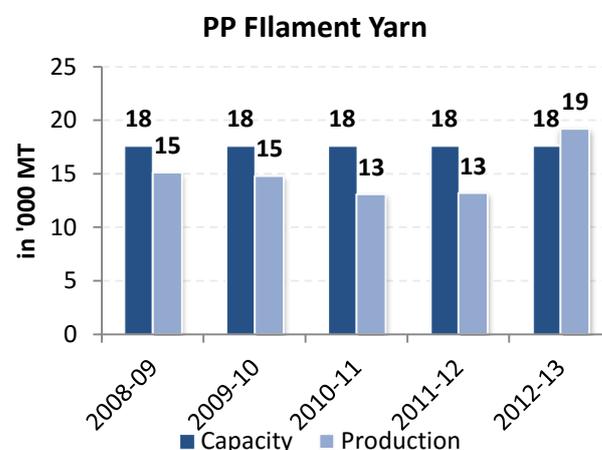


Exhibit 419: Production of PPFY



Source: CITI annual report 2012-13

The details of the PP fibre export, import and consumption have been shown in the following exhibit:

Exhibit 420: Balance sheet of PP fibre and yarn

Description	All figures in '000 MT				
	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13
POLYPROPYLENE STAPLE FIBRE					
Opening Stock	0.0	0.1	0.0	0.1	0.0
Supply Side					
Domestic Production	3.4	3.4	3.8	4.1	4.3
Imports	0.1	0.2	0.1	0.3	0.3
Total Availability	3.5	3.7	3.9	4.5	4.6
Demand side					
Domestic Consumption	2.6	3.1	3.3	3.9	3.2
Exports	0.9	0.5	0.6	0.6	1.4
Total utilization	3.5	3.6	3.9	4.5	4.6
Closing stock	0.0	0.1	0.0	0.0	0.0
POLYPROPYLENE FILAMENT YARN					
Description	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13
Opening Stock	0.3	0.1	2.2	0.2	0.3
Supply Side					
Domestic Production	15.1	14.8	13.1	13.2	19.2
Imports	1.7	1.2	1.5	1.9	1.5
Total Availability	17.1	16.1	16.8	15.3	21.0
Demand side					
Domestic Consumption	16.4	13.1	15.5	13.8	18.7
Exports	0.6	0.8	1.3	1.2	1.9
Total utilization	17.0	13.9	16.8	15.0	20.6
Closing stock	0.1	2.2	0.0	0.3	0.4

Source: CITI annual report 2012-13

Key manufacturers of PP fibre and filament are Jindal Polyester Ltd., Reliance Ltd and Parasrampur Industries.

Nylon

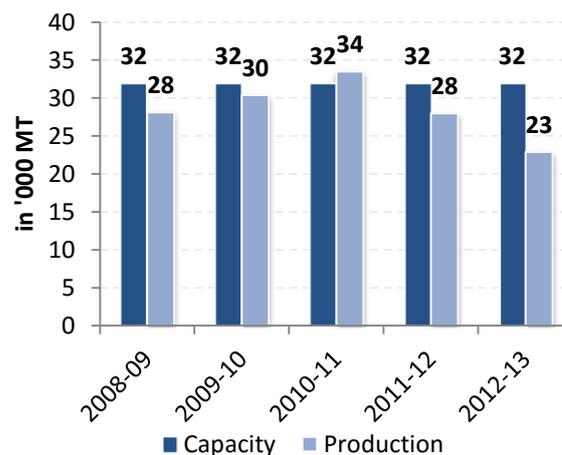
Nylon (Polyamide) finds application in majority of the Technical Textile products. Regular Nylon filament yarn is produced in India though the consumption has

outpaced the indigenous production in recent years resulting in increase in imports.

Nylon tyre yarn is a key input for the Mobiltech Technical Textiles. The production of nylon has been declining over the last few years on account of declining demand of indigenous consumption. The details of production and capacity for Nylon filament yarn is as shown:

Exhibit 421: Production of Nylon Filament yarn

Nylon Filament yarn



Source: CITI annual report 2012-13

The details of consumption and trade trends for Nylon filament yarn is as shown:

Exhibit 422: Balance sheet for nylon

Description	All figures in '000 MT				
	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13
Opening Stock	3	2	3	6	2
Supply Side					
Domestic Production	28	30	34	28	23
Imports	4	2	2	1	2
Total Availability	35	34	39	36	27
Demand side					
Domestic Consumption	31	29	30	32	23
Exports	2	2	2	2	2
Total utilization	33	31	32	34	25
Closing stock	2	3	6	2	2

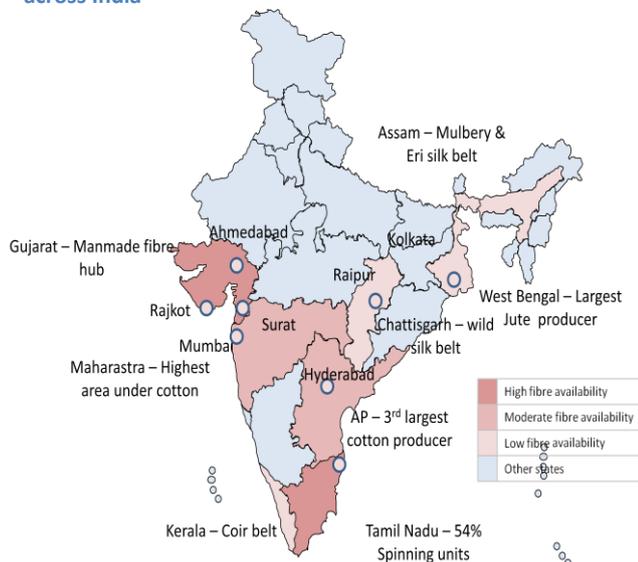
Source: CITI annual report 2012-13

Century Enka and SRF Ltd. and are the key manufacturers of Nylon yarn

Geographical Availability of Natural Fibres In India

The geographical distribution of production of natural fibres in India is as follows:

Exhibit 423: Geographical distribution of key raw materials across India



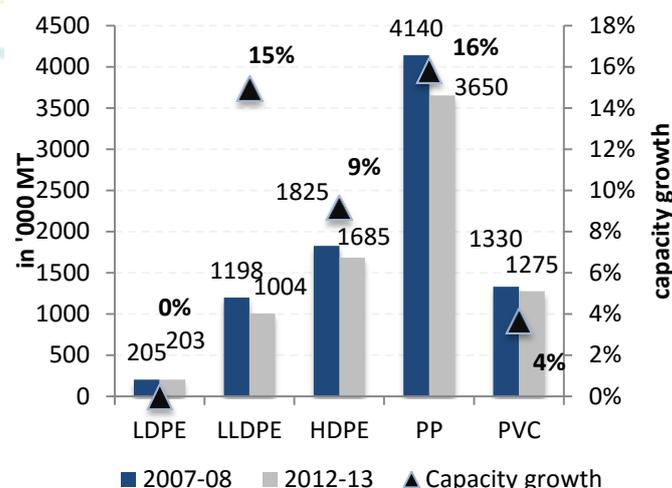
Poly-olefins and PVC

Polyethylene (PE) is the most widely used polymer. It has three different varieties depending on the density - High Density Polyethylene (HDPE), Low Density Polyethylene (LDPE) and Linear Low Density Polyethylene (LLDPE). Different types of PE and Poly Vinyl Chloride (PVC) are the key polymers that find application in Technical Textile. HDPE/LDPE tapes are used in manufacture of variety of Technical Textile products. In addition the polymers are used as coating material for interlinings, etc. HDPE has a significant consumption in the packaging industry and variety of other products in Technical Textiles.

PVC is majorly used as coating material for flex fabric, blinds, etc. The consumption of PVC in last five years has increased outpacing the production. With significant increase in imports of PVC India is a net importer of PVC.

During the XIth five year plan capacity of LLDPE and HDPE increased by 15% and 9% respectively making India a net exporter in both the categories. India is also a major exporter of PP and industry saw capacity additions at 16% per annum for PP during the last five years. The details of capacity and production of major polymers used in Technical Textile are shown in following exhibit.

Exhibit 424: Capacity and Production of polymers 2011-12



Source: CPMA website, WG report on Petrochemical industry 2012

The production consumption and trade of key polymers for 2011-12 is as shown in the following exhibit

Exhibit 425: Key statistics for polymers used in Technical Textiles

2011-12 (in '000 MT)	Capacity	Production	Demand	Import	Export
LDPE	205	203	405	200	1
LLDPE	835	1004	1198	238	45
HDPE	1825	1685	1657	241	225
PP	4140	3650	2993	193	848
PVC	1330	1275	2087	813	0

Source: CPMA website

The major manufacturers of HDPE are: IPCL, GAIL, Haldia Petrochemicals, IOCL and BPCL

The major manufacturers of LDPE are:

- IPCL owned by Reliance Industries Ltd.

The major manufacturers of PVC in India are:

- Reliance Industries
- Finolex Industries
- DCW

Speciality Fibres

There are 23 speciality fibres that are used in Technical Textiles. The majority of the demand of speciality fibres is met via imports. Aramids, FR fibres, carbon fibres, high tenacity and super high tenacity fibres are the key speciality fibres used in significant amount in Indian Technical Textile industry.

Aramids: The demand of aramids is entirely met by imports mostly through Du Pont, Indian manufacturers and DRDO is also conducting research to develop aramid fibres within the country.

FR fibres: Speciality Fire retardant fibres commonly used in India are mo-acrylic based fibres and FR

polyester. The demand for these fibres is catered via imports. While mod-acrylic fibres are imported from Korea, Taiwan and China, FR polyester is supplied by Treviera – the German subsidiary of Reliance.

High Tenacity Fibres: Polyester and nylon high tenacity and super high tenacity fibres are used in India mainly in industrial work wear, conveyor belts, tyre cords, sail cloth and high tensile sewing threads. The domestic production is estimated to be of 27000 MT and imports of another 31,000 MT.

Glass Fibres: Glass fibre demand in India is mostly catered through domestic production with Saertex, Owen corning, Montex and UP Twiga being the key

manufacturers. The total estimated domestic supply is of 114,751 MT.

Carbon Fibres: Carbon fibre manufacturing in India is done by three key companies – Kemrock, Hindoostan technical fabrics and National Aeronautical Laboratory. The total domestic supply is estimates to be of close to 480 MT with imports of around 23 MT.

In addition to these key speciality fibres, other speciality fibres like super absorbent fibres, alignate fibres, conductive fibres, etc are mostly catered through import.

Duty Structure for Import of Fibres in India

The duty structure for different fibres and fabrics along with the HS code under which they are imported has been shown in the following exhibit:

Exhibit 426: Duty structure for major fibres being imported

Products	Product description	HS codes	2012-13			2015-16		
			Basic duty	CVD	Special CVD	Basic duty	CVD	Special CVD
Polymers used in Technical Textiles								
Polymers and polypropylene	Polymers in primary form	3901	10%	12%	4%	10%	12.5%	4%
	Polymers of polypropylene	3902	10%	12%	4%	10%	12.5%	4%
	Polymers of acrylo nitrite	3906	10%	12%	4%	10%	12.5%	4%
Synthetic fibres								
Synthetic fibres and yarn	Monofilaments of cross sectional dimension of more than 1 mm	3916	10%	12%	4%	10%	12.5%	4%
	Nylon	3916 5506 5511	10%	12%	4%	10%	12.5%	4%
	Nylon for tyres	5401	10%	12%	4%	10%	12.5%	4%
	Polyester	5402 5503 5511	10%	12%	4%	10%	12.5%	4%
	Polypropylene	5402 5501 5511	10%	12%	4%	10%	12.5%	4%
	Viscose	5403 5511	10%	12%	4%	10%	12.5%	4%
	Other manmade fibres/ filaments	5503	10%	12%	4%	10%	12.5%	4%
Natural fibres								
Silk fibres	Silk fibres	5002	30%	0%	4%	30%	0%	4%
Wool fibres	combed wool yarn	5107	10%	12%	4%	10%	12.5%	4%
	Fibres of animal hair not for retail	5108	10%	12%	4%	10%	12.5%	4%
Cotton fibres	Fibres of cotton	5201	10%	0%	4%	10%	0%	4%
	Cotton Yarn	5206	10%	12%	4%	10%	12.5%	4%

Products	Product description	HS codes	2012-13			2015-16		
			Basic duty	CVD	Special CVD	Basic duty	CVD	Special CVD
	(other than sewing thread)							
Flax fibres	Flax in raw form	5301	30%	0%	4%	30%	0%	4%
	Flax fibres	5306	10%	12%	4%	10%	12.5%	4%
Hemp	True Hemp	5302	30%	12%	4%	30%	12.5%	4%
Jute fibres	Jute & textile based fibres	5303	10%	0%	4%	10%	0%	4%
	Jute yarns	5307	10%	12%	4%	10%	12.5%	4%
Coir Fibres	Coir Fibres	5305	10%	12%	4%	10%	12.5%	4%
	Coir yarns	5308	10%	0%	4%	10%	12.5%	4%
Specialty fibres								
Aramid	Fibres of aramids	5402 5503	10%	12%	4%	10%	12.5%	4%
Poly vinyl fibres	PVC filament yarns	5402	10%	12%	4%	10%	12.5%	4%
	PVA filament yarns	5402	10%	12%	4%	10%	12.5%	4%
Carbon & conducting fibres	Carbon fibres	68151090 68159990	10%	12%	4%	10%	12.5%	4%
	Conductive fibres	68151090 68159990	10%	12%	4%	10%	12.5%	4%
Ceramic fibres	Ceramic fibres	69039030	10%	12%	4%	10%	12.5%	4%
PTFE coated fibres	PTFE coated fibres	32100040 39209941 39209942 39209949	10%	12%	4%	10%	12.5%	4%
Glass fibres	Glass fibres	70199010	10%	12%	4%	10%	12.5%	4%

Source: https://www.icegate.gov.in/Webappl/index_imp.jsp

28. Technology

In addition to the conventional technologies, the manufacture of Technical Textiles requires specific unconventional spinning, weaving, knitting, braiding and nonwoven technologies. The details of these technologies have been summarised in the following exhibit.

Exhibit 427: Key technologies used in Technical Textile

Technology	Applications	Manufacturers	Remarks
Spinning Technologies			
DREF Spinning	Hometech, Protech, Indutech, Meditech, Packtech, Mobiltech	Fehrer, Austria	
Warp Spinning	Hometech, Mobiltech, Clothtech	Leesona, US Mackie, U.K. Suessen, U.K.	
Weaving Technologies			
Projectile Weaving	Agrotech, Geotech, Indutech, Buildtech	Juegens, Germany Sultex, Switzerland Texilmach, Russia	USD 15,000 to USD 90,000 FOB
Rapier Weaving	Mobiltech, Protech, Sportech	Cobble Blackburn, UK CTMTC, China Dornier, Germany Giropan NV, Belgium Juegens, Germany	USD 10,000 to USD 40,000 FOB

Technology	Applications	Manufacturers	Remarks
		Mackie, U.K. Metag, Italy Mullaer Frick, Switzerland Panter, Italy Picanol, Belgium Promatech, Italy Spa Textile, Spain Sultext, Switzerland Texo, Sweden Trinca, Italy	
Air-Jet Weaving	Mobiltech, Sportech, Meditech (for medical gauge)	CTMTC, China Dornier, Germany Investa International, Czech Republic Mullaer Frick, Switzerland Panter, Italy Picanol, Belgium Promatech, Italy Sulzer Tessile/Smit Textile, Italy Sultext, Switzerland	USD 6,000 to USD 20,000 FOB
Water-Jet Weaving	Buildtech, Clothtech	CTMTC, China Nissan, Japan	USD 6,000 to USD 15,000 FOB
Circular Weaving	Packtech, Meditech, Indutech	Frederick Enterprises Co. Ltd., Taiwan Karl Mayer, Germany Lohia, India Sima, Italy Starlinger, Austria	USD 10,000 to USD 25,000 FOB
Multiphase Weaving	Geotech, Buildtech	Sultext, Switzerland Techmasheexport, Russia	
Knitting Technologies			
Technology	Applications	Manufacturers	Remarks
Circular Knitting	Homotech, Indutech, Protech, Meditech, Agrotech, Packtech, Sportech	Artex Group, USA, Berney Knitting Machinery Co. Inc., USA USA ITM Ltd. South, USA Monarch Knitting Machinery Corp., USA Textram Inc., USA Pai Lung Machinery Mills Co. Ltd., Taiwan Keum Young Machinery Mill Co. Ltd., Korea Texmac Inc, USA Karl Mayer, Germany	10,000 USD to 35,000 USD FOB
Flat Knitting	Meditech, Protech, Buildtech, Mobiltech	Shima Seiki, Japan Stiger, Germany Kauo Heng, Taiwan Elex International, India SuoHwan Machinery Co., Taiwan Brother Industries Ltd., Japan Keum Young Machinery Mill Co. Ltd., Korea Stoll H GmbH & Co., Germany Protti SpA, Italy Universal Maschinenfabrik, Germany	4,000 USD to 10,000 USD FOB
Warp Knitting			
a) Tricot Machines	Agrotech, Homotech, Indutech, Packtech, Sportech, Geotech,	LIBA, Germany Cummins Machinery	USD 65,000 to USD 90,000 FOB

Technology	Applications	Manufacturers	Remarks
	Mobiltech, Buildtech	Corporation, USA ITM Ltd. South, USA Karl Mayer, Germany Jakob Muller AG ,Switzerland	
b) Raschel Netting Machines	Packtech, Indutech, Agrotech, Clothtech, Sportech, Geotech, Meditech, Hometech, Buildtech	Cummins Machinery Corporation, USA ITM Ltd. South, USA Karl Mayer, Germany Cornez SpA, Italy Jakob Muller AG, USA Arlin Industries, USA LIBA, Germany	USD 35,000 to USD 55,000 FOB
c) Stitch-bonding	Hometech, Indutech, Mobiltech, Packtech, Clothtech, Protech	Chima Inc, USA Karl Mayer, Germany Textima Import Export, USA Southern Mill Supply Corp., USA Jakob Muller AG, USA	12,000 USD to 25,000 USD FOB
d) Multiaxial Knitting	Mobiltech, Geotech, Protech, Indutech, Meditech, Sportech, Buildtech	American LIBA Inc., USA Cummins Machinery Corporation, USA Fillattice SpA, Italy Fletcher International Inc., UK Jakob Muller AG, USA Mayer Textile Corp., USA	
e) Spacer Fabrics Knitting	Sportech, Mobiltech, Hometech, Meditech, Indutech	LIBA, Germany Cummins Machinery Corporation, USA Comez SpA, Italy Karl Mayer, Germany Jakob Muller AG, USA	USD 50,000 to USD 1,00,000 FOB
Braiding Technologies			
Technology	Applications	Manufacturers	Remarks
Braiding Machinery	Mobiltech, Sportech, Meditech, Indutech	Barney Knitting Machinery Co. Inc., USA Fletcher International Inc., Spain Lamb Knitting Machinery Corp., USA United Textile Machinery Corp., USA Karl Mayer, Germany	USD 5000 to USD 20,000 FOB

In addition to these, specific machines are required for production of non –woven fabrics. The details of these have been summarised in the following exhibit:

Exhibit 428: Machinery for non woven

S.No	Machines Suppliers	Process	Capacities	Applications	Remarks
1	Erko-Trutzschler GmbH, Germany	Opening, blending & mixing machines, Airlay cards	25T/day	Wipes, Cotton pads, Surgical gowns, Drapes, Geotextiles, Automotive Textiles, Filter fabrics, Agrotextiles, Home furnishing,	

S.No	Machines Suppliers	Process	Capacities	Applications	Remarks
		Opening, blending & mixing machines, Needling Technology	100-1200gsm, 6.5mts wide.	Geotextiles	USD 15,000 to USD 50,000 FOB
		Opening, blending & mixing machines, Needling Technology	250 to 1500gsm, 3.0 mtr wide	Automotive Textiles,	USD 50,000 to USD 2,00,000 FOB
		Opening, blending & mixing machines, Needling Technology	250 to 100gsm, 3.2mts.	Filter fabrics	USD 50,000 to USD 2,00,000 FOB
2	Fleissner GmbH, Germany	Fibre production plants, Spun lace lines, Driers	25T/day	Wipes, Cotton pads, Surgical gowns, Drapes,	USD 25,000 to USD 5,50,000 FOB
3	Fong's, Hong Kong	Complete bleaching line	25T/day	Cotton bleaching	USD 2,00,000 to USD 7,00,000 FOB
4	Gavazzi, Italy	Cake opener to Bale press	25T/day	Fibers into Bales	
5	Fleissner Belt Ovens, Germany	Thermobonding & Fusion lines, Hot ovens, Low speed winders	3mts wide	Nonwovens, Coating applications, Industrial wipes, Textiles Finishing, Rubberized coir.	USD 3,00,000 to USD 20,00,000 FOB
6	Falu, Switzerland	Conversion machines			USD 2,500 to 15,000 USD
		Cotton pads	240 cotton pads per min	De-makeup cotton pads	
		Cotton Swabs	2700 cotton swabs	Cotton swabs	
7	Bouda, Austria	Conversion machines			USD 2,000 to 20,000 USD FOB
		Zig-zag cotton		Medical purpose	
		Cotton rolls		Medical purpose	
		Cotton balls		Medical purpose.	
8	Andritz Kusters	Laminating & finishing calendars rollers		Apparel, home textiles, sport textiles, Technical Textiles, nonwovens.	USD 30,000 to USD 80,000 FOB
9	Bastian, Germany	High speed winders	3.2 Mtr	Nonwovens, Bopp films, etc.	
		High strength PET fibres	300T/ annum	Bullet-proof vests, helmets, armours, anti-cut gloves, rope, marine use, cement reinforcing material	
10	Shaoyang Textile Machinery Co. Ltd., China	Spun bond line,	3.2mts wide, 3.2 MS, 10-150gsm	Geotextiles, Medical textiles, Automotive, Hygiene, Packaging.	USD 3,00,000 to USD 15,00,000 FOB
11	Hanwei Machinery Manufacturing Co. Ltd., China	Diapers, Adult diapers, Sanitary Napkins, Pull up diapers.			USD 2,00,000 to USD 10,00,000 FOB
		Diapers	400 pcs/min	Baby diapers, adult diapers	
		Lady napkins	350 pcs/min	Sanitary napkins	
12	DILO Group, Germany	Cross lapper	Up to 200m per min.	Web forming	http://www.dilo.de/index.php?id=39&L=1
		Needle punching machine		Used in automotive non woven textile and needle punched fabrics	http://www.dilo.de/index.php?id=39&L=1

*Note: Compiled based on Industry inputs and secondary sources

29. Policy Framework

Technical Textile Policy Of Central Government

Indian government has been running schemes for promotion of investment into Technical Textile industry in India. These are:

Technology Up-gradation Financial Support Scheme (TUFS)

TUFS scheme was first introduced in 1999 to help industry players' up-grade to newer advanced technology. It has been the fore front of technological up-gradation and development in India for the textile sector.

TUFS scheme aims at developing the technology levels of machinery and installation of Indian textile sector by providing financial benefits to the promoter of the industry which is going for a new advanced technology installation, capacity expansion or machinery up-gradation. The scheme aims to increase the production infrastructure to state of the art technology and therefore, it has set various threshold parameters, up-gradation below which would not qualify.

Eligibility

Installation of the following machinery would make the investment eligible for TUFS scheme benefits:

- Cotton Ginning and Pressing
- Spinning/Silk Reeling & Twisting, Synthetic filament yarn Texturising, Crimping & Twisting machinery
- Manufacturing of viscose filament yarn and viscose staple fibre
- Weaving / Knitting
- Technical Textiles and non-woven machinery
- Garment / Made-up manufacturing
- Processing of fibre, Yarn, Fabrics, Garments and made-ups
- Jute industry machinery
- Energy saving & process control equipments for various sectors
- Machinery for CAD, CAM and design studio.

For being eligible under the scheme the size of investment must be above the minimum economic size and the technology being purchased should be higher than the benchmarked technology.

In addition to this, investment in machinery for development of common infrastructure, in house R&D, energy saving devices, etc would be eligible for up to 25% of the cost of machinery.

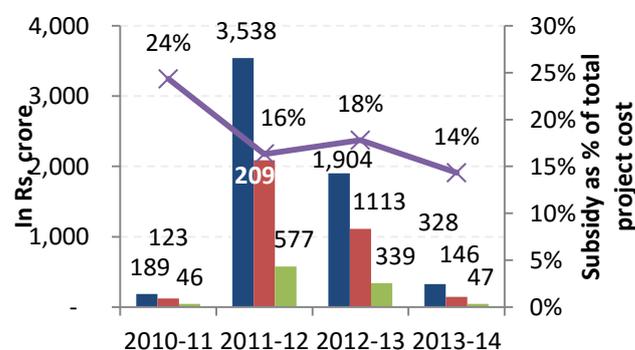
Quantum of Benefit

Under the scheme, an industry player going for new installation, expansion or modernisation of machinery can avail the following benefits:

- Re-imbursement of up to 5% of the interest charged by financial institutions for a maximum of five years. The promoter must invest at least 20% of the cost of machinery.
- The Scheme provides 15% Margin Money subsidy for SSI textile and jute sector in lieu of 5% interest reimbursement on investment in TUF compatible specified machinery subject to a capital ceiling of Rs. 500 lakh and ceiling on subsidy Rs.45 lakh.
- The Scheme provides 5% interest reimbursement plus 10% capital subsidy for specified processing machinery excluding CETP, garmenting machinery and machinery required in manufacture of Technical Textiles.

The Scheme provides 5% Interest subsidy or 25% capital subsidy on benchmarked machinery at par with handloom sector. The details of benefit via subsidy provided through TUFS on capital loans for the last four years have been exhibited as follows:

Exhibit 429: Benefits accrued via TUFS



Source: OTx, iMaCS analysis

Technology Mission on Technical Textiles

The TMTT scheme is aimed at improvement of basic infrastructure in terms of testing facilities, lack of market development support, skilled manpower, R&D, improved regulatory measures, preparation of specifications and standards for Technical Textiles, etc. The scheme is being implemented in two phases, the details of which are as follows:

Mini Mission 1:

Under Mini mission 1, four COEs were upgraded to a state of the art technology level and four new COEs were created between 2011 and 2013. This aimed at developing testing and R & D facility for Technical Textiles within India.

Mini Mission 2:

Under Mini mission 2, support would be provided for:

- Development of business start –ups
- Conduction of seminars and workshops on Technical Textiles
- Support for contract research
- Support for development of market for sale to institutional players
- Support of domestic and export market development of Technical Textiles
- Identification of regulations and standards for Technical Textiles

Focus Product Scheme (FPS) for Technical Textiles

The objective of this scheme is to incentivize export of products that have high export intensity or employment potential in order to offset infrastructure inefficiencies and other associated costs involved in marketing these products. Exports of notified products to all countries (including SEZ units) shall be entitled for Duty Credit scrip equivalent to 2 % of FOB value of exports (in free foreign exchange). There are 33 Technical Textile products that are allowed for FPS benefits under this scheme.

Promotion of Agro-textiles in North Eastern States

The aim is to utilize Agro-textiles in improving the horticulture and floricultural produce of the NE states. With increasing acceptability of Agro-textiles, entrepreneurship in the area of agro-textiles production in the country will get an impetus. The growth of usage of Agro-textile products in the country will thus benefit both agriculturists as well as textile entrepreneurs in the country.

It is proposed that in the project period (5 years), Agro-textiles will be utilized to improve the horticulture and floricultural produce of the Northeast states by providing technological and financial support for establishing the demonstration centres and disburse Agro-textile-Kit with overall fund outlay of Rs. 55 crore. It would aim at creating awareness and dispersal of agro-textile kits. The scheme has two components discussed as follows:

Component 1: Creating Awareness And Setting Up Of Demonstration Centres And Developing Capacities

It would involve participation from State agricultural bodies, Krishi Vigyan Kendras (KVKs), NGOs and agricultural universities. It would include organisation of seminars, workshops for farmers and local stakeholders, publication of articles emphasizing on the advantages of agro textiles for horticultural and

agricultural products in local magazines, promotion of agro textiles through exhibitions by Indian manufacturers and publicity on radio and television.

It would also include setting of demonstration centres demonstrating the benefit of usage of Agro textile products suitable for the region, in collaboration with agro textile manufacturers and relevant State Agriculture bodies/universities, Krishi Vigyan Kendras (KVK), NGOs, etc with technical support from the COE. The major manufacturers and suppliers for demonstration centre set up would be empanelled by the COE of agriculture – SASMIRA. A total of 24 to 32 demonstration centres are envisaged with 3 to 4 in each of the 8 states.

Component 2: Distribution of Agro-textile Kits in North Eastern Region

Subsidized agricultural kits where in the beneficiary bears only 10% of the cost would be provided to the farmers and stakeholders in North East, with an aim to provide hand holding support to the local farmers for promotion of awareness and use of agro textiles. The maximum support per stakeholder would be limited to Rs. 5 lakh. A total of 700 suck kits are expected to be distributed amongst the stakeholders and farmers in the region.

Promotion of Geotextiles In North Eastern States

Scheme for usage of geotextiles in North-eastern region has been proposed in the 12th plan by the Ministry. The scheme has a total outlay of Rs. 500 crore and aims at promoting and utilizing the use of geotextile in development of infrastructure in the North East. The scheme would have two major components:

Component 1: Promotion and use of geotextiles in construction of roads, hill and river embankments, etc. This component of the scheme would be for on ground implementation and usage of geotextiles. Out of the total funding close to 85% of the funds would be utilized for this purpose.

Component 2: In component 2, rest of the 15% of the funding would be used for sensitization activities, market studies, on site testing, sensitization activities, training and capacity building for skilling of workers in geotextiles.

Focus Incubation centres

Ministry of Textiles has set up six focus incubation centres at a cost of Rs 17.4 crore. These centres would help budding entrepreneurs build innovative Technical Textile products in a "plug and play" model, and would help promote Make in India in textiles.

Concessional Custom Duty for Specified Technical Textile Machinery

Major machinery required for Technical Textiles have been placed under concessional custom duty list. These would get a concession of 5% on the custom duty, allowing the total duty to be 18.61%. This list includes 26 machines required for Technical Textiles and complete production line for non woven along with machinery for finishing and converting of non woven. The list of machinery included in the list is as follows:

- Precision coating heads
- Turret winder and unwinders
- Coating equipment for scrim fabrics
- Multi-colour roto gravure printing machine for coated fabrics
- Printing equipment for signage for coated or laminated fabrics
- Grommet flexing machine
- Ultra sonic, hot air and wedge RF / laser ploymetric sealing machine
- Weatherometer
- Automatic thickness gauge
- Puncture resistance".
- Twisting Machine
- Material Handling system for Twisting Machines
- Data capture system for Twisting Machines
- Balancing Equipment for Cable Corder Spindle Motors
- Shuttle-less looms
- Reeds for weaving machines
- Warp defects detection system
- Parts for Airjet weaving machines
- Parts for projectile weaving machines
- Parts for Rapier weaving machines
- Warp knotting system
- Take up system for weaving machine
- Creels for weaving machines
- Package change system for creels
- Process control equipment namely, Tension meters, On-line denier checking system, On-line twist checking system, On-line EDS monitoring system, Filamentation detector, Fluff Detector, Automatic Fabric Inspection System, Tacho-meters
- Storage and Transport systems namely, Automated fabric transport system and Automated fabric packing system

- Finishing Machines namely, Dipping Machine for Tyre Cord/industrial Fabrics, Coating Machines, Dipping Machine for beting duck, Stenter for Technical Textiles, Embossing Rollers, Parts and Accessories for Dip and coating units, Hydraulic Control for Accumulator, Dynamic Braking for Pull Rolls System, De-webber system, Burners with Controllers
- Testing equipment, namely, Tensile Tester, Thermal Shrinkage Tester, Twist Tester, Fatigue Tester";

In addition to this complete production line for the following non woven are also placed in the concessional list:

- Needle punched non woven
- Chemically bonded non woven
- Thermally bonded non woven
- Stitch bond non woven
- Spun laced non woven
- Spun bonded non woven
- Melt blown non woven
- Spun melt non woven
- Machinery for finishing of all non woven
- Machinery for converting of all non woven to made ups.

Menstrual Hygiene Scheme of Ministry of Healthcare and Family Welfare (MoHFW)

The Menstrual hygiene scheme of the Ministry of Health and Family Welfare was launched in 2011 with an aim to ensure menstrual hygiene amongst adolescent girls, wherein sanitary napkin packs containing 6 napkins branded as "Freeday" are proposed to be distributed at a price of Rs. 6 per pack across 152 districts in 20 states across the country. The first phase of the scheme targets to cover roughly 25% of the adolescent girl (Aged 10 to 19) population of the country. The scheme aims at providing this benefit to 1.5 crore girls in first phase, who are below BPL and cannot afford a sanitary napkin. Out of the 152 districts proposed, the scheme has taken off in 107 districts, across 17 states, where the napkins are being supplied through central procurement. In the rest 45 districts, the Napkins are to be procured and distributed through SHGs. The scheme although in its initial phase currently would give a significant awareness boost for sanitary napkins, which comes under Meditech segment of Technical Textiles.

Make In India Programme

The "Make in India" programme was launched nationwide by our Hon'ble Prime Minister Shri

Narendra Modi in 2014 with an aim to facilitate entrepreneurship and growth of manufacturing sector in India. It aims at facilitating investment, foster innovation, enhance skill development, protect intellectual property and develop manufacturing infrastructure in India. It spans across 25 industry sectors with special focus on textiles and garments due to its vast potential of creating manufacturing employment. The key policy initiatives under make in India are:

- 100% FDI is permitted through automatic route in textiles and garmenting sector
- Increased role of IT in getting licenses and permits for the convenience of industries
 - Process of applying for Industrial License & Industrial Entrepreneur Memorandum made online on 24x7 basis through eBiz portal
 - Environmental clearances can be obtained online
 - Self certification to be introduced for select regulatory requirements for non-risk and non-hazardous businesses
- Development of New Infrastructure
 - Impetus on development of new industrial corridors - Delhi – Mumbai, Chennai – Bangalore, Chennai – Vizag, Amritsar – Kolkata.
 - Development of 100 smart cities across India
- New Initiatives for success
 - Via “Make in India” programme dedicated teams would be identified to guide and assist first time investors in the process of setting up the industry.
 - Focussed targeting of organisations for expansion and investment would be done for better results
- Focus on Indian IPR regime
 - The Government aims to strengthen India’s IPR regime through development of highly equipped patent offices and provision of online patent filing facility.
 - India is also a member of various international agreements on patents and allows foreign applicants claiming priority to file for patents.
- Focus on National manufacturing
 - Make in India provides special focus to employment creating sectors of leather, textiles and garmenting, footwear, food processing and gems and jewellery
 - Focus in higher on development of SMEs
 - 17 new National Investment and Manufacturing zones have been identified across the proposed industrial corridors for

development. Units coming under NIMZ would have a single window clearance system.

- A technology Development and Acquisition fund has been proposed across Industry for acquisition of technologies, creation of patent pool and promoting domestic equipment manufacturing
- Defined timelines are set for obtaining clearances and licenses for manufacturing from different regulatory bodies

In addition to these, the Make in India Programme provides few textile sector specific policies. These are as follows:

- Investment allowance (additional depreciation) at the rate of 15% to manufacturing companies that invest more than INR 1 Billion in plant and machinery acquired and installed between in 2013-14 and 2014-15
- Tax incentive for research and development
 - Income tax deduction of up to 200% of the capital and revenue expenditure excluding land and building cost done by a company on scientific research and development
 - Income tax deduction of up to 200% for sum paid to National laboratory, University and institutes for research activities

Make in India is more relevant for Technical Textiles as preponderant sectors among the 25 sectors consume and drive Technical Textile consumption. Thus growth of individual sectors will drive growth of Technical Textiles as shown in the following exhibit

Exhibit 430: Focus sectors for make in India

Sl. No	Focus sectors under “Make in India”	Impact on segment	TT
1	Automobiles	Mobiltech	and composites
2	Automotive components	Mobiltech	and composites
3	Aviation	Composites	and Mobiltech
4	Biotechnology	Protech	
5	Chemicals	Indutech	and Protech
6	Construction	Buildtech	and Geotech
7	Defence Manufacturing	Protech, composites	and specialty fibres
8	Electrical machinery	Indutech	
9	Electronic systems	Indutech	
10	Food Processing	Nonwovens	
11	IT and Business Process Management	Homotech	
12	Oil and gas	Protech	and Indutech

Sl. No	Focus sectors under "Make in India"	Impact on TT segment
13	Leather	Sportech and Protech
14	Media and entertainment	Homotech and Buildtech
15	Mining	Protech and Indutech
16	Pharmaceuticals	Meditech and Packtech
17	Ports and shipping	Geotech, Indutech and composites
18	Railways	Composites, Mobiltech and Protech
19	Renewable energy	Composites and Indutech
20	Roads and highways	Geotech
21	Space	Composites and Protech
22	Textile and garments	Clothtech and Homotech
23	Thermal power	Speciality fibres, Indutech and Composites
24	Tourism and Hospitality	Homotech and Buildtech
25	Wellness	Homotech

Source: Makeinindia.com and iMaCS analysis

State-wise Technical Textile Policy

Textile industry is wide spread sector of the Indian economy having a major role to play in the economy and employment generation for many states. The key states where textiles and related activities play a significant role in the economy are Gujarat, Maharashtra, Rajasthan, Tamil Nadu, Karnataka, Andhra Pradesh and the North Eastern States in particular Assam. State specific textile policies for the key states with emphasis on the Technical Textiles have been discussed in the subsequent sections.

Gujarat

Textiles play a crucial role in the economy of Gujarat, with organisations involved in activities across the textile value chain. Gujarat also has a major chunk of Indian Technical Textile industry.

Textile Policy

Key highlights of the textile policy of Gujarat published in 2012 and valid till 2017 are:

Scheme1: Financial Assistance via Credit Linked Subsidy

- Scheme for Financial Assistance by way of credit linked interest subsidy in Ginning & Pressing, Cotton Spinning, Weaving, Dyeing & Processing, Knitting, Garment/Made-ups, Machine Carpeting, Machine Embroidery and any other activities/ process like crimping, texturing, twisting, winding, sizing etc. within the Textile value chain. The maximum interest subsidy would be limited to 5% with an exception of up to 7% for Spinning and made-up garmenting unit. This scheme would be in addition to any other scheme as per Government of India
- A Special power tariff concession of one rupee per unit would be provided in the overall power bill for a period of five years to the spinning units as a promotional incentive for starting a cotton spinning unit.
- Units setting up a captive power plant would be given assured supply of lignite for a period of five years via an agreement with GMDC.
- Refund of VAT up to 100% is refundable for products within value chain of cotton to garments and made ups. The scheme is applicable on purchase of Raw material as well as on purchase for fixed assets in a year. The scheme is applicable for a period of 8 years.

Scheme2: Assistance in Technical Textiles

- Maximum interest subsidy of up to 6% will be available for establishment of new enterprise, expansion and modernisation of a Technical Textile unit. The subsidy would be applicable only on new and modern plant and machinery purchase and for a maximum period of five years.
- Second Machinery having a residual life of minimum 10 years and cost of less than 50% of new machinery would be considered for interest subsidy to a maximum extent of 60% of the cost of the plant and machinery.

Scheme3: Assistance for Energy Conservation, Water Conservation and Environmental Compliance To Existing Units

- Assistance to a maximum of Rs. 50,000/- or 50% of the cost would be given to firms having an existence for more than three years for conducting water audit, energy audit and environmental compliances.

Scheme 4: Assistance for Technology Acquisition and Up-gradation

- Assistance to an extent of 50% of the cost or Rs. 25 lakh would be provided to enterprises acquiring a new technology for specialised application. The beneficiary can avail the scheme only once and it

would be applicable only for acquiring the technology for the first time in India.

Scheme5: Assistance for Apparel Training Institutes

- Autonomous institutes having a background of textile or apparel industry or skill development would be provided a one-time assistance of up to 85% of the cost to a maximum extent of Rs. 3 crore including a maximum of 25% for machinery and equipment, for setting up new training institutes. The cost of land and recurring expense would be borne by the promoter.
- Assistance to a maximum of Rs. 20 lakh and up to 50% of the up-gradation cost would be provided to different ITIs and training centres who would come up for up-gradation of training centre to make them viable apparel training centres.
- Assistance to training institutes up to Rs. 7000/- per trainer for training of trainers would be provided up to a maximum of 100% if the trainer is attending a GoI or a PSU promoted institute and 50% if the trainer is attending a Private sector promoted institute.
- Assistance to trainees in form of re-imburement of tuition fees up to Rs. 7,000/- or 50% of the fees would be provided for attending trainings of at-least 120 hour course.

Scheme 6: Training Support For Power-Loom Sector

- Stipend up to Rs. 2500/- per trainee per trainee for a period of maximum three months, would be given to the trainee under-taking power loom weaving training under ATIRA, MANTRA or at Skill Development Centres promoted by State or Central government.
- Allowances at Rs. 200 per day for a maximum of two days would be provided to weavers to help him upgrade skills for working on auto loom, high speed and shuttle less looms, where in the weaver would not be charged any fees for the same by institutions.
- Allowances at Rs. 300 per day for a maximum of six days would be provided to jobbers to help him upgrade skills for working on auto loom, high speed and shuttle less looms, where in the weaver would not be charged any fees for the same by institutions.

Scheme 7: Support for Establishing Textile and Apparel Park

- State government would provide assistance to a maximum of Rs. 10 crore or 50% of the cost for setting up common infrastructure of a textile park. The financial assistance can go up to Rs.30 crore for setting up a spinning park. The park must have

provision for at least 20 manufacturing units or in case of spinning park area of a minimum 150 acres with space for setting 10 spinning units.

State Textile Policy Highlights For Technical Textile

Gujarat State government has a specific financial assistance scheme for promotion of Technical Textile industry in Gujarat. The scheme provides credit linked interest subsidy at 6% over and above any incentive available from Government of India. The eligibility and assistance criteria for the scheme are discussed as follows:

Eligibility

All industries of Technical Textiles spread across the 12 segments are eligible for the scheme. Both new and existing enterprises can avail this scheme for expansion and up-gradation in the Technical Textile sector. The scheme is also be valid for purchase of machinery specified under the TUF scheme. However, the beneficiary cannot avail benefit from any other State sponsored schemes for the same purpose while availing this scheme.

Quantum of Assistance

A Maximum interest subsidy of 6% would be provided by Govt. of Gujarat in addition to any other incentive by Central government. The subsidy would be provided for a maximum of five years and would be applicable only on the interest levied by financial institutions to those organisations which pays regular instalment. Defaulters would not be provided the subsidy during the default period.

The assistance would be provided only for investment in new and modern plant machinery as specified under TUF scheme of GoI, while establishing new enterprise or modernisation, expansion and diversification of existing enterprises.

The benefit can also be availed while acquiring second hand machinery on up to 60% of the purchase value of the second hand machinery. However, the second hand machinery must have a 10 years vintage and 10 years of residual life at time of acquisition with the total cost of acquisition less than 50% of the cost of new machinery.

Maharashtra

While Maharashtra has many large textile units and allied industries, the textile policy of Maharashtra is specifically aimed at development of certain under developed areas of Maharashtra.

Textile Policy

The salient aspects of the new textile policy of Maharashtra State for 2011-17 have been enumerated as follows:

- New co-operative spinning mills in Vidharba, Matharwada and North Maharashtra region would be given equity support up to 5% as per the existing financial pattern of 5:45:50.
- Subsidy of up to 10% of the total cost of project for shuttle-less power-loom, warping, sizing, Yarn dyeing, dyeing, processing and garmenting unit would be provided to co-operative societies undertaking the project in order of the merit of the project and according to the availability of funds.
- Subsidy of up to 5% of the cost of project for setting up co-operative power loom units by ST/ SC and other minority communities would be provided by the government of Maharashtra.
- A 10% capital subsidy would be provided for modernisation of power loom units of SC/ ST and minority communities.
- A 10% capital subsidy would be provided to enterprises starting new textile projects in Vidharba, Matharwada and North Maharashtra regions.
- Interest subsidy on long term loans linked with TUF scheme of GoI would be provided for starting a new textile project or modernisation, expansion and rehabilitation of an existing project.

State Textile Policy Highlights for Technical Textile

Maharashtra State does not have any specific policy for Technical Textiles industry.

Karnataka

Karnataka has come up with an encouraging textile policy for the year 2013-18 with an aim to increase investments in textile sector. The state aims to invest a total of Rs. 10,000 crore with focus on all segments of the textile industry in the coming five years.

Textile Policy

New textile policy for Karnataka released in 2013 and valid till 2018 focuses on the following areas:

- Strengthening of textile value chain
- Technical Textiles
- Geographical dispersion of textile and garmenting units
- Human resource development
- Infrastructure development
- Technology up-gradation of entire value chain
- Capacity building
- Institutional development
- Standards and compliances

Interventions in the above mentioned areas would be provided through the following measures:

Credit Linked Capital Subsidy

Credit linked capital subsidy would be provided to incentivise entrepreneurs and existing business men to go for capacity addition and new projects in different districts of Karnataka. Half of the share of this subsidy would be provided as subsidy once the developmental milestone is reached and the other half would be provided as interest subsidy for a period of five years. The different schemes under capital subsidy are:

- **Credit linked capital subsidy:** A capital subsidy of up to 20% of the cost of new plant and machinery would be provided to the enterprises starting a new project or modernising or expanding an existing project. While 20% subsidy is being offered for projects coming up in areas having little development, 15% is being offered in districts having a sustainable development but a small textile industry. The upper cap for the subsidy is based on the value of total investment of the project and has been mentioned in the following exhibit:

Exhibit 431: Subsidy details

Project investment	Maximum value of subsidy
Up to Rs. 10 Crore	20% of new fixed assets
Rs. 10 Crore to Rs. 25 Crore	20% of new fixed asset or Rs. 3 Crore
Rs. 26 Crore to Rs. 50 Crore	20% of new fixed asset or Rs. 4 Crore
Rs. 50 Crore to Rs. 99 Crore	20% of new fixed asset or Rs. 6 Crore

- **Special capital subsidy for Technical Textiles and integrated units:** In addition to the capital subsidy, Technical Textile projects are eligible for an additional 10% subsidy on value of plant and machinery to a maximum of Rs. 25 lakh. Integrated units are also eligible to an additional subsidy of 20% of Rs. 30 lakh if they are being developed in remote under-developed districts and a subsidy of 10% or Rs. 25 lakh if they are coming up in a developed district.
- **Capital subsidy for locating in designated textile park:** A capital subsidy of 5% or Rs. 10 lakh would be provided to units which are locating in the designated State government or Central government textile parks.
- **Capital subsidy for Eco friendly units:** Textile units would be given a 20% capital subsidy in plant and machinery for purchase of cleaner and environmental friendly technologies. The subsidy would be limited to a maximum of Rs. 20 lakh

Credit Linked Interest Subsidy

- Half of the amount of capital subsidy to be given as per the previous section would be distributed as interest subsidy to the entrepreneur or businessman over a period of five years. This would be from the capital subsidy planned and not exclusive to it.

Entry Tax and Stamp Duty Re-imbusement

- Full re-imbusement would be provided on the entry tax paid for plant and machinery and capital goods inclusive of the ones used for captive power generation, common effluent treatment and waste disposal units. Stamp duty re-imbusement up to 50% for developed districts and full re-imbusement for remote under-developed districts would be provided for land either allotted or purchased or leased.

Common Infrastructure for Textile Parks

- Common infrastructure such as CETP, STP, Waste disposal facility, Power supply infrastructure, Drainage system, captive power plant, telecommunication system, testing laboratory, design centre, factory building, roads or any basic infrastructure being set –up at a green field textile park would be eligible for a subsidy of up to 40% of the cost of project up to a maximum of Rs. 20 crore.
- New common Infrastructure buildings coming up in brown field projects would be eligible for a 40% subsidy with a maximum cap of Rs. 12 crore.
- If a new Greenfield project is coming up in a backward area and occupies at-least 51 acre of land, a subsidy of 40% or Rs. 25 crore would be provided for common infrastructure development.
- Capital subsidy of up to 50% of project cost with a maximum limit of Rs. 5 crore would be provided for starting a Central Common Effluent treatment Plant (CETP) or hazardous waste disposal unit in the state.
- Power subsidy of up to Re. 1 per unit would be provided for all value chain activities of textile value chain as well as units of Technical Textile and new Greenfield projects.

Subsidy for Mega Projects

- In case of mega projects of more than Rs. 100 crore which provide direct employment to at least 150 employees, a capital subsidy of 10% of the fixed assets with a maximum limit of Rs. 10 crore would be given to the promoter. The project would also be eligible for tax benefits of up to 10% on state taxes, 100% re-imbusement of Stamp duty and entry tax and up to 50% re-imbusement for expenses incurred towards employee ESI and EPF. The above mentioned

power subsidy of Re.1 per unit would also be valid for mega projects.

Capacity Building

- Capital subsidy for development of market development and branding centre up to 50% or Rs. 50 lakh would be provided
- Capital subsidy for design development centre up to 50% or Rs. 25 lakh would be given
- Capital subsidy in form of re-imbusement of 50% of project cost or Rs. 5 lakh would be given for projects for developing of standards and compliances.

State Textile Policy Highlights For Technical Textile

Karnataka’s textile policy puts a special thrust towards growth of Technical Textile industry in Karnataka. Technical Textile units are eligible for an additional 10% capital subsidy over and above the general capital subsidy for a textile unit. This takes the maximum capital subsidy for a Technical Textile unit to up to 30% of the project cost. While the general 20% subsidy is applicable on investment in new fixed assets, the subsidy for Technical Textiles is applicable only on new plant and machinery for Technical Textiles.

In addition to this, the State plans to start a Centre of Excellence (COE) with Government of Karnataka as lead partner and with due support from existing COEs. The COE would be funded by State government and would undertake activities like R&D, HRD, Testing and evaluation, Incubation centre, etc.

The State plan for investment into Technical Textiles in the coming five years has been shown in the following exhibit:

Exhibit 432: Investment plan of Karnataka Govt. for textiles

Sector	Investment planned (in Rs. Crore)					Total for 5 yrs
	2013-14	2014-15	2015-16	2016-17	2017-18	
All textiles	1,002	1,552	2,462	2,497	2,487	10,000
Technical Textiles	200	250	400	425	425	1,700
Share of Technical Textile	20%	16%	16%	17%	17%	17%

Rajasthan

Rajasthan launched a special customised package for development of textile sector in the state in 2013, which would remain in effect till 2020.

Special Customised Package for Textile Sector

The salient aspects of the customised package for textile sector have been enumerated as follows:

Eligibility

The package would be applicable for the following industries:

- Any new textile or Technical Textile enterprise where the promoter is making a minimum investment of Rs. 25 lakh and providing employment to at least ten workers.
- Any existing textile enterprise including Technical Textiles unit going for Up-gradation, modernisation, expansion or diversification where in it would be investing at least Rs. 25 lakh with a minimum employment generation for 10 workers.
- Revival of a sick textile or Technical Textile unit through a minimum investment of Rs. 25 lakh and employment generation for 10 workers

Quantum of Benefits

The key benefits and schemes under the package are:

Interest Subsidy:

- Interest subsidy of 5% per annum for would be provided to textile units going for investment of up to Rs. 25 crore. An additional subsidy of 1% would be given to enterprises going for a fixed capital investment of more than Rs. 25 crore.
- Interest subsidy for a Technical Textile unit would be higher at 7% per annum.
- Interest subsidy would be given for a period of maximum five years, only for the loan taken from an institution recognised by RBI.

Re-imburement for VAT

- Incentive in form of re-imburement of up to 60% of VAT would be given on purchase of yarn by the textile or Technical Textile unit for a period of maximum five years.

State Textile Policy Highlights for Technical Textile

Rajasthan government is providing an addition 2% interest subsidy for Technical Textile units when compared to a textile unit, taking the total subsidy for Technical Textile unit to 7% per annum.

Andhra Pradesh

Andhra Pradesh launched a special textile and apparel promotion policy in 2005 applicable for a period of five

years till 2010. In 2010, the government in its Industrial and investment policy announced the extension of the textile policy for a period of another five years till 2015.

Textile and Apparel Promotion Policy

The textile and apparel promotion policy focuses on development of three crucial sectors in Andhra Pradesh through a cluster approach. These are the Handloom sector, the power loom sector and textile and apparel sector. The salient aspects of the policy for textile and apparel sector have been enumerated as follows:

Infrastructure Development

- The state government would create export and apparel parks using cluster approach to promote textile and apparel industry in the State.
- It would develop Integrated Textile Parks under SITP scheme of Central government through SPVs, land for which would be provided by the State government to the SPV.
- State government would provide a special incentive for mega textile projects requiring investment of more than Rs. 100 crore and providing employment to more than 2,500 workers.

Promotion of Spinning Industry

- Encouragement would be given to new spinning units of more than 12,000 spindles for promotion of spinning units in the state.
- A grant of up to Rs. 1000 per worker would be given by the State government to the Spinning unit for geographical diversification and starting of new spinning ventures across the state.

Promotion of Garmenting Industry

- Garmenting units would be given an incentive of up to Rs. 5000 per worker employed for meeting requirements of training of employee.
- Garmenting units would be given an additional power tariff concession of Rs.0.25 per unit, in addition to the existing concession of Rs. 0.75 per unit being given under Industrial policy of the State.
- Garmenting and export units would be provided 100% re-imburement of stamp duty as well as exemption from zoning regulations and urban land ceiling exemption

The state does not have any specific policy for the technical textile industry.

The summary of different schemes available in the above mentioned states is as shown:

Exhibit 433: State specific policy incentive for key states offering benefits specific to Technical Textiles

State	Capital subsidy	Interest subsidy	Common infrastructure development	Re-imbursement of costs
Gujarat	Capital subsidy up to 25% or Rs. 25 lakh for new technology	6% over what is offered by Central Govt.		100% of VAT for cotton value chain
Karnataka	Capital subsidy up to 20% of cost	50% of capital subsidy to be distributed as interest subsidy	Subsidy of up to 50% for CETP and up to 40% for Greenfield projects	Stamp duty re-imburement of up to 50%
Maharashtra	10% capital subsidy for plants in Vidharbha and Marathwada areas	5% credit linked subsidy for power loom sector		
Rajasthan		Interest subsidy of up to 7%		Re-imburement of VAT on capital purchases
Andhra Pradesh	Special assistance for SITP and spinning units having more than 12000 spindles			

State policies and iMaCS analysis

In addition to these states that have specific Technical Textile and textile policies, many other states offer support to industries, which are also applicable for Technical Textile set up. The key states providing policy support to industries have been discussed subsequently:

Madhya Pradesh

The state is rich in natural resources – fuels, minerals, agriculture, forests. Given its central location in Northern India, Madhya Pradesh has geographical advantage. Many FMCG companies have moved their warehouses here to save on logistics expenses. Companies have access to key consumer markets and major cities such as Delhi (740 km), Mumbai (780 km), Kolkata (1,350 km) and Chennai (1,435 km). Because of this advantage, numerous consumer goods companies have also set up manufacturing bases in the state. Further, Madhya Pradesh is a power surplus state.

Industrial Policy and Regulatory Framework

Madhya Pradesh State Industrial Development Corporation Limited (MPSIDC) is the nodal agency for industrial growth in the state. It is the central point to coordinate, activate and ensure implementation of mega infrastructure projects. MPSIDC has identified 19 industrial growth centres in order to attract medium and large industries as well as non-resident Indians (NRI) to the state and provide various facilities and concessions to them. For a structured growth, the

Government has divided the state into six clusters, viz., Indore, Bhopal, Jabalpur, Gwalior, Rewa and Sagar.

In order to attract investors and promote entrepreneurs, the state government has appointed TRIFAC, an agency to facilitate a single-window mechanism, for speedy approvals of various clearances and permissions.

Industrial Investment Promotion Scheme

Eligible Industrial units having fixed capital investment of greater than INR 1 Crore or more would be given industrial investment promotion assistance on the basis of category of the district after adjusting the input tax rebate on the amount of commercial tax and central sales tax deposited by them (excluding the amount of value added tax on purchase of raw materials) on the basis of minimum eligible capital investment and the extent shown below. **Large and Medium industries** (LMIs) will be given Industrial Investment Promotion Assistance after adjusting the input tax rebate on the amount of the VAT and CST (excluding thr amount of VAT on purchase of RM) deposited to them to the extent shown below

Exhibit 434: Madhya Pradesh - Policy benefits

Category of District	Minimum eligible capital investment in Rs. Crore	Percentage of investment promotion assistance	Period of assistance (No. of years)
Advanced district	Less than 25	50	3

Category of District	Minimum eligible capital investment in Rs. Crore	Percentage of investment promotion assistance	Period of assistance (No. of years)
	Above 25	75	3
Backward 'A'	Less than 20	50	5
	Above 20	75	5
Backward 'B'	Less than 15	50	5
	Above 15	75	7
Backward 'C'	Less than 10	50	5
	Above 10	75	10

The reimbursement of Industrial Investment Promotion Assistance will be made directly to the industrial unit on a quarterly basis.

The Madhya Pradesh Government has identified textile as one of its thrust sectors and this reflects in its special package for textile sector in its Industrial policy.

- New textile units will be given an investment subsidy @ 10% of eligible capital investment subject to a maximum limit of INR 1 Crore.
- New units with a fixed capital investment of more than INR 100 Crore will be given entry tax exemption for a period of 7 years.
- An interest subsidy @2% for a period of 5 years will be provided on long-term loan linked to the centrally sponsored Textile Up-gradation Fund Scheme (TUFS) subject to maximum limit of INR 5 Crore.
- 25% subsidy will be given for establishment of Apparel Training Institute subject to a maximum limit of INR 25 Lakh.

Chhattisgarh

Since its formation in 2000, Chhattisgarh has strived to develop into a mineral and energy based industrial hub. Chhattisgarh is among the richest Indian states in terms of mineral wealth, with 28 varieties of major minerals, including diamonds. It is a leading mineral producing state.

The state has several industrial development projects either completed or under planning and implementation. They include eight industrial areas, four large industrial areas, nine integrated infrastructure development centres (IIDC), and seven industrial parks. The seven parks include food processing, herbal and medicine, gems and jewellery, metal, apparel, engineering and aluminium. The state

has a notified special economic zone (SEZ) in the Rajnandgaon district. A total of 121 memorandums of understanding (MoU) with proposed investment of US\$ 35.3 billion were signed over the period, 2001-2012.

The industrial policy seeks to accelerate the pace of industrialisation in the state. It envisages the creation of an enabling environment and infrastructure for encouraging exports from the state and to promote private sector participation for the development of basic and industrial infrastructure.

Manufacturing Vision & Policy of the State Government

Chhattisgarh is planning to come up with a new Industrial Policy in November 2014. The policy is expected to address the areas of concern at the policy implementation level. At present the land available for new projects is limited due to concerns regarding environmental clearances and other issues. Some progress has made by the government with the land owners and central government in this area and very soon they expect to obtain more land for industrial growth.

Taxation: The state government has abolished check-posts and fully computerised the system with rationalisation of taxes. It was proposed by the industry to remove Industry entry tax and to simplify the process of filling taxes. They wished to have an online web based system for the same.

Technology promotion: The state has set up an e-portal for submission, calculation and refund of sales tax in the state. The government is in the process of setting up such portals for other departments also. The state has also launched an online payment portal for payment of dues.

Energy and infrastructure availability: The state has a surplus of power and this is a major advantage to set up the manufacturing units in the state. However, roads network is inadequate and also the quality of roads is not good. The state shall now enable to provide permissions to build two-lane roads in forest areas. Earlier such permissions were required to come from Bhopal. Also, the government is considering construction of concrete roads in the cities.

The state plans to connect their highways to the eastern industrial corridor to promote investment and industrialisation. The state is setting up Road Development Corporation to address to the concerns of road infrastructure in the state.

Sector-Specific Investment Strategy: The state is setting up industrial parks for IT, Biotechnology, Electronics etc across the state. They also wish to promote automobile industry; textile industry, chemical, plastics, pharmaceuticals, metal based industries, Agricultural, food and forest produce

processing industries. The state has 17 priority based (product based) industries identified. The state is planning for specific industry focussed strategies for the same.

There is a provision of 30% of the fixed capital investment to the industries established by the entrepreneurs of general category maximum limit is Rs.90 lakh. With further provisions for priority industries and products such as HDPE Bags and pipes, the State is open to welcoming investments.

Arunachal Pradesh

Arunachal Pradesh, the largest in area amongst the North-eastern States of India, is endowed with plenty of natural resources, which needs to be converted into goods and services for the development of the State and its people. At present, the industrial growth in the State is dismal and at a nascent stage despite enormous potential for industrial growth.

Further, the Government of India has given tremendous thrust on the “Look East Policy” which itself calls for greater infrastructure for industries and trade. The North Eastern Industrial Investment & Promotion Policy-2007 (NEIIPP-2007) has been formulated by the Ministry of Commerce and industry, Government of India for industrialization and proper development of North-Eastern Region.

Arunachal Pradesh with its huge hydropower potential of over 57,000 MW, which is being developed in a phased manner, will soon have surplus power to feed power intensive industrial units. Textiles (handloom and power looms), Handicrafts and Sericulture has been identified by the State Government as a thrust areas, which will be eligible for various incentives. State Government shall provide 99% Sales Tax (VAT)/Entry Tax exemption to eligible industrial units on import of actual raw materials, machineries and equipments into Arunachal Pradesh as also on sale of finished goods in the State of Arunachal Pradesh for a period of 7 years from the date of commencement of commercial production.

Assam

Assam is the second largest State of North East India by its geographical area having highest population in the region. The growth rate of GSDP in the State during the 9th plan period was 1.51% which increased to 5.33% during the 10th Plan period. The State Government was able to achieve an annual average growth rate of 8.42 % during the 11th Plan period. The projected growth rate for 12th plan period is 9.38%

Industrialization in Assam dates back to the days of first commercial plantation of Tea and which occupies

an important position in the state’s economy. Apart from that, Assam, with its Four Refineries and Allied units, produces a major part of the Petroleum and Petroleum based products in India. The Government of Assam is emphasizing on adoption of Eco-friendly investment strategy for sustainable development of the state.

Assam has a vibrant industrial base. From the oldest tea industry and huge onshore oil production to the only Stock Exchange in the region and large presence of Banks and Financial Institutions, its industrial base spreads across a wide spectrum of existing industries in Petroleum, Petrochemicals, Fertilizers, Textiles, Cement, Paper, Plastic and a host of products and services.

The State is trying to invite investments with a slew of tax exemptions. For example: the State provides VAT exemption duties as mentioned below:

Exhibit 435: Industrial policy - Assam

Category	Micro	Small	Medium & Large
New	Maximum of 200% of Fixed Capital Investment	Maximum of 150% of Fixed Capital Investment	Maximum of 100% of Fixed Capital Investment
New & Existing unit undergoing Expansion/ Modernisation/ Diversification	Maximum of 150% of Additional Fixed Capital Investment	Maximum of 100% of Additional Fixed Capital Investment Maximum of 90% of Additional	Maximum of 90% of Additional Fixed Capital Investment

Bihar

The Bihar Government announced its industrial policy, a significantly updated version to face the challenge of attracting investors from outside as well as inspiring its own entrepreneurial talent. The new industrial policy is said to be based on a close analysis of the policies of some other states like Gujarat, Orissa, Chhattisgarh, Himachal Pradesh and Uttarakhand with a view to attract investment in all categories, especially small and medium industries.

Highlights of the New Industrial Policy 2011-16:

- The policy identified nine “thrust areas” — food processing, agro-based industries, tourism, super specialty hospitals, IT, technical and high education, electronics, hardware and non-conventional sources of energy.

- Land acquisition – the government assures it would try its best to make land available to the entrepreneurs.
- Though not part of the policy statement, the state has made available Rs 1,500 crore to the authorities concerned for strengthening the land bank.
- The new policy provides for a subsidy grant of 50 per cent for setting up captive power plants. The amount of grant/subsidy would go up to 60 per cent if any unit decides to set up non-conventional sources of energy for captive use.
- Entrepreneurs would not have to pay any stamp duty for land registration when setting up a new industrial unit or carrying out expansion to existing units.
- The policy will provide a capital subsidy of about Rs 5 crore to those making less than Rs 500 crore of investments whereas Rs 30 crore would be given as capital subsidy to industrial units that invest Rs 500 crore or above.
- According to the scheme if any industrial unit follows government reservation policy, it would get 10 per cent additional funds. But this is not binding on them.
- The government would provide special incentive to entrepreneurs from Scheduled Castes or Scheduled Tribes. Women and the disabled would also get similar benefits. For these categories, 100 per cent VAT would be reimbursed if their turnover crosses Rs 30 lakh per annum.
- To promote quality products and expansion, the policy would allow incentives for the preparation of detailed project reports (DPR), ISO certification and carbon credits.
- The government would also try to promote quality and reimburse 75 per cent of the fees involved in getting quality certifications.
- The new policy would exempt new units from luxury tax and reimburse 80 per cent of the value-added tax (VAT) deposited by a fresh unit for a period of 10 years with a cap of 300 per cent of the capital invested in setting up the unit.
- According to the policy, if a unit appoints 100 persons in a given fiscal on the basis of the government's reservation policy, the entire employee pension fund (EPF) contribution borne by the company for that year would be fully reimbursed

Goa

Goa is one of the smallest states of the country. The state is endowed with iron ore resources and this has been a key industry. It is also an established base for the pharmaceuticals industry and is emerging as a destination for knowledge based industries such as biotechnology and Information technology.

Traditionally tourism has been a prime mover of the economy and the State is recognised as an important global tourist destination. Fisheries are another sector which contributes significantly to economic output as well as to exports.

The government of Goa is presently working on the drafting of a new industrial policy in order to boost investor confidence and to attract new industries to Goa. The objectives of the new industry policy will be to encourage the setting up of industries, which are non-polluting and employment oriented with the new thrust areas identified as electronics and pharmaceuticals.

The industry has suggested that implementation of GST will help business, since Goa depends on raw materials/intermediary products and distribution of final products on other states. In terms of incentives, new units setting up in Goa in the thrust areas will be offered a 'Special Incentive' of 70%/50% (backward talukas/other talukas respectively) on their total investment in the form of VAT rebate, employment rebate and stamp duty rebate. Pointers for the same are outlined below:

- VAT/CST – upper limit of 25% of VAT/CST payable during the year.
- Employee wages – upper limit of Rs. 25 lakh per unit per year or 15% of total wages per year, whichever is lower for Goan direct employees with monthly emoluments of a minimum of Rs 15,000
- Stamp duty on land acquisition – upper limit of 50% of stamp duty payable in backward talukas 25% of stamp duty payable in other talukas to be set-off against VAT/CST paid in the first year of operation

Haryana

Haryana is among the highly economically developed and industrialised States of India. The State has its manufacturing stronghold particularly in sectors like automobile & auto components, light engineering goods, IT & ITES, textile & apparels and electrical & electronic goods. The new industrial policy, taking into account the current economic scenario and prospective developments, lays particular emphasis on further strengthening the base of the manufacturing sector besides knowledge based & high tech industries, efficient use of energy, conservation of resources and pragmatic environmental policies for sustainable development.

The State has identified "Handloom, Hosiery, Textile and Garments Manufacturing" as one of the key sectors in manufacturing and a cluster approach for the development of same shall be encouraged.

- Panipat has already established its place on the international map as a centre for the handloom

products. Gurgaon - Manesar belt has also emerged as the centre for manufacture and export of ready-made garments. A number of units are engaged in the manufacturing of leather garments and other accessories. The HSIIDC has already developed a Textile Park at Barhi.

- An International Trade and Convention centre would be set up at Panipat to promote handloom products. These Trade Centres would have global market information data and design centre for handloom and garments industry.
- FAR up to 250% is permissible for apparel units in the new industrial estates and expansion phases of the existing industrial estates.

The HSIIDC, being the nodal agency of the State Government for development of Industrial Infrastructure, is responsible for laying down its Estate Management. While HSIIDC would continue to act as the state's nodal agency to develop industrial infrastructure in the public sector, the Government has decided to partner with the Private Sector in some of these initiatives.

On the taxation front, Value Added Tax regime is envisaged to be replaced by Goods & Service Tax (GST) regime in the State. This will give more relief to the industry, trade, agriculture and consumer through a more comprehensive and wider coverage of input tax set-off and service tax set-off, subsuming of several taxes in GST and phasing out of CST.

Himachal Pradesh

The State benefits from the "SPECIAL PACKAGE OF INDUSTRIAL INCENTIVES FOR THE STATES OF HIMACHAL PRADESH AND UTTARAKHAND." The extension of this scheme of Central Grant or Subsidy under Special Package – II for Industrial units in the states of Himachal Pradesh and Uttarakhand was affected with a view to accelerating the industrial development in these States.

All new industrial units and existing industrial units on their substantial expansion would be eligible for Capital Investment Subsidy @ 15% of investment of Plant & Machinery, subject to a ceiling of Rs. 30 lakh. Micro, Small and Medium enterprises would be eligible for Capital Investment Subsidy @ 15% of the investment in plant & machinery subject to a ceiling of Rs. 50 lakh. The subsidy will be available for the duration of the scheme to such units which have pre-registered and commence commercial production / operation prior to 31-03-2017. Other eligibility parameters and details have been outlined in the Scheme document.

In this scheme, the Government identifies Woven fabrics (Excisable garments) and Sports goods and articles and equipment (for general physical exercise and equipment for adventure, sports activities) and

Paper and paper products excluding those in negative list as thrust industries.

Jammu and Kashmir

Keeping in view the fact that the state of Jammu & Kashmir lags behind in industrial development, a need has been felt for structured interventionist strategies to accelerate industrial development of the state and boost investor confidence. The new initiatives would provide the required incentives as well as an enabling environment for industrial development, improve availability of capital and increase market access to provide a fillip to the private investment in the state.

To achieve this J&K State Government has decided on the following **Fiscal incentives to new industrial units and substantial expansion of existing units:**

- New Industrial units and existing industrial units on their substantial expansion as defined, set up in growth centre, industrial infrastructure development centres (IIDCs) and other location like industrial estates, parks, export processing zones, commercial estates, etc. as notified by the Central Government are entitled to 100% (hundred percent) excise duty exemption for a period of 10 years from the date of commencement commercial production.
 - ii) All new industries in the notified location would be eligible for capital investment subsidy @ 15% of their investment in plant and machinery, subject to a ceiling of Rs. 30 lakh. The existing units will be entitled to this subsidy on substantial expansion, as defined.
 - iii) An interest subsidy of 3% on the working capital loan would be provided to all new industrial units in notified locations for a period of 10 years after commencement of commercial production. This benefit would also be extended to existing units in notified locations on expansion, as defined, as well as to defined thrust Industries.
 - iv) The insurance premium to the extent of hundred percent on capital investment for a period of 10 years would be extended by the Central Government to all new units and to existing units on substantial expansion, as defined.
 - v) The present income tax exemption would continue as per the existing dispensation applicable to Jammu & Kashmir. The State Government may consider extending Sales Tax exemption to the units which avail of concessions under this policy.

Jharkhand

Jharkhand Industrial Policy – 2001 was formulated and implemented after the creation of the State of Jharkhand. The basic objective of the policy was to optimally utilize the available resources in planned and systematic manner for the industrialization of State. It

was aimed at enhancing value addition of the natural and human resources in efficient manner to generate additional employment and resources for the growth and development of the State. And it has accomplished this to a significant extent. However, there is a need to boost the economic activities to sustain the current level of growth and achieve even better pace of development.

Gaining from this, Jharkhand has committed the following policy measures to make the State an attractive investment destination:

Infrastructure

Top priority will be accorded by the State Govt. in development of physical and social infrastructure through Public-Private-Partnership (PPP). Private investment in power, telecom, roads, airports, ICD, logistics etc will be facilitated. The State Govt. would take specific measures for development of sectoral clusters taking into account the need of the targeted industries. The State has already started implementing the concept of BOT, BOOT etc and would evolve comprehensive guidelines for funding and operating infrastructure projects with private investments or PPP.

- To encourage industrial activities of specialized nature at suitable location, sector specific industrial parks have been envisaged in the State. Apparel Fibre and Textile Park are also planned to be set up under Govt, Private, Joint Venture or PPP mode.
- Industrial units under specified category including Jharcraft, or projects under joint venture, PPP mode, State Govt. etc will be facilitated to get access to all the existing schemes of Govt. of India such as
- Technology Up gradation Fund Scheme (TUFS)

(ii) Scheme for Integrated Textile Parks (SITP)

(iii) Scheme for Integrated Skill Development

- The State Government will extend the benefits to textile / apparel units in areas / activities excluding those which have been covered under Govt. of India schemes.
- VAT exemption - Large and Mega Industries shall be eligible for reimbursement of 50% of the NET VAT paid per annum up to a maximum of 75% of total fixed capital investment for different duration depending on the location of the unit as per the policy document.
- **Incentive for Industrial Parks, Private Industrial Area / Estate** - 50% of cost, up to maximum Rs 10 crore, incurred on development of common infrastructure of green field textile, apparel park, IT/ITES park, Bio-technology park, Gems and Jewellery park, Bio-tech and Herbs park, Chemical

and Pharmaceutical parks, Food Park, Automobile Vendor Park etc (as mentioned in policy document) and private industrial area / estate will be borne by the State Government.

Kerala

Kerala has been in the fore front of Social development indicators in India throughout the modern era. Though, post liberalisation phase has seen significant growth in secondary and tertiary sectors like IT, Tourism, entertainment, internet and mobile services, airlines, banking, insurance etc. the growth has not been commensurate with social development indicators.

Higher Economic Growth is necessary not only to generate higher tax revenue but also to sustain the advances made in social sector and in order to allocate more resources by the State to the welfare activities for the poor and needy has yet to be widely acknowledged in the State. The State traditionally has been a wage earning society. The great challenge before the Government is to convert Kerala into an Entrepreneurial Society. Government will promote entrepreneurial culture among the people of the State in a Mission mode.

In order to generate higher economic growth, investments are required for creating High quality infrastructure, skilled human capital, technology up-gradation and Enterprise promotion.

Large industries in the State have significant potential because of good infrastructure facilities available in the State like power, transport system, airports, ports and availability of rare minerals. In order to facilitate Investment in Mega projects, a High level Council will be formed to arrive at consensus among the political parties and civil society leaders. As a step towards industrial development, the State will focus on industrial infrastructure at par with the Global Standards. Also, Government will encourage suitable Industries that are non-polluting, environmental / eco friendly and employment oriented that have the potential to pay wages at par with the living standards of Kerala.

Manipur

The Policy is prepared keeping in mind the National Manufacturing Policy, 2011, the Look East Policy of the Government of India, the North East Industrial and Investment Promotion Policy-2007, Transport Subsidy Scheme, 1971(as amended from time to time), various schemes and Policy of the Government of India and shall remain in force up to 31st March, 2017 or before replacement by new Policy.

The annual average growth rate of the State was highest in 2009-10 with 7.6% and it was 2% which in 2006-07. The rates have been decreased to 6.1% and

6.2% (P) during 2010-11 and 2011-12 respectively. The per capita income however increased from Rs. 20,786 in 2004-05 to Rs. 36,085 (P) in 2011-12. Agriculture is the main occupation of the population.

Manipur has come up with an industrial policy to attract investments. Few of its key provisions have been stated below:

- The State Government shall provide Capital Investment Subsidy to all eligible new manufacturing enterprises, at the rate of 30% (thirty per cent) on the capital investment on plant and machinery.
- The State Government shall provide to all eligible manufacturing enterprises in the fold of Medium and Large an interest subsidy of 4% per annum on term loan taken from Bank and Financial Institution subject to a ceiling Rs.40,000/- (forty thousand)per month. This subsidy shall be available for the first three years from the date of commercial production or from the date of release of loan, provided that the enterprises have no interest liabilities overdue to the sponsoring banks / financial institutions.
- The State Government shall also provide interest subsidy of 3% on working capital for the first three years to all eligible manufacturing enterprises from the date of commercial production or from the date of release of loan, provided that the enterprises have no interest liabilities overdue to the sponsoring banks/ financial institutions.
- Tax Incentives

All new units, which manufacture goods in Manipur, will be entitled to exemption of 99% of tax payable under the Manipur Value Added Tax Act, 2004, Central Sales Tax (CST) and any Commodity Tax subject to the limit mention below:-

Exhibit 436: Tax incentive - Manipur

Category	Terms of Exemption
Micro	Seven years
Small	Seven years
Medium & Large	Seven years subject to 200% of fixed capital investment

In case of existing units, they will be eligible for 99% tax exemption for seven years from the date of commencement of commercial product ion with similar limits for medium and large units as indicated above.

Government will adopt an integrated approach to infrastructural support and development in addition to up-gradation of basic facilities at the Industrial Estate, Takyelpat, completion of Food Park, and setting up of Textile Park / Park at suitable locations, new industrial estates, industrial areas, industrial clusters, identification and development of Growth Poles.

Meghalaya

The New Industrial & Investment Promotion Policy is designed to facilitate investments in new sectors across the State and thus ensure accelerated and sustained growth. The Policy focuses to attract, facilitate and promote wider expectations and high end investment. In conjunction with the North East Industrial and Investment Promotion Policy (NEIIPP), 2007, the Meghalaya Industrial and Investment Promotion Policy (MIIPP) – 2012 makes some key provisions for attracting investments. Some of these provisions are mentioned as follows:

- For MEDIUM, LARGE, MEGA AND ULTRA MEGA manufacturing and service enterprises, State Capital Investment Subsidy on cost of Factory Building, Plant and Machinery will be provided to Large & Medium enterprises at the rate of 30 % (thirty percent) of the fixed capital investment subject to a ceiling of Rs.100.00 lakh
- The State Government shall provide 99 % Sales Tax (MVAT) remission to eligible industrial units on sale of goods/by products within the State for a period of 7 (seven) years from the date of commencement of commercial production. Accordingly, the unit shall pay 1 % of the tax amount payable in accordance with tax return under MVAT to the State Government. Similarly for sale of goods/by products between interstate the unit shall be eligible for remission of 99 % of the CST amount as applicable and shall pay only 1 % of the tax amount under CST to the State Government for sale of finished goods/by products to any registered dealer/customer and submit "C" form wherever applicable. All new & existing units undergoing expansion of 25 % or more shall be eligible for exemption for the further period of 5 years.

In case GST becoming applicable during the tenure of this Policy, the above said concession shall be extended to State GST only.

- **Special incentives for Export Oriented Units :** Export Oriented Units exporting minimum 25% of its installed capacity for at least 3 consecutive years, shall be given additional 15% capital investment subsidy subject to a maximum of Rs.50 lakh.

- **Interest Subsidy :**Subsidy on interest payments to Banks/Financial Institutions will be provided at the rate of 4 % (four percent) with a ceiling of Rs.30000.00 per month on term loans (excluding working capital loans) availed by an entrepreneur for setting up of approved enterprises for a period of 3 (three) years from the date of disbursement of the loan. This subsidy will be in the form of re – imbursement of actual payments made.

• **Special incentives for Mega Large Enterprises:** An approved Project in the Border Area will be granted exemption from paying royalty on those minerals which are use on manufacturing activity for 6 months.

• **Special incentives for Ultra Large Enterprises :** An approved Project in the Border Area will be granted exemption from paying royalty on those minerals which are use on manufacturing activity for 1 year

Mizoram

In view of the National Industrial Policy which laid special emphasis for the development of Industries in the North Eastern Region, the Govt. of Mizoram had notified new Industrial Policy 2000 for accelerated Industrial and Economic development of the State. The main objectives of the New Industrial Policy of Mizoram 2000 are to engineer rapid sustainable growth of Industry in the State. It laid stress on encouraging Industries utilizing locally available raw materials.

In view of the hilly terrain of the State with underdeveloped infrastructure and Entrepreneurship level of the people, there is limited scope for development of large enterprises. MSME with tremendous scope of employment will be encouraged.

Nagaland

In tune with the industrial policy resolutions, the government of Nagaland has formulated a package of incentives for promotion and setting up of industrial units and revitalization of sick industrial units in the State.

The Implementing Agency for the Incentive Scheme-2000 in respect of the Large & Medium and SSI sector shall be the Director of Industries. For eligible units the Government has announced some incentive packages are under:

Highlights of the Central Government's North East Industrial Policy 1997

Capital Investment Subsidy: Capital investment subsidy shall be provided at the rate of 15% on plant and machinery subject to a maximum of ceiling of Rs. 30.00 lakh.

Interest Subsidy: Interest subsidy of 3% on working capital loans for a period of ten years.

Tax Holiday:-

- Excise Tax exemption for 10 years from the date of commercial production.
- Income Tax exemption for 10 years from the date of commercial production.

Incentives available under Incentive Scheme-2000 (State Scheme)

Power subsidy: Subsidy on power tariff will be provided at the rates of 30% and 25% for connected

loads up to **2 MW** and above **2 MV** respectively for a period of 5 years from the date of commercial production subject to a maximum ceiling limit of Rs.2 lakh annually. This will be reimbursement scheme on actual consumption of power for manufacturing process substantiated with requisite details.

Special Incentives for 100% Export Oriented Units (EOU): An additional 5% capital investment subsidy subject to a maximum ceiling of Rs. 3.00 lakh. Sales Tax exemption for an additional period of one year is present.

Orissa

The Industrial Policy Resolution (IPR) of Orissa 2001 and 2007 has put in place a robust policy framework for industrial promotion and investment facilitation in the State, including creation of an enabling environment. The Industrial Policy Resolution 2014 aims at reinforcing and further expanding this process. Orissa is one of the richest mineral states having chromite, nickel, bauxite ore and coal deposits to the extent of 97.9%, 92.5%, 51.0%, and 33.2% respectively of the total deposits of the country. The state has rich water resources as a natural corollary to its geographical position.

The state has been witnessing a rise in the number of SSI/MSME units in recent years. During 2011-12, 5,505 MSME units went into production with an investment of US\$ 92 million and 30,387 persons were provided employment

The state offers a wide range of fiscal and policy incentives for businesses under the Industrial Policy Resolution, 2007. Additionally, the state has sector-specific policies for IT and micro, small and medium enterprises. The state government has also constituted 'Team Orissa' to help with investment promotion As a part of the state government-enacted Orissa Industries (Facilitation) Act, 2004, a single-window clearance system was implemented in the state. This was done with the aim of facilitating the growth of industries and creating an attractive environment for both domestic and international investments.

The Industrial Development Corporation of Orissa (IDCO) has been entrusted with the responsibility of creating infrastructure facilities in industrial estates across the state.

Key features of the Orissa Industrial Policy-2014

- Non-mineral based new industrial units located in the Tribal Revenue Sub-Divisions under Tribal- Sub Plan with minimum investment of five crore rupees in plant & machinery and providing direct employment to minimum hundred persons shall be treated as deemed priority sector unit and be eligible for all incentives prescribed for the priority sector.

- **Power Subsidy:** New industrial unit other than in Priority sector industries shall be exempted from the payment of electricity duty up to a contract demand of 500 KVA for a period of 7 years from the date of availing power supply for commercial production. New industrial unit in the Priority Sector shall be exempted from payment of electricity duty up to a contract demand of 5 MVA for a period of 7 years from the date of availing power supply for commercial production
- **VAT Reimbursement:** New industrial units in Priority Sector shall be eligible for reimbursement of 100% of VAT paid for a period of five (5) years from the date of commencement of production, limited to 200% of cost of plant and machinery provided that the VAT reimbursement shall be applicable only to the net tax paid, after adjustment of input tax credit against the output tax liability.
- **Reimbursement of Entry Tax** shall be available to eligible industrial units as follows:
 - Priority Sector units shall be eligible for 100% reimbursement of Entry Tax on acquisition of plant & machinery for setting up of industrial units.
 - Priority Sector units shall be eligible for 100% reimbursement of Entry Tax on purchase of raw materials for a period of five years from the date of first Fixed Capital Investment subject to a total maximum ceiling of 100% of fixed capital investment.
- 100% reimbursement of CST on sales of finished products by the new industrial units in Priority sector for a period of 10 years.
- **New industrial unit coming under priority sector** shall be entitled to interest subsidy @ 7% per annum on term loan availed from Public Financial Institutions / Banks for a period of five years from the date of commencement of production subject to a total maximum limit of Rs 2 Crore
- **New industrial unit in the Priority Sector** shall be exempted from payment of electricity duty up to a contract demand of 5 MVA for a period of 7 years from the date of availing power supply for commercial production.
- **Export Promotion:** Augmentation of exports commensurate with the export potential of the State shall be a priority activity of the Government. An Export Policy and Action Plan for export promotion shall be notified in consultation with leading exporters of the State and related agencies. An Export Resource Centre shall be established in the Directorate of Export Promotion and Marketing.

Punjab

To encourage industrial development and employment generation in the State, it is imperative that fresh

impetus is given to Industry and Commerce. Hence, the State Government announces this Package of Fiscal Incentives for setting up new industry. Alive to the needs and aspirations of SME sector, the package provides for liberal incentives to this segment too.

VAT and CST Incentives

The State of Punjab has outlined the following VAT and CST incentives for medium and large scale industries. It has a separate structure for MSME as well.

Exhibit 437: Policy incentive - Punjab

Eligible Area*	FCI above Rs.10cr to Rs. 25cr	FCI above Rs.25cr to Rs.100cr	FCI above Rs.100cr to Rs.500cr	FCI above Rs.500cr
Zone I	50% VAT+ 75% CST	60% VAT +75% CST	70%VAT +75%CS T	80%VAT +75%CS T
Maximum cumulative quantum of incentive	50% of FCI	60% of FCI	70% of FCI	80% of FCI
Zone II	25% VAT+ 50% CST	30% VAT+ 50% CST	35% VAT+ 50% CST	40% VAT+ 50% CST
Maximum cumulative quantum of incentive	25% of FCI	30% of FCI	35% of FCI	40% of FCI
Eligibility Period in Years	8	10	11	13

Exhibit 438: Zone classification for Punjab

Zone I:	Fazilka, Ferozepur, Tarn Taran, Amritsar, Gurdaspur, Pathankot, Hoshiarpur, Sangrur, Barnala, Mansa, Moga, Bathinda, Sri Muktsar Sahib and Faridkot. All approved Industrial Parks, Industrial Focal Points and Industrial Estates in all districts of the State.
Zone II:	Patiala, Fatehgarh Sahib, Ludhiana, Jalandhar, Kapurthala, Shaheed Bhagat Singh Nagar (Nawanshahr), Rupnagar and Ajitgarh (Mohali).

The Industrial policy also provides for Incentives for Integrated Textile Units.

Sikkim

Sikkim is again a state of North East that finds coverage under the North East Industrial Investment Policy 2007. This coupled with other state specific policies provide some incentives for incentives as outlined below:

Concession on State and Central Sales Tax: The State Sales tax shall be exempted for a period of 10 (ten) years from the date of commencement of actual Commercial Production. However, for the units set up

in the thrust area, the exemption period will be 12 (Twelve) years. Additional provisions as specified in policy may apply.

VAT Exemption: The Value Added Tax (VAT) payable by an Industrial Unit shall be deferred for a period of 10(ten) years and for a period of 12(twelve) years for the notified thrust industries from the date of commencement of actual commercial production. These Industrial Units will be permitted to collect VAT and roll it back as Working Capital for the entire period of deferment as the case maybe. At the end of the deferment period, the VAT collected will have to be remitted to the Government Account in four half yearly instalments. In case of those units which are already enjoying the sales tax exemption the same will be converted into VAT deferral scheme as above for the remaining periods of their exemption as the case maybe. The state also provides various power subsidies.

Tamil Nadu

The State of Tamil Nadu has always been in the forefront of economic growth in the country. The State has made impressive strides over the years to carve out a niche for itself in the fields of engineering, automobiles, textiles, leather, Information Technology, electronic hardware and hi-technology industries and the Gross State Domestic Product (GSDP) stood at Rs.4,51,313 crore at constant prices in 2012-13¹⁶. The industrial GSDP of Tamil Nadu grew at an impressive rate of 9.60% from the year 2005-06 to 2012-13 at constant prices.¹⁷

The State of Tamil Nadu has unveiled ambitious plans for further industrialization. A few measures towards the same are captured below:

Power Supply

Power supply to Industries: All units with demand of more than 10 MVA will be provided with reliable supply at 110 KV or 230 KV level depending on the eligibility. Uninterrupted power supply will be given to the projects if the same is covered by MoU or Government Order (non-MoU).

Inclusion of Investment made in captive power plants: Captive power plants will be treated as eligible fixed assets for the purpose of the structured package of assistance. "Captive Power Plant" for this purpose means a power plant set up to generate electricity primarily for the units' own use.

VAT refund on Capital Goods for establishing captive power plants: Refund of 50% of the VAT paid on

purchase of capital goods exclusively for captive power generation within the construction period, provided they are manufactured in Tamil Nadu.

Capital Subsidy and Electricity Tax Exemption: Irrespective of the location of the project, new or expansion manufacturing units will be given a back ended capital subsidy and electricity tax exemption on power purchased from the Tamil Nadu Generation and Distribution Corporation Ltd. (TANGEDCO) or generated and consumed from captive sources based on employment and investment in fixed assets /eligible assets as the case may be, made within the investment period as detailed as follows:

Exhibit 439: Policy incentive - Tamil Nadu

Investment in fixed assets/eligible fixed assets (Rs. in crore)	Direct employment (in numbers)	Capital subsidy (in Rs. crore)	Electricity tax exemption (in number of years) from date of commercial production
5 to 50	100	0.3	2 years
50 - 100	200	0.6	3 years
100 - 200	300	1	4 years
200 to 500	400	1.5	5 years
500 – 1500	600	1.75	5 years
1500 -3000	800	2	5 years
3000 and above	1000	2.25	5 years

Apart from the above standard incentives, Mega and Super-mega projects will be eligible for a structured package of incentives as detailed in the industrial policy if they satisfy both the investment and the minimum employment criteria fixed for each category. Investments made below Rs.200 Crore are also eligible for receiving VAT related fiscal incentives as follows:

Exhibit 440: Re-imbursment of VAT - benefits for Tamil Nadu

Investment within 3 years	Soft loan given would be equal to VAT paid
Rs. 50 – 100 Crore	First 3 years from the commencement of commercial production
Rs. 100 – 200 Crore	First 4 years from the commencement of commercial production

¹⁶ Source : Union Planning Commission, Government of India

¹⁷ Source: Central Statistical Organisation (CSO), Government of India

Telangana

The Government of Telangana¹⁸ outlines the plans for improving the business environment and improving the investment climate:

1. The Government of Telangana is committed of creating a conducive environment including a single window clearance system for the industries.
2. There is a convergence of the state government's policies ("Made in Telangana" initiative) and Government of India's policies ("Make in India" initiative)
3. The Government of Telangana is aware of different problems being faced by industrialists and policy decisions are being taken to quickly create an industry friendly regulatory regime.
4. Govt. would examine the possibility of encouraging entrepreneurs from un-privileged backgrounds by taking up initiatives to improve the diversity of the vendor base of the government departments.
5. Eight districts of Telangana are identified by the Government of India as backward districts. It is expected that Government of India would provide adequate financial support to the development of these districts.

The Government also identified the areas where the assistance of the Central Government will be required. Industry players have also shared their views with the Government requesting facilitation in area such as providing marketing support to MSMEs and labour laws' reforms to name a few.

Tripura

The state of Tripura announced its Tripura Industrial Investment Promotion Incentive Scheme, 2012 for industrial enterprises which shall be valid till March 2017. A brief snapshot of the incentives offered to attract investment from industries has been captured below:

- **Capital Investment Subsidy @30%** on fixed capital investment (with additional subsidy @2.5% to ST, SC and Women Enterprises), subject to a ceiling of Rs.50 Lakh per enterprises. The amount of subsidy shall stand reduced to the extent of entitlement of the enterprise for subsidy on the same investment under the NEIIPP-2007 and to the extent of subsidy on the same investment actually received under any other Scheme.
- **Industrial Promotion Subsidy** equal to the net amount (net of input taxes) of the Tripura Value Added Tax (VAT), Central Sales Tax (CST) and any other commodity tax actually paid by an enterprise

to the State Government on sale of finished goods, subject to overall ceiling of Rs.50 lakh per enterprise per annum. The subsidy shall be given to an eligible enterprise for 5 years from the date of commercial production.

- **Partial Reimbursement of Power Charges** to the extent of 15% of the power charges actually paid by the enterprise, subject to a ceiling of Rs.12 lakh per enterprise per year. The incentive shall be given to an eligible enterprise for 5 years from the date of commercial production.
- **Partial Reimbursement of Interest on Term Loans** actually paid to banks/financial institutions to the extent of 3% of the term loans availed by the enterprise, subject to a ceiling of Rs.1.50 lakh per enterprise per annum. The incentive shall be given to an eligible enterprise for 5 years from the date of commercial production.

Uttar Pradesh

The government of Uttar Pradesh has approved and announced the new Infrastructure and Industrial Investment Policy – 2012 with an objective of attaining an Industrial growth rate of 11.2% per annum.

The policy envisions establishing Uttar Pradesh as the most preferred destination for investment by accelerating industrial development, creation of a conducive business environment and development of high-end infrastructure facilities in order to create new employment opportunities.

Significantly, to make policy execution transparent and effective, all supporting Government Orders, Notifications etc have been issued along with policy document. Implementation of the policy will be regularly monitored by a High-Level Committee constituted for this purpose for this purpose.

Exemption in Entry Tax & other taxes

- Entry tax on iron & steel to be used as raw material will be rationalized
- Facility of input tax refund or set-off will be allowed to manufacturers who export outside India through export houses in the course of export under sub-sec(3) of sec 5 of Central Sales Act 1956.
- List of schedule II part C (tax liability of only 4%) will be expanded to include more items of raw material, processing material and packaging material.

Energy sector related incentives

Exemption from Electricity Duty for 10 years to new industrial units and to captive power generating units for own consumption

Investment promotion Scheme

For eligible units, Interest free loan equivalent to VAT and Central Sales Tax paid by industrial units or 10% of the annual turnover whichever is less will be provided

¹⁸ Special Chief Secretary (Industries)

for a period of 10 years repayable after 7 years from the date of disbursement.

Capital Interest Subsidy Scheme

Interest on loan taken for plant and machinery by new industrial units set up in Eastern U.P., Central U.P. and Bundelkhand, will be reimbursed @ 5 percentage points with a ceiling of INR 50 lakh/annum for a maximum period of 5 years.

For new textile units, interest on loan taken for plant and machinery will be reimbursed @ 5 percentage points with a ceiling of INR 100 lakh/annum in Eastern U.P., Central U.P. and Bundelkhand and up to INR 50 lakh per annum in Western U.P. for a minimum period of 5 years.

Infrastructure interest subsidy scheme

Interest on loan taken by industrial units for developing infrastructure facilities of self use, such as-road, sewer, water drainage, power line etc will be reimbursed @ 5percentage points with a ceiling of INR 100 lakh/annum for a maximum period of 5 years.

Uttarakhand

The State benefits from the “Special Package Of Industrial Incentives For The States Of Himachal Pradesh And Uttarakhand.” The extension of this scheme of Central Grant or Subsidy under Special Package – II for Industrial units in the states of Himachal Pradesh and Uttarakhand was affected with a view to accelerating the industrial development in these States.

All new industrial units and existing industrial units on their substantial expansion would be eligible for Capital Investment Subsidy @ 15% of investment of Plant & Machinery, subject to a ceiling of Rs. 30 lakh. Micro, Small and Medium enterprises would be eligible for Capital Investment Subsidy @ 15% of the investment in plant & machinery subject to a ceiling of Rs. 50 lakh. The subsidy will be available for the duration of the scheme to such units which have pre-registered and commence commercial production / operation prior to 31-03-2017. Other eligibility parameters and details have been outlined in the Scheme document.

Himachal Pradesh State Industrial Development Finance Corporation (HPSIDC) and State Industrial Development Finance Corporation of Uttarakhand Limited (SIDCUL) shall be the designated agency for disbursement of Capital Investment Subsidy on the basis of the recommendation of the State Government in the states of Himachal Pradesh and Uttarakhand respectively.

West Bengal

Fiscal incentives and Concessions for Investment under Scale-1 (Rs 10-100 Crore FCI): The total incentives under all heads shall not be more than 100% of FCI.

Industrial Promotion Assistance (IPA)

Industrial units under certain geographical areas (specifically under Group B, C & D and falling in the Scale 1 (Scale 1 being defined as Rs 10-100 Crore Fixed Capital Investment) will be granted Industrial Promotion Assistance (IPA). The total IPA for which an industrial unit would be eligible shall be equivalent to certain percentage of the tax paid by the unit in the previous year. Value Added Tax (VAT) shall be considered for the entire eligible period. However, Central Sales Tax (CST) shall be considered for the first three years from the Commencement of Commercial Production as certified by DI. IPA would be admissible for a number of years as given below and upto75% of the Fixed Capital Investment by the industry, whichever is reached earlier.

Exhibit 441: IPA classification for West Bengal

Area	IPA for number of years	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
B&C	8	80 %	80 %	80 %	80 %	80 %	80 %	80 %	80 %
D	8	90 %	90 %	90 %	90 %	90 %	90 %	90 %	90 %

Industrial units under certain geographical areas (specifically under Group B, C & D and falling in the Scale 2 (Scale 2 being defined as Fixed Capital Investment above Rs 100 Crore and up to 500 Crore) will be granted Industrial Promotion Assistance (IPA) as described below.

Industrial units under Group B, Group C and Group D falling in the scales of 2, 3 & 4 will be granted Industrial Promotion Assistance (IPA). The IPA for which an industrial unit would be eligible shall be equivalent to certain percentage of the tax paid by the unit in the previous year. Value Added Tax (VAT) shall be considered for the entire eligible period. However, Central Sales Tax (CST) shall be considered for the first three years from the **Commencement of Commercial Production** as certified by DI. IPA would be admissible for a number of years as given below and up to 75% of the Fixed Capital Investment by the industry, whichever is reached earlier.

IPA for Scale 2 (Fixed Capital Investment above Rs 100 Crore and up to 500 Crore)

Exhibit 442: IPA benefits - scale 2 by West Bengal Govt.

Areas	IPA for yrs	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
B&C	9 yrs	80 %	80 %	80 %	80 %	80 %	80 %	80 %	80 %	80 %
D	9	90	90	90	90	90	90	90	90	90

Area	IPA for yrs	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
	yrs	%	%	%	%	%	%	%	%	%

Anchor unit subsidy of Rs. 100 lakh shall be offered for the first two manufacturing enterprises with minimum employment of 100 members and minimum investment of Rs. 50 Crore in each of the Sub-Divisions coming in Groups- B, C & D will be offered. This subsidy will be applicable only in areas where no industrial enterprises with investment of Rs. 50 Crore and above exist at present.

The following industries will get Additional Incentive as mentioned below, for certain duration, besides the normal incentive admissible in the respective Area (A/B/C/D) and Scales (1/2/3/4).

- Garments manufacturing & Hosiery (stitching and sewing with no dyeing and affluent generating component)
- Gems and Jewellery

- Handicrafts
- Agro & Food Processing
- Jute & Textiles
- Leather (In the Calcutta Leather Complex)
- HPL Downstream Projects

Tax holidays also have been proposed to incentivize the spatial distribution of industries to all the districts of the state and especially in North Bengal and Jangal Mahal districts. The Tax Holiday will be admissible from the date of actual start of production by the industry.

West Bengal Textile Policy-2013-2018 that shall come into effect on and from the 1 September 2013 in the whole of West Bengal and remain valid for the period ending on 31st March, 2018.

A mega Power loom Park with common facilities centre (CFC) to be set up by the State Govt. on PPP model. Adequate pre and post machineries will be installed for the Power loom weavers of the State apart from minimum 200 hi-tech power looms. It also announces a slew of fiscal incentives for MSME enterprises depending on different zones.

The summary of different schemes available in the above mentioned states is as shown:

Exhibit 443: Policy incentive summary – All Indian states

State	Credit linked capital subsidy	Credit linked interest subsidy	Common infrastructure development	Re-imbursalment of costs
Madhya Pradesh	15% in all districts for eligible micro and small enterprises	5% - 20% depending on district for eligible MSME		Upton 50 – 75% adjusted against conditions for VAT and CST for LMI
Chhattisgarh	30% - 35% with upper cap depending on scale and district	25% - 75% for MSME depending upon industry and district	Target an apparel industrial park	
Arunachal Pradesh	15%-30% as per NEIP_2007	3% as per NEIP_2007 and Central Working Interest Subsidy Scheme		100% Income Tax exemption will continue under NEIIPP, 2007 as was available under NEIP, 1997
Assam	15%-30% as per NEIP_2007	3% as per NEIP_2007		VAT exemption up to 90%-200% of fixed capital investment
Bihar	Rs 5 Cr – 30 Cr of subsidy depending upon value of investment			25% - 80% VAT reimbursement subject to conditions
Goa				VAT rebate with upper limit of 25% of VAT/CST payable during the year
Himachal Pradesh	15% of investment of Plant & Machinery, subject to a ceiling of Rs. 30 lakh for eligible units			
Jammu and	Upton 15% to max of Rs 30	3% on working		

State	Credit linked capital subsidy	Credit linked interest subsidy	Common infrastructure development	Re-imbusement of costs
Kashmir	Lakh depending on location	capital loan,10 years depending on location and production		
Jharkhand	Industrial units under specified category will be facilitated access to existing schemes of Govt. of India such as (i) Technology Upgradation Fund Scheme (TUFS) (ii) Scheme for Integrated Textile Parks (SITP) (iii) Scheme for Integrated Skill Development		50% of cost, up to maximum Rs 10 crore, incurred on development of common infrastructure of green field textile, apparel park	50% of the NET VAT paid per annum up to a maximum of 75% of total fixed capital investment with conditions
Kerala			High level Council to facilitate Mega Projects	
Manipur	30% to eligible units	4% per annum on term loan to maximum of Rs.40,000/- (forty thousand)per month and 3% on working capital for eligible units		99% - 200% tax exemption for 7 years depending upon category
Meghalaya	30% of fixed capital investment to max. of Rs.100.00 lakh for medium, large and bigger enterprises			99 % Sales Tax (MVAT)/CST remission subject to eligibility and conditions
Mizoram	15%-30% to max of Rs 30 Lakh as per NEIIP_2007	3% as per NEIIP_2007 working capital loans for a period of ten year		100% Income Tax exemption for 10 years from date of commercial production
Nagaland	15%-30% to max of Rs 30 Lakh as per NEIIP_2007	3% as per NEIIP_2007 working capital loans for a period of ten year		100% Income Tax exemption for 10 years from date of commercial production
Orissa		7% per annum on term loan for 5 years from date of commencement of production to max. of Rs 2 Crore for priority sector		100% of VAT paid for a period of five (5) years from the date of commencement of production and 100% CST reimbursement of for priority sector
Punjab				Upton 80% VAT+ 75% CST depending upon location and scale of investment with cap @ 50% FCI
Sikkim	15%-30% to max of Rs 30 Lakh as per NEIIP_2007	3% as per NEIIP_2007 working capital		100% Income Tax exemption for 10 -12 years from date of

State	Credit linked capital subsidy	Credit linked interest subsidy	Common infrastructure development	Re-imbusement of costs
		loans for a period of ten year		commercial production; VAT be deferred for 10-12 years subject to conditions
Tamil Nadu	new /expansion manufacturing units will be given back ended capital subsidy (0.3- 2.25 Crore)and electricity tax exemption(2 – 5 years) subject to investment scale			Soft loan equal to VAT paid in the First 3 - 4 years from start of commercial production for Investments made below Rs.200 Crore
Tripura	30% (with additional subsidy @2.5% to ST, SC and Women Enterprises), to max of Rs.50 Lakh and conditions	3% of the term loans to max of Rs.1.50 lakh given to eligible enterprise for 5 years from the date of commercial production		Net amount (net of input taxes) to the State Government on sale of finished goods, subject to overall ceiling of Rs.50 lakh for 5 years from the date of commercial production
Uttar Pradesh	Interest on loan for capex @ 5 percentage points with a ceiling of INR 50 lakh/annum, for a maximum period of 5 years subject to location. For new textile units, cap may be 100 Lakh with conditions	For eligible units, Interest free loan equivalent to least of VAT+CST or 10% of the annual turnover for 10 years repayable after 7 years from the date of disbursement	Interest on loan taken by industries developing infrastructure for self use, such as- road, etc will be reimbursed @ 5 percentage points with ceiling of INR 100 lakh/annum for a maximum period of 5 years	
Uttarakhand	15% of investment of Plant & Machinery, subject to a ceiling of Rs. 30 lakh for eligible units			
West Bengal	Assistance Upto75% of the Fixed Capital Investment depending upon scale and location		Anchor unit subsidy of Rs. 100 lakh with conditions	

State policies and iMaCS analysis

Taxation on Technical Textile Products Across States

In addition to the policy support, the taxation on Technical Textiles is also a key factor that impacts an investor's decision to set up manufacturing in a particular state. While most states have conform to a Value Addition Tax (VAT) rate of 4% for most of the Technical Textile products like non woven, coated fabrics, readymade garments, imported Technical Textiles, belting, etc. In addition, few states such as Rajasthan, Andhra Pradesh, Tamil Nadu and Karnataka charge 5% VAT on Technical Textile products.

Duty Drawback Structure For Technical Textiles

For export promotion, the Central government has the duty drawback scheme run by Department of revenues, for re-imbusement of import duties paid for manufacturing of export products. Segment wise duty drawback structure is indicated in the following exhibit.

Exhibit 444: Duty drawback rates - 2013-14

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
Agrotech			
Shade nets	3923	7.20%	1.90%
	3924	7.20%	1.90%
	3926	7.20%	1.9% 3.3% for nylon nets
	6005	7.2% for grey fabric 7.7% for dyed	3.10%
Mulch Mats	3926	7.20%	1.9% 3.3% for nylon nets
Anti bird & anti hail nets	5607	8.60%	1.90%
Crop covers	3926	7.20%	1.9% 3.3% for nylon nets
	5603	8.60%	1.90%
Fishing nets	5607	9.20%	3.40%
	5608	9.20%	3.40%
Meditech			
Baby diapers, Adult diapers & Sanitary napkins	4818	1.70%	1.70%
Surgical disposables	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	6210	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF
	6307	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
Surgical sutures	3006	1.70%	1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
	3908	1.70%	1.70%
	4015	1.70%	1.70%
	5401	10.40%	3%
	5402	3%	3%
Surgical dressing	3003	1.90%	1.90%
	3005	1.90%	1.90%
	3006	1.70%	1.70%
	5803	4.30%	1.70%
	5810	7.50%	3.10%
Artificial Heart valves, vascular grafts, Meshes and tendons and Kidneys	9018	4.70%	1.70%
	9021	4.70%	1.70%
Artificial joints	9018	4.70%	1.70%
	9021	4.70%	1.70%
Mobiltech			
Tyre Cords	5607	9.20%	3.40%
	5902	1.7% for rayon 3% for nylon	1.7% for rayon 3% for nylon
Seat belt webbings	5806	7.30%	1.70%
	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
	8708	7.20%	1.70%
Car upholstery	5811	4.30%	1.70%
	5903	8.20%	1.90%
	6304	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
	9401	4.70%	1.70%
Headliners	5603	8.60%	1.90%
Sun visors	8708	7.20%	1.70%
Air bags	8708	7.20%	1.70%
Aircraft webbings and upholstery	4811	3.30%	3.30%
	4818	1.70%	1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
	5902	1.7% for rayon 3% for nylon	1.7% for rayon 3% for nylon
	5403	1.90%	1.90%
	5407	7.2% - grey 7.7% - dyed	3%
	5902	1.7% for rayon 3% for nylon	1.7% for rayon 3% for nylon
	6302	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
	6304	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
Packtech			
PP nonwoven sacks, Leno bags and fabric	6305	5.40%	1.70%
FIBC	6305	7.20%	1.90%
Soft luggage covers	4202	6.90%	1.70%
Jute hessians	5310	1.9% -hessian cloth 2.6% - sacking	1.9% -hessian cloth 2.6% - sacking
	6305	6.10%	1.70%
Tea bag filters	4805	1.70%	1.70%
	4823	3.30%	3.30%
Buildtech			
Architectural membranes	3921	3.30%	3.30%
	3926	7.20%	1.9% 3.3% for nylon nets
Hoarding & Signages	3919	1.70%	1.70%
	3920	7.20%	2.60%
	5903	8.20%	1.90%
Canvas tarpaulins	5903	8.20%	1.90%
	6306	5.40%	1.70%
HDPE tarpaulins	6306	5.40%	1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
Awnings & canopies	5407	7.2% - grey 7.7% - dyed	3.1%
	5512	8.4% - grey 8.9% - dyed	3.1%
	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Wall coverings	3918	1.70%	1.70%
	3926	7.20%	1.9% 3.3% for nylon nets
Sportech			
Sport Composites	9506	6.60%	1.70%
Artificial turf	3918	1.70%	1.70%
	5404	1.90%	1.90%
	5703	9.10%	1.70%
	6702	Nil	Nil
Parachute Fabrics & Ballooning fabrics	5407	7.2% - grey 7.7% - dyed	3%
	5211	4.9% - grey 5.4% - dyed	1.30%
	8801	1.70%	1.70%
Sleeping bags	9404	9.20%	1.10%
Sport Nets	5607	8.60%	1.90%
	5608	9.20%	3.40%
	9506	4.70%	1.70%
Sport Shoe Component	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	5903	8.20%	1.90%
Tents	5407	7.2% - grey 7.7% - dyed	3%
	6306	5.40%	1.70%
Swim wears	6112	7.6% - of cotton 8.9% - of blended 10.2% - MMF	1.7% - of cotton 2.2% - blended 2.6% - MMF
	6211	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
Protech			
Personal protective jackets	6210	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF
Fire retardant fabric	6210	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF
Chemical protective clothing	6210	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF
Industrial gloves	4015		1.70%
	4203		6.90%
Clothtech			
Laces & Tapes	5806		7.30%
	5808		4.30%
Interlinings	5407	7.2% - grey 7.7% - dyed	3.1%
	5512	8.4% - grey 8.9% - dyed	3.1%
	5513	7.0% - grey 7.5% - dyed	3.1%
	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	5903		8.20%
	6217	7.6% for cotton 8.9% for blended 10.2% for MMF	1.7% for cotton 2.2% for blended 2.6% for MMF
Zip Fasteners	9607	Brass zippers - 2.6% Others - 1.7%	Brass zippers - 2.6% Others - 1.7%
Elastic narrow fabrics	5806		7.30%
	5808		4.30%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
		7.2% for grey fabric - MMF 7.7% for dyed - MMF 4.9% - grey fab - Cotton & others 5.4% - dyed - cotton & others	3.1% for grey fabric - MMF 3.1% for dyed - MMF 1.6% - grey fab - Cotton & others 1.6% - dyed - cotton & others
Hook & Loop fasteners	3926		7.20%
	5806		7.30%
	5906		8.2% -MMF 4.4% - cotton
	5911		8.2% -MMF 4.4% - cotton
Umbrella fabric	5204		3.50%
	6307		7.2% for cotton 8.2% for blended 9.2% for MMF
Sewing threads	5204		3.50%
	5401		10.40%
labels	5801		7.3% - MMF 3% - Cotton & others
	5806		7.30%
	5807		4.30%
	6217		7.6% for cotton 8.9% for blended 10.2% for MMF
	6307		7.2% for cotton 8.2% for blended 9.2% for MMF
	9001		1.70%
	9002		4.70%
	9014		4.70%
	9502		HS code revised
	9602		1.70%
	9606		1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
	9608	1.70%	1.70%
Hometech			
Fibrefill	5503	1.70%	1.70%
Carpet backings	5310	1.70%	1.70%
	5407	7.2% - grey 7.7% - dyed	3%
Stuff toys	9502	HS code revised	HS code revised
	9503	5.20%	1.70%
Blind fabric	3918	1.70%	1.70%
	3921	3.30%	3.30%
	5407	7.2% - grey 7.7% - dyed	3%
	5806	7.30%	1.70%
	5903	8.20%	1.90%
	5907	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
	6303	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
	6304	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
	6306	5.40%	1.70%
	6307	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
Filter fabrics	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	6031		
	6090		
Mattresses	5208	4.4% - grey 4.9% - dyed	1.30%
	5210	4.9% - grey 5.4% - dyed	1.30%
Non woven wipes	4818	1.70%	1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	6307	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
Mosquito nets	6304	7.2% for cotton 8.2% for blended 9.2% for MMF	1.8% for cotton 1.5% for blended 1.1% for MMF
Furniture fabrics	5801	7.3% - MMF 3% - Cotton & others	1.70%
	5903	8.20%	1.90%
	5907	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Geotech			
Geotextiles	3918	1.70%	1.70%
	3920	7.20%	2.60%
	3921	3.30%	3.30%
	3926	7.20%	1.9% 3.3% for nylon nets
	5602	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	5603	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
	5604	6.80%	1.90%
	5609	3%	1.70%
Indutech			
Decatising cloth	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Bolting cloth	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Absorbent glass battery separators	7019	1.70%	1.70%
Cigarette filter rods	5601	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
Coated abrasives	5512	8.4% - grey 8.9% - dyed	3.1%
Conveyor belts	4010	3.30%	3.30%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
	5910	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
	3926	7.20%	1.9% 3.3% for nylon nets
Drive belts	4010	3.30%	3.30%
Computer ribbons	9612	1.70%	1.70%
PCBs	7019	1.70%	1.70%
Paper Making fabrics	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Composites	7019	1.70%	1.70%

Product	HS code el	Duty Drawback when CENVAT has not been availed	Duty Drawback when CENVAT has been availed
Aramids	5402	3%	3%
	5505	9.10%	1.70%
	5601	8.6% for MMF 3% for cotton	1.9% - for MMF 1.7% for cotton
Ropes & Cordages	5607	8.60%	1.90%
	5608	9.20%	3.40%
Filtration products	5911	8.2% -MMF 4.4% - cotton	1.9% - MMF 1.7% - cotton
Industrial brushes	9603	1.70%	1.70%

Source: IMaCS analysis, www.fieo.org

30. Centres Of Excellence: A One Stop Shop For Technical Textiles

Technical Textiles manufacturing calls for conformance to standards (both international and national) based on the type of product and the nature of application. In India, the testing facilities for Technical Textiles are predominantly setup by the Textile Research Associations (TRAs). These facilities ensure that the products being manufactured meet the requirements of the prescribed standards, which will be carried out at a nominal cost. In addition to these facilities, some of the major manufacturers also have their own in-house testing facilities required to monitor key production parameters. TRAs face different Challenges especially the newer COEs face issues such as, Lack of awareness among the end user industry players and lack of interest from industry players to join hands in institutional and product development.

Till date a total of nine centres of excellence (COEs) have been established to help develop the Technical Textile industry by providing required support for new product development and adequate testing facilities. The details of these COEs are:

Exhibit 445: COEs present in India

Sl. No.	Centre of excellences	District	Specialisation
1	The Synthetic and Art Silk Mills' Research Association (SASMIRA),	Mumbai	Agrotech & Packtech
2	Bombay Textile Research Association (BTRA)	Mumbai	Geotech & Oekotech
3	Northern India Textile Research Association (NITRA)	Ghaziabad	Protech & Mobiltech
4	South India Textile Research Association (SITRA)	Coimbatore	Meditech
5	PSG College of Technology, Coimbatore	Coimbatore	Indutech & Homotech
6	DKTE Society's Textile & Engineering Institute (DKTE)	Kolhapur	Non woven & Clothtech
7	Ahmedabad Textile Industry's Research Association (ATIRA)	Ahmedabad	Composites & Buildtech
8	Wool Research Association (WRA)	Thane	Sportech
9	Manmade Textile Research Association (MANTRA)	Surat	Coating and lamination, Agrotech

Out of these, five are old COEs having an existence of over four years. These are SASMIRA, BTRA, NITRA, MANTRA and SITRA. These have well developed labs capable of providing all important testing facilities. They have also been actively involved in development of standards for different Technical Textile products. The details of these facilities are as discussed below:

Indian COEs

SASMIRA – COE for Agrotech

SASMIRA is engaged in multiple activities providing scientific and technical assistance to textile and allied industries. Some of the activities being carried out are:

- Development of Technical Textiles
- Product development
- Effluent treatment, water recycling and waste re-utilization
- Development of energy conservative processes

Testing Facility at SASMIRA

For Technical Textiles, SASMIRA provides facilities for testing, evaluation and investigation of products such as polymer, fibre, yarn, garment and other textile related products. It specializes in testing of Agrotech products. The facility was up-graded under the TMTT scheme of Government of India and has the following testing capabilities:

Exhibit 446: Testing facilities at SASMIRA

Sl. No.	Product	Sub-product	Testing infrastructure
1	Fibre	Natural & Synthetic	Testing on mechanical, chemical and biological parameters along
2	Yarn		

Sl. No.	Product	Sub-product	Testing infrastructure
3	Fabric	Apparel, garment and Technical Textile	with few analytical parameters wherever applicable
4	Technical Textile	Specialization - Agro-textile Others – Geo-textile, Mobiltech, Meditech, Sportech and Protech	
5	Dyes	All class	
6	Auxiliaries	Finishes and coatings	
7	Effluent	Dye house and water samples	
8	Miscellaneous	Polymer characterisation	

IMaCS analysis

The Agrotech COE testing facilities is equipped with standards of American Standard for Testing and Materials (ASTM), British Standards (BS), German Institute for Standardisation (DIN), International Organisation for Standardisation (ISO) and European Standards (EN) to cater to the industries needs for export orders.

The Agrotech COE laboratory is accredited with NABL in accordance with international testing standards ISO/IEC 17025- 2005 for physical and chemical evaluation of textiles. In addition, the laboratory is also accredited with American Association for Lab Accreditation (A2LA), USA for physical, chemical and microbiological testing of textiles and allied substrates. The American accreditation is able facilitate the industry players to export the Agrotech products to USA readily.

Further, to increase international exposure and acceptance of test results and for knowledge sharing, the COE has entered into foreign collaborations with American Association for Laboratory Accreditation(A2LA), USA for accredited testing services, Industrial Fabrics Association International(IFAI), USA for marketing and entrepreneurship in Technical Textiles, International Jute Study Group(IJSG), for development of Agro-textile product from natural fibres and Colorado State University for research and development in Technical Textiles.

The COE is able to cater to the testing needs of most of the Agrotech players ranging from SMEs including Kusumgar, Polynova to large industry players like Garware, Tata and Johnson.

The detailed lists of equipments available at SASMIRA for testing are:

Exhibit 447: List of Instruments with SASMIRA for testing

Sl. No	Equipment	Quality parameter to be tested	National/ International Standards
1	Stiffness Tester	Used to measure Stiffness of fabrics. Results are expressed in bending length (to calculate flexural rigidity) and bending modulus of fabrics	IS:6490-1971
2	Crease Recovery Tester	Rapid Determination of crease resistance of fabrics	IS:4681-1981, BS 3086 - 1972, AATCC - 66-1996
3	Yarn Appearance Winder	Inspection of non-uniformity in yarns by visual method	ASTM - D2255-1979
4	Launderometer	Evaluating of colour - fastness to washing of the dyed and printed textiles	ASTM - D3557, AATCC 61-1996, ISO - 105-C06
5	Twist Tester	Determination of the direction and amount of twist in yarn	ASTM D-1422-1976
6	Crimp Tester	To measure the percentage crimp in yarns	IS:3442-1980
7	Wrap Reel	Preparing leas to determine count and leas strength of the yarns	ASTM - D1578-1983
8	Crock Meter	Rapid Determination of fastness of dyed and printed textiles to dry and wet rubbing.	IS:766-1988, AATCC -8-1996, ISO - X12
9	Pilling Tester	Rapid determination of pilling of woven or knitted fabrics – with soft spun and filament yarns	IS:10971-1984, ICI Standards
10	Hydrostatic Dome/head Tester	Determination of water proofness of medium and heavy fabrics such as tentage, water bags, tarpaulins etc., as well as the resistance offered by a fabric to water penetration under static pressure	IS:391-1975, AATCC - 127-1995, ISO-811
11	Thermal Conductivity Apparatus	Comparing the Thermal Insulation properties of textile Materials	Standards of Niven's Hot Plate
12	Perspirometer	Rapid determination of colour-fastness to perspiration of dyed and printed textiles	IS:971-1983, AATCC - 15-1994, ISO-E04
13	Light Fastness Tester	Used to measure light fastness of the fabric	IS 2454-1967BS 1006-

Sl. No	Equipment	Quality parameter to be tested	National/ International Standards
			1978AATCC 16-1993
14	Multilight colour matching cabinet	Used to evaluate colour matching for the metamerism match or isomeric match	BS 950
15	UV/Day light lamp viewing cabinet	Visual assessment of colour under standard light conditioning	BS 950
16	Conditioning Cabinet	To condition the fabric samples	BS 950
17	Spray Tester	Measuring the water-repellent efficiency of finishes applied to the fabric	IS:390-1975, AATCC -22-1996, ISO - 4920
18	Crimp Rigidity Tester	To determine the bulking potential of texturised yarns	Based on HATRA test method. ASTM - D4031-1981

Source: http://www.sasmira.org/list_of_instrument.html

Association with Promotional Schemes

SASMIRA, being the COE for Agrotech has the key responsibility of providing the required technical support for implementation of the Scheme – “Promoting usage of Agro-textiles in North East Region (NER)” launched by Ministry of Textiles. The detail of the scheme has been discussed under Part D- chapter 3 of this report.

Research & Development (R&D) at SASMIRA

COE for Agrotech is also being used for development of new products and prototypes, providing innovation and R & D support to the industry. The key prototypes developed at SASMIRA are shown as follows:

- Reflective ground covers
- Work wear for agro textiles
- Barrier packaging for agro-chemicals.
- Development of speciality fabric for water conservation
- Indigenous development of ultrasonic device(S) for maintenance of weaving accessories
- Application of supercritical fluid for dyeing
- Development of durable, breathable and barrier work wear fabric for agro textile application
- Dyeing of polypropylene using nanotechnology
- Establishing methods for simultaneous functional finishes for textiles
- Development of UV fluorescent yarns
- Development of super absorbent polymer fibre mats

Testing Facility at MANTRA

The testing facilities available at MANTRA are:

Exhibit 448: Testing facility for Agrotech

Sl. No.	Test	Equipment
Facilities at COE - Agrotech		
1	Testing linear density of fibre	Vibrodyne
2	Permeability of textile	Permeability of geotextile is tested by passing different glass bead fractions through the textile using a hydrodynamic sieve tester
3	Fabric thickness	The institute has film thickness tester which can be used to test the fabric
4	Water permeability test	The COE is equipped to test horizontal water permeability for

- Development of multi layered bio mat to combat oil spills
- Development of electrically conductive PET/ CNT nano composites films
- Design of Processing Sequence Suitable For Embroidered Fabrics Incorporating Embellishments

All these prototypes are currently under tests and trials to check fitness for commercial use.

Contact Information

The contact information for SASMIRA is as follows:
 Synthetic and Art Silk Mills' Research Association (SASMIRA), Worli, Mumbai – 400 030
 Ph: +91- 22 -24935351 – 52
 Fax: +91 -22 – 24930225
 Email: sasmira@vsnl.com
 Website: <http://www.sasmira.org/>

MANTRA – CoE For Agrotech & Coating and Lamination

Manmade textile Research Association (MANTRA) is a pioneer institute in the field of manmade textiles. The institute was set up in 1981 with an aim to develop to promote full-fledged Research and development in the field of manmade textiles. Currently MANTRA is a support COE for Agrotech while it is in process of becoming a fully equipped COE for coated and laminated fabrics, the first of its kind in India.

Sl. No.	Test	Equipment
		different textiles.
5	Water vapour permeability test	The MOCON based water vapour transmission tester available at the COE is capable of testing permeability through on woven and plastics.
6	Cold crack test	The COE has equipments to test the stability of the fabric at -40 degree Celsius
7	CBR puncture test	The Institute has equipment to test the puncture resistance of soil cover fabrics in accordance with DIN 54307
8	Tests for shade nets	The equipments available have capability of testing both the wind blocking and shading percentage of agro-textiles
9	Abrasion resistance test	TABER Dual head rotary resistance tester is capable of testing abrasion resistance even at 60 rpm speed.
10	Soil Cover porosity	The Institute has AOS tester which tests the porosity of the soil cover geo textile fabric
11	Weatherometer	The OUV test equipment measures the weathering resistance and life of the material by altering UV with moisture.
Facilities at COE – Coating and laminating		
1	Lenzing Water permeability test	The institute has LENZING water permeability tester used to test the permeability of non-woven
2	Liquid strike through time test	The institute has equipment – “Lister” used to measure the strike through permeability for non-woven diapers.
3	Surface resistivity test	It can conduct test to measure electrical surface resistivity for fabric
4	Air Permeability test	The test instrument at MANTRA can be used to determine the air permeability of the fabric up to 200 Pascal pressure
5	Flammability test	The institute does flammability tests for FR upholstery fabrics to measure the flammability of substrates.
6	WIRA spray testing	It is used to determine the resistance of fabric ,without water repellent coating ,to wetting
7	WIRA liquid absorbency time test	The COE has infrastructure to test the absorbing power of non woven. It finds application in testing for surgical applications
8	WIRA liquid Absorption capacity test	The COE can test for liquid absorption capacity of a non woven fabric

*Source: MANTRA website

Research & Development (R&D) at MANTRA

COE for Coating and Lamination at MANTRA has been actively involved in different research projects. From its inception till date MANTA has been involved in 28 R&D projects through Ministry of textiles and has completed a total of 79 research projects through various industrial tie ups and co-operation. The key researches under Technical Textiles are:

- Development of multi layer fabric for Sportech
- Development of bag filter fabric from PPS, PTFE and polyester
- Development of PLA coated fabric for packaging of food and medicines, etc
- Development of lightweight bio degradable composites
- Development of sensor fabrics and smart fabrics
- Development of low cost green house cloth from polyester
- Development of anti allergenic fabrics
- Development of high tenacity air texturised tent fabric
- Work wear for agro textiles

- Barrier packaging for agro-chemicals.
- Application of cost effective technology for re-use of water jet effluent
- Development of fabrics made from PTT yarns
- Development of cost effective filter fabrics for bag filters
- Development of enzymatic technique for weight reduction of polyester
- Development of bio-degradable and recyleable Technical Textiles from banana yarns
- Development of banana fabrics suitable for extreme cold conditions by plasma technology
- Application of nano technology for delustering of bright polyester fabric

All these prototypes are currently under tests and trails to check fitness for commercial use.

Contact Information

The contact information for MANTRA is as follows:
 Manmade Textile Research Association (MANTRA)
 Near Textile market, Textile exchange
 Ring Road Surat – 395 002
 Gujarat

Ph: +91 – 261 – 2323211, 2337062
 Fax: +91 – 261 – 2322500
 Email: director@mantrasurat.org
 Website: <http://www.mantrasurat.org/>

BTRA – COE for Geotech

BTRA is the COE for Geotech segment of Technical Textiles and is also one of the upgraded COEs. The testing facilities at BTRA are equipped to handle most of the testing requirements of the industry and are able to assist entrepreneurs to develop geo-synthetics products indigenously.

Testing Facility at BTRA

It is equipped for conducting all types of tests for geo-textiles. Details of the products that can be tested at BTRA are shown in the following exhibit:

Exhibit 449: Testing facilities at BTRA

Sl. No.	Product	Sub-product
1	Geo-textiles – woven & non-woven	Geo-textiles
2		Geo-grids
3		Geo-membranes
4		Geo-composites
5		Geo-synthetic clay liners
6		Geo-drain
7		Geo-cell
8		Geo-straps
9		PVD drains
10		Geo-nets
11		Turf reinforcement mats
12		Erosion control blankets
Others		
1	Glass composites	
2	Metal gabions	
3	Rope gabions	
4	Rubberised conveyors	Heavy duty conveyors
5	Foam	PU foam
6	Insulating pads	Non woven and rubberised
7	Non-woven	
8	Filters	Both woven & non woven
9	Waddings	Non woven
10	Reinforced belt for conveyor	Steel wire coated with PVC
11	Seat belt and its assembly	Car seat belts
12	Webbings	Nylon webbings
13	Coated fabrics	PVC and Teflon coated and foam laminated

iMaCS analysis,

Further, the Geotech COE testing facilities is equipped with standards of American Standard for Testing and Materials (ASTM), British Standards (BS), German Institute for Standardisation (DIN), International Organisation for Standardisation (ISO), INDA, EDANA

and European Standards (EN) to cater to the industries needs for export orders.

The Geotech COE laboratory is accredited with GAI-LAP accreditation for geo-synthetics Institute, USA, which is one of the most reputed accreditation in the field of geo-synthetics. Further the lab is also accredited with NABL in accordance with international testing standards ISO/IEC 17025- 2005 for physical and chemical evaluation of textiles. The American accreditation is able facilitate the industry players to export the Geotech products to international markets. Further, to increase international exposure and acceptance of test results and for knowledge sharing, the COE has entered into foreign collaborations with FITI (Testing Laboratory GRI, USA accredited), South Korea, and GRI (Geosynthetic Research Institute), USA. The COE is also the member of IGS (International Geosynthetic Society), USA; European Disposables and Nonwovens Industry Association (EDANA), Europe and Association of the Nonwoven fabrics industry (INDA), USA.

The COE is able to cater to the testing needs of most of the Geotech players ranging from SMEs including CTM Technical Textiles to leading players like TechFab and Strata.

Research & Development (R&D) at BTRA

The COE for Geotech also has also been at the forefront of developing new technologies by supporting technology's much needed prototype development. It has installed development facilities for Nonwoven products (geotextiles & others) by needle punching technology, Nonwoven products (geo-textiles & others) by Hydro entanglement technology and a development facility for woven geo-textile & other Technical Textiles. The major prototypes developed at BTRA are:

- Non-woven geo-textiles: This has been developed and tested in both laboratory environment and commercial environment. It has been commercialised and is actively being used by industry players to provide geo-textile solutions.
- Woven geo-textile: The woven geo-textile being developed by BTRA has been developed and tested. However, commercial production of the same
- Woven geo-textile: BTRA is also in process of developing a woven geo-textile which is currently under development.

Other than these other research activities undertaken at BTRA are:

- Plasma technology for textile processing
- Development of methods for testing formaldehyde content in textiles
- Development of textile finishing agents using chitosan

- Enhancing properties of conductive textiles using atmospheric pressure plasma technology

Contact Information

The contact information for BTRA is as follows:

Bombay Textile Research Association (BTRA)

Lal Bahadur Shastri Marg

Ghatkopar (W), Mumbai – 400 086

Maharashtra

Ph: +91 – 22 – 25003651

Fax: +91 – 261 – 25000049

Email: btra@vsnl.com

Website: www.btraIndia.com

SITRA – COE for Meditech

SITRA is the COE for Meditech segment of Technical Textiles and is also one of the upgraded COEs. The testing facilities at SITRA are equipped to handle vast range of testing requirements of the industry and are able to assist entrepreneurs to develop wide range of products indigenously for import substitution.

Testing facility

The Meditech COE testing facilities is equipped with standards of American Standard for Testing and Materials (ASTM), British Standards (BS), German Institute for Standardisation (DIN), International Organisation for Standardisation (ISO), Australian Standards and European Standards (EN) to cater to the industries needs for export orders.

The Meditech COE laboratory is accredited with NABL in accordance with international testing standards ISO/IEC 17025- 2005 for physical and chemical evaluation of textiles. Moreover, the COE has entered into collaboration with The University of Bolton, United Kingdom. This would also facilitate co-operation and exchange in research findings / research dissemination and staff deputation and training. Also, a Memorandum of Understanding proposal with North Carolina State University, USA is under process. Once signed, this will open up possibilities for joint research programmes to be conducted in the field of Meditech. The COE is able to cater to the testing needs of most of the Meditech players ranging from SMEs including Nobel Hygiene, to leading players like KOB Medical Textiles and 3M.

Research & Development (R&D) at SITRA

The COE actively engages in furthering the cause of innovation both at technology and product level. In this respect, the COE with regards to developing innovative products and prototypes has exceeded its targets by developing nine prototypes up till now. It has been able to do so drawing on its own facilities set up for this purpose. The different prototypes being developed at SITRA are:

- Bifurcated Vascular Graft
- 3D Compression bandages for Lymphedema
- Spun-lace non-woven wound dressings for malodour wounds
- Breathable Surgical gowns treated with Nano Finishes
- Barbed - Bi-directional Surgical Sutures
- Development of 4-layered Face-Mask
- Development of Face Mask with Eye-Guard
- Development of Face Mask with Nylon 6-nanomembrane
- Development of 8-layered mopping pad
- Development of spacer fabric for medical inlay sin orthopaedic shoes
- Development of cut resistant Technical Textiles using spectra fibres
- Development of spun silk garments made of hollow yarn
- Controlled drug release on chitosan coated cotton gauze
- Design and fabrication of an instrument to assess the resistance of materials used in medical face masks to penetration against aerosol particles using latex spheres
- Development of special wound care dressing made of PVA/ chitosan and PVA/silver nitrate nano membrane

The COE is also running an incubation centre for the support of the emerging entrepreneurs. Till date COE has rolled out two products from its incubation centre – Ankle support and Gynae post Partum drape.

Contact Information

The contact information for SITRA is as follows:

South India Textile Research Association (SITRA)

13/37, Avinashi Road, Coimbatore Aerodrome Post

Coimbatore – 641 014

Ph: +91- 422 -2574367-9, 4215333

Fax: +91 -422 – 2571896, 4215300

Email: info@sitra.org.in

Website: <http://www.sitra.org.in/>

NITRA – COE for Protech

NITRA is the COE for Protech segment of Technical Textiles and is also one of the upgraded COEs. The testing facilities at NITRA are equipped to handle most of the testing requirements of the industry and are able to assist entrepreneurs in testing and developing protective textiles indigenously.

Testing Facility at NITRA

The COEs is equipped to test the products including Protective Garments, Carpets, FR overall, Combat Uniforms, Upholstery.

Further, the Protech COE testing facilities is equipped with standards of American Standard for Testing and Materials (ASTM), British Standards (BS), German Institute for Standardisation (DIN), International Organisation for Standardisation (ISO), Australian Standards and European Standards (EN) to cater to the industries needs for export orders.

The testing laboratory is NABL accredited as per ISO/IEC 17025- 2005 standards and supports testing of various product groups spanning yarn, fibre, yarn and fabric. To keep pace with the world developments in technological advances in Technical Textiles the COE has fostered collaborations with Bolton University and Manchester Metropolitan University to enhance its acumen in Research and Development, Consultancy and training.

The COE is able to cater to the testing needs of most of the Protech players ranging from large industry players including Arvind Mills, Alok Industries, Ginni Filament to Defence organisations and SMEs including Dynamic industries, Superior Fabrics etc.

Research & Development (R&D) at NITRA

The COE actively engages in furthering the cause of innovation both at technology and product level. The COE has developed six prototypes up till now. These are:

- Fabric using High Modulus Polyethylene (HMPE) fibre for armour
- Fabric using corn fibres
- Cut resistance and abrasion resistant gloves and apparels using composite metallic yarns
- Protective clothing of anti-microbial fibres
- Technology for ultrasonic cleaning of garments
- Nylon Cotton Blended fabric (NYCO) for use by defence and para-military forces
- Development of personal protective textile using novel fibre
- Development of special functional fabric for bedding and sportswear for providing extra ordinary comfort with excellent micro climate
- Development of shield of corn fabric for enhanced fire protection

In addition to these four new COEs were created in the span of last five years. The details of the same are:

Contact Information

The contact information is as follows:

Northern India Textile Research Association (NITRA)
Sector – 23, Raj Nagar,
Ghaziabad – 201 002

Uttar Pradesh

Ph: +91 – 120 – 2786434

Fax: +91 – 120- 2783596

Email: mail@nitratextile.org

Website: www.nitratextile.org

ATIRA – COE for Composites

ATIRA is the COE for Composite materials. It is a process focussed COE and is one of the newly formed COEs. The testing facility at ATIRA is under development with installation and commissioning of most of the equipment being completed

The COE is equipped to test product segments including CFRP/GRP/Thermoplastic composites/Plastics. Further, the Composite COE testing facilities is equipped with standards of American Standard for Testing and Materials (ASTM), and International Organisation for Standardisation (ISO), to cater to the industries needs.

The Composite COE laboratory is in the process of getting accreditation from NABL in accordance with international testing standards ISO/IEC 17025- 2005 and also from American Association for Lab Accreditation (A2LA). Moreover, the COE has entered into collaboration with North West Composites Centre, Manchester, U.K. for Testing, Accreditation, Affiliation & knowledge support in Composites Testing. Also, it is in talks with Fraunhofer Institute, ICT, Germany for collaboration in the areas of advancements with design, simulation analysis and prototyping of composites.

Newer facilities added at the COE have been mentioned below:

Testing and Evaluation Facilities

Testing & Evaluation facilities are fully operational and the laboratories have started serving the composites and allied industries:-

- **Mechanical Testing Laboratory** – Provides testing services for all the mechanical parameters including Fatigue as per the national and international standards namely, IS, ASTM, and ISO. The testing services include testing of coupon as well as of full sections of composite structural components. This testing facility is NABL accredited. So far the laboratory has served more than 50 industrial clients including MNCs and several foreign clients.
- **Heat and Flame Protection Testing Laboratory** – Provides testing facilities for any composite materials and components specifically composite and allied components and items used in Railways as per the well accepted global standard: EN 45545. The laboratory is serving the industry for last six months and has applied for NABL accreditation.

Incubation Centre and Prototyping Facilities at ATIRA:

Weaving, Braiding – Preforming Facilities

- Commercial scale warping and weaving facilities for Glass, Aramid and Carbon – serving industry for over last 1 year.
- Narrow Loom weaving/performing facilities, specifically for rope-like and belt-like weaved structure using aramid, glass, high tenacity PE etc. – Prototyping & Developmental activities for last one year
- 176 Carrier- Radial Braiding-Preforming Facility – Facility for braiding of Carbon, specifically 50K Carbon is under procurement

Composite Processing Facility-

Pultrusion Technology - A unique commercial scale facility for pultrusion using different types of resins including PU resin system and with Circular winding facilities – Serving the industry for over last six months.

Infusion Technology -This facility has been created specifically for serving wind mill blade production sector.

Research and Development

- Development of a novel rotating ring system to achieve breakthrough in existing modern ring frame productivity, yarn quality and power consumption
- Design and development of electronic precision alignment aids for a modern card to improve yarn quality
- Enhancement of Cottonseed oil recovery adopting German PEFT Technology.
- Spinning of Fire retardant fibre blends on cotton system
- Indigenous development of automatic multilayer garment cutting machine
- To evolve construction related design as well as environmental design parameters for both woven and non-woven geosynthetics
- Bio Preparation technology: Enhanced sustainability in cotton and cotton containing textile processing

List of testing instruments available at DKTE COE Nonwovens

Exhibit 450: Texting facilities at DKTE CoE for Non woven

Sl.no	Testing equipment	Test	Test Standard
1	GSM Tester (SDL Atlas, Hong Kong)	Mass per unit area of fabric (Nonwoven, Woven, Knitted)	IS 15891 Part 1 : 2011 WSP 130.1.R4 (12)
2	Digital Bursting Strength Tester Autoburst M229(SDL Atlas, Hong Kong)	Bursting strength and distension at burst of woven, knitted and nonwoven fabrics, papers and boards	ASTM D3786; BS 3424(PT6); ISO 13938-1, ISO 3303-2 ; ERT 80-4-20; EN 12332-2 ; WSP 030.1.R3 (12)
3	Digital Thickness Tester (SDL Atlas, Hong Kong)	Thickness of fabric	IS 15891 Part 2 : 2011 ISO9073-2:1995, WSP 120.1.R4

- Development of protective textiles for protection against electromagnetic radiations
- Textile Dyeing: An effort towards sustainable and cleaner eco-friendly technology
- Development of Nano-Fiber Based Textiles

Contact Information

The contact information for ATIRA is as follows:
Ahmedabad Textile Research Association (ATIRA)
P.O Ambadvari, Vistar, Ahmedabad - 380 015
Gujarat
Ph: +91 – 79 – 26307921, 26307922
Fax: +91 – 79 – 26304677
Email: director@atira.in
Website: www.atira.in

DKTE Society's Textile and Engineering Institute – COE for Non woven

DKTE Centre of Excellence for Non-woven; a process/technology focussed CoE and is one of the newly formed CoE's. DKTE CoE has made noteworthy progress as regards to the establishment of all necessary facilities at one place and catering to the needs of the Technical Textile & nonwoven industry by providing all necessary services like Training, Technical consultancy, testing services, Information resource centre, Incubation centre, Product/Prototype development facility.

Testing facility at DKTE COE Nonwovens

COE laboratory is well equipped with all necessary modern testing instruments for the testing of raw materials (Fibres), nonwovens and Technical Textile products, which complies with standards of American Standard for Testing and Materials (ASTM), European Standards (EN) and International Organisation for Standardisation (ISO), WSP test methods to cater the needs of industry. The non-woven COE laboratory is fully functional & in the process of getting accreditation from NABL in accordance with international testing standards ISO/IEC 17025 - 2005 and also from American Association for Lab Accreditation (A2LA).

4	Water Repellency Tester- Bundesmann M 230 (SDL Atlas, Hong Kong)	Water Repellency of fabric	ISO 9865, NF G 07-058
5	Microscope With Microtome Pysen SGI, XE Series (WIRA, UK)	Physical identification of fibres	AATCC 20
6	Limiting Oxygen Index (LOI) Tester (Gov Mark, USA)	Limiting oxygen index of textiles	ASTM D 2863, ISO 4589 Part 2 BS2782Part1, Method 141, NFT 51-071
7	Pore Size Analyser/ Capillary Flow Porometer CFP 1300 AE (PMI, USA)	Pore Size of fabrics	ASTM E 1294-89 ASTM F316-03
8	UV Accelerated Weathering Tester (Q LAB, USA)	UV degradation for fabrics	AATCC 186-2009 ASTM D 3105, ASTM D 5019
9	Linear Density & Fibre Crimp (FaviMat, Textechno, Germany)	Testing of linear density, crimp and tensile properties of fibre	BISFA,ASTM, ISO
10	Air Permeability Tester (Textest Instruments AG, Switzerland)	Air Permeability of fabric	AFNOR G 07-111, WSP 070.1.R3 (12) EDANA 141.1, EN ISO 9237
11	Water Vapour Transmission Rate Tester Gravitest FX 3150 (Textest, Switzerland)	Water vapour transmittivity of textiles	ASTM E96, BS 3'177, DIN 52'615, DIN 53'122-1, EN 1'931, EN ISO 12'572, ISO 2'528, JIS L1099 Method A
12	Non Woven Orientation NOS-200 (Lenzing, Austria)	MD:CD ratio, fibre distribution in nonwoven	In house Method
13	Liquid Strike Through & Wet Back, LISTER AC (Lenzing, Austria)	Strike Through time for Liquid (or simulated urine) and Wet Back of nonwoven coverstock fabrics for diapers.	Liq. strike-through time by EDANA/INDA-standards WSP 70.3, Wet back by EDANA/INDA standards WSP 80.10
14	Thermal Conductivity Tester (Lasercomp, USA)	Thermal Conductivity of textiles like fabric, foam etc.	ASTM D-1518-11a
15	Digital Tearing Strength Tester Elmatic (Mesdan, Italy)	Tearing Strength of fabric	EN ISO 13937-1 EN ISO 4674-2 (coated fabrics) ASTM D 1424 ASTM D 751 (coated fabrics) EN ISO 21974 ISO 1974 ISO 9290 ASTM D5734 (non-wovens)
16	Hydrostatic Water Head Tester (Mesdan, Italy)	Hydrostatic Water Head testing	EN ISO 20811, DIN 53886, AFNOR G-07 057, ISO 811, BS 32823, BS EN 3321, BS EN 3424, AATCC 127
17	Gradient Ratio Test Apparatus (BT TECH, USA)	To test the Filter/clogging characteristics of geotextiles	ASTM D 5101 Soil / Geo-textile Gradient Ratio Permeameter
18	Water Transmittivity Tester (BT TECH, USA)	To test the Transmissivity (in-plane flow) Characteristics of geo-synthetic Drainage material profiles	ASTM D 4716-87
19	Tensile strength of Textiles Instron-5967 (Instron, USA)	Yarns, Fabric (Woven/ Knitted) Nonwoven, Geotextiles, Composites	IS 15891 (Part 3) : 2011 ISO9073-3:1989
20	Direct Shear Box (AIMIL, India)	Soil /Geo-synthetic interaction (Coefficient of direct sliding)	IS:11229,2720(PART13)
21	Digital pH Meter	pH of aqueous extract	IS : 1390 , ISO-3071, AATCC-81
22	Viscometer RVDV-II+ Pro (Brookfield, USA)	Viscosity of fluids and Polymers	In house Method

Incubation Centre and Prototyping Facilities at DKTE COE Nonwovens

For Product/ Prototype development DKTE COE has a 2.0 meters wide needle punching line from one of the best machine manufacturer i.e. Truetzschler Nonwovens, Germany, Hot calendar and Thermal Bonding line from Yamuna Machine Works Ltd., India. Also, COE have plans to buy other nonwoven manufacturing technologies & finishing technologies

like Spunlace, Chemical bonding, SMS line, Coating and Lamination line, fibre retrieving lines in industrial width to complete their infrastructure for prototyping and incubation.

Moreover, for R&D, product/prototype development, training etc. COE has entered into collaboration with international institutions like Hochschule Niederrhein University, Germany & Technical University of Liberec for joint research in Nonwovens. Also, it is in talks with RWTH Aachen University, Germany for product

development & standardisation in the area of Nonwovens.

Research & Development (R&D) at COE

The COE is actively involved in research and development. It has developed many products/prototypes some of these are,

- Filter Fabric for recycling of Textile Effluent
- Development of Solar based water purifier by using nonwoven fabrics.
- Nonwoven for reinforcement of Insulation panels of ducting by using glass fibre (product has been commercialised)
- Antimicrobial cum antistatic wipes
- Nonwoven shoe cover
- Geo bags (product has been commercialised)
- Filter fabric (air filtration, water filtration)
- Automotive Fabric
- Nonwoven for Sewage and drainage application (product has been Commercialised)
- Activated carbon based nonwoven for filtration (For water purification, chlorine removal)
- Sludge Dewatering filter bag (product has been commercialised)
- Nonwoven interlining (product has been commercialised)
- Nonwoven needle punched fabric for quilt.

Contact Information

DKTES's Textile and Engineering Institute, Ichalkaranji 'Rajwada', P Box No. 130, Ichalkaranji Tal: Hatkanangle, Dt. Kolhapur – 416 115 (MS) India Tel: +91 230 2421300, 2437316, 2437317 Fax. +91 230 242329

Email: dktecoe@gmail.com;

Web: www.dktecoenonwovens.in

PSG College of Technology – COE for Indutech

PSG is the COE for Indutech and is a more recently established COE. This being the case the testing facility is yet to acquire all its equipment after which the laboratory shall be duly accredited with suitable accreditations.

Testing Facility at COE

The testing facility at the COE shall be providing testing services for normal and speciality fibres, natural and synthetic yarn, natural and synthetic fabrics, natural and synthetic Nonwovens, natural and synthetic ropes and cordages.

The COE is already in talks with universities such as Bolton Tech University, U.K., ITA, RWTH, Aachen University (Industrial Textiles and Composites), ITV,

Denkendorf, Germany (Braiding), Hof, University Germany (Automotive Textiles) and Carborundum Universal, India (Industrial Abrasives) for collaborations.

Research & Development (R&D) at COE

The COE is actively involved in research and development. It is in process of developing two prototypes for use in Indutech. These are:

- Oil Absorption pads – Testing in progress
- Acoustics materials – Under development

Contact Information

The contact information is as follows:

PSG college of Technology – COE for Indutech

Department of Textile Technology

Metallurgy and Foundry Division campus

Neelambur, Coimbatore – 641 062

Tamil Nadu

Ph: +91 – 422 – 2572177

Email: psgIndutech@gmail.com,

psgIndutech@gapps.pgtech.ac.in

Website: <http://www.psgtech.edu/coeIndutech/>

Wool Research Association (WRA) – COE for Sportech

WRA is engaged in industrial and fundamental research predominantly in the field of wool technology. The association renders its services to its members and non-members from textile industry, defence, customs, railways, state transports and other authorities in areas of product development, process development, testing and training.

Wool Research Association (WRA) has engaged itself in the development of Technical Textiles over the last two decades. It has foreseen the significance of this emerging technology. It had also undertaken a few sponsored projects relating to Sportech, Indutech, Mobiltech, etc. Of late Sportech products have assumed added significance for the following factors:

- Increased activities and participation in sports in the country.
- Availability of high performance fibres, new technologies of coatings and manufacturing.
- Higher level of sports standard and challenges within sporting nations.
- Newer sports requiring high dexterity, skill and sporting gears.
- New interest of the youth for outdoor activities and leisure.
- Growth of sports facility in the country.

Testing Facility at WRA

The COE is in the process of procuring equipment for its testing and prototype facility. Further, the COE is also in the midst of procuring books and standards to enable information access to the industry stakeholders. The COE is in the process of selection of leading international institutions regarding technical consultancy and collaboration. The institutions are:

- North Carolina State University
- RMIT University, Melbourne, Australia
- Trigon UK

Research & Development (R&D) at WRA

The COE is actively involved in research and development and has done 15 researches for the Technical Textile industry. The key R&D projects being done at the COE are:

- Non asbestos abrasive yarns for braids used as insulating material in lifting pumps
- 100% carbon woven fabrics for high heat resistance applications up to 1200' C
- Wool based flame retardant fabrics
- To develop a smart indigenous sleeping bag with heating property
- Design and development of high performance, Multifunctional, Protective Sportswear for various sports
- Development of water proof breathable sportswear with desired functional properties by eco-friendly water based coating techniques
- Development of thermal responsive high altitude multi layer protective clothing made principally of angora fibre.
- Ultra sound assisted scouring and smooth finishing of wool & other specialty animal fibres and their products
- Development of composites from coarse Indian wool for better utilisation
- Surface topographical finishing of Indian wools and their products for imparting multiple functional properties by utilising nano clay and ceramic inorganic powders with ultrasonic and plasma technology
- To develop a multi functional finish with anti bacterial , deodorant, shrink resistant, and improved dyeing properties by grafting with chitosen biopolymer for apparel grade woollen products
- To impart super wash properties to Indian wool & products through eco-friendly non-corrosive technique using plasma technology
- Enhancement of flame retardancy and soil repellence of wool through plasma technology

- Design and Development of Interior Textiles with special emphasis on heat resistance and flame retardancy

Accreditation Agencies

It is necessary to obtain certain accreditations for the Technical Textile products manufactured in India to enable exports of the same to other countries as well as meet the necessary standards prescribed within India. The various accreditations and agencies are listed below:

- ISO 17025 – National Accreditation Board for Laboratories,
- ISO 9000 – International Standards Organization,
- National Association of Testing Authorities(NATA), Australia,
- Standards Council of Canada,
- Japan accreditation board for conformity assessment,
- International Accreditation Japan,
- United Kingdom accreditation system,
- International accreditation service,
- American association of laboratories accreditation,
- National voluntary laboratories accreditation program,
- German accreditation system for testing,
- Comite francais d' accreditation(COFRAC),
- Deutscher akkreditierungs rat(DAR),
- Raad Voor accreditatie(RVA)

Contact information

The contact information is as follows:

Wool Research Association (WRA)
 P.O – Sandoz Baug, Kolshet Road
 Thane – 400 607, Maharashtra
 Ph: +91 – 22 – 25314294
 Fax: +91 – 22- 25868365
 Email: wra@wralIndia.com
 Website: www.wralIndia.com

Profiles of Centres of Excellence in Other Countries

There are more than 26 Centres of Excellences (CoEs) of high repute for textile and Technical Textile across the world. This section provides an introduction to these centres of excellences and also identifies the key learning based on the functioning, set up and operation of these CoEs capture special and unique features of these institutions pertinent to Technical Textiles industry.

We first introduce the institutions we have studied to understand their unique features and then capture the key learning in the subsequent section.

Institution Profile for CoEs

CoEs in Europe

Instituto Tecnológico Textil (AITEX), Spain

Instituto Tecnológico Textil (AITEX), Spain is a non profit making association formed by the Valencian Government through the valencian Insititute for Small and Medium sized Industries (IMPIVA) in 1985. It is a non profit making association having textile and textile related companies as members. AITEX conducts activities to improve a textile company's competitiveness, promotes modernization activities for textiles and, Introduces new technologies and improvement of the company and products quality and prepares all kinds of actions and services that contribute to the progress of the sector at industrial level. It is managed by a governing body, which is formed by approval of IMPIVA and the Science and Technology Inter-ministerial Commission. It has team strength of 141 researchers and technicians and has close to 950 companies as its member. The Institute is actively involved in research having developed 14 patents and running 181 R&D projects.

Non-woven Research and Innovation Institute (NIRI), U.K

NIRI was formed as a University of Leeds spinout company in 2005. NIRI is nonwoven material specialist organization which helps organizations to develop commercially-viable nonwoven fabrics and products. It was formed with the aim to manage the growing portfolio of confidential industrial projects, product development initiatives and technology transfer projects working in partnership with the global nonwovens industry supply chain. It is currently involved in improving the performance of existing nonwoven components and developing completely new non-woven materials. The team consists of leading nonwoven specialists having thorough knowledge of nonwovens. The focus area of NIRI is on the sectors of automobiles, wipes, medical and geo textiles, filtration, hygiene products, aeronautical applications, apparels and sustainable materials. NIRI is actively involved in providing testing services and providing consultancy services and partnerships for research and development.

British Textile and Technology Group (BTTG), North England

BTTG was established in 1989 by merger of Shirley Institute and Wool Industry Research Association. It has been involved in testing, certification and consultancy services. It is accredited to ISO/IEC 17025:2005. The Institute has two major divisions –

- BTTG Testing & Certification which specialises in the testing and Certification of Personal Protective Equipment, Geosynthetics, Floor coverings and other construction products. It also offers Certification to EU Directives
- Shirley Technologies provides a broad range of services to the traditional apparel sector. It specialises in chemical testing and provides certification for the Oeko-tex scheme.

The Institute helps manufacturers to attain a CE mark for Personal protective products for attaining salability in Europe. The Institute also has presence in China, India and Pakistan.

Technology Research Institute (TRI), USA

TRI is an Independent third party geosynthetics firm, which also provides geo-synthetic testing, and research services. It provides routine index testing in accordance with ASTM, ISO, BS, DIN and GRI test methods and also advanced standardized interface friction, permeability, creep and stress-rupture, transmissivity, gradient ratio, UV-resistance, chemical resistance, and accelerated time-temperature creep and stress rupture testing. The Institute is formed of three key divisions - the advisory division, the marketing division and the service division.

The Geosynthetic Institute (GSI), Delaware, U.S.A

The Geosynthetic Institute (GSI) is an Independent not for profit organisation formed by a consortium of organizations interested in, and involved with, geosynthetics - Geosynthetic Research Institute (GRI), Geosynthetic Information Institute (GII), Geosynthetic Education Institute (GEI), Geosynthetic Accreditation Institute (GAI), and Geosynthetic Certification Institute (GCI). The Institute was incorporated in Delaware in 1991. It has 71 organisations as its members. GSI aims at developing, investigation and implementation of the various facets of geo-synthetics, recognizing them as engineering materials. It involves conducting basic and advanced research, developing test methods and standards, providing certification, training and tutorial services as well as providing support for conferences and seminars.

North Carolina State University (NCSU) - Textile Apparel Technology and Management (TATM) and Textile Engineering, Chemistry and Science (TECS)

The two textile departments at NCSU specialises in the field of medical textiles, polymer chemistry and colour chemistry. The faculty research areas for these institutes are Nan sciences, Surface Modification, Fibers and Polymers, Color and Dye Chemistry and

Sciences, Technical Textiles and Textile Structures, Energy, Environment and Sustainability, Systems and Quality, Health and Safety, Educational Innovation, Supply Chain, Economic Competitiveness.

TATM: TATM offers courses in fashion and textile management, textile technology, textile and apparel management and fashion and textile design. Its research activities in the department encompass areas of fibre, textile, apparel, and retail complex, with expertise in product design and development, textile technology and in managerial fields of marketing, supply chain, competitiveness and trade.

TECS: The department is dedicated to providing instruction in the science, engineering and technical application of chemistry, colour, polymers, bio-medicals, design, and production with regard to fibres and fibre-based materials.

Textiles and Nonwovens Development Centre (TANDEC)/ Nonwovens Research Lab at the University of Tennessee (UNTNR)

TANDEC was established in 1990 as an application development facility for melt processing. It was later rechristened at UNTNR under University of Tennessee. It provides services of advanced melt blown lines, processing and testing facilities for fully equipped non woven research lab, research and development and educational courses for non woven. UNTNR's pilot line has been utilized by many private organisations with close to 15 organisation making use of it every year.

Clemson University

Established in 1898, Clemson University in South USA's oldest textile school having its own apparel research centre. The textile research institute of the University – the school of textiles, fibres and polymers is now a part of Material Science and Engineering College. The COE has well established weaving laboratory, non woven laboratory and dyeing, finishing and printing laboratory with modern testing facilities and equipments. In addition it also has composites fabrication facility and material processing laboratory. They have a 4 to 5 member team dedicated for research in Technical Textiles, focusing on research on specialised material used for defence or high tech application.

Department of Clothing Design and Technology, The Manchester Metropolitan University, UK

Department of Clothing Design and Technology is an internationally recognised research centre and leader in the area of clothing design and technology. They are involved in research activities pertaining to International fashion marketing, logistics and supply

chain, fashion design, CAD/CAM, product development, anthropometrics, manufacturing systems and performance of textiles amongst others. The department has five laboratories for body morphology, clothing comfort, textile performance, clothing engineering and computer aided manufacturing. It has tie ups with 15 Institutions across the world.

Huddersfield Textile Centre of Excellence, U.K

Huddersfield textile Centre of Excellence was established in 1999 by the Huddersfield and District Textile training Company. The centre provides training at different levels from apprentice level to training of technicians and managers. The Institute also house a design incubator for assisting and promoting entrepreneurship amongst fashion design graduates. The CoE offers high specification testing facilities in accordance to WIRA, USTER, etc. The centre is a not for profit centre and has state of the art equipments and up to date technology which are the key drivers for its success as a COE.

Donghua University, China

Donghua University was founded in 1951 at Shanghai as China Textile University. It has 12 colleges with two colleges dedicated to textiles – College of textile and Fashion art design Institute. These colleges have eight state of the art research centres. The few of them are:

National Engineering Research Centre (NERC) for dyeing and finishing of textiles: The research centre was founded in June 2000, and has been the leading centre in China for high grade cotton fibre dyeing, finishing technology and ecological textile dyeing. The Centre is aims at developing technical innovation in the field of dyeing and finishing while assimilating and educating about new dyeing and finishing technologies evolving around the world.

New Fabric Quick Response Centre: The Centre aims at establishing technological information on oriental fabrics and through development of textile information databases, testing and analysis of new fabrics overseas to derive their composition and manufacturing technique, producing newer fabrics in accordance to market, conducting exhibitions and seminars to promote academic exchanges.

In addition to these two, there are six more research centres- 21st Century green fabric research centre, Chemical fibre engineering research centre, development centre for automotive textile materials, Textile technology development centre for building material, Advanced manufacturing technique R&D centre and Carpet equipment research centre. These

research centres specialises in Technical Textiles and textile engineering with focus on Mobiltech and Buildtech.

Composites Testing Laboratory (CTL), Asia

Composites Testing Laboratory (CTL) is a joint venture between the Composite Technology Research of Malaysia (CTRM) and the CTL of Tastaill Teo, Ireland. It was founded in 2010 for conducting testing of composites panel for aerospace applications and non aero test panels. It is a leader in the field of accredited mechanical and physical testing of advanced composites for aerospace, wind energy and automotive applications. It provides services of physical testing, chemical testing, mechanical testing, fractography analysis, analysis on composite structure, short courses on testing, conducting training and workshops.

Taiwan Textile Research Institute (TTRI), Taiwan

TTRI was founded in 1971 as China Testing and Research Centre (CTTRC) with emphasis on quality control, testing and certification. Over the years, for better management and operations, the name was changed to CTI and then in 2004 to TTRI. The scope of business for TTRI includes R&D for textile related technology and information, design planning, evaluation and certification of textile fibres. It is also involved in providing training of textile related technology and comprehensive services for textile industry. It has two main departments - the department of raw materials and yarns which focuses on development of textile materials, OEMs of functional spinning master batch, development of special long tape yarn and trail production of melt spinning. The second department is the department of Products which focuses on development and transfer of technology for weaving, dyeing, finishing and final products, promotion of newer services and technologies and training in the relevant sectors.

Advanced Material Technology Centre (AMTC), Singapore

AMTC was established in 2008 by the Singapore Polytechnic to integrate R&D activities of speciality chemicals and functional materials i.e., nanotechnologies, green building materials, materials recycling advanced materials. The Centre provides an interface between R&D activities and industrial applications, working in close collaboration with government agencies, enterprises, local and overseas research centres and professional associations. It is involved in consultancy services for commercialisation of technologies, research and testing services wherein it offers facilities for chemical

analysis, product reliability test, material characterisation, micro fabrication and pilot scale production. For R&D it has collaboration with seven Asian Institutions, government and professional bodies and private enterprises.

School of Materials, University of Manchester

The School of Materials, University of Manchester was formed by synergistic merging of the Corrosion and Protection Centre, the Manchester Materials Science Centre and the Department of Textiles and Paper in 2004. It offers services for material testing and analysis, research and development and professional development programmes. It has two key research centres – The Materials Performance Research Centre and the Northwest Composites Centre. It has research groups in the sectors of biomaterials, ceramics and inorganics, corrosion and protection, design fashion and business, polymers, composites and carbon and textile technology. It has one of the largest and best equipped composite textile research units in Europe - National Composites Certification and Evaluation Facility (NCCEF) an independent ISO 17025 accredited test laboratory.

The Nonwovens Institute, North Carolina, U.S.A

The Nonwovens Institute (NWI) was launched in 2007 as the world's first accredited academic program for the interdisciplinary field of engineered fabrics. The Nonwovens Cooperative Research Centre (NCRC) founded in 1991, acts as its core research arm. It focuses on research related to materials and characterisation, polymer processing, modelling of nonwoven processes, engineered structures and Health, safety and sustainability.

TITV Griez - The Institute for Special Textiles and Flexible Materials, Germany

TITV Griez is a close-to-market research organization and also provides services pertinent to research, development, consulting, testing and professional training along the textile value chain. More than 50 employees develop high-tech solutions with the classic textile technology as the basis for new materials. The successful interdisciplinary cooperation with non-textile branches is an important feature of TITV and fosters innovation. For example, the combination of electronics and textiles creates innovative textile products for completely new applications.

Hohenstein Institute

Hohenstein was founded in 1946 by Prof. Dr. Otto Mecheels as an independent and privately owned research and teaching centre with headquarters in Bönningheim, Germany. Currently, it accommodates

around 500 employees in 40 contact offices globally. In India they have 4 offices. The research work at the Hohenstein Institute is complemented by a diverse range of testing, training, consulting and certification services. They offer manufacturers, retailers, service providers and consumers “competence from one single source” through interdisciplinary cooperation between textile engineers, chemists, physicians, biologists and physicists. The Institute places heavy emphasis on effective transfer of research results in lectures, seminars, publications etc. to keep its edge as a research institution.

School of Textiles & Design, Heriot-Watt University, United Kingdom

The School is specialised in the education of professionals and practitioners in the global textile and clothing industries. The school works in partnership with academia and industry locally, nationally and internationally. They have well-established links across the world, equipping students for employment through competitions, sponsorship, industry speakers, work placements and live projects such as Design for Textiles project with Eley Kishimoto. Students benefit from links with designers and manufacturers. Students can get involved with industrial projects and companies provide support for individual masters projects including: Begg Scotland, Mackintosh and Scottish Cashmere Club. The School's close association with the Scottish textile industry and membership of the Scottish Textile Industry Association ensures ongoing and relevant industry collaboration.

Department of Textile, Ghent University, Belgium

The Department offers education at national and international level. It is involved in or coordinating several national, European and international research projects and also renders technical and scientific services to the textile industry. The research activities at Ghent University are evolving more and more into fundamental research having a clear multidisciplinary character and introducing several new technologies. For example, research into advanced materials for niche applications, where the unique quality and functional properties of the material are decisive for success. Applied research is directed towards a variety of application areas such as electro spinning of nanofibres, high performance fibres and structures, electrically conductive textiles, smart textiles, colouration technology, artificial turf, polymer technology, carpet technology and fibre technology.

Geosynthetic Materials Association

The Geosynthetic Materials Association (GMA) is a division of the Industrial Fabrics Association

International (IFAI), is the central resource for information on geosynthetics. GMA provides a forum for consistent and accurate information with an end to increase acceptance and promote the correct use of geosynthetics. GMA represents nearly 80 member companies. GMA actively identifies, assesses, analyzes and acts upon market growth opportunities and issues that affect its member companies. Activities centre on five areas: engineering support, business development, education, government relations and industry recognition. In the area of education, GMA has also teamed up with the North American Geosynthetics Society to host a series of short courses around the country. Some of the courses offered are Geosynthetics and their Applications, Coal Ash Containment, Geosynthetics in Waste Containment Systems and Introduction to Geosynthetics in Transportation.

Centre for Technical Textiles, University of Leeds, UK

Centre for Technical Textiles (CTT) has a mission to achieve excellence in fundamental and applied research in fibrous structures whilst promoting interdisciplinary collaboration in all science and engineering fields related to Technical Textiles. The Centre offers services such as Consultancy and knowledge transfer services in textile materials, Manufacturing to provide solutions to industrial problems and Product innovation. The CTT undertakes basic and applied research in Technical Textiles, with its core expertise being the study of fibrous structures based on the chemistry, physics, engineering and processing of fibres and textile assemblies, such as formation, structure and properties of fibrous assemblies and environmentally sustainable textile materials and processes including colouration and finishing. Applied research is directed towards a variety of application areas such as agriculture, architectural textiles, geo-technical and civil engineering, automotive and transport (marine, rail and aviation), filtration, intelligent textile materials, medical and healthcare, sports and personal protective materials, sustainable technologies and recycling.

Thuringian Institute of Textile and Plastics Research, Germany

Thuringian Institute of Textile and Plastics Research (TITK) is an industry oriented research institute, which conducts both fundamental and applied research in fields of relevance to various industries. TITK has established itself as a modern and world-renowned institute for polymer materials research. It currently employs a team of 150 scientists and laboratory, technical and commercial assistants. TITK's services

include, innovation consulting, research and Development, manufacturing of specialized products from its research laboratories, testing of chemical and physical characteristics of textiles and composite materials and types of plastics, material Testing (OMPG) and contract Research. TITK helps clients develop new polymeric materials, meet detailed specifications, develop new methods for measuring specific material characteristics. TITK's subsidiary OMPG, is an accredited test laboratory certified according to DIN EN ISO/IEC 17025 and provides a plethora of material of testing services.

Nonwoven Tools, USA

Nonwoven Tools was conceived by Don Hindman (after 35 years of industry experience) as a means of improving efficiency and profits on the nonwoven production floor. Nonwoven Tools realizes that complex machinery and complex processes cannot be taught to the average production floor employee merely through the use of text books. As a result, Nonwoven Tools uses innovative video, computer, and audio presentations to provide courses that are relevant not only to the subject, but to the employee. Many of these courses are delivered over the internet to provide instant access and low prices. Nonwoven tools also offer various law-required courses for manufacturing employees to take on a yearly basis.

The Institute of Textile Machinery and High Performance Material Technology (ITM)

The Institute of Textile Machinery and High Performance Material Technology (ITM) at the TU Dresden is a university research centre in the field of textile and ready-made technology that is composed of two professorships (Professorship of Textile Technology and Professorship of Ready-made Technology).

The Institute's core activity is to provide a high-quality curriculum to students and research activity, by meeting these objectives:

- Offering excellence in education to its students and doctoral candidates by giving its students a solid scientific foundation and up-to-date practical experience.
- Conducting fundamental research activity and industry-oriented projects.
- Continuous expansion of interdisciplinary cooperation with research institutes in various disciplines and industry partners.
- Transferring research results into practical solutions.

Key Learning from Foreign CoEs

1. Customization of Courses Offered

As observed, many foreign institutions offer custom designed courses in sync with market and industry requirements. Further, organizations such as ITM offer few distance-learning courses. Some of institutions are also providing onsite training in collaboration with Industry. This method of delivery not only provides for an additional source of revenue but also flexibility in terms of customizing courses to meet industry demand. Customization of courses for private organizations would also open up avenues for more interaction with companies and benefit all stakeholders.

2. Infrastructure Needs and Requirements

Global CoEs are very well equipped with latest technology and knowhow relevant to the industry's needs. Advanced Materials Technology Center (AMTC), Singapore Polytechnic, Singapore is a case in hand, for the same. This is also made easier for them by presence of skilled workforce with relevant experience in the field of Technical Textiles. On our part, however, we have significant lot to achieve in terms of keeping up with the evolving infrastructural and skill needs of the industry.

3. Sharper Focus on Basic Research

In the CoEs abroad, extensive research is being done in the field of polymers and fibre technology. In addition, most of the in house research is based on joint ventures, consulting and internal ideas resulting from these prolonged interactions. The learning in this for our CoEs is to lay emphasis on Co-Development and Co-creation of research projects drawing upon joint ventures and consulting assignments as an approach to augment its wherewithal for the related technology/product. In addition, fibre technology needs to be promoted for better Technical Textiles.

4. Heavy Emphasis on Revenue Generation

In all Global CoE's studies, there is heavy emphasis on the CoEs generating sizeable revenues and sustaining themselves as independent entities. Various streams of revenue exploited by global CoEs include those from IPR and manufacturing activities on their equipments for commercial purposes besides research, especially from IPR since research and development is the forte of such CoEs. This function is also augmented by presence of a dedicated sales force with domain experience.

5. Reach of CoEs Beyond National Boundaries

A key aspect of global CoEs that is worth imbibing is in terms of reach. For example, for the COE in US there are many clients from international markets like Europe. In addition, CoEs have brick and mortar presence in many countries overseas.

6. Service Offerings

Some of the foreign CoEs have a wider range of services to offer and not constrained to R&D and testing. They offer full-fledged project management and end-to-end solutions. To sight, a few service offerings such as evaluation of practical onsite testing opportunities, another example is that these COEs are not only providing results for their testing services but also technical and statistical analysis. This methodology points to an approach of graduating to a solution provider to the industry, rather than just a specific service provider. In addition, this is part of a conscious special emphasis on diversifying into other services as a means of sustenance. International CoEs have multiplied their services and have plenty of certifications with them, which contribute to this end. Further, foreign CoEs also provide turnkey project management services and support right from conceptualization to commercialization.

7. Structure of COEs- Into verticals and Departments

School of Textiles & Design, Heriot-Watt University, UK organizes itself into separate departments for activities

such as testing, R&D, consulting, etc. Further, with organization of service departments global COEs break down their scientific departments as well into machine development, technology development, process development, product development.

8. Tie-ups and Accreditations

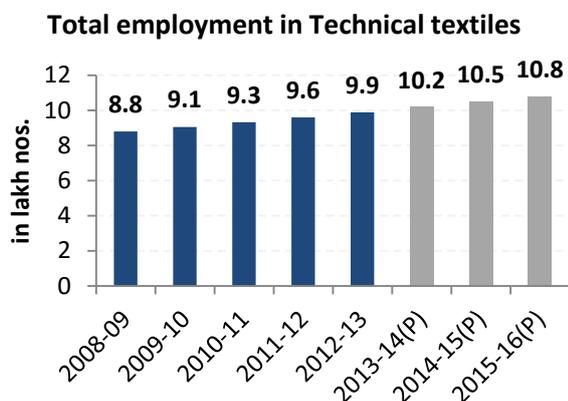
A significantly contrasting feature of CoEs abroad is the involvement of academic as well as industry stakeholders in their modus operandi. One of the most visible instances of this is the presence of active board members from industry and a frequent change in the same. An example of the same is North Carolina State University. Tie – ups with industry to provide hand holding support in all its activities helping in revenue generation and industry interaction is an area which also needs effort from the Indian industry. The gap can be bridged only with active participation and effort from both sides.

9. Marketing and Commercialization

In case of global CoEs, there is a huge thrust on marketing its services and ensuring repeat business from existing clients. This is instrumental in ensuring a continuous revenue stream. There is a dedicated branch for commercialization of proto-types and various IPR materials and other research outcomes. Active marketing is also done through extensive participation in international trade shows, conferences, seminars and demonstrations of utilities of Technical Textiles at similar platform

31. Manpower Availability

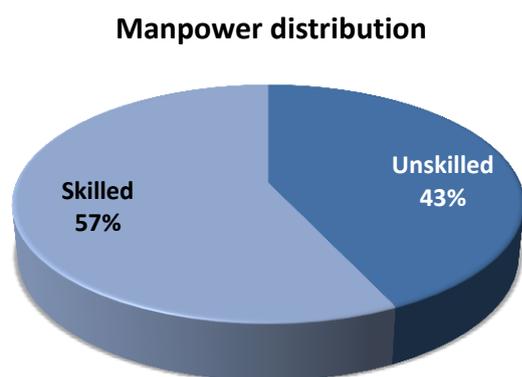
The Indian Technical Textile industry employed 9.89 lakh people in 2012-13. The employment in the industry has at the rate of 3% per annum during the last five years. The growth of man-power employed in Technical Textile sector can be seen in following exhibit **Exhibit 451: Total manpower employed in Technical Textiles**



Source: Technicaltextile.gov.in, iMaCS analysis

Skilled manpower composes approximately 43% of the total manpower employed in Technical Textile industry. This is relatively higher when compared to the textile industry of India. However, the high skilled operations in manufacture of non woven and Technical Textile manufacturing have been the driving force for employment of more and more skilled personnel. The distribution of supervisory, skilled and unskilled staff in the industry is as shown in Exhibit 452.

Exhibit 452: Distribution of man-power across industry

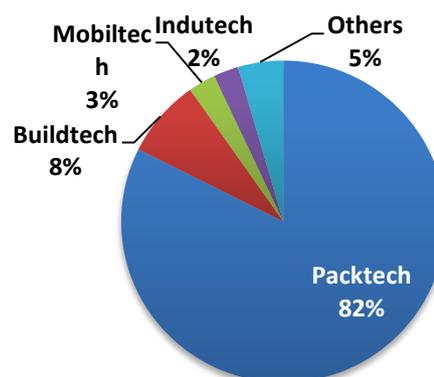


Source: iMaCS analysis, Primary survey

In addition to the above, over 1.07 lakh persons are also involved in the conversion industry related to Technical Textiles, most of which are involved in Packtech product based industries. Close to 27% of total Technical Textile output goes to converter industries where fabrication of final products and small value additions are done, before the product goes as a

input for downstream products. The key products where converter industry has a major role to play are Jute and hessian sack industry, FIBC bags, Canvas tarpaulins and HDPE tarpaulins. In all these products the converter industry is involved in final fabrication and stitching activities from the Technical Textile fabric. The sector wise split of employment generated by converter industry is shown in the following exhibit.

Exhibit 453: Segment wise Employment in converter Industry



Source: iMaCS analysis

Key Issues in Manpower

Although the man-power in the Technical Textile industry has been growing at 8% per annum for the last four years, the industry faces shortage of skilled man-power. The key issues faced with respect to manpower by the industry are:

- Lack of adequate ITIs and Polytechnics in the field of textile particularly for Technical Textile:** Technical Textile industry requires skilled workmen for many operations like for coating of fabrics, production of non woven, and operation of advanced machinery required for Technical Textiles. As most of the segment of Technical Textile is relatively small, the institutes offering courses in the textile stream do not provide specific training and education which are required for Technical Textile industry. In absence of any technical institute churning out skilled labourers, most of the industry players have to provide on job training or develop training courses so as to train the employees to a threshold skill-set of operation in Technical Textiles.
- High employee turn-over in the skilled category:** Industry faces lack of skilled labourers particularly in the segment of coated fabrics and advanced technologies. As the demand for skilled employees is very high, many workers after attaining a set skill

set through training prefer to switch organisation in pursue of higher pay grades. As a result, the organisation often finds it difficult to get the appropriate replacement in due time, often leading to loss of production or forcing the initial employer to provide a salary hike to the worker, leading to increase in cost of production.

Recommendations:

While the requirement of manpower is growing with more entrepreneurs and industrialists getting aware of the vast opportunities in Technical Textiles, the availability of skilled manpower is a key constraint. Therefore the following recommendations are suggested to enhance manpower availability:

- **Providing Training in Specialised Fields of Coating, Lamination, etc:** The demand for specialised textile activities is high in Technical Textiles, whereas most of the institutions fail to address these needs of the industry. Therefore it is suggested that a specialised diploma courses for specific processes like coating, laminations, non woven processing be carried out at major textile institutes across India. Currently such training is

being provided in limited numbers only by the Centre of excellences.

- **Dove-tailing skill development and manpower employment with ISDS scheme:** Ministry of textiles runs the Integrated Skill development Scheme for development of vocational and employable skills across different sectors of textiles and apparels. It is suggested that more of Technical Textile courses should be made part of the course, so as to educate masses in the specialised fields of Technical Textiles. Co-ordination with ISDS schemes would also provide the employers with a foundation from where they can hire labourers in case when employee turnover is higher or extra resources are required.
- **Inclusion of Technical Textiles as a Course/ Subject in all Textile Institutions:** It is recommended that Technical Textiles should be included as a course/ subject in all major textile institutions. This would help increase the awareness amongst the graduating textile engineers and workforce about Technical Textiles, while attracting newer people towards Technical Textiles. The step can give a significant boost by helping provide skilled workforce for Technical Textiles.

Skill Development

India has a total of eleven institutions that specialise in educating students on textile and Technical Textiles. These institutions offer under-graduate, post-graduate and also doctoral courses in textile sector. Most of these institutions are located in Maharashtra with a total presence in seven states. The details of these institutions are:

Exhibit 454: Institutions specialising in textile education and research

Sl. No.	Name of Institution	District	State	Course Offered	Specialisation
Colleges specifically for textile related courses					
1	Dept. Of Textile Engineering - IIT Delhi	Delhi	Delhi/ NCR	B.Tech - Textile Engineering M.Tech - Textile Engineering and Fibre Science Technology PH.D	
2	UP Textile Technology Institute (UPTTI)	Kanpur	Uttar Pradesh	B.Tech - Textile Chemistry B.Tech - Textile Engineering B.Tech - Manmade Fibre Technology B.Tech - Textile Technology M.Tech - Textile Engineering M.Tech - Textile Chemistry	
3	The Synthetic and Art Silk Mills' Research Association (SASMIRA),	Mumbai	Maharashtra	Diploma in Man-made Textile Technology Diploma in Man-made textile chemistry Diploma in Knitting technology Advanced Diploma in Apparel Merchandising	Agrotech
4	Bombay Textile Research Association (BTRA)	Mumbai	Maharashtra	Courses in various Technical Textile and textile processing – mechanical and	Geotech

Sl. No.	Name of Institution	District	State	Course Offered	Specialisation
Colleges specifically for textile related courses					
				chemical	
5	Northern India Textile Research Association (NITRA)	Ghaziabad	Uttar Pradesh	Diploma level Training programs in Knitting, weaving, processing, Technical Textile and textile technology	Protech
6	South India Textile Research Association (SITRA)	Coimbatore	Tamil Nadu	Training programmes for jobbers, operators and management training programs	Meditech
7	Manmade Textile Research Association (MANTRA)	Surat	Gujarat	Training programs in non woven technology	Agrotech
8	PSG College of Technology	Coimbatore	Tamil Nadu	M. Tech – Textile Technology PH.D – Textile Technology B.E - Textile Technology B.Tech – Fashion technology B.Sc- Apparel & fashion technology	Indutech
8	DKTE Society's Textile & Engineering Institute (DKTE)	Kolhapur	Maharashtra	Diploma Programmes • Diploma In Textile Manufactures • Diploma In Textile Technology • Diploma In Fashion & Clothing Under-Graduate Programmes • B.Tech. (Textile Technology) • B.Tech. (Manmade Textile Technology) • B.Tech. (Textile Plant Engineering) • B.Tech. (Textile Chemistry) • B. Tech. (Fashion Technology) Post-Graduate Programmes • M.Tech. (Textile Technology) • M.Tech. (Textile Chemistry) • M.Tech. (Technical Textile) Doctorate in Textiles (Ph.D.) MBA in Textile	Non woven
9	Ahmedabad Textile Industry's Research Association (ATIRA)	Ahmedabad	Gujarat	ATIRA provides training in the fields of Ginning, textile processing, weaving	Composites
10	Wool Research Association (WRA)	Thane	Maharashtra	Diploma in dyeing and finishing of wool, Training programmes in CAD, knitting, dyeing, physical and chemical testing	Sportech
11	Institute of Jute Technology	Kolkata	West Bengal	B.Tech - Jute & Fibre Technology B.Tech - Jute Technology M.Tech -Textile Technology	Jute Based Textiles

Source: Websites of institutions, Primary meetings

In addition to these institutions, there are another 29 colleges providing courses for engineering in textiles at the under-graduate level. The list of these institutions and colleges has been listed in the following exhibit

Exhibit 455: Institutions offering courses in textile engineering

Sl. No.	Name of Institution	District	State	Course Offered
Textile courses offered at other colleges – Under Graduate Courses				
1	University College of Technology	Hyderabad	Andhra Pradesh	BE - Textile Technology B. Tech - Textile Engineering
2	Maharaja Sayaji Roa University of Baroda	Baroda	Gujarat	M.E - Textile Engineering
3	L D College of Engineering	Ahmedabad	Gujarat	B.E - Textile Technology
4	Gujarat Technological Institute	Ahmedabad	Gujarat	B.E - Textile Technology

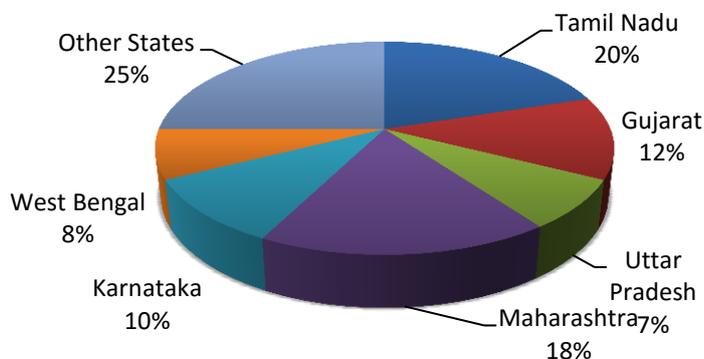
Sl. No.	Name of Institution	District	State	Course Offered
5	NGF College of Engineering Technology	Faridabad	Haryana	Fashion Technology & Apparels Engineering
6	Panipat Institute of Engineering and Technology	Panipat	Haryana	B.Tech - Textile Engineering
7	Visvesvaraya Institute of Technology	Belgaum	Karnataka	B.E - Silk Technology
8	Bapuji Institute of Engineering and Technology	Davangere	Karnataka	B.E - Textile Technology
9	Shri Jayachamarajendra College of Engineering	Mysore	Karnataka	B.E - Polymer Science & Technology
10	Government SKSJ Technology Institute	Bangalore	Karnataka	B.Tech - Textile Technology
11	Shri Viashnav Institute of Technology & Science	Indore	Madhya Pradesh	B.E - Textile Technology
12	Jawaharlal Institute of Engineering and Technology	Yavatmal	Maharashtra	B.E- Textile and Information Technology
13	Veer mata Jijabai Technological Institute	Mumbai	Maharashtra	M.Tech – Textile Technology B.Tech - Textile Engineering
14	Institute of Chemical Technology	Mumbai	Maharashtra	PH.D – Technology, Ph.D – Science M.Tech & M.Sc – Fibre and Processing technology, Textile Chemistry M.Tech & M. Sc – Textile Chemistry B.Tech - Fibres and Textile Processing Technology
15	ORISSA Institute of Textile Technology	Cuttack	Orissa	B.Tech - Textile Technology
16	Shri Guru Gobind Singh College of Engineering & Technology	Nanded	Maharashtra	B.Tech - Textile Technology
17	College of Engineering and Technology	Bhubaneswar	Orissa	B.Tech - Textile Engineering
18	Dr. B R Ambedkar National Institute of Technology	Jalandhar	Punjab	B.Tech - Textile Technology
19	Sangam University	Bhilwara	Rajasthan	B.Tech - Textile Technology
20	Karpagam University	Coimbatore	Tamil Nadu	B.Tech - Textile Technology
21	Sona College of Technology	Salem	Tamil Nadu	B.Tech - Textile Technology
22	Park College of Engineering & Technology	Coimbatore	Tamil Nadu	B. Tech - Textile Technology
23	K S Rangasamy College Of technology		Tamil Nadu	B. Tech - Textile Technology
24	Jaya Engineering College	Chennai	Tamil Nadu	B. Tech - Textile Technology
25	Bannari Aman Institute of Technology	Erode	Tamil Nadu	B.Tech - Textile Engineering
26	Harcourt Butler Technological Institute	Kanpur	Uttar Pradesh	B.Tech - Leather Technology
27	The technological Institute of Textile and Sciences	Bhiwani	Haryana	M.Tech – Textile M.Tech – Fashion & apparel engineering B.Tech – Textile Chemistry B.Tech – Textile Technology B.Tech – Fashion & Apparel
28	Government college of engineering and textile technology	Serampore	West Bengal	Textile Technology Apparel and Production Management
29	Government college of engineering and textile technology	Behrampore	West Bengal	M.Tech – Mechanical Processing of Textiles B.Tech – textile technology

Source: Compiled based on information in various education related websites like targetstudyetc and Information from CoEs,

These colleges are spread across India with clusters in Gujarat, Maharashtra and Tamil Nadu.

Exhibit 456: State wise distribution of textile institution

**State wise distribution of Textile institutes
(Total - 40)**



Source: iMaCS analysis

In addition to the above covered institutions offering textile courses, there are a total of 68 polytechnic and ITIs that offer specific diploma courses in textile sector. These are as follows:

Exhibit 457: Institutions offering diploma courses in textiles

Sl. No.	Name of Institution	District	State	Course Offered
Institutions, Polytechnic, ITIs offering diploma in textile field				
1	Government Polytechnic	Chittoor	Andhra Pradesh	Diploma in Textile Technology
2	Government Polytechnic, Obulavariapalli	Kadaba	Andhra Pradesh	Diploma in Textile Technology
3	S.R.R.S Government Polytechnic	Karimnagar	Andhra Pradesh	Diploma in Textile Technology
4	Shri Ram Institute of Management Technology	Delhi	Delhi	Diploma in Textile Technology
5	Aryabhata Polytechnic	Delhi	Delhi	Diploma in Garment Engineering
6	Government Polytechnic - Altinho	Panaji	Goa	Diploma in Garment Engineering
7	Government Polytechnic for Girls	Surat	Gujarat	Diploma in Textile Technology
8	Gujarat Technological Institute	Ahmedabad	Gujarat	Diploma in Textile Technology
9	Maharaja Sayaji Roa University of Baroda	Baroda	Gujarat	Diploma in Textile Technology
10	Sir. Bhavsinhji Polytechnic Institute , Vidhyanagar	Bhavnagar	Gujarat	Diploma in Textile Technology
11	Dr. S and S.S Gandhi College of Engineering Technology	Surat	Gujarat	Diploma in Textile Processing Technology Diploma in Textile Manufacturing Technology
12	Ganpat University	Mehsana	Gujarat	Diploma in Garment Engineering
13	Government Polytechnic	Hisar	Haryana	Diploma in Textile Technology
14	Central Polytechnic	Trivandrum	Kerala	Diploma in Textile Technology
15	Dr. B R Ambedkar Polytechnic College	Gwalior	Madhya Pradesh	Diploma in Textile Technology
16	Government Polytechnic	Mau	Madhya Pradesh	Diploma in Textile Technology
17	Shri Vaishnav Polytechnic College	Indore	Madhya Pradesh	Diploma in Textile Technology Diploma in Garment Engineering
18	NMIMS University	Mumbai	Maharashtra	Diploma in Textile Technology
19	University of Mumbai	Mumbai	Maharashtra	Diploma in Textile Technology

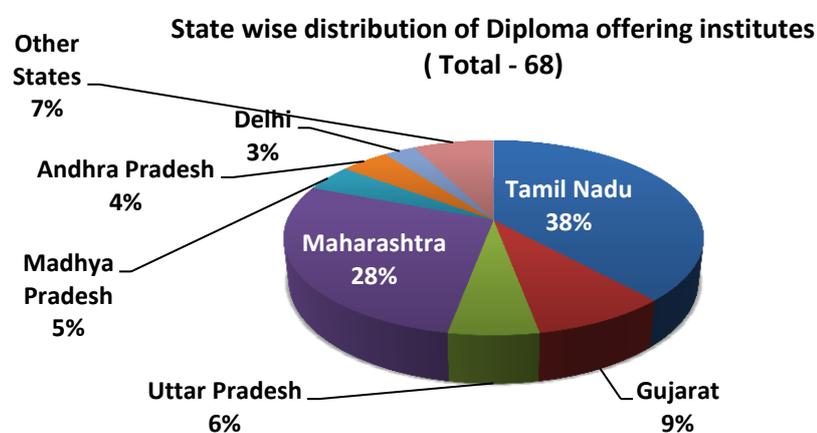
Sl. No.	Name of Institution	District	State	Course Offered
Institutions, Polytechnic, ITIs offering diploma in textile field				
20	Tilak Maharashtra Vidyapeeth	Pune	Maharashtra	Diploma in Garment Engineering
21	Institute of Textile Technology, Choudwar	Cuttack	Orissa	Diploma in Textile Technology
22	Punjab Institute of Textile Technology	Amritsar	Punjab	Diploma in Textile Technology
23	Jayoti Vidyapeeth Women's University	Jaipur	Rajasthan	Diploma in Garment Engineering
24	Annai J.K.K Sampoorani Ammal Polytechnic College	Erode	Tamil Nadu	Diploma in Textile Technology Diploma in Garment Engineering
25	Annamalai Polytechnic College	Villupuram	Tamil Nadu	Diploma in Textile Technology
26	E.I.T Polytechnic College	Erode	Tamil Nadu	Diploma in Textile Technology
27	Elumalai Polytechnic College	Villupuram	Tamil Nadu	Diploma in Textile Technology
28	G.R.G Polytechnic College	Coimbatore	Tamil Nadu	Diploma in Textile Technology Diploma in Garment Engineering
29	GandhiGram Rural Institute	Dindigul	Tamil Nadu	Diploma in Textile Technology
30	Gomathi Ambal Polytechnic College	Tirunelveli	Tamil Nadu	Diploma in Textile Technology
31	Institute of Textile Technology	Chennai	Tamil Nadu	Diploma in Textile Technology Diploma in Textile Manufacturing Technology
32	Karpagm Polytechnic College	Coimbatore	Tamil Nadu	Diploma in Textile Technology
33	Latha Mathavan Polytechnic College	Madurai	Tamil Nadu	Diploma in Textile Technology
34	Nachimuthu Polytechnic College	Coimbatore	Tamil Nadu	Diploma in Textile Technology
35	Nanjappa Institute of Technology	Coimbatore	Tamil Nadu	Diploma in Textile Technology
36	Nanjappa Polytechnic College	Coimbatore	Tamil Nadu	Diploma in Textile Technology
37	P.A.C Ramasamy Raja Polytechnic College	Virudhnagar	Tamil Nadu	Diploma in Textile Technology Diploma in Garment Engineering
38	P.S.G Polytechnic College	Coimbatore	Tamil Nadu	Diploma in Textile Technology
39	Pasumpon Nethaji Polytechnic College	Tirunelveli	Tamil Nadu	Diploma in Textile Technology
40	Periyar University	Salem	Tamil Nadu	Diploma in Textile Technology
41	Ratnavel Subramaniian Polytechnic College	Dindigul	Tamil Nadu	Diploma in Textile Technology
42	Rudhraveni Muthuswamy Polytechnic College	Tirupur	Tamil Nadu	Diploma in Textile Technology
43	Rukmani Shanmugam Polytechnic College	Madurai	Tamil Nadu	Diploma in Textile Technology
44	S.S.M Institute of Textile Technology and Polytechnic	Namakkal	Tamil Nadu	Diploma in Textile Technology
45	Shri Raghvendra Polytechnic College	Namakkal	Tamil Nadu	Diploma in Textile Technology Diploma in Garment Engineering
46	Sri Sowdambika Polytechnic College	Virudhnagar	Tamil Nadu	Diploma in Textile Technology
47	Subramaniam Polytechnic College	puudukottai	Tamil Nadu	Diploma in Textile Technology
48	Dr. Dharambal Govt. Polytechnic College for Women	Chennai	Tamil Nadu	Diploma in Garment Engineering
49	V.S. VellaiChamy Nadar Polytechnic College	Virudhnagar	Tamil Nadu	Diploma in Garment Engineering
50	Government Polytechnic	Kanpur	Uttar Pradesh	Diploma in Textile Technology
51	Government Girls Polytechnic, Gorakhpur	Gorakhpur	Uttar Pradesh	Diploma in Textile Technology
52	S.D. Polytechnic	Muzaffarnagar	Uttar Pradesh	Diploma in Garment Engineering

Sl. No.	Name of Institution	District	State	Course Offered
Institutions, Polytechnic, ITIs offering diploma in textile field				
53	Seth Jai Prakash Mukund Lal Girls Polytechnic	Ghaziabad	Uttar Pradesh	Diploma in Garment Engineering
54	Govt. Polytechnic , Solapur	Solapur	Maharashtra	Diploma in Textile manufactures
55	Govt. Polytechnic, Osmanabad	Aurangabad	Maharashtra	Diploma in Dress designing and garment manufacturing
56	Govt. Women’s residential Polytechnic, Yavatmal	Nagpur	Maharashtra	Diploma in Dress designing and garment manufacturing
57	Govt. Women’s residential Polytechnic, latur	Latur	Maharashtra	Diploma in Dress designing and garment manufacturing
58	Sophie Shree B K Somanai Polytechnic	Mumbai	Maharashtra	Diploma in Dress designing and garment manufacturing
59	Dattajirao Kadam Tech. Educational. Society’s Textile & engg. Institute	Icalkaranji, Kolhapur	Maharashtra	Diploma in Dress designing and garment manufacturing Diploma in Fashion & clothing technology Diploma in Textile technology Diploma in textile manufacturers
60	W. Tech. Educational. & research Smt. R Purohit Institute	Nagpur	Maharashtra	Diploma in Dress designing and garment manufacturing Diploma in Garment technology
61	Agnihori School of Technology	Wardha	Maharashtra	Diploma in Dress designing and garment manufacturing
62	Dr. Rajendra Gode Polytechnic	Amravati	Maharashtra	Diploma in Dress designing and garment manufacturing
63	Govt. Women’s residential Polytechnic – Tasgaon	Sangli	Maharashtra	Diploma in Dress designing and garment manufacturing
64	Rajiv Gandhi Technical Institute	Chandur	Maharashtra	Diploma in Dress designing and garment manufacturing
65	Indrayani College of technical education	Amravati	Maharashtra	Diploma in Dress designing and garment manufacturing
66	Swaraj Institute of Technology and Management Science	Amravati	Maharashtra	Diploma in Dress designing and garment manufacturing
67	Siddhant Institute of Technical Education, Nerphingli	Amravati	Maharashtra	Diploma in Dress designing and garment manufacturing
68	Siddhant Institute of Technical Education, Tiwasa	Amravati	Maharashtra	Diploma in Dress designing and garment manufacturing

Source: Compiled based on information in various education related websites like targetstudyetc and Information from CoEs

A majority of these institutes are clustered in Tamil Nadu. The state wise distribution of different ITIs and polytechnics offering diploma courses in textile is as shown in the following exhibit:

Exhibit 458: State wise distribution of polytechnics offering textile courses



Source: iMaCS analysis

32. Mandatory Regulations For Technical Textiles Across Different Countries

The mandatory regulations for different products across the countries are discussed in the following sections:

Geotech

The usage of geo textile is not mandatory but is governed by guidelines and is recommended as best practice. The recommendations made in “Wetland’s Best Management Practices” by the US Federal guidelines pertaining to the use of geo textiles are as follows:

- Geo textiles should be used during construction to minimize disturbance, filling requirements and the cost of maintenance.
- Geotextiles should be used in drainage as a filtering barrier to prevent percolation of the drain water into grounds, etc.
- Geotextile fabric use at landing sites is recommended in wetlands and on soils with low bearing strength to minimize soil erosion and compaction
- Geotextiles should be used to increase bearing strength of roads and prevent contamination of fill material with fine soil.

In addition to these, in European Union (EU) the CE marking are being used to ensure that the geotextile being used is of the correct standards. The following CE standards are applicable for geotextiles:

- EN 13249: Roads and other trafficked areas
- EN 13254: Reservoirs and dams
- EN 13250: Railways
- EN 13255: Canals
- EN 13251: Earthworks, foundations and retaining walls
- EN 13256: Tunnels and underground structures
- EN 13265: Liquid waste containment
- EN 13252: Drainage systems
- EN 13257: Solid waste disposals
- EN 13253: Erosion control works

Packtech:-

A number of packaging regulations prevalent in different countries mandates the use of Technical Textiles in the area of packaging. Europe, Japan, Australia and New Zealand already have the packaging regulations in place. These regulations mandate and govern the use of all the materials used in packaging, including Technical Textile materials. The highlights of

the Packaging regulations prevalent internationally and in different countries are as follows:

In Europe —*The European Union (Packaging) Regulations 2014* mandates the packers/manufacturers to meet design conditions for packaging. These regulations are mentioned under Section 4 and can be summarized as follows:

- Packaging should have the minimum adequate weight and volume while adhering to the necessary level of safety and hygiene.
- Packaging should be reusable, recoverable or recyclable and should be such that it has minimum impact on the environment on being disposed off,
- Packaging should be such that in case of disposal through landfills or incineration, the generation of toxic waste in form of ash, leach ate or emissions should be to the minimum.
- The physical characteristics of the packaging should enable prediction of number of rotations of permissible re-use.
- The packaging must be built in a manner, that certain percentage of weight is recoverable / recyclable once the complete usable life of product is over.
- Biodegradable packaging if used should be such that most of it decomposes to water, biomass and carbon dioxide.

JAPAN: Apart from Europe, Japan has strict packaging laws. - Container and Packaging Recycling Law, 1995 and the Regulation for food packaging in Japan governed by the “Food safety Basic Law (2003)” and food sanitation law (1947). These laws aim at zero waste development, by recycling all the waste and cracking down the non-recyclable waste though high power electricity and finally using the slag generated in the process in constructive applications like building roads. The key clauses of the regulations governing packaging are:

- Food Packing should not contain toxic or harmful content. The content should not have any adverse effect on food quality once contact is established between food and packaging.
- Specifications and standards for different food packaging materials are established.
- Packaging materials are taxed at source – “Recycling tax”, based on weight of the packaging. To reduce the tax burden, the companies have done significant Research and development to minimize weight of packing material.

- In line with Japan, China also introduced a similar policy called - “Circular Economy Policy” for packaging waste management in 2009.
- In Australia and New Zealand —The National Packaging Covenant, 1999|| launched by the Australian and New Zealand Environment & Conservation Council (ANZECC) governs usage of packaging products.
- In Republic of Korea, there are mandatory packaging requirements for poultry products sold in the market to be packaged (slaughtering plants, meat packers, sellers, and importers are subject to these requirements). These mandatory requirements encourage the use of packaging material.
- There is an Aerospace Recommended practice in place, drafted by International Air Transport Association (**IATA**), which recommends the use of Cargo Pallet nets. It recommends the use of cargo pallet nets and states that, the normal means of restraining cargo on a pallet is using the corresponding airworthiness certified net: when properly installed and closed over the pallet load, it provides an effective means of restraint (i.e., will not release its contents) up to the ultimate load factors applicable to the pallet position within the aircraft’s certified flight envelope
- The recommended practice by IATA also recommends the use of Pallet Covers. The policy recommends the usage of airworthiness mandated fire resistant covers required in FAR 25.857 Class B (Combi-aircraft main deck) compartments and also recommends proper use of common type pallet covers to prevent crushing of wet packaging, to avoid cargo stacks shifting out of contour or collapsing and potentially interfering with the aircraft structure

In developing countries including Asian countries like Malaysia, Indonesia, Thailand, Singapore and India, there is no system in place, regulating the usage of products/materials used for packaging. Only business guidance is available for the packaging industry in these countries.

Sportech

The mandatory regulations in Sportech are applicable only in case of protective wear for sports and for

parachutes. The key regulations for protective sports the leading sports associations govern wear. The key clauses are:

- **FIFA** – Mandatory use of shin guards and footwear during football matches
- **ICC** - International Cricket Committee (ICC) provides the standards and specifications for different protective equipment to be used in cricket – pads, gloves, arm and shin guards, helmets, etc.
- **Sports Biking Helmet** - Sports Bicycle helmets are mandatory in Australia, Chile and some parts of Canada. Many other countries have mandatory laws in urban areas and for the cyclist under the adult age like Austria, Slovakia, Spain, Japan, etc.
- **Hockey** – In field hockey, the players are recommended to wear shin, ankle and mouth protection. For the goalkeeper it is mandatory that his protective gear include a headgear, leg guards and kickers.
- USA Hockey Association makes it mandatory for all players to wear necessary protective equipments like guards, shin pads, shoulder pads, etc, with each player being personally responsible for doing so.

Mobiltech

Only a few products in the Mobiltech segment have mandatory usage requirements according to the various regulations and policies prevailing. The products for which policies recommending and mandating the usage are Helmets, Airbags, Seat belts and Air filters. Following is a summary of different regulations mandating and recommending the usage of textile products for Mobiltech applications:

Seat belt:-

Most western countries have some seat belt legislation. The move towards seat belt wearing legislation started in Australia in the late 1960s, although it was echoed elsewhere. Since then, seat belts regulations have been made mandatory in many countries and in others, there is a recommendation to use seat belts. The different countries where seat belts are mandatory are shown in Exhibit 459.

Exhibit 459: Regulation regarding seat belts

Country	Compulsory wearing				Compulsory fitting	
	Cars			Bus passengers	Cars	Buses
	Driver	Front passengers	Rear passengers			
Australia	1970					
EU	1993					
France	1973 (outside cities), 1975 (cities at night), 1979 (all)		1990	2003	1979	
Germany	1976	1976	1984	1999	1970, 1979 (back seat) 1999	
Hungary	1976		1993			
Hong Kong	1983	1983	1996		1996 (back seat)	
Ireland	1979		1992			
Japan			2008		1969	
New Zealand	1972	1972 (15 years and over), 1979 (8 years and over)	1989		1972 (vehicles registered after 1965), 1975 (after 1955)	
Spain	1975					
Sweden	1975	1975	1986	1986	1969 (front) 1970 (rear)	2004
United Kingdom	1983		1989 (children), 1991 (all)	2007 (if fitted)	1965 (front) 1986 (rear)	
United States	1985-1994 (except New Hampshire and American Samoa)				1966	2004

Airbags:-

Currently for Airbags, there are mandatory usage requirements in the USA only. The Intermodal Surface Transportation Efficiency Act of 1991 which mandates that all cars and light trucks should have air bags on both sides came into effect in 1998 in USA. This was mandated by the National Highway Traffic Safety Administration (NHTSA), U.S.

In the United Kingdom, and most of Europe, there is no direct legal requirement for new cars to feature airbags. Instead, the Euro NCAP vehicle safety rating encourages manufacturers to take a comprehensive approach to occupant safety. A good rating on NCAP can only be achieved by combining airbags with other safety features like seat belts. Thus almost all new cars now come with at least two airbags as standard. In Australia, the Australasian College of Road Safety (ACRS) recommends use of air bags as a secondary restraint. However, the regulation regarding mandatory air bags is still not in place due to the various aspects related to air bags like potential threat to children and pregnant women seating in front, etc.

Helmets:-

Motorcycle helmets are of high significance in preventing fatal head injuries in case of two wheeler accidents. Most of the countries across the world have mandatory norms for use of helmets in two wheeler motor vehicles. The major countries having regulations governing helmets and the respective regulations are shown in

Exhibit 460: Mandatory helmet regulations across the world

Sl. No.	Country	Year of acceptance	Regulation
1	United Kingdom		BSI 6658, SHARP
2	Australia & New Zealand		AS/NZS 1698, CRASH
3	Canada		CSA CAN3 D230 – M85
4	USA		DOT FMVSS 218
5	Europe		ECE regulation 22
6	Russia		GOST R 41.22-2001
7	Philippines		ICC
8	Japan		JIS T 8133:2000
9	Malaysia		MS: 1:2011

Sl. No.	Country	Year of acceptance	Regulation
10	Brazil		NBR 7471
11	Indonesia		SNI
12	Vietnam		TCVN 5756: 2001
13	China	Mar 1988	Regulation of Road Traffic Administration
14	India	IS 4151	

Diesel Particulate Filter (Air Filters)

There are no direct regulation which controls use of air filters in automobiles, but many stringent emission norms and regulations followed across the world indirectly effect the market for air filters, as these emission regulation, requires that a modern updated air filter is used and that the engine be replaced with the low polluting one after considerable time period. The latest such regulation was passed in California in 2014 by the Air Resource Board. It states, that all diesel fuelled heavy vehicles with weight more than 14,000 pounds are too slowly upgrade the engines over a period of next 10 years in such a manner that all vehicles have particulate matter filter by 2016 and meet m=engine model year requirement by 2023.

Similarly in Europe stringent legislation regarding engine emission is in place to check air pollution. Any light vehicle in Europe must have a Euro 4 engine and the legislation for changing the same to Euro 5 is already in way. Similarly, for heavy vehicles the emission standards are set by Directive 2005/55/EC and Directive 2005/78/EC. To adhere to these regulations, vehicle manufacturers must use high quality diesel particulate filter, thereby affecting the market of air filters.

Tiedown:

The Aerospace Recommended practice in place, drafted by **IATA**, recommends the use of tiedowns along with Cargo Pallet nets and Pallet covers for Air transport purposes. This is because significant load shifting or deformation out of contour (without being released from the net) which may not be always entirely avoided with a net has a potential for aircraft structural damage. The Association therefore recommends the use of tiedowns straps in complement to net restraint.

Meditech

Though there are a number of standards/test requirements in place for the Technical Textile and other products used in Meditech segment, there are hardly any regulations mandating the use of Meditech products. However, commonly established norms and standard practices promote the usage of Meditech products, conforming to set standards as identified by

relevant associations across different countries. A summary of regulations and standard practices recommending the use of Meditech products across countries is as follows:

Sutures:-

Food and Drug Administration, U.S., has approved and recommended synthetic absorbable sutures for almost all surgical uses with the exception of certain cardiovascular and neurologic surgical procedures. Later use non-absorbable sutures as a standard practice, as, for example, in the suturing of prosthesis to tissue. Synthetic absorbable sutures have been used in many thousands of surgical operations of many types and show prospects of replacing other absorbable suture materials traditionally used in surgical operations. As a standard practice, the synthetic absorbable materials are also being used in some procedures in place of non-absorbable materials because of their retained strength and low tissue reactivity.

Sterile Packaging:-

Though there is no law mandating the use of sterile packaging, in U.S., International Association of Healthcare Central Service Material Management (IAHCSMM) has given the "Sterile Storage and Transport Standards". The standards/law recommends the use of sterile packaging for safe medical procedures.

Healthcare Textiles:-

Healthcare textiles include surgical clothing (gowns, caps, masks, uniforms etc.), surgical covers (drapes, covers etc.) and beddings (sheets, blankets, pillow cases etc.). These healthcare textiles are of two types, disposable and non-disposable. As standard practice these healthcare textiles are currently being used by healthcare professionals all over the world because these are an important measure to control infection in a healthcare setting. Following are the key benefits provided by the healthcare textiles, because of which the use of these textiles has gain popularity recently:

- Prevent the penetration of bacteria, microorganisms, or particulates (wet and dry).
- Avoid penetration of liquids to the skin
- Controls spread of infections from visitor to the hospital environment and vice versa.

The use of these textile materials (both disposable and non-disposable) has also gained popularity in developing countries because of increased awareness in the user segment. According to the standard

practice, trend is now changing and the use of disposable healthcare textiles is increasing.

AAMI is the Association for the Advancement of Medical Instrumentation. This organization consists of healthcare professionals, professional organizations, medical device manufacturers and trade organizations. AAMI is dedicated to increasing the safety and efficacy of medical instrumentation through education and the creation of uniform standards. Within AAMI there are technical committees (representing users, manufacturers, academia and regulators) that create the different standards and recommended practices. AAMI's standard PB70:2003 provides the specifications relating to Liquid Barrier Performance and Classification of Protective Apparel and Drapes Intended for Use in Health Care Facilities. The main objectives of the standard are:

- To help end-users select the types of drapes and gowns most appropriate for a particular task
- Assist manufacturers in qualifying, classifying and labelling the barrier performance of their products

These objectives are accomplished through a system of classification based on the products' liquid barrier performance (in the critical zones). There are four levels of barrier performance, level 4 being the highest protection available.

Exhibit 461: Barrier performance test classification for Meditech

Level	Test	Result
1	AATCC 42 Water Impact (WI)	≤ 4.5 g
2	AATCC 42, WI AATCC 127 Hydro Head (HH)	≤ 1.0 g ≥ 20 cm
3	AATCC 42, WI AATCC 127, HH	≤ 1.0 g ≥ 50 cm
4	ASTM F1671, Gowns ASTM F1670, Drapes	Pass Pass

The following table summarizes the OSHA regulations mandating the use of PPE products for protection from various hazards:

Exhibit 462: Summary of OSHA regulation

Category	PPE Product	Hazards Protected
Eye and face protection	Face mask, eye glasses and other eye and face protection equipments	Hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapours, or potentially injurious light radiation
Respiratory protection	Filtering face piece (dust mask), Helmet, High efficiency particulate air (HEPA) filter and other respiratory protection products	Hazards from dust and other respiratory related hazards.
Head	Protective Helmets	Hazards when working in areas where there is a

Protech

Personal Protective Clothing/Equipment: - In the Protech segment there are regulations mandating the use of personal protective clothing /equipment in most of the developed countries. In U.S. and U.K., these regulations mandate the usage of PPE at the workplace. The highlights of the regulations prevalent in different countries mandating the use of Protech products are as follows:

U.S.A:-

In U.S., federal regulations mandate the use of personal protective equipments (PPE) under "Occupational Health and Safety Act (OHSA)". The highlights of the OHSA regulations related with PPEs are as follows:

- The act obliges an employer to eliminate any reasonably foreseeable risk to the health and safety of any person at the place of work. If it is not reasonably practicable to eliminate the risk, the employer is mandated to control the risk and the usage of PPE is advised and recommended for the same.
- The act mandates the employer to provide and ensure the use of protective equipment at the place of work wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. The act also mandates the equipment to be maintained in a sanitary and reliable condition.
- In case the employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.
- The Regulation also mandates the use of particular types of PPE in certain circumstances as a means of control. This include use of harnesses in elevated work platforms and use of specific types of PPE in asbestos removal processes

Protection		potential for injury to the head from falling objects.
Occupational Foot protection	Protective footwear	Hazard of foot injuries due to falling or rolling objects, or objects piercing the sole, and where there are electrical hazards.
Hand protection	Gloves a other related PPE	Hazards to hands such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.
Torso Protection	PPE including fire retardant wool and specially treated cotton clothing items and other types of protection including leather, rubberized fabrics, and disposable suits for Torso protection	Torso protection: heat, splashes from hot metals and liquids, impacts, cuts, acids, and radiation.

Europe:-

In Europe, "The Personal Protective Equipment at Work Regulations act" governs and mandates the use of PPEs at the workplace. The regulations are somewhat similar to those in OSHA. Following points summarizes the act

- The regulations mandate the employers to provide free of charge PPEs to his employees who may be exposed to a risk to their health or safety while at work except where and to the extent that such risk has been adequately controlled by other means which are equally or more effective.
- The regulation also mandates the use of PPEs by self-employed persons.
- The law also mandates the employer to take into account the seriousness and frequency of the risk when deciding on the frequency of use of PPE.
- The law also states the requirements for compatibility, assessment, maintenance, and accommodation etc. of the PPEs.
- The regulation applies to and mandates the usage of PPEs like safety helmets, gloves, eye protection and high-visibility clothing, Safety footwear, chemical protective clothing, thermal protection clothing etc.

South Africa:-

The South African Department of Health has a protective clothing policy for radiation control. The policy regulates the use of protective clothing at the places having radiological emission. The policy mandates the use of:-

- Protective aprons (workers)

Buildtech:-

The usage of Technical Textile products in Building/Construction is governed by the respective building codes prevalent in different countries. These building codes regulate the usage of different Technical Textiles used in buildings. Though these codes do not

- Protective gloves (workers)
- Thyroid shields for patients and radiation workers
- Gonad shields for patients

Australia:-

In Australia, 'Motorcycling Australia', the governing body of motorcycle sport, encourages and recommends the use of PPEs for all motorcycle activities. But, the body does not support the mandatory imposition of the use of protective clothing. The body also supports enforcement and registration authorities which act to encourage the use of protective equipment by motorcyclists. The body has taken a number of initiatives for the same, including the following:

- The body supports the removal of GST and all other taxes on CE Standards approved protective clothing with a belief that this will reduce the price of protective clothing.
- It supports the adoption of the CE standards for impact protection, back protectors, protective clothing, protective footwear and stone and debris shields by all manufacturers.
- It supports the prosecution of any person or organisation importing or selling protective clothing which purports to meet any Standard but does not.
- The institute also supports the prosecution of any person or organisation importing, manufacturing or selling labels which are intended to mislead as to compliance of any protective equipment with a Standard.

mandate the use of Technical Textiles, these codes have the mandatory specification standards for different products used (roof coverings, floor coverings, membranes, textile structures etc.). These specifications include fire testing standards among others. Different test requirements/standards are specified in different building codes and the

manufacturer/builder should refer to the building code prevalent applicable to the area of work for

- construction materials regarding their combustibility;
- floor coverings;
- roofing's;
- surface layers of construction materials and structures;
- textile furnishing materials;
- protective layers of structures of combustible materials;

The Building codes safeguard life and protect the public welfare by regulating design, construction practices, construction material quality (including fire performance), location, occupancy, and maintenance of buildings and structures. When regulating materials, many of the model building codes refers to quality consensus standards for products or tests developed by standard-setting organizations such as ASTM and the National Fire Protection Association (NFPA).

Following is a brief description of building codes/regulations, currently in place in different countries:

Europe:-

The European Commission published the building products directive (89/106/EEG) in 1989 to promote free trade of building products. The directive contains six essential requirements that apply to the building itself. One of the requirements is safety in case of fire. Therefore building products must have a fire classification based on the same standards throughout Europe. A member state that regulates for a certain safety level will be able to identify the fire properties of a building product corresponding to that level. Products complying with the essential requirements of the directive are labelled CE. The function of the building directive relies on a number of specifications. In the fire area a definition of European fire classes, harmonised test standards and rules for attestation of conformity are such important specifications. The European fire classes and the rules for attestation of conformity are published by the European Commission. The reactions to fire standards are published by CEN.

U.S.A:-

Building codes in the U.S. have developed over the years principally by locality and region. Local municipalities can choose to adopt their own building code version. Thousands of such jurisdictions across the country could make this potentially unworkable for material suppliers, designers, architects, and the construction industry. Even today there are virtually

conforming to the local standards. These building codes generally apply to the following:

- steel structures;
- walls, posts, beams, inserted ceiling and roof structures;
- fire doors;
- feed through;
- closing fire barriers;
- smoke channels and valves

no nationally mandated building codes or regulations. There are three Model Building Codes in the U.S. that have been in effect since about 1940. These codes, until recently, have been updated every 2 or 3 years. Their use has been preferred in the following regions:

- The West: The Uniform Building Code (CBC) issued by the International Conference of Building Officials (ICBO).
- The Midwest and Northeast: The BOCA National Building Code issued by Building Officials and Code Administrators International, Inc.
- The South: The Standard Building Code issued by the Southern Building Code Congress International, Inc. (SBCCI).

Following are the brief points summarizing the building codes in U.S.

- These model building codes are favoured in the areas where they originate and are adopted in full or in part in state or city building regulations.
- Local or regional variations in building code acceptance allow for particular concerns of that area; for example, heavy wind resistance is needed along the Gulf Coast and Florida because of the hurricane threat and building codes and regulations have been altered in California because of the likelihood of earthquakes.
- Localities can adopt a model building code but with specific changes or provisions needed in their particular location.
- Fire precautions are dealt with comprehensively in these model building codes. Many of the fire standards referenced in the codes are issued by the American Society for Testing and Materials (ASTM). Many building authorities also use the nationally available NFPA 101 Life Safety Code of the National Fire Protection Association (NFPA), which also covers fire precautions.

U.K.:-

Like U.S., in U.K. also there is no universal building code applicable. Following are building regulations apply in the various parts of the United Kingdom:

- England and Wales: The Building Regulations 1991.

- Scotland: The Building Standards (Scotland) Regulations 1990-1997.
- Northern Ireland: The Building Regulations (Northern Ireland) 1991.

These regulations give the technical provisions for use and fire performance of building materials and components in the supporting documents to the Building Regulations. All the technical provisions are based on the same test methods specified in British Standards.

Japan:-

In Japan, The Building Standards Law came into effect on November 16, 1950. The law lays down guidelines and standards for plots of land, building design, furnishing and use. The law after subsequent revisions defines:

Basic requirements - definition of categories of building parts and materials

- Fireproof, fire preventive construction, non-combustible materials, etc.
- Quasi non-combustible materials, fire retardant materials, and so forth.

Performance criteria required for defined building parts and materials

- Fireproof, quasi-fireproof, fire preventive construction
- Non-combustible, quasi-non-combustible, fire retardant materials.
- *Approval of building parts and materials with the required performance*
 - Approval for "performance evaluation report" of tested materials (based on specific test methods and technical criteria) are submitted by designated examination bodies
 - Among the specification-based materials listed in the previous notifications, those that proved to satisfy the new fire performance requirements are presented in the new regulation system.

Other Countries:-

The other countries where there are building codes regulating the products used in the building construction are: China, Germany, France, Belgium, Ethiopia and Nordic countries (Denmark, Finland, Iceland, Norway and Sweden) amongst others.

Apart from the building regulations explained above there are other regulations which recommends and mandates the usage of Technical Textile products for building applications. Some regulations and standard practices also require the Technical Textile products to be used for enhanced performance and safety

purposes. The regulations for some of the products are explained as follows:

Scaffolding nets:-

In US, OSHA regulates and mandates the use of fall protection system including the safety nets and personal fall arrest systems. The act requires the employer to determine if the walking/working surfaces on which its employees are to work have the strength and structural integrity to support employees safely. The act mandates the employer to protect the employees from falling by the use of guardrail systems, scaffolding/safety net systems, or personal fall arrest systems. There are also other regulations mandating the use of safety nets at specified places of work.

House-wrap:-

In US, the building code requirements for air infiltration and moisture protection barriers encourage the use of House wraps. All Model codes recommend the use of a weather-resistant barrier paper behind porous veneers. Though the codes usually cite 15-pound felt, all the codes allow for the substitution of "equivalent" materials, opening the door for plastic house-wraps. The house-wraps are mandated to pass performance tests conducted by an independent lab to qualify as an equal. There are also some states (Massachusetts, Michigan and Wisconsin), which have incorporated air barrier requirements into their commercial energy conservation codes. This encourages the use of house wraps.

Hometech

In U.K., for the Hometech segment, there are regulations in place for fire safety of Furniture and Furnishings. The Furniture and Furnishings (Fire) (Safety) Regulations 1988 set levels of fire resistance for domestic upholstered furniture, furnishings and other products containing upholstery. These regulations do not mandate the use of Technical Textile products but encourages the use of these products as Technical Textile products are manufactured to meet these standards:

- furniture intended for private use in a dwelling, including children's furniture
- beds, head-boards of beds, mattresses (of any size)
- sofa-beds, futons and other convertibles
- nursery furniture
- garden furniture which is suitable for use in a dwelling
- furniture in new caravans
- scatter cushions and seat pads, pillows,
- loose and stretch covers for furniture

These regulations mandate the use of textile products meeting the set standards, resistance requirements etc.

In U.S., there are also set Flammability Test Procedure for Seating Furniture for Use in Public Occupancies. These test procedures are mandatory to be followed and standards are mandated to be met.

Oekotech:-

In Oekotech, there are mandatory waste disposal policies in various countries in the world, but these are very limited. Most of the developed countries including U.S., Germany, U.K., have the waste collection and disposal policies, under which the waste is calculated by the residential and industrial premises and is then disposed off in an appropriate manner. These policies mandate the usage of waste containers in certain cases. The main policies are highlighted subsequently:

In U.S.A,

The Code of Federal Regulations (CFR) gives the guidelines for the storage and collection of residential, commercial and institutional solid waste under Title 40 Part 243. The code gives the design specifications for different type of containers and mandates the usage of these containers. The law gives the requirements and recommended procedures and operations for safety, collection equipment, and collection frequency and collection management. The code highlights the following:-

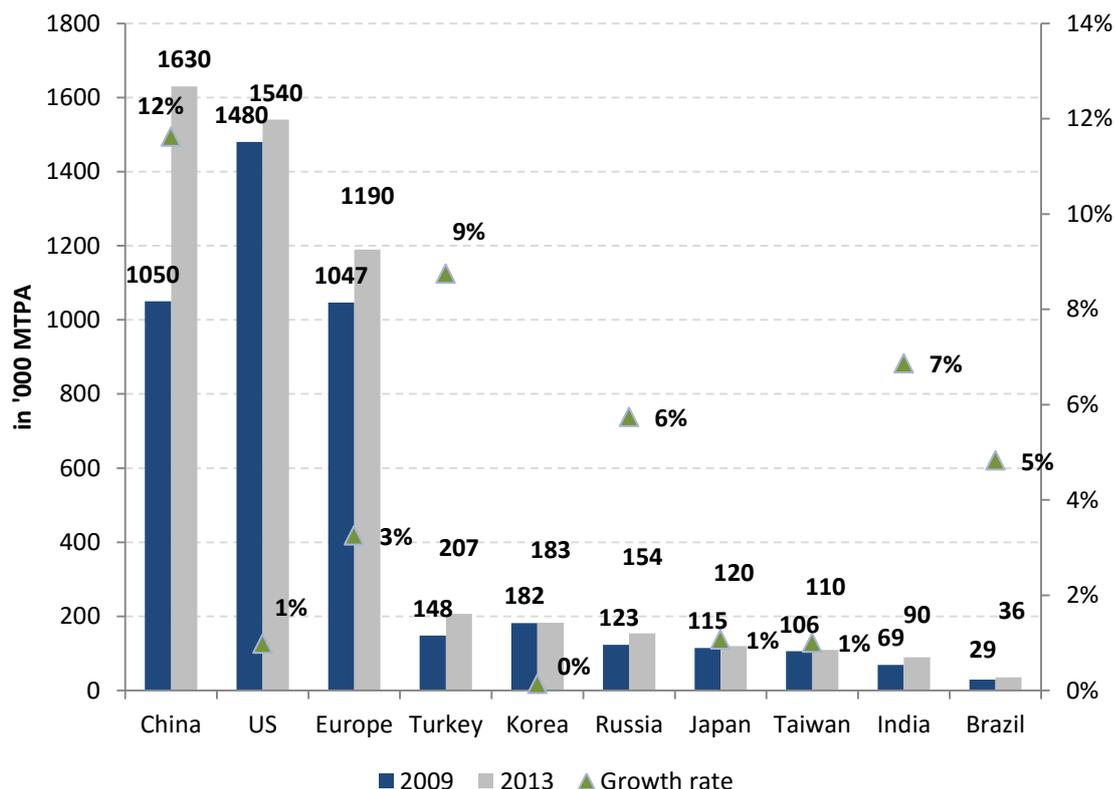
- All solid waste containing food wastes shall be securely stored in covered or closed containers which are non-absorbent, leak-proof, durable, easily cleanable (if reusable), and designed for safe handling so that they do not constitute a fire, health, or safety hazard.
- Containers shall be of an adequate size and in sufficient numbers to contain all food wastes, rubbish, and ashes that a residence or other establishment generates in the period of time between collections.
- In the design of all buildings or other facilities which are constructed, modified, or leased after the effective date of these guidelines, there shall be provisions for storage in accordance with these guidelines which will accommodate the volume of solid waste anticipated, which may be easily cleaned and maintained, and which will allow for efficient, safe collection.
- Waste containers used for the storage of solid waste must meet the standards established by the ANSI for waste containers.

In District of Columbia, the government has a mandatory Solid Waste Management Policy under which The District's Executive Branch must provide a clearly labelled box for separation and collection of recyclable paper for every government employee's office work area. Paper deposited in such boxes shall be moved to appropriate designated collection points in each building to be collected by the custodial staff and, finally hauled and delivered to a recycling facility.

33. Competitive Assessment Of India Vis-a-vis Other Countries

US, Europe and China are the largest manufacturers of Technical Textile product together accounting for more than 80% of the production. While the production in Europe and US is stagnant for the last few years, China is rapidly building capacity for production of Technical Textile products. Other than these, key manufacturers of Technical Textile are Korea, Japan, Turkey, India, Mexico and Brazil. India accounts for less than 5% of the world Technical Textile production. The production of Technical Textiles across top ten Technical Textile manufacturing countries is shown in the following exhibit.

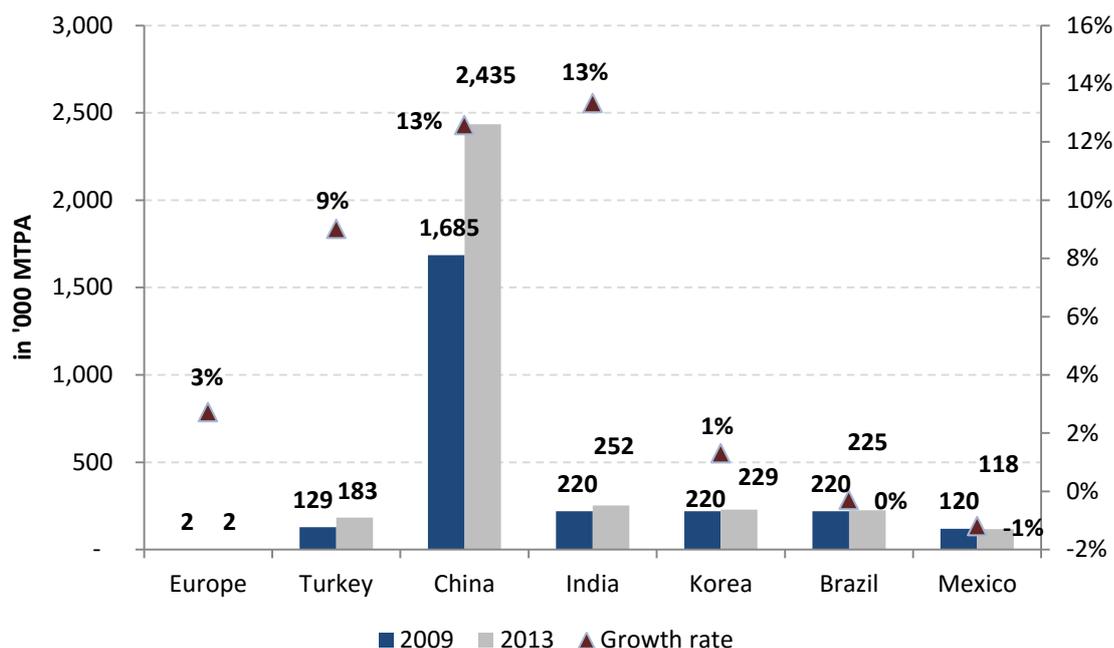
Exhibit 463: Fibre consumption of Technical Textiles across the world



*source: Report on world market Technical Textile by CIRFS

In the last few years, globally the manufacturing of non-woven has increased with better awareness about the benefits of the same. India accounts for about 6% of world’s non woven production. China is world’s largest non –woven producer accounting for close to 60% of world production. The major manufacturing locations for non woven are located in Asia and Latin America. The top manufacturing countries are China, India, Korea, Brazil and Mexico. During the last five years only India and China have seen high growth rate in production of non-woven fabric, while investment in most other developing countries has been insignificant. The production of non woven across the top non woven manufacturing countries is shown in following exhibit.

Exhibit 464: Production of non woven across major countries



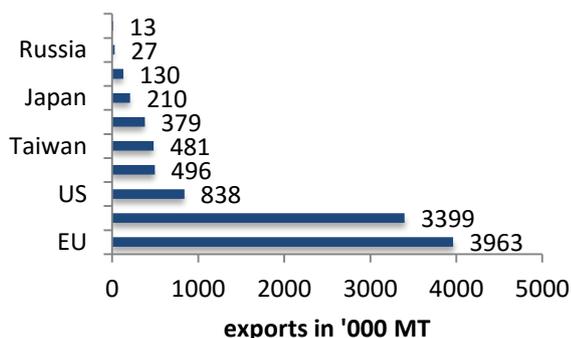
*source: Report on world market Technical Textile by CIRFS, IMAcS analysis

International Trade

European Union (EU) is the largest exporter of Technical Textile in the world closely followed by China. India accounts for roughly 4% of exports of Technical Textile world over. The details of imports of Technical Textile by the top 10 exporting countries are as shown in Exhibit.

Exhibit 465: Export of Technical Textile in the world - 2010

2010- World export of technical textiles

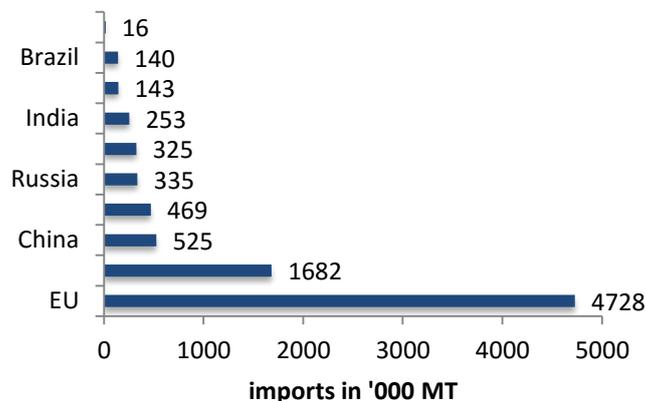


Source: Report on world market Technical Textile by CIRFS

On the import side, EU and US are the largest importers accounting for close to 70% of imports of Technical Textile. Europe is the largest player in Technical Textile foreign trade having a major share in both exports and imports. The imports of Technical Textile across top ten importing countries is as shown in Exhibit 466.

Exhibit 466: Major importers of Technical Textiles - 2010

2010- World import of technical textiles

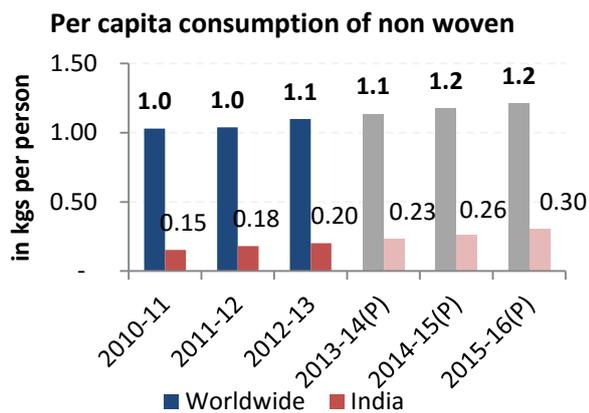


Source: Report on world market Technical Textile by CIRFS

Consumption of Technical Textiles

While India is slowly catching up to become a significant player in Technical Textile world market, there is a lot of unexplored potential in the domestic market that has not yet been tapped primarily due to lack of awareness about the benefits of Technical Textiles. The Indian per capita consumption of non woven is just about 200 gm whereas the world wide non woven consumption is estimated to be 1.1 kg. Although the Indian per capita consumption is expected to grow at 15% in coming years, there still is a vast potential for non woven application in India

Exhibit 467: Per capita non woven consumption



Source: EDANA, iMaCS analysis

Similarly India also lacks in the consumption of composites when compared to the world with per capita consumption of composites hovering at just around 0.25 kg in India when compared to that of 10 kg in United States of America. Indian composite usage is mostly limited to glass fibre composites with very little application of carbon composites.

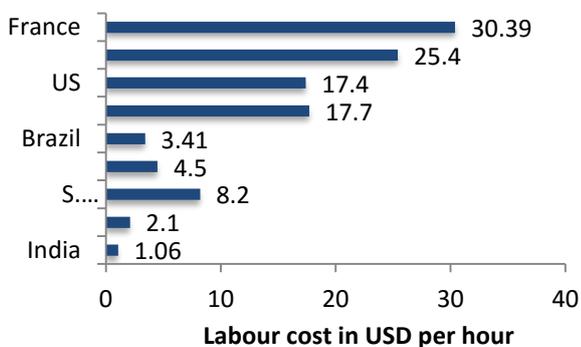
Country-wise Factor Analysis

The major factors incentivising investment and production of Technical Textiles are easy availability of raw material, cheap labour force goods promotional policies and low power tariffs. Comparison of India with respect to major developing countries involved in Technical Textile industry is as follows:

Comparison of Labour Cost

India is one of the places with cheapest labour when it comes to Technical Textile industry. Given the fact, that many segments of Technical Textile industry require lot of manual labour in form of stitching and weaving, cheap labour acts as a substantial benefit over other countries in particular China. Labour cost across major countries is shown in the following Exhibit.

Exhibit 468: Average labour cost across countries - 2011

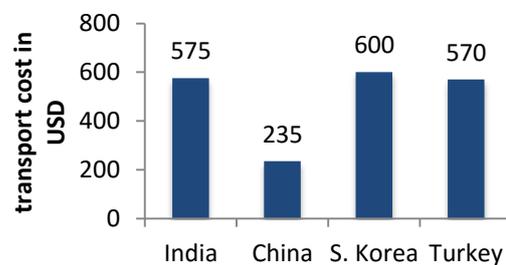


Source: Werner International, iMaCS Analysis

Comparison of Transportation Cost

Technical Textile industry across the world is staggered, with Asia leading in exports and US and EU leading in consumption and imports. Therefore for most countries involved in foreign trade of Technical Textile, the transport cost incurred becomes a major factor while importing products. Unlike labour, the transport and handling cost at Indian ports is relatively on a higher side when compared to other countries. China exporters have an advantage here with total transport and handling cost at ports at just about 1/3rd of other major suppliers. The detail of the transport and handling cost at ports is as shown in the following exhibit.

Exhibit 469: Average handling and transport cost at ports in USD



Source: World Bank, iMaCS Analysis

Comparison of Availability of Raw Material

One of the prime factors determining the growth of Technical Textile industry in a country is the easy availability of raw materials. India and China has advantages when it comes to availability of raw material due to a flourishing indigenous textile industry. India and China are amongst the largest producers of both man-made and natural fibres which gives them a strategic edge of availability of cheap and regular supply of key raw materials. Comparison on the same front can be seen in the following exhibit:

Exhibit 470: Raw material availability in key textile countries

Raw Material	India	China	South Korea	Japan	EU	Turkey	Latin America
Production							
Man-made fibres	High	Very high	Moderate	Low	Moderate	Moderate	Low
Natural Fibres	High	Very High	Low	High	Low	Low	Low
Dependancy on import	Low	Low	Moderate	High	High	Moderate	High

2012 International Top 40 Non-woven Companies

The top 40 international companies by sales value are mentioned in the below table:

Exhibit 471: Top international non woven companies

S.No	Company	Sales (2012)
1	Freudenberg	\$ 1.48 Billion
2	Dupont	\$ 1.35 Billion
3.	Kimberly-Clark Corporation	\$ 1.25 Billion
4	PGI	\$ 120 million
5	Ahlstrom Corporation	\$ 106 million
6	Johns Manville Corporation	\$ 670 million
6	Fitesa company	\$ 670 million
8	Glatfelter	\$ 538 million
9	Fiberweb company	\$ 465 million
10	Avgol	\$ 329 million
11	Sandler AG Sandler AG	\$ 311 million
12	Hollingsworth & Vose (H & V) Hayes-Group (H & V)	\$ 300 million
13	Japan Vilene	\$ 263 million
14	Companhia Providencia	\$ 260 million
15	First Quality Nonwovens	\$ 250 million
16	Asahi Kasei	\$ 246 million
17	Buckeye Technologies	\$ 239 million
18	Fibertex Personal Care A / S Fibertex Personal Care A / S	\$ 229 million
19	Toray Advanced Materials Advanced Materials	\$ 224 million
20	Mitsui Chemicals Mitsui Chemicals	\$ 219 million
21	Colbond company	\$ 210 million
22	Pegas Nonwovens PEGAS Nonwovens	\$ 203 million
23	Jacob Holm Industries Jacob Holm	\$ 192 million
24	Union Industries	\$ 184 million
25	Toyobo	\$ 164 million
26	Vita Nonwovens	\$ 159 million
27	Georgia-Pacific	\$ 152 million
28	Andrew Industries	\$ 150 million
28	Textilgruppe Hof	\$ 150 million
30	Propex Holdings	\$ 140 million
31	Lydall Company	\$ 134 million
32	Precision Custom Coatings	\$ 132 million
33	Suominen Nonwovens Suominen Nonwovens	\$ 131 million
34	Hassan Group	\$ 128 million
35	Fibertex Nonwovens A / S Fibertex Nonwovens A / S	\$ 126 million
36	Unitika	\$ 122 million
37	The Jofo Group	\$ 120 million
38	Nan Liu Enterprise South six corporate NEW	\$ 118 million

S.No	Company	Sales (2012)
39	Spuntech	\$ 113 million
40	Kuraray	\$ 112 million
41	KNH	\$ 100 million
42	Dounor Nonwovens	\$ 92 million

Source: Taiwan nonwoven fabrics industry association

Key Advantages of Investing in India w.r.t Global Players

With respect to other developing countries that are proficient in Technical Textiles like China, Taiwan, Japan and Korea, India has a distinct advantage of being at a geographically favourable position as well as a strong raw material base which gives it an edge when looking of investment. In addition to this, the fast growing domestic market is a major driving force for the Technical Textile industry which is still in a nascent stage with vast potential of growth lying untapped within Indian markets. These factors coupled with the promotional incentives provided by the government for targeting export market makes India a favourable destination for investment in Technical Textiles. The key advantages with respect to global counterparts have been further enumerated as follows:

1. A strong raw material base second only to China in both natural fibres as well as manmade fibres
2. A stable political government that promotes investment and has policy benefits to attract investors.
3. A growing domestic market with increasing purchasing power where Technical Textiles is expected to grow significantly in coming year

Products Being Used in Other Countries but not in India

As the Technical Textile industry of India is still in its growing phase especially in the segments of geo-tech, agro-tech and Meditech, there are few products that are yet to come to Indian markets. Some of the key products that can have a potential market in India are:

Silage bags

India has one of the largest cattle populations in the world, making it one of the leading countries in milk production. However, the dairy industry of India is highly un-organised and traditional in approach with share of organised industry limited to just 6.5% of the industry. Most of the production is carried out in villages and small dairy sheds at sub-urban locations.

The industry faces the issue of poor milk yield, which is less than 50% of the average yield around the world. It is because the cattle is given dry fodder for most of the year, as the period for cultivation of green fodder is

limited to just a few months. Indian government has been actively involved in promoting storage of this green fodder through underground-silos and bunkers.

In light of this, silage bags which are polypropylene bags can provide significant breakthrough for the industry as they can store green fodder for long periods up to three years. Silage bags is a new technology that is fast catching up in Indian markets and is expected to become a significant part of the Technical Textile industry in coming years. The main benefits of using silage bags are:

- Lower cost as compared to concrete or brick silos
- Higher quality of silage
- Low storage losses due to spoilage
- Longer storage of green fodder
- Bags can be easily transported as compared to fixed concrete silos
- They are available in all sizes from 50 kg to 500 kg capacity. Hence, farmers based on their requirement and financial capacity can go for the preferred silage bag

Silage bags are yet to catch up in India. Currently Reliance is producing FIBC silage bags along with few other manufacturers located primarily in Gujarat like Saurya Polypack.

Disposable Drapes for Medical Use

Hospital acquired infections (HAI) are bacterial or fungal infections that are difficult to cure due to the antibiotic resistance developed by the microbe due to continuous exposure to hospital environments using antibiotic. As a result, these infections prove to be very serious and difficult to control making prevention of occurrence or spread of such diseases the best option. A major factor responsible for spread of HAIs is soiled linen. Therefore, disposable anti bacterial medical textiles are used in most of the developed countries to prevent spread of HAIs.

HAI occurrence in developed countries is on a lower side varying from 3% to 12% while the occurrence in developing countries ranges from 6% to 19%, making HAI a major cause of hospital deaths. In India, the occurrence of HAI is around 25%, making it a very serious threat. A major reason behind this is poor management of hospitals and patient care apparatus and clothing. Disposable textiles for medical use can be a major breakthrough in Indian medical care scenario as it would inhibit growth and spread of HAIs, making the hospitals a lot safer.

Disposable curtains, bed sheets and pillows are commonly used in hospitals and nursing homes around the world to prevent spread of infection. Disposable

drapes and textiles used for medical purposes include curtains, bed sheets, towels, clothing, and pillows. They have a life of close to one year; however, it is recommended that they be replaced at any outbreak of infection.

These are manufactured from a durable, disposable, and completely recyclable polypropylene fabric which inhibits bacteria growth. These can be made from both woven PP and non woven PP. However use of non-woven is preferred around the world due to its cheaper cost. These have the following crucial benefits which make them suitable for use in hospitals:

- Anti-bacterial
- Waterproof
- Recyclable
- Cheaper when compared to woven textile

Major manufacturers of disposable textiles around the world are Haines Medical in Australia, Global Medics in New Zealand and Opal disposables.

House Wraps

House wraps are protective wrapping fabric made of synthetic materials usually made of high density polyethene fibres or polypropylene fibres. These function as weather resistant barrier preventing rains, snow and dust from damaging the walls of the building, while allowing water vapour to pass through to the exterior thereby increasing the life of the walls. Textile based house wraps are of the following types:

- Laminated polypropylene based woven house wraps
- Supercalendered wetlaid polyethylene fibril non woven house wraps
- Fibreglass based house wraps

Typical properties of house wraps are:

- Light weight
- Water resistive barrier
- U V Stabilization
- Chemical and flame resistance
- High abrasion/ tear resistance
- Limited air permeability

House wraps are commonly used in Europe and U.S.A in areas which face extreme weathers and high weather fluctuations particularly in areas having high snowfall and rains, as melting snow and heavy rains can have a damaging effect on the walls.

The key manufacturers of house wraps are Du Pont with Its brand *Tyvek* and Kimberly Clark with its brand *Block-iT*.

In India, the product has not been taken up commercially expect for a few limited applications. The product can be of high value in the Northern Himalayan regions which face heavy snowfall and the North Eastern areas which witness heavy rainfall.

Building Composites

Composites used for building applications include composite Fibre Re-enforced Plastic (FRP) re-enforcement bars (Re-Bars), composite foundation walls and door components. While the use of Re-Bars in India is fast catching up with increasing awareness and engineers preferring Re-Bars in construction of bridges and foundations in difficult terrains, the usage of composite foundation wall and composite doors are yet to catch up in Indian market.

Composite foundation walls are a recent development launched in US in June 2014. It is made of fire resistant modar resin and consists of a fibreglass composites panel. The key advantage of these wall panels is that they can be quickly assembled and are light in weight, while providing high performance against weathers and chemicals. The composite foundation wall has been developed by Composite Panel Systems (U.S.A), Fibertech Industries Ltd. (U.S.A) using the materials from Ashland Performance materials (U.S.A).

Composite doors are used mostly in Europe and US. They offer the benefits of increased performance and strength due to higher resistivity of these doors to weather, fire and chemicals, while providing the flexibility of using a material of choice as the core which could be of wood or any other material. The composite doors have relatively high durability as compared to normal doors. While the idea of having composite doors is catching up in Indian building and construction Industry, the market is still in a very nascent stage. Key global manufacturers of composite

doors are GRP composite Doors, Solidor and Permadoor in U.K.

Silt bags

Silt bags are basically sediment control bags which have the technical properties of retaining the sediments while letting out water due to its micro porous construct. The Silt Bag is designed to filter water. These bags are mostly made of durable geotextile filter fabric usually of non woven.

These bags due to its water filtering capabilities find application across construction industry for different purposes. Key applications of silt bags are:

- It is used as filtering device for filtering waste water from construction sites and storage sites. The water often contains a lot of toxic and chemical waste which cannot be directly released in the environment. Hence the water is released using a silt bag, which lets out the water while retaining the waste.
- Removal of silt from water bodies: Silt removal keeps the water bodies fresh and usable. Silt bags are often laid on the shores of water bodies where the water is pumped into the bags using a pump. Once through the bag, the silt is retained and the clean water seeps out. The silt stored can be used for any landscaping requirement.

The silt bags find application as dirt bag to remove waste and also as a silt fence to prevent silt from entering a water body. The key players in silt bag across the world are Reed and Graham Geosynthetics, Granite Environmental and ACF environmental.

34. Opportunities, Challenges & Recommendations

Since 2008, the global economy has witnessed a slow down leading to production and consumption slow down.

Technical Textile industry is driven by the demand from several end user industries, so the impact of slowdown has trickled down into the Technical Textile industry across the globe including India. However during the last five years several positive trends have been witnessed in India, which include

- Increase in exports across products/segments such as fishnets and other nets, ropes & cordages, conveyor belts, geo textiles, surgical disposables, protective textiles, surgical sutures etc.
- Domestic consumption has increased across several products including shade nets, scaffolding nets, hygiene and surgical products, etc.
- Institutional consumption has also increased across several segments including Geotech, Meditech, Protech, etc.
- Import substitution has also improved in some of the product segments such as diapers

With Indian economy expected to grow, these trends are expected further to drive Technical Textile production and exports during this decade fueled by strong consumer and institutional demand coupled with manufacturing competitiveness. With the increasing manufacturing cost in China, India is expected to emerge stronger in case of exports of several products.

However, there are still several challenges for the growth of Technical Textile industry in India, which are:

1. Raw material availability
2. Lack of norms for TT products
3. Lack of Domestic Technical Textile Machinery Manufacturers
4. Research and Development capability
5. Lack of awareness about Technical Textile products
6. Lack of skilled manpower

In addition to these challenges, there are structural issues such as availability of infrastructure, quality power, anomalies in taxation, labour policies, etc, which may slower the growth of the industry.

Vision

The Technical Textile industry in India has witnessed a double-digit growth of 12% during the last five years growing from a mere Rs. 36,775 crore in 2007-08 to Rs. 73,679 in 2013-14. The years have seen a stable

growth in domestic consumption as well as growth in exports. Over the years, newer Technical Textile products with higher value addition have made a foothold in Indian markets and the industry is steadily graduating from a low value added intermediate-product manufacturer to high value added end-product manufacturer. It has also been a stronghold for budding entrepreneurs and SMEs who either have started afresh in Technical Textiles or have diversified from conventional textiles.

However, when compared to Europe and China who are the global leaders in Technical Textiles, India still has a long way to go in developing specialized Technical Textiles from basic research for high tech applications across industries. The per capita usage of Technical Textiles particularly nonwoven and composites has seen remarkable growth in last few years and has a significant future potential for growth. The increased usage of Technical Textiles is expected to bring significant cost and usage benefits to industries and technical applications in India, promoting the overall life and quality of output across industries

There has been a continuous support from the Government through fiscal benefits and industrial policies for technology up-gradation and R&D promotion in the industry.

With due consideration to the above findings, the following vision is being proposed for Technical Textiles sector in India

“To increase our Technical Textile manufacturing to Rs. 5.2 lakh crore by 2025 targeting exports of Rs. 1.3 lakh crore by 2025 by becoming the preferred global Technical Textile manufacturing destination with focus on export oriented manufacturing specializing in high value added Technical Textile manufacturing targeting the industrial and end user consumer segments”

To achieve such vision IMaCS proposed the following recommendations:

Recommendations

IMaCS ‘recommendations for facilitating the growth of Technical Textiles in India are primarily targeted at resolving the impediments to growth discussed above. The recommendations are classified under Fiscal, R&D, HRD and others.

Fiscal Recommendations

Reduce Import Duty on Specialty Fibres*¹⁹

Specialized fibres and yarn required for manufacturing of some of high-end Technical Textiles products. Some of these specialty fibres are not produced indigenously and are often imported from other countries. The import duty on such fibres and yarn is a very high in the range of 23-26 %. Thus the landed cost becomes very high making the Technical Textile products uncompetitive against the imported TT products. The import duties on such products, which are not produced in India, have to be rationalized towards increasing the manufacturing by adding value. The net import duty rates are subject to change with the introduction of GST (Goods and Services Tax). Basic Custom Duty will continue to be there under GST system. However, the additional custom duty in lieu of CVD /Excise and the Special Additional Duty (SAD) in lieu of sales tax/VAT will be subsumed in the GST.

Remove VAT* Levied on Non-Woven Fabric

In certain states, VAT levied on non-woven fabrics is higher than that on other textile fabrics e.g. in case of Tamil Nadu, VAT on non woven fabric and its product is 5% where as the woven and knitted fabrics of cotton, artificial fibres/filaments, etc are exempted from VAT. VAT on non-woven fabric should be removed to promote its consumption.

Research and Development

Pushing PPP in R&D With The Existing CoEs

Under TMTT, Government has set up eight centres of excellence for providing infrastructure support to the industry in terms of testing facilities, incubation centres, facilities for product development etc. There is a need to leverage this R&D infrastructure towards development of new products. Therefore, the existing manufacturing units should be incentivized to utilize the infrastructure and R&D capability of CoEs to produce new value added products, which can be commercialized. Research and development activities by private organizations, can be dovetailed with Central Government schemes that promote R&D under the departments of DST, DSIR and CSIR. Soft loans available for R&D under different Central and State schemes can also be used for R&D in Technical Textiles sector. In case of R&D investments are entirely from GoI in case of PPP projects, IPR may remain with CoEs.

Human Resource Development

Lack of skilled labour is one of the major constraints in Technical Textile industry. Government should take the following measures in this regard:

- Ensure inclusion of Geotech in Civil Engineering curriculum of various engineering colleges like IITs with specialized masters programmes for Geotech, Buildtech and Oekotech
- Introduce focused courses on non-woven, composites, coated and laminated fabrics covering it's applications in addition to technical information.
- Introduce courses at Masters level of textiles engineering for Technical Textiles
- Conduct joint promotion and training with institutions involved in extension activities for farmers like agricultural universities, co-operatives, agrochemical and fertilizer manufacturers, financial institutions/banks, on usage of Agro-textiles
- Increased focus of Textile Sector Skill Council (TSC) under NSDC towards training on Technical Textiles and related segments could provide a significant boost in making skilled workforce available in the sector. Courses may be identified in the area of woven (Technical Textile), non-wovens, composites, coated & laminated fabrics, etc., covering all the 12 segments and training may be provided under PPP basis at various clusters/locations where the units exist or training may be conducted with the assistance of CoEs.
- Facility for industrial visits to Technical Textile plants should be included in the course curriculum for graduation and post graduation courses related to textiles and Technical Textiles, to provide a firsthand experience to the students who would soon be making a debut into the industry. These industrial visits should be complemented with detailed presentation on the high potential of Technical Textile industry and various segments in it so as to attract young work force to the industry.
- An option of undertaking case studies and projects related to Technical Textiles should be made available to the students undergoing graduate and post graduate courses related to textiles. Tie ups with CoEs and textile institutions should be made to facilitate such studies. In addition, case studies related to Technical Textiles should be inculcated in curriculum of Post graduation and Management courses. Students should be provided with facility to conduct case studies on Technical Textile sector to attract young Managerial and business oriented students to the industry.

¹⁹* Subject to GST Implementation

Export Promotion

Identification of HSN Codes for Technical Textiles

- It is important to identify and distinguish Technical Textiles items from the conventional textiles to implement schemes related to exports. Wherever the HSN code does not exist for important products, such codes have to be created.

Export Promotion Assistance

- Since major consumers of Technical Textile products are developed countries, it is recommended to grant the benefit of Market Linked Focus Product Scheme (MLFPS) when exported to European Union (EU) and USA.
- Increase the coverage of products under Focus Product Scheme.
- Increase incentive/entitlement to 5% from existing 2% for exports under MIES scheme.
- Increase in duty draw back and caps for Technical Textile products.
- Continuation of incremental export scheme for Technical Textiles
- Coverage of pre used Technical Textile machinery under EPCG scheme.
- Extend the benefit of 3 % rate of Interest Subvention Scheme on Pre and Post shipment Rupee Export Credit to Technical Textiles.
- Focus on Technical Textiles should be maintained while negotiating FTAs with key importing countries to promote Indian Technical Textile exports especially in the emerging markets of Asia, Africa and South America.
- The duty drawback provided for export promotion for Technical Textiles should be well illustrated and easy for new entrepreneurs to identify. Increased focus should be provided to newer segments of specialty fibres, industrial fibres and composites.

Setting up of an export promotion council

- During the last five years, the exports of Technical Textiles across several segments have witnessed high growth owing improved competitiveness. There is a need to leverage this momentum and position India as a key Technical Textile Manufacturer. Technical Textile export promotion council may be set up to promote Indian TT products across the globe. The council may focus on identification of market opportunities and promotion of Indian Technical Textiles across the globe by conducting/facilitating Buyer Seller Meets, Conferences, Exhibitions, Workshops, etc.

Promotion Of Investment in Technical Textiles:

Promotion of FDI in Technical Textiles

Technology is a key source of competitiveness in Technical Textile industry. Foreign players, which have technology and expertise, can set up manufacturing and R&D units in India to cater to Indian and Global markets. To attract FDI, it is necessary to communicate competitive strengths of India across the globe.

So it is recommended to identify countries that have technology and expertise which would include US, European countries, Japan, Taiwan, Korea, etc. Decision makers of top Technical Textile companies may be invited and workshops/road shows may be conducted in each of the country highlighting advantages of investing in India

It is recommended to have provisions for promotion of joint ventures in Technical Textiles. Special focus should be provided to upcoming and high value segments of specialized fibres and yarn and composite to attract top firms across the world to have a set up in India. To incentivize these global organizations, facilities like protection of IPRs can be ensured, along with support for acquisition of machinery and R&D. This would also help in technology transfer to India.

Fund allocation to Technical Textiles under the RRTUFS scheme to attract domestic investors

The investments in Technical Textile via TUFS have seen limited growth since 2007-08. Separate allocation of funds for Technical Textiles under TUFS would help the sector to attract more Investments.

Special focus on certain products to promote investment

Technical Textile industry in India is in its growth stage and many high value-added products and strategic products are yet to take off in a big way in the domestic and export markets. In light of this, additional policy support should be extended to upcoming sectors and high potential sectors to attract investments. These policy supports could include incentivising via tax rebates, preferential land allocation and reimbursement or exemption of municipal tax and stamp duty.

Creation of Focus Incubation Centres (FICs)

Incubation centres with focus on providing a firsthand experience in Technical Textiles, should be promoted at CoEs, Large institutions, SITPs and major clusters. These Incubation centres would provide a plug and play infrastructure available on rental basis to

entrepreneurs for a specified period to try their hand at Technical Textile businesses. These incubation centres can also be developed in partnership with Private Technical Textile organisations, which would provide a dedicated space and machinery for the incubation centre along with a dedicated work force on a rental basis. This would help in encouraging entrepreneurs to invest in Technical Textile sector.

Cost effective business model for MSMEs available on public website of Textile Ministry

A sample business model for starting an MSME for major Technical Textile products having high potential should be developed and made available on the website of Ministry of Textiles, Office of Textile Commission and Ministry of MSME. This would have details of the machinery and manpower requirement along with details of land required and finances required. The Business model can also list out methods of financing providing snapshots of different schemes of Govt. of India that can be used for funding of the same. Such a business model would help entrepreneurs and businessmen who intend to get into the sector but have little knowledge or awareness regarding the industry and the requirements for setting up units.

In addition dedicated training programmes for development of entrepreneurial skills in Technical Textiles for the SME sector is recommended for increased participation of the SME sector in the industry.

Consultancy services by CoEs to Businessmen and Entrepreneurs

Globally CoEs are involved in not just research and development activities but also in providing consultancy and complete implementation support to organisations entering their domain of expertise. CoEs in India may also offer consultancy support to entrepreneurs and businessmen for setting new unit, upgrading old machinery, identifying market potential and developing newer products in their domain of Technical Textiles. This coupled with R&D support and easy availability of business model for MSMEs would create a fertile environment for smaller businesses to diversify into Technical Textiles. It would also be beneficial for the CoEs which would have additional channels for revenue generation via consulting along with R&D support.

It is recommended that in order to develop consultancy services and commercialise other Research activities by CoEs appropriate National or International body of repute like Industry associations, Reputed Institutions, Consulting organisations should be

involved so as to identify the key strategies and requirements of foreign CoEs and replicate the same in India to bring Indian CoEs to the same level of commercialisation.

Import Substitution to attract new investments

- Across several segments of fibres, rolled goods and converted product there is import dependency. Over the last five years improvement has been witnessed with some of the products being manufactured in India. Still import substitution is an area of opportunity for new investment Areas where import substitution opportunities exist have to be communicated to the investors in Technical Textile space to promote investments. Items like airbags and automotive textiles which are largely imported should be promoted for domestic production through replication of production processes.

Regulatory Mechanism For Promotion Of Usage Of Technical Textiles

Agrotech

The regulatory and promotional mechanism and incentives can improve the consumption of agro based TT products such as shade nets, plant nets, harvesting nets, crop covers, mulch films and anti bird and anti hail nets. The following are the key interventions to boost Agrotech consumption:

1. Increasing the total subsidy limit for Technical Textile products to 70% of the total cost from the current 50%.
2. Inclusion of crop covers and woven and non woven textile based mulch mats into NHM and NHB subsidies.
3. Increasing the overall budget for protected cultivation from the current planned Rs. 70 lakh for MIDH scheme²⁰.
4. Providing an additional subsidy support from the State governments for protected cultivation, especially in the Himalayan and North Eastern States, which have high potential for horticulture and floriculture products.
5. Active promotion to increase awareness and facilitation of farmers and entrepreneurs to go for larger plantations having protected cultivation, which would be subsidised through National Horticulture Board (NHB) subsidies. NHB offers subsidies for large commercial projects having area of over 4,000 sq. m. Whereas National Horticulture

²⁰ [http://nhm.nic.in/Archive/midh\(English\).pdf](http://nhm.nic.in/Archive/midh(English).pdf)

Mission (NHM) offers benefits for individual farmers and small plantations. The share of NHB subsidies when compared to the ones offered through National Horticulture Mission (NHM) is also very less. Increased focus on NHB subsidies would be added incentive for entrepreneurs to go for larger plantations which would have modern technologies.

6. Agro textile promotional schemes like Agricultural promotion in North East should be implemented in other high focus regions such as Himalayan States and along the Western Ghats.
7. Incentives should be provided for crop insurance in case where the farmer insuring the crop has also used agro textiles. This would promote usage of agro textiles by farmers who go for crop insurance as well as increase awareness for both crop insurance and agrotexiles.

In addition to the above mentioned interventions regulatory activities of developing adequate standards for all the agro textile products should be expedited. Also extensive research for development of advanced Technical Textiles for agricultural uses should be promoted at the COEs. It is recommended that a new Research Committee for Agriculture (RCA) having participation from Ministry of Agriculture, National Horticultural Board, Ministry of Textiles, Centre of Excellences and reputed Industry associations and agricultural Institutions across the country should be constituted for promotion of Agro textile usage and research.

Key Advantages

Aggressive promotion of agro textiles through the above mentioned interventions would help increase the productivity and the quality of output for various horticultural products, leading to increased remuneration for the horticultural farmers. It would also increase the confidence of farmers in modern agricultural techniques.

Meditech

Meditech products that are meant for hospital use and for dressing of wounds, have to be regulated through strict regulatory policies to ensure the safety of patients and prevention of spread of Hospital acquired infections. These regulations can have a significant impact on the usage of Meditech products especially ensuring the type and kind of medical Technical Textile to be used in these products. The key products that can be promoted through string regulations are surgical disposables such as non woven caps, gloves, masks, etc., as well as disposable hospital linens. The key

regulatory mechanisms to increase the consumption of Technical Textiles for Meditech are:

1. Regulations making it mandatory to use non woven disposables like caps, shoe covers, etc instead of woven re-usable ones.
2. Regulation for use of non woven disposable bed linen, curtains and pillow covers.
3. While the above regulations and guidelines would promote use of Technical Textiles, to facilitate the same, supporting guidelines for safe disposable of the non woven disposable fabric and products must also be developed and circulated across the all hospitals and healthcare institutions.
4. Promotional campaign creating awareness about probable reduction in HAIs through use of disposable Technical Textile fabrics.

Key Advantages

Regulatory mechanisms for use of disposable fabrics and dressings and its safe disposal, would help in preventing the spread of infections through various tangible mediums within hospitals. This would be very beneficial for reducing the occurrence of Hospital Acquired Infections (HAIs). Currently India has a very high rate of occurrence of HAIs, over 20% as compared to other developed countries where the occurrence of HAIs is limited to around 7%.

Mobiltech

Mobiltech, Technical Textiles employed in automobiles, is one of the segments most amenable to regulations given that it has significant consequences in terms of safety and consumption for masses.

Within Mobiltech, a sizeable institutional consumer is the railways. The railways specify the necessary materials to be used in its seats and berths and upholstery in various specifications designed by the Research Designs and Standards Organization (RDSO). For example: The seat covers and berths used in the coaches in the Railways need to be of specified materials PU Foam/densified thermal bonded polyester blocks to RDSO specification ²¹(and adherent to the requirements specified in the Schedule of Technical Requirements (STR) for manufacture of the said fittings by the RDSOA. Also, stain proof fire resistant upholstery cloth to RDSO specification no. C-K

²¹ PU Foam or Densified thermal bonded polyester blocks to RDSO specification No.C-K607 can be supplied as an alternative to PU foam to specification No. RDSO/2007/CG-04) as given in SCHEDULE OF TECHNICAL REQUIREMENTS FOR MANUFACTURE AND SUPPLY OF SEATS & BERTHS COMPLETE FOR AC AND NON-AC RAILWAY COACHES MANUFACTURED BY ICF DRAFT FOR COMMENTS FROM SUPPLIERS

610 of specified colour only can be procured for AC First Class side of AC coach.

Other product categories of Mobiltech that has regulation pertinent to it in place are seat belts and helmets. Relevant regulation for making of airbags mandatory in motor vehicles is on the anvil and may be expected soon.

In India, all cars manufactured after March 25, 1994 were mandated to be equipped with front seat belts through the Indian Motor Vehicles Act, 1988 that has been amended from time to time. The rule was extended for rear seats in 2002. The usage of seat belts is to be implemented by the respective states with most states making seat belt usage for front seat passengers mandatory in 2002. Older vehicles that did not have seat belts originally were exempted. However, now a new Road Transport and Safety Bill proposed by Ministry of Road Transport and Highways is slated to replace the ageing Motor Vehicles Act, 1988. This Bill targets saving two lakh lives in first 5 years by way of reduction in road traffic accident deaths. It has a very heavy focus on emphasising passenger safety.

Also, the government will mandate airbags and offset frontal and side-impact crash tests. Presently, cars in India are not required by law to be crash tested or be fitted with airbags. The Society of Indian Automobile Manufacturers has agreed to the new norms. The industry also seems to be geared to implement these measures with two leading players Toyota Kirloskar and Volkswagen offering airbags on most of their products sold in India.²²

Packtech

Within Packtech, PP woven sacks and jute bags are widely deployed for packaging of all types of items – food grains, sugar, salt, cement etc. Out of these industries, Food items are the largest single consumer of products covered in the segment of Packtech. The Government of India mandates various standards and norms for packaging of food items. Popular regulation covers packaging of food grains and sugar. Government of India has diluted the compulsory packing by directing that sugar to the extent of 20% of total production of commodity shall be packed in jute packaging material for the year 2013-14 effective from January 14 as against the compulsory packing at 40% under Jute Packaging Materials (Compulsory use in packing commodities) Act, 1987 (JPMA). The compulsory packaging of food grains remained constant at 90% of production under JPMA.

²² Business Standard

The Ministry of Environment and Forests that establishes the rules of classification, packaging and labelling of hazardous substances could also play a key role in mandating the kind of materials that can be used in packaging of such substances.

Sportech

Sportech Products like Architectural turfs, Parachute fabrics and Sport nets can be promoted through regulatory policies. The key regulatory and promotional mechanisms for increasing usage are:

1. Promotional policy of Ministry of Youth and Sport (MoYS) and incentivising Sports Authority of India (SAI) for up-grading grass turfs of Hockey and Football to astroturfs can be a major boost to the artificial turf industry which currently constitutes 70% of the domestic artificial turf market. SAI has been aggressively involved in up-grading all hockey turfs at its regional sub centres and already has 13 artificial turf hockey and football fields. Along with hockey and football turfs, usage of artificial turf should also be promoted for cricket wickets across National cricket training grounds. In addition setting of standards and norms for replacement of artificial turfs can be a major boost for increasing the consumption through replacement market in the next five to ten years to come.
2. Providing cost subsidy to State governments for up-grading the hockey and football field turfs.
3. Policy support should be provided for promoting of sports at educational institutes and rural areas, providing the guidance about the usable life and replacement period of different products. Increase in sports would ultimately help increasing Sportech consumption.

Most of the other products are not institutional, but end use consumption products like tents, sleeping bags, sport shoes and sport composites. The uses of these products are dependent on the market demand from end consumers.

Key Advantages

The promotion of artificial turf would help increase the quality of Indian sporting infrastructure to a globally acceptable level. This would not only promote India as a venue for International events, but would also provide the necessary infrastructure to our sportsmen for practicing, thereby ensure that they stay globally competitive.

Buildtech

Within the segment of Buildtech the products – hoardings and signage and scaffolding nets are used in city landscaping and construction industry and

regulatory measures for increasing the aesthetics of the city and ensuring safety during construction activities can have a significant impact on their usage. The key regulatory mechanisms for increasing usage are:

1. Regulatory norms and guidelines for increasing the aesthetics of the city should be developed and promoted across all major cities. These norms would define the use of flex boards and banners at different areas of the city would have a key impact on the usage of hoardings and signage fabric. These norms could include providing of two and three sided bill boards so as to increase the aesthetics of the city by having all side covered hoarding. Similarly use of high quality flex fabric instead of PVC could be promoted for better readability and aesthetics.
2. Similarly a stricter regulation making it compulsory for contractors and construction companies to use scaffolding nets during contraction of buildings in high density region or development of bridges and high rise buildings would provide the necessary push to scaffolding nets for penetration into tier II and tier III cities increasing the usage of scaffolding nets significantly.
3. Creating awareness about different Technical Textile products like awning and architectural membranes.

Other products in the Buildtech segment are not industry dependent, but are used by end users or contractors as per demand and requirements. Similarly the products in Hometech and Clothtech segment are entirely end consumer driven products. The usage of these products cannot be promoted through regulatory measures.

Protech:

Protech is another segment which can be highly regulated and the usage is closely associated with the usage norms and the regulatory policies in place. The key regulatory mechanisms for promoting usage of Protech products are:

1. Developing the required standards for bullet proof jackets and other Technical Textile products.
2. Mandating the use of protective Technical Textiles work wear - fire retardant apparels, chemical protective clothing, industrial gloves, etc in hazardous working environments like in chemical factories, high temperature applications like oil drills, power plants, steel and other industrial plants. A draft amendment in the Factories act for making it compulsory for employers to provide adequate protective clothing to the workers has already been proposed. NITRA along with BIS has developed a white paper in this regard.

3. Development of right standards for different Protech products so as to facilitate institutional buyers in purchasing large quantities of such items would be very beneficial for the industry promoting the usage significantly. BIS has already, developed drafts for nine new standards for Protech and envisages developing another five standards in the coming years.
4. Regulatory changes in National Building code for stricter implementation of use of fire retardant fabrics in commercial and office space for curtains, fabrics, blinds, etc can give a significant push to fire retardant fabric market of India.
5. Similarly, mandatory regulations for use of fire retardant fabrics as acoustic fabrics, seat cover fabrics and interiors in public places like auditoriums, cinema halls, gather can give a big boost to the usage of protective Technical Textiles.

Key Advantages

The development of guidelines, norms supported by the regulatory mechanism for promotion of protective Technical Textiles, would help increase the safety of workers at various hazardous work stations, leading to lower injuries and casualties. The regulations for use of FR fabrics in commercial and office space and places with large gatherings, would significantly reduce the risk of fire accidents and related losses.

Geotech and Oekotech

Geotech and Oekotech segments of Technical Textiles are mostly dependent on institutional demand. The usage in various government agencies and Ministries is the sole driver for the industry. Regulatory and promotional measures for increasing the usage of such products would have a long term and lasting impact on the current consumption of Technical Textiles. The key regulatory and promotional mechanisms for increasing usage of Geotech and Oekotech are:

1. Inclusion of geotextiles in the schedule of rates for Central PWD and State road departments so that it is easier to purchase and use the same. Geo textiles and oekotextiles can also be included in the schedule of rates for different Ministries like railways, Ports and Shipping, Urban Development, Various states and Ministry of water resources for providing ease in usage.
2. Inclusion of geotextiles in handbooks and guidelines for different government departments and user ministries.
3. **Ministry of Roadways:**
 - a. Inclusion of geotextiles in the ORANGE book of MoRTH.
 - b. Having promotional schemes wherein incentives would be provided for use of

geotextiles for construction of Expressways and National Highways having high traffic.

- c. Providing incentives for trail usage of natural geotextiles – coir and jute based, by different state governments.
 - d. Special incentives for use of PVDs in clay soil terrains and geo nets in weak soil formation for the Municipal Corporation developing the roads in case of city roads.
- 4. Ministry of Railways:** Ministry of railways has been using the geo textiles in trial phases across different terrains under its subdivisions. There is over 700 km of track across India which is developed on weak soil formation and requires regular rework and maintenance. Use of geo nets and geo textiles in such locations can significantly reduce maintenance work.
- a. Policy changes, where in a small but certain amount of the railway budget is dedicated towards use of Technical Textiles, can give a significant boost to the use of Technical Textile by railways.
- 5. Ministry of Water resources and Ministry of Ports and Shipping:**
6. Schemes may be formulated for comprehensive river and port embankments to promote geo bags and geo tubes usage
- 7. Ministry of Urban Development and Waste Management** and State departments for the same: The capacity of disposal of hazard waste generated in India is very less as compared to the total waste generation. The Majority of such waste is not disposed in the right manner often leading to the polluted soil and water resources in the nearby areas.
- a. Mandatory regulations should be formulated for use of adequate Geotech and Oekotech towards disposal of hazardous waste in ground areas to prevent soil and water pollution.
 - b. Incentive subsidy may be provided to Municipal corporations on use of geo and Oekotech for disposal lining of landfills/waste disposal units.

Key Advantages

The key advantages of using geotextiles is the increased longevity of roads and railways, which would reduce the repair and maintenance expenditure It would also help in creation of better transport infrastructure and reduction in accidents and loss of life.

Indutech

The segment of Indutech covers products which are driven by their end application. From the point of view of regulation and policy support, filtration as a category is amenable to the same and also has regulations in place.

The Central Pollution Control Board defines various emission norms for heavy industries such as cement and power. These industries make heavy use of filter bags in addressing and meeting these norms. Stringent regulations in similar industries mandating the use of air bags to restrict specific type of emissions (say, fugitive emissions) can further the cause of environment as well as Technical Textiles.

Also, promotion of wind power by the Ministry of New and Renewable Energy would go a long way in boosting demand for composites.

Others

Formulation of Standards

- Technical Textiles are functional in nature, meeting specific performance requirements of the users. The specifications/ standards therefore assume critical importance. In India, standardization process is in progress, though at a very slow pace. The consumption of non-standardized product does not meet the requirement of the consumers, gives the bad reputation to the product, and affects negatively on the consumption. Thus there is need to expedite the standardization process.
- Standards have been formulated for many products. There is need to formulate a mechanism to encourage users to take cognizance of the standards and while issuing tenders where in only standardized products may only be made eligible for supply. The Government subsidies may also be restricted to standardized products, for which standards are available.
- BIS standards are particularly important for Geotech, Oekotech, Protech, Meditech and Buildtech as the standards for other segments can be defined by end-user industries as per requirements. Therefore, Government may take up with BIS to streamline the system of formulation of standards for expediting the process.
- The standards should provide level playing field for Indian and International players, and hence, should be based on specifications and not on any patented technologies
- Government may formulate a mechanism to encourage institutional users to consume standardized products.

- Norms for medical waste management are required for increasing adoption of medical disposables in India. These standards can be developed in consultation with the Ministry of Health.

Formulation of Standards for Waste Management of Non Woven Products

- Since nonwoven products can be recycled, the major issue is effective management of the generated waste.
- Ministry of Textiles should liaise with the Ministry of Environment and Ministry of Urban Development to devise policies and mechanisms, which enable management of waste and suitable changes, should be incorporated in the *Municipal Solid Wastes (Management and Handling) Rules, 2000* in order to promote the usage of nonwoven products.

Regulatory Mechanism to Increase Consumption of Technical Textiles

- Usage of seat belts may be made mandatory in all buses, LCVs and M & HCVs and in all cars on long-distance roads.
- Installation of airbags may be made mandatory in automobiles
- Usage of geosynthetics may be made mandatory for erosion control
- Strict implementation of usage of helmets for riders and pillions
- Mandatory usage of medical disposables in all government / government-aided hospitals; treatment under all emergency cases to be mandatorily considered as HIV positive thereby necessitating mandatory usage of medical disposables
- The usage of fire-retardant textiles should be made mandatory at all public places like theatres, auditoriums, trains (curtains, seat-covers, etc), hotels, hospitals & restaurants. These are currently suggested in the National Building Code but are not mandatory. Necessary regulatory amendments should be effected to the municipal and town planning acts to ensure compliance. *The legislation for mandatory usage of fire retardant textiles should be implemented immediately for any new constructions. For the old constructions, the government can provide incentives to shift to fire-retardant textiles.*
- The usage of fire-retardant textiles should be made mandatory in all railway coaches. The Indian Railways in this regard can implement the regulation.

Promotion of Consumption of Technical Textiles Among Institutional Users

- Inter-ministerial committees or councils may be set up with different end-user ministries and industry as members to sort out issues related to institutional consumption of Technical Textiles and removal of any bottlenecks in the consumption of Technical Textiles. These committees would have representation from Ministry of Textiles, End user Ministries, Technical and Market consultants and people from industry and should work in tandem for promotion of Technical Textiles in the country.
- Refresher courses should be arranged for Officials, scientists and doctors in different Central and State Government departments and agencies that are involved in institutional purchase of Technical Textiles like CPWD and State PWDs, Ministry of Ports and Shipping, NHAI, BRO, etc so as to keep them appraised of the latest developments in Technical Textiles and also spread the awareness regarding benefits of Technical Textiles
- As the State Government often governs many of the institutional government purchases of Technical Textiles, there should be stronger involvement and participation of State government in spreading the awareness and promoting Technical Textiles within the state.
- Sector specific seminars and awareness programs and workshops should be conducted on a regular basis advocating the benefits and use of Technical Textiles to institutional buyers. These should be followed by Buyer seller meets, business-to-business meetings with involvement of Industrialists, industry associations, institutional buyers and nodal officers of user Ministries.

Inclusion of Non Woven Products under NHM For Subsidy

- Plastic mulching is included under NHM Support. Similarly, non-woven mulching has to be included under NHM towards increasing the usage of non-woven mulch mats.
- Non-woven crop-covers are not included under NHM resulting in almost negligible domestic usage of these products. Almost 100% of the crop-covers manufactured in India are exported. In order to develop the demand for crop-covers in India, the crop covers should be included under NHM. NHM should also help in creating the awareness and benefits of these products.
- Facilitation should be provided to the farmers for availing NHM subsidy in shorter.

Focus on Use of Recycled Material for Technical Textiles

Clothing and textile requirement across the world has been growing at a steady rate and the resultant pressure on the raw materials is steadily growing. Along with it, the disposal of waste textiles and old textiles is a key issue that has to be resolved. These textiles are not suitable for dumping in landfills, as the manmade fibres are not biodegradable. In light of this, it is imperative that many of the textile waste be recycled and used for the clothing and Technical Textile industry. Therefore, use of Technical Textiles from recycled polyester and recycled PET bottles should be advised. In addition to minimize the pressure on virgin resources, the recycling of PET bottles for production of manmade fibres should be promoted aggressively.

Promotion of Coir and Jute Technical Textiles

India is a major producer for coir and jute fibres in the world with abundant supply and limited use of the same. To ease pressure on manmade fibres and cotton, which are in heavy demand, coir and jute Technical Textile should be promoted. While Jute finds a significant usage in Packtech, coir can be used for developing geotextiles. Currently pilot projects of Jute and coir geotextiles are underway by regional railways. A stronger policy support and push for usage of these by user Ministries is recommended.

Registration of Technical Textile Units for Availing TUFSS Subsidy

- It is recommended that Technical Textile units going for TUFSS subsidy should be registered with Office of the Textile Commissioner. This would enable easy tracking of progress as well as strengthening of the Technical Textile database within the country.

Development of Clusters

- Unlike traditional textiles, the technologies involved in Technical Textiles are many. There is a need for focused development on existing and new clusters across different technologies. For the existing clusters such as fish net manufacturing, medical textile clusters in Tamil Nadu, Sportech clusters in Punjab, Packtech clusters in Gujarat, etc., the focus of the development programmes may be tailored as per the current capability of the each cluster. A diagnostic study may be conducted and interventions may be planned to improve the cluster capability through better market linkages, product development and R&D, common facility centres, quality improvement, skill development, incubation etc. These clusters can be developed into organized Technical Textile parks with provision of subsidized centrally managed services regarding R&D facilities,

Incubation centres, Common facilities like ETPs and skill development.

- Dedicated Technical Textile parks should be promoted under the SITP scheme. Over 80% units in these parks would be of Technical Textiles. Additional benefits can be provided to units coming in newer segments like carbon composites.
- New clusters may be formed across various products such as nonwovens, composites, coated and laminated fabrics, etc, where incentives may be provided to set up multiple units and Technical Textile park may be formed.

Promotion of Technical Textile Machinery Manufacturing

Most of the Technical Textile machinery is not produced indigenously. Most of the state-of-the-art Technical Textile machinery are very expensive and high rate of duty makes imports of such machinery cost prohibitive, restricting the investments in such plants. CoEs for textiles machinery were set up in China for reverse engineering of the advanced machinery so that the technology could be replicated and manufactured locally at a much lower price. Thus, over a period these CoEs were able to fulfill their purpose and manufacturing of technology intensive machinery started at a lower price in China. In similar lines, machinery development through reverse engineering may also be encouraged. This can also be done on a Public Private Partnership Basis.

Dedicated support for promotion of indigenous development and manufacturing of high quality and modern machinery can be provided through a separate scheme. This scheme could provide capital subsidy for plant setup re-imbursment of input VATs and interest subsidies to manufacturers setting up modern Technical Textile machinery units.

In addition, collaboration between Ministry of Textiles and The Department of Heavy Industries is suggested for developing a road map of development of Indigenous Technical Textile machinery industry.

International Collaboration of CoEs

In lines with Global CoEs, Indian CoEs should also aim at developing international collaboration with industries, academic bodies and global CoEs for the purpose of knowledge sharing related to newer and modern technologies, market demand, new researches, etc. The collaboration should aim at benefitting the local manufacturers in India and their International counterparts through technology transfer, identifying prospects of joint ventures and potential entry strategy into newer global markets.

Formulation of Standing Committee for Promotion of New Technical Textile Products:

It is recommended to formulate a standing committee for promotion of high potential fast growing Technical Textile emerging products. This committee would be responsible for devising promotion strategies specific to key emerging products and monitor the growth of the industry to devise the right interventions as and when required for promotion of these Technical Textile products.

Scheme for promoting Technical Textiles

Indian Technical Textile is still in a growing phase with a vast potential. The SGDTT scheme till 2011 and TMTT scheme of the 11th plan has helped in a significant manner in developing up to date testing and research infrastructure, mapping of Technical Textile units in India and creating awareness regarding the use of different Technical Textile products. However, there is still a lot of progress that needs to be done in terms of

further strengthening of the CoEs into newer more advanced CoEs for emerging products, promotion of R&D and quality production in PPP and private sector. Along with it there is a need to going beyond general awareness about products and inculcate the benefits and usability and of Technical Textiles amongst users and informing them about how to use Technical Textiles. To cater to these industry requirements, it is recommended that a new scheme of five years should be run by the Ministry in line with the TMTT, which would focus on developing knowledge base, R&D support, incubation and entrepreneurship development, marketing, export promotion, awareness creation and new product introduction.

Continuous Monitoring of Industry

The government already has a system of compiling statistics of conventional textile industry, on continued basis. A similar system with respect to Technical Textile industry may be introduced.

Annexure

35. Profile of Key Players

Agrotech

The profile of these organisations is as shown below:

Company Name	Garware Wall Ropes
Type of Unit -	Large
Type of Unit -	OTHERS
2: Type of Management	Public Limited
Products	Fishing Nets
Technical Textile segment	Agrotech
End user Industries	Fishing nets and twines
Production	7461 MT
Exports (in Rs. Lakh)	Rs. 26300 lakh
Capacity 2012-13	8724 MT
Key Raw Material (RM) Required	Nylon, polypropylene monofilament and multifilament
Source of Raw Material Domestic	Majority of raw material for netting manufacturing is domestic
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	50130
Sales Turnover 2011-12 (in Rs. Lakh)	58082
Sales Turnover 2012-13 (in Rs. Lakh)	60305
EBITDA 2010-11 (in Rs. Lakh)	5494
EBITDA 2011-12 (in Rs. Lakh)	6120
EBITDA 2012-13 (in Rs. Lakh)	6413
Net Profit 2010-11 (in Rs. Lakh)	2443
Net Profit 2011-12 (in Rs. Lakh)	2401
Net Profit 2012-13 (in Rs. Lakh)	2467
Total employees	
Total Assets (2012-13) – in Rs. lakh	15414
Contact	
Technical collaborations	JV - Garware Environmental Services Pvt. Ltd. is yet to start operations
District	Pune
State	Maharashtra
Factory Location	Pune & Wai - 3 factories 10/66, Kirti Nagar Industrial Area, New Delhi
Registered Office Address	Corporate Office - Plot no 11, Block D1, MIDC Chinchwad Pune - 411 019
Registered office phn .no.	011-25923367 '020-30780000

Company Name	Garware Wall Ropes
	020-30780195
Contact Person	Mr. Pradeep Patil
Designation	Head - Textiles
Telephone	09370313237 022-30780217
Email Address	papatil@garwareropes.com sales@garwareropes.com
Website	www.garwareropes.com
Fax Number	020-30780350

Company Name	Rishi Techtex
Type of Unit	Large
Type of Unit -	Others
2: Type of Management	Public Limited
Products	Plastic Knitted Bags - shade nets
Technical Textile segment	Agrotech
End user Industries	
Production	1118 MT
Capacity 2012-13	1200 MT
Key Raw Material (RM) Required	Plastic granules, HDPE/PP/LDPE Plst.Raw Mtls, KRAFT paper
Source of Raw Material	Mostly domestic
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	2927
Sales Turnover 2011-12 (in Rs. Lakh)	3624
Sales Turnover 2012-13 (in Rs. Lakh)	3604
EBITDA 2010-11 (in Rs. Lakh)	375
EBITDA 2011-12 (in Rs. Lakh)	-
EBITDA 2012-13 (in Rs. Lakh)	-
Net Profit 2010-11 (in Rs. Lakh)	112
Net Profit 2011-12 (in Rs. Lakh)	106
Net Profit 2012-13 (in Rs. Lakh)	-
Total employees	-
Total Assets (2012-13) – in Rs. lakh	3631
Contact	
District	Dadar & Nagar Haveli
State	Dadar & Nagar Haveli
Factory Address	Plot No 277/3/3, Dadra Demni Road, Haveli, Dadra & Nagar Haveli
Registered Office Address	612 Veena Killedar Indl Estate, 10/14 Pais Street Byculla (W),

Company Name	Rishi Techtex
	Mumbai, 400011, Maharashtra
Registered office phn .no.	91-22-23084886/ 23075677/23060572
Email Address	info@rishitechtext.com
Website	http://www.rishipac.com

Company Name	Tuflex(Netlon India Ltd)
Type of Unit -	Large
Type of Unit -	Others
2: Type of Management	Private Limited
Products	Agro products - nettings and mulching films
Technical Textile segment	Agrotech
End user Industries	Agriculture sector
Production	4297 MT
Key Machinery Installed -	European machinery, including stitching machines, sewing machines, cutting machines, finishing machines, bending machines, printing, lamination, slitting, pouching, laser marking
Key Raw Material (RM) Required	Polypropylene, polyester
Source of Raw Material Domestic (Share in %)	Mostly domestic
Financials	
Sales Turnover 2011-12 (in Rs. Lakh)	16471
Sales Turnover 2012-13 (in Rs. Lakh)	14526
Net Profit 2011-12 (in Rs. Lakh)	-393
Net Profit 2012-13 (in Rs. Lakh)	-842
Total Assets (2012-13) – in Rs. Lakh	10966
Contact	
District	Vadodra
State	Gujarat
Factory Address	Vadodara
Registered Office Address	702/704, GIDC, Palej, Bharuch, Gujarat - 392 220, India
Registered office phn .no.	Mob.: 91-9898058583 Telephone: 91 - 2642 – 277663
Contact Person	Mr. D Noble
Designation	Dy. General Manager – Marketing
Email Address	sales@tuflex.net
Website	http://polymernets.com/

Company Name	Neocorp International Limited
Type of Unit	Large
Type of Unit -	Others
2: Type of Management	Public Limited

Company Name	Neocorp International Limited
Products	Agrotech - Agro Net, Woven ground cover, rope, mulch film, vermibed
Technical Textile segment	Agrotech
End user Industries	In agro farming
Production	1930 MT
Capacity 2012-13	2000 MT
Key Raw Material (RM) Required	Fabrics/ tape, granules, sacks/ fabrics
Source of Raw Material Domestic(Share in %)	Mostly domestic
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	23107
Sales Turnover 2011-12 (in Rs. Lakh)	28399
Sales Turnover 2012-13 (in Rs. Lakh)	43011
EBITDA 2010-11 (in Rs. Lakh)	3288
EBITDA 2011-12 (in Rs. Lakh)	4427
EBITDA 2012-13 (in Rs. Lakh)	-
Net Profit 2010-11 (in Rs. Lakh)	1419
Net Profit 2011-12 (in Rs. Lakh)	1658
Net Profit 2012-13 (in Rs. Lakh)	1583
Total Assets (2012-13) – in Rs. lakh	67364
Contact	
Technical collaborations	Technical collaboration with Sungkwang Chemical Industrial Company, Korea
District	Dhar
State	Madhya Pradesh
Factory Address	Industrial Area Sector - 1, Plot No 62-63 Pithampur, Dhar, Madhya Pradesh
Phone Number	91-07292-252284/ 252278/501632/33
Registered Office Address	220 Mahavir Industrial Estate, Op Mahakali Caves Rd Andheri (E), Mumbai, 400093, Maharashtra
Registered office phn .no.	91-22-26879510
Email Address	Registered office: bom@neocorp.co.in Works: contact@neocorp.co.in
Website	http://www.neocorp.co.in

Company Name	CTM agrotexiles
Type of Unit -	Medium
Type of Unit -	Others
2: Type of Management	Private Limited
Products	Shadenets and agro nets
Technical Textile segment	Agrotech

Company Name	CTM agrotextiles	
Production	1500 MT	
Key Raw Material (RM) Required	Polypropylene and polyester	
Source of Raw Material	100% domestic	
Financials		
Sales Turnover 2011-12 (in Rs. Lakh)	1119	
Sales Turnover 2012-13 (in Rs. Lakh)	1163	
Net Profit 2011-12 (in Rs. Lakh)	-	
Net Profit 2012-13 (in Rs. Lakh)	12	
Total Assets (2012-13) – in Rs. lakh	1287	
Contact		
District	Ahmedabad	
State	Gujarat	
Registered Office Address	205. New cloth Market Ahmedabad - 380 002 Gujarat	
Registered office phn .no.	079 22165163	
Telephone	079 22165163	
Email Address	info@ctmagrotextiles.com	
Website	www.ctmagrotextiles.com	
Fax Number	+91 79 2216326	

Meditech

The profiles of the key players are as shown:

Company Name	Ginni Filaments Ltd	
Type of Unit -	Non SSI	
Type of Unit	Others	
2: Type of Management	Public Limited	
Products	Spun bond non-woven rolled goods, Finished Products-Wipes	
Technical Textile segment	Meditech	
End user Industries	Hygiene related consumption	
PRODUCTS	Non woven rolled goods and wipes	
production (2012-13)	Production 8000 MTPA	
Export 2012-13	6,800 MTPA	
Product (Capacity)	Spun bond/Spunlace	
Unit of capacity	MTPA	
Capacity 2012-13	10000	
Capacity Utilization 12-13	80%	
Capacity expansion plan	Investing Rs.150 crore in the next 3 years.	
Manufacturing process	Hydro-entangling-Spun Bond	
Key Raw Material (RM)	PSF and Rayon(Viscose)	
Source of Raw Material	India and Indonesia	

Company Name	Ginni Filaments Ltd	
Financial information		
Sales Turnover 2011-12 (in Rs. Lakh)	71700	
Sales Turnover 2012-13 (in Rs. Lakh)	75500	
EBITDA 2011-12 (in Rs. Lakh)	4	
EBITDA 2012-13 (in Rs. Lakh)	95.5	
Net Profit 2011-12 (in Rs. Lakh)	-33900	
Net Profit 2012-13 (in Rs. Lakh)	-14000	
Total employment	145	
Contact		
District	Mathura	
State	U.P	
Factory Address	Panoli, Gujarat	
Registered Office Address	110 K M Stone, Delhi Mathura Rd, Chata – 281 401, Mathura	
Contact Person Name & Designation	Mr.R.R.Maheshwari	
Designation	Director-Marketing	
Telephone	0120 -4058400	
Email Address	rrmaheshwari@ginnifilaments.com	
Website	www.ginnifilaments.com	
Fax Number	0120 4250975	

Company Name	Welspun India Ltd	
Type of Unit -	Non SSI	
Type of Unit	Others	
2: Type of Management	Public Limited	
Products	Spunlace (wipes included)	
Technical Textile segment	Meditech	
End user Industries	Hygiene and Healthcare Products	
Product (Capacity)	Spunlace	
Unit of capacity	MTPA	
Capacity 2012-13	12000	
Product segment for financial	Hygiene and Healthcare	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	204919	
Sales Turnover 2011-12 (in Rs. Lakh)	259099	
Sales Turnover 2012-13 (in Rs. Lakh)	304294	
EBITDA 2010-11 (in Rs. Lakh)	15564	
EBITDA 2011-12 (in Rs. Lakh)	45111	
EBITDA 2012-13 (in Rs. Lakh)	49002	
Net Profit 2010-11 (in Rs. Lakh)	-9979	

Company Name		Welspun India Ltd
Net Profit 2011-12 (in Rs. Lakh)		11711
Net Profit 2012-13 (in Rs. Lakh)		17141
Contact		
District	Mumbai	
State	Maharashtra	
Factory Address	Welspun City ,Village Versamedi Taluka Anjar, Kutch Gujarat, 370110	
Phone Number	2836-661111	
Registered Office Address	Welspun House, 6th Floor, Kamala Mills Compound, Senapati Bapat Marg, Lower Parel, Mumbai 400 013,	
Registered office phn	22 66136000 / 24908000	
Contact Person Name & Designation	Mr. Milind Hardikar	
Designation	Managing Director	
Telephone	22 66136000 / 24908000	
Website	http://www.welspunindia.com	

Company Name		Kimberley-Clark Lever Ltd
Type of Unit -	Non SSI	
Type of Unit -	Others	
2: Type of Management	Private Limited	
Products	Wipes,Sanitary Napkins,Baby Diapers,Surgical Disposables	
Technical Textile segment	Meditech	
End user Industries	Hygiene and Healthcare	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	21105	
Sales Turnover 2011-12 (in Rs. Lakh)	24442	
Sales Turnover 2012-13 (in Rs. Lakh)		
EBITDA 2010-11 (in Rs. Lakh)	-2351	
EBITDA 2011-12 (in Rs. Lakh)	-1951	
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)	-2351	
Net Profit 2011-12 (in Rs. Lakh)	-1951	
Net Profit 2012-13 (in Rs. Lakh)		
Contact		
District	Pune	
State	Maharashtra	
Factory Address	Survey No. 279, Rasoni Industrial Park, Village Mann, Taluka Mulshi, Pune, - 411 057	
Phone Number	+91 20 30547175	

Company Name		Kimberley-Clark Lever Ltd
Registered Office Address	Survey No. 279, Rasoni Industrial Park, Village Mann, Taluka Mulshi, Pune, - 411 057	
Registered office phn .no.	20 30547175	
Contact Person	Mr.Prakash Iyer	
Designation	MD	
Telephone	20 30547175	
Email Address	marketing.india@kcc.com	
Website	https://www.kcprofessional.co.in	

Company Name		Johnson & Johnson Ltd
Type of Unit -	Non SSI	
Type of Unit - EOU UNIT	Others	
2: Type of Management	Public Limited	
Products	Baby Diapers,Sanitary Napkins,Wipes,Surgical Disposables,Implants,Extra-Corporeal,Surgical Dressings,Ear Buds,Eye Pads,Dental Floss	
Technical Textile segment	Meditech	
End user Industries	Hygiene,Healthcare,Implan table and Extr-corporeal	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	280879	
Sales Turnover 2011-12 (in Rs. Lakh)	360062	
Sales Turnover 2012-13 (in Rs. Lakh)	404272	
EBITDA 2010-11 (in Rs. Lakh)	28002	
EBITDA 2011-12 (in Rs. Lakh)	49517	
EBITDA 2012-13 (in Rs. Lakh)	65433	
Net Profit 2010-11 (in Rs. Lakh)	17668	
Net Profit 2011-12 (in Rs. Lakh)	33792	
Net Profit 2012-13 (in Rs. Lakh)	40534	
Contact		
District	Mumbai	
State	Maharashtra	
Factory Address	Mulund,Mumbai	
Registered Office Address	501 Arena Space Behind Majas Bus Depot Off Jogeshwari Vikhroli Link Road, Jogeshwari (E) Mumbai 400 060	
Registered office phn .no.	022 66646464	
Contact Person Name & Designation	Mr.N.K.Ambwani	
Designation	MD	

Company Name	Johnson & Johnson Ltd
Telephone	022 66646464
Email Address	Contactus@jnindia.com
Website	http://www.jnindia.com

Company Name	Procter & Gamble Hygiene & Health Care Ltd.
Type of Unit -	Non SSI
2: Type of Management	Public Limited
Products	Baby Diapers, Sanitary Napkins and Dental Floss
Technical Textile segment	Meditech
End user Industries	Hygiene Segment
Product segment	Hygiene
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	100288
Sales Turnover 2011-12 (in Rs. Lakh)	129741
Sales Turnover 2012-13 (in Rs. Lakh)	168678
EBITDA 2010-11 (in Rs. Lakh)	19894
EBITDA 2011-12 (in Rs. Lakh)	25113
EBITDA 2012-13 (in Rs. Lakh)	31752
Net Profit 2010-11 (in Rs. Lakh)	15088
Net Profit 2011-12 (in Rs. Lakh)	18129
Net Profit 2012-13 (in Rs. Lakh)	20322
Contact	
District	Mumbai
State	Maharashtra
Registered Office Address	Procter & Gamble, India P&G plaza, Cardinal Gracias Road, Chakala, Andheri (E), Mumbai - 400099
Designation	MD
Telephone	(91-22) 2826 6000
Website	https://www.pg.com/en_IN

Company Name	Nobel Hygiene Pvt. Ltd
Type of Unit -	Non SSI
Type of Unit - EOU UNIT	Others
2: Type of Management	Private Limited
Products	Adult Diapers, Baby Diapers and Under pads
Technical Textile segment	Meditech
End user Industries	Hygiene Segment
Product (Capacity)	Baby Diapers, Adult Diapers, Underpads
Unit of capacity	Million Pieces
Capacity 2012-13	Baby Diapers-100, Adult Diapers-50, Underpads-40

Company Name	Nobel Hygiene Pvt. Ltd
Capacity Utilization 12-13	BD-100%, AD-50%, UP-10%
Key Machinery Installed - Name of machine	GDM from Italy
Key Raw Material (RM) Required	Wood Pulp, Super absorbant and PP
Source of Raw Material	WP-US, SA-Taiwan, Korea & China, PP-Japan, Taiwan, Korea and China
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	4500
Sales Turnover 2011-12 (in Rs. Lakh)	5000
Sales Turnover 2012-13 (in Rs. Lakh)	6000
EBITDA 2010-11 (in Rs. Lakh)	450
EBITDA 2011-12 (in Rs. Lakh)	800
EBITDA 2012-13 (in Rs. Lakh)	1000
Total employment	230
Contact	
District	Mumbai
State	Maharashtra
Factory Address	Nashik
Registered Office Address	Unit No. 204, Antariksh Thakur House, Makwana Road, Near Marol Fire Brigade, Andheri – East. Mumbai - 400 059.
Registered office phn .no.	022 – 42121314 022 – 32427985
Contact Person	Mr. Kamal Johari
Designation	Director
Telephone	022 – 42121314 022 – 32427985
Email Address	sales@nobelhygiene.com
Website	www.nobelhygiene.com

Company Name	Gufic Biosciences Ltd
Type of Unit -	Non SSI
Type of Unit - EOU UNIT	
2: Type of Management	Public Limited
Products	Sanitary Napkins
Technical Textile segment	Meditech
End user Industries	Hygiene
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	7131
Sales Turnover 2011-12 (in Rs. Lakh)	8356
Sales Turnover 2012-13 (in Rs. Lakh)	10014
EBITDA 2010-11 (in Rs. Lakh)	630

Company Name		Gufic Biosciences Ltd
EBITDA 2011-12 (in Rs. Lakh)		771
EBITDA 2012-13 (in Rs. Lakh)		1113
Net Profit 2010-11 (in Rs. Lakh)		146
Net Profit 2011-12 (in Rs. Lakh)		153
Net Profit 2012-13 (in Rs. Lakh)		333
Contact		
District	Mumbai	
State	Maharashtra	
Registered Office Address	37,1st Floor, Kamala Bhavan II, Swami Nityanand Road, Andheri (East), Mumbai - 400 069	
Contact Person	Jayesh P Choksi	
Designation	Chairman	
Telephone	22-67261000	
Email Address	gufic@guficbio.com	
Website	http://www.guficbio.com	

Company Name		Ramaraju Surgical Cotton Mills Ltd
Type of Unit -	Non SSI	
2: Type of Management	Public Limited	
Products	Surgical Dressings-Bandages and Cotton	
Technical Textile segment	Meditech	
End user Industries	Surgical Dressings	
Financials		
Sales Turnover 2010-11 (in Rs. Lakh)	20919	
Sales Turnover 2011-12 (in Rs. Lakh)	19611	
Sales Turnover 2012-13 (in Rs. Lakh)	23798	
EBITDA 2010-11 (in Rs. Lakh)	5948	
EBITDA 2011-12 (in Rs. Lakh)	2363	
EBITDA 2012-13 (in Rs. Lakh)	5996	
Net Profit 2010-11 (in Rs. Lakh)	1260	
Net Profit 2011-12 (in Rs. Lakh)	-1018	
Net Profit 2012-13 (in Rs. Lakh)	2255	
Contact		
District	Rajapalayam	
State	Tamil Nadu	
Factory Address	R S C Mills Premises, 119 P A C Ramaswamy Raja Salai, Rajapalaiyam, 626117, Tamil Nadu	
Registered Office Address	R S C Mills Premises, 119 P A C Ramaswamy Raja Salai, Rajapalaiyam, 626117, Tamil Nadu	
Registered	4563-235904	

Company Name		Ramaraju Surgical Cotton Mills Ltd
office phn		
Contact	Mr.R Nalina Ramalakshmi	
Designation	MD	
Telephone	4563-235904	
Email Address	rscm@sanchernet.in	
Website	http://www.ramarajusurgical.com	

Company Name		Suryavanshi Spinning Mills Ltd
Type of Unit -	Non SSI	
Type of Unit -	Others	
2: Type of Management	Public Limited	
Products	Surgical Dressings-Bandages and Cotton	
Technical Textile segment	Meditech	
End user Industries	Surgical Dressings	
Product segment	Healthcare	

Company Name		Suryavanshi Spinning Mills Ltd
Financials		
Sales Turnover 2010-11 (in Rs. Lakh)	28191	
Sales Turnover 2011-12 (in Rs. Lakh)	27073	
Sales Turnover 2012-13 (in Rs. Lakh)	26825	
EBITDA 2010-11 (in Rs. Lakh)	3274	
EBITDA 2011-12 (in Rs. Lakh)	948	
EBITDA 2012-13 (in Rs. Lakh)	341	
Net Profit 2010-11 (in Rs. Lakh)	1614	
Net Profit 2011-12 (in Rs. Lakh)	-817	
Net Profit 2012-13 (in Rs. Lakh)	-1556	
Contact		
District	Secunderabad	
State	Andhra Pradesh	
Factory Address	Bhongir, Nalgonda District, Aliabad, Ranga Reddy District in Andhra Pradesh and Rajna in Chindwara District of Madhya Pradesh	
Registered Office Address	6th Floor Surya Towers, 105 Sardar Patel Road, Secunderabad, 500003	
Registered office phn .no.	40-30512700	
Contact Person Name & Designation	Mr.Rajendra Kumar Agarwal	
Telephone	40-30512700	
Email Address	info@suryavanshi.com	
Website	http://www.suryavanshi.com	

Company Name	Lotus Surgicals Pvt. Ltd
Type of Unit -	Non SSI
2: Type of Management	Private Limited
Products	Sutures & Hernia Mesh
Technical Textile segment	Meditech
End user Industries	Implantable
Product (Capacity)	Sutures & Mesh
Capacity Utilization 2012-13 (in %)	50%
Source of Raw Material Domestic(Share in %)	Partly imported from France and partly catered through domestic supply
Product segment	Implantable
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	2000
Sales Turnover 2011-12 (in Rs. Lakh)	3600
Sales Turnover 2012-13 (in Rs. Lakh)	5000
EBITDA 2010-11 (in Rs. Lakh)	
EBITDA 2011-12 (in Rs. Lakh)	200
EBITDA 2012-13 (in Rs. Lakh)	500
Total employment	300
Contact	
District	Mumbai
State	Maharashtra
Factory Address	Khasra No. 1051/1&2, Twin Industrial Estate, Selaqui, Dehradun - 248197 Uttaranchal, India
Phone Number	135-2698661, 2698709
Registered Office Address	Unit No. 404, Prathamesh Towers B, Raghuvanshi Mill Compound, Senapati Bapat Marg Lower Parel, Mumbai - 400022
Registered office phn .no.	22-24913541, 24913542
Contact Person	Mr. Mehernosh Daruwalla
Designation	MD
Telephone	22-24913541, 24913542
Website	http://www.lotus-surgicals.com

Company Name	Dr.Sabharwal Manufacturing Labs Ltd
Type of Unit -	Non SSI
Type of Unit - EOU UNIT	
2: Type of Management	Public Limited
Products	Surgical Dressings- Tapes, Bandages etc and disposables and Eye Pads

Company Name	Dr.Sabharwal Manufacturing Labs Ltd
Technical Textile segment	Meditech
End user Industries	Healthcare and Eye Pads
Product segment	Healthcare
Financials	
Sales Turnover 2010-11 (in Rs. Lakh)	424
Sales Turnover 2011-12 (in Rs. Lakh)	563
Sales Turnover 2012-13 (in Rs. Lakh)	569
EBITDA 2010-11 (in Rs. Lakh)	21
EBITDA 2011-12 (in Rs. Lakh)	51
EBITDA 2012-13 (in Rs. Lakh)	86
Net Profit 2010-11 (in Rs. Lakh)	13
Net Profit 2011-12 (in Rs. Lakh)	26
Net Profit 2012-13 (in Rs. Lakh)	48
Contact	
District	Panchkula
State	Haryana
Factory Address	Kanpur and Panchkula
Registered Office Address	"Sabharwal House" 260, Sector 6 , Panchkula - 134109, Haryana - (INDIA)
Registered office phn .no.	172-3259521
Contact Person	Mrs. Anjana Sabharwal
Designation	Director
Telephone	172-3259521
Email Address	drsimpl@gmail.com
Website	http://www.drsabharwal.com

Mobitech

The profile of the key players is shown as below:

Supreme Nonwovens Ltd.

Company Name	Supreme Non-woven
Type of Unit	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Interlinings, non woven automotive textile components
Technical Textile segment	Non woven, automotive textiles
Financials	
Sales Turnover 2010-11(in Rs. Lakh)	14915.23
Sales Turnover 2011-12(in Rs. Lakh)	17117.59

Company Name		Supreme Non-woven
EBITDA2010-11(in Rs. Lakh)		2625.22
EBITDA2011-12(in Rs. Lakh)		2411.08
Net Profit2010-11(in Rs. Lakh)		1023.44
Net Profit2011-12(in Rs. Lakh)		829.98
Contact		
District	Mumbai	
Registered Address	Supreme House, Plot No. 110, 16th Road, Chembur, Mumbai 400 071. Maharashtra, India.	
Contact Person	Mohan Kawrie	
Telephone	Tel: +91(22)25208822 Fax:+91(22)25208093	
Email Address	mumbai@supremegroup.co.in	
Website	http://www.supremegroup.co.in/	

Company Name		Bhilwara Melba Limited
2: Type of Management	Private Limited	
Products	Automotive Furnishing Fabric,Decorative Furnishing Fabric,Contract Furnishing,Flame Retardant fabric,Technical Textiles,Air Texturised Yarn - Grey & Dyed	
Technical Textile segment	Mobiltech, Protech (the company is organized into departments of Automotive Furnishing Fabric,Decorative Furnishing Fabric,Contract Furnishing,Flame Retardant fabric Technical Textiles,Air Texturised Yarn - Grey & Dyed)	
PRODUCTS	Air Texturised Yarn:1800 MT per annum,Fabric:4.8 Mn Linear	
Product(Capacity)	Air Texturised Yarn 1800 MT per annum Fabric 4.8 Mn Linear Metres	
Manufacturing process	The Plant is fully integrated with state-of-the-art manufacturing facilities consisting of air texturising, yarn dyeing, warping, dobby & jacquard weaving, warp, circular, & flat knitting, double raschel, woven velour, processing, finishing & lamination. The company has also set up state-of-the-art CAD/CAM designing system. It has fully supported and well equipped	

Company Name		Bhilwara Melba Limited
		laboratory for quality control and maintenance of international standards in manufacturing. The company has secured TS 16949 certification from Det Norske Veritas, The Netherlands. The company is in the process of implementing Total Quality Management (TQM) and Enterprise Resource Planning (ERP). The company can offer wide range of foam laminated/unlaminated fabrics in warp/circular/flat knitted and jacquard/dobby weaving to meet the specific requirements of automotive customers and offers flame retardant fabric, water repellent fabric and anti-bacterial fabric.
District	NOIDA	
Factory Address	Banswara, Rajasthan (India)	
Registered Office Address	Bhilwara Towers A-12, Sector-1 Noida 201301 (UP)	
Contact Person		
Name & Designation	Mr. Sanjay Sharma Sr. Vice President (Marketing)	
Telephone	Ph: +91 120 4390000 Fax: +91 120 4277841	
Email Address	BMD@LNJB.COM	
Website	http://www.bmdonline.net/index.html	

Company Name		Uniproducts(I) Limited
Type of Unit	Large	
Type of Unit -	Non SSI	
Products	Floor coverings	
Technical Textile segment	Mobiltech	
Production 2010-11	5,293,797 kg	
Capacity 2010-11	6,500,000 kg	
Key Installed Machinery Name of machine	Needle Punching lines from Germany and Austria, Finishing lines from Switzerland, Heavy duty Presses of Italian make, Complete Carpet Moulding line from Germany, German make PU Foaming and Moulding machines	

Company Name		Uniproducts(I) Limited	
Key Raw Material (RM) Required		LDPE powder, Namda, Wooden Flooring, binders, EVA sheets, interlinings, resin powder, foaming chemical, polypropylene, LDPE/ HDPE, resins, cotton waste, resins felt, polyester, viscose fibres, felts, carpets, carpet tiles, aluminium, fluff pulp	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		176.32	
Sales Turnover2011-12(in Rs. Lakh)		152.62	
EBITDA2010-11(in Rs. Lakh)		18.88	
EBITDA2011-12(in Rs. Lakh)		11.25	
Net Profit2010-11(in Rs. Lakh)		2.33	
Net Profit2011-12(in Rs. Lakh)		-4.98	
Land & Building Gross value (on 31 MAR'13) (in Rs. Lakh)		28.39	
Major Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		87.31	
Ancillary Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		4.54	
Other Fixed Assets Gross value (on 31 MAR'13) (in Rs. Lakh)		0.19	
Contact			
Factory Address		B-36 SIPCOT Indl growth centre,Ogagada, Sriperumbudur Taluk, Kancheepuram Dist Tamil Nadu	
Registered Office Address		Jarthal Village Rd 84 Km.Stone, Delhi-Jaipur Rd PO Sangwari, Rewari, 123401, Haryana	
Registered office phn .no.		91-01274-249348/49/50	
Contact Person		Dr. Ashwan Kapur	
Designation		Managing Director	
Email Address		Marketing – Automotive Division tkkhatri@unitexindia.com Marketing – Lifestyle Division kanyalcs@unitexindia.com Purchase Department vtripathi@unitexindia.com H R Department farhan@unitexindia.com General Queries uniproducts@unitexindia.com Investors preeti@unitexindia.com	
Website		http://www.unitexindia.com	

Company Name		SRF Limited	
Type of Unit -		Large	
Type of Unit		Others	
2: Type of Management		Public Limited	
Products		Ny.Tyre	Cord
Technical segment	Textile	Fabric/Ind.Y.Fibr	
Production 2010-11		51879.77 MT	
Production 2011-12		50225.76 MT	
Production 2012-13		49400.78 MT	
Capacity2010-11		60334 MT	
Capacity2011-12		71384 MT	
Capacity2012-13		71384 MT	
Key Raw Material (RM) Required		MEG, Fluorspar, Chlorine, Sulphuric Acid, Caustic Soda, Yarn, Chloromethane, Chloromethanes, Methanol, Caprolactum, Fabric, Trichloroethylene, Polyester Chips, Nylon Chips, Nylon Yarn, PTA, Polyester Films, Nylon tyre cord fabric	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		3063.27	
Sales Turnover2011-12(in Rs. Lakh)		3530.25	
Sales Turnover2012-13(in Rs. Lakh)		3322.55	
EBITDA2010-11(in Rs. Lakh)		906.88	
EBITDA2011-12(in Rs. Lakh)		831.63	
EBITDA2012-13(in Rs. Lakh)		621.52	
Net Profit2010-11(in Rs. Lakh)		483.44	
Net Profit2011-12(in Rs. Lakh)		387.38	
Net Profit2012-13(in Rs. Lakh)		258.51	
Total employment (2012-13)		2300	
Land & BuildingGross value (on 31 MAR'13) (in Rs. Lakh)		552.8	
Major Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		1,578.90	
Ancillary Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		33.39	
Other Fixed Assets Gross value (on 31 MAR'13) (in Rs. Lakh)		17.8	
Collaborating Partner		Trvelite, US	
Contact			
Factory Address		Technical Business,Industrial Area Malanpur, Bhind, Madhya Pradesh, 477116	Textiles
Phone Number		91-7539-283164, 91-7539-283164	

Company Name		SRF Limited
Registered Office Address	C-8 Commercial Complex, Safdarjung Development Area, New Delhi, 110016	
Registered office phn .no.	91-11-26857141	
	Media Queries: Mukund Trivedy, Head of Corporate Communications E-Mail: mukund.trivedy@srf.com Redressal of investor complaints: Mr. Anoop K. Joshi, Vice-President Company Secretary E-Mail: ajoshi@srf.com Name of investor grievance redressal officer : Mr. Sanjiv Kumar Sharma, Chief Manager (Secretarial) E-Mail: Sanjiv.Sharma@srf.com	
Email Address	E-Mail: Sanjiv.Sharma@srf.com	
Website	http://www.srf.com	

Company Name		IFB Autoliv
Type of Unit	Large	
Type of Unit -	OTHERS	
2: Type of Management	Private Limited	
Products	Seat belt webbing	
Technical Textile segment	Mobiltech	
End user Industries	Automotive industry	
Unit of quantity(2010-11)	40 mn MT	
Product (Capacity)	Seat belt webbing	
Capacity 2012-13	140 Mn MT	
Financial information		
Sales Turnover2010-11(in Rs. Lakh)	40905	
Sales Turnover2011-12(in Rs. Lakh)	42925	
Sales Turnover2012-13(in Rs. Lakh)	39377	
EBITDA2010-11(in Rs. Lakh)	3620	
EBITDA2011-12(in Rs. Lakh)	3398	
EBITDA2012-13(in Rs. Lakh)	1649	
Net Profit2010-11(in Rs. Lakh)	1785	
Net Profit2011-12(in Rs. Lakh)	2275	
Net Profit2012-13(in Rs. Lakh)	920	
Contact		
Registered Office Address	#16, Visveswariah Industrial Estate, 1st Main Road, Off Whitefield Road, Mahadevpura, Bangalore, Karnataka - 560048, India	
Registered office phn .no.	080-39884450	

Company Name		IFB Autoliv
Email Address	info@ifbautomotive.com	

Company Name		Century Enka
Type of Unit	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Public Limited	
	Industrial yarn plus tyre cord fabrics: The Plant at Pune produces High Tenacity Nylon (Polyamide 6) and Polyester Industrial Yarns and Greige Tyre Cord Fabrics among other products. Century Enka's Yarns are used as reinforcing material in tyres, conveyor belts, V-belts, hoses, ropes & cordage and broad & narrow woven.	
Products		
Technical segment	Textile	Mobiltech
End user Industries	Automotive industry	
Production 2012-13	31200 MT	
Financial information		
Sales Turnover2010-11(in Rs. Lakh)	-	
Sales Turnover2011-12(in Rs. Lakh)	164951	
Sales Turnover2012-13(in Rs. Lakh)	155217	
EBITDA2010-11(in Rs. Lakh)	18352	
EBITDA2011-12(in Rs. Lakh)	9950	
EBITDA2012-13(in Rs. Lakh)	14788	
Net Profit2010-11(in Rs. Lakh)	7936	
Net Profit2011-12(in Rs. Lakh)	878	
Net Profit2012-13(in Rs. Lakh)	2189	
Contact		
District	Pune	
Registered Office Address	Registered Office: 2nd Floor, Century Arcade, Narangi Baug Road, Pune - 411 001. (Maharashtra)	
Registered office phn .no.	Tel. No. 020-2616 6511 Fax No. 020-2616 6511	
Website	http://centuryenka.co.in/cenka.html	

Company Name	Rane TRW Steering Systems Ltd.
Type of Unit	Medium
Type of Unit -	OTHERS
2: Type of Management	Private Limited
Products	Seat belt webbing, airbag cushion
Technical Textile segment	Mobiltech
Production 2012-13	5704320 metres
Products for exports	OSD+steering systems
Financial information	
Export 2010-11 (in Rs. Lakh)	56969
Export 2011-12 (in Rs. Lakh)	61962
Export 2012-13 (in Rs. Lakh)	63085
Sales Turnover2010-11(in Rs. Lakh)	7160
Sales Turnover2011-12(in Rs. Lakh)	6923
Sales Turnover2012-13(in Rs. Lakh)	7889
EBITDA2010-11(in Rs. Lakh)	6611
EBITDA2011-12(in Rs. Lakh)	7114
EBITDA2012-13(in Rs. Lakh)	4386
Net Profit2010-11(in Rs. Lakh)	5098
Net Profit2011-12(in Rs. Lakh)	4891
Net Profit2012-13(in Rs. Lakh)	3324
Total employment (2012-13)	962
Contact	
District	Chennai
State	TN
Phone Number	RTSSL operates four plants located at Viralimalai, Guduvancherry and Singaperumalkoil in Tamil Nadu and Pant Nagar in Uttarakhand employing around 962 persons.
Registered Office Address	Rane TRW Steering Systems Limited Steering Gear Division 45, TTK Road, Alwarpet, Chennai - 600 018, India
Registered office phn .no.	+91 44 24994390
Website	www.rane.co.in
Fax Number	+91 44 24994409

Company Name	Dakota
Type of Unit	Small
Type of Unit - EOU UNIT	No
2: Type of Management	Proprietorship
Products	Non Woven Fabric
Technical Textile segment	Mobiltech

Company Name	Dakota
End user Industries	Mobiltech
PRODUCTS	Non Woven Fabric
Unit of quantity (2010-11)	Lakhs Meter
Production 2010-11	4 lakh meters
Production 2011-12	4 lakh meters
Production 2012-13	4 lakh meters
Capacity2010-11	6 lakh meters
Capacity2012-13	6 lakh meters
Capacity Utilization 12-13	65%
Manufacturing process	Knitting
Key Machinery Installed - Name of machine	Loom
Key Raw Material (RM)	PSF
Financial information	
Sales Turnover 2012-13(in Rs. Lakh)	1000
EBITDA2012-13(in Rs. Lakh)	100
Net Profit2012-13(in Rs. Lakh)	50
Total - Permanent employment (2012-13)	22
Contact	
District	Thane
State	Maharashtra
Factory Address	15th Floor, Dev Corpora, Pokhran Road No. 1, Eastern Express Highway
Phone Number	022-67004935
Contact Person	Suraj Rao
Email Address	info@dakotaworldwide.com
Website	www.dakotaworldwide.com
Fax Number	022-67004950

Packtech

The profiles of the key players is shown in the following exhibit:

Company Name	Texplast
Type of Unit	Medium
Type of Unit -	OTHERS
2: Type of Management	Private Limited
Products	HDPE Woven bags, Panel bag, circular bag
Technical Textile segment	Packtech
End user Industries	Packing bags
PRODUCTS	HDPE thread/tape

Company Name		Texplast	
Production 2010-11		2699.13 MT	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		3072	
Sales Turnover2011-12(in Rs. Lakh)		7032	
Sales Turnover2012-13(in Rs. Lakh)		NA	
EBITDA2010-11(in Rs. Lakh)		384	
EBITDA2011-12(in Rs. Lakh)		737	
EBITDA2012-13(in Rs. Lakh)		NA	
Net Profit2010-11(in Rs. Lakh)		92.14	
Net Profit2011-12(in Rs. Lakh)		99.28	
Contact			
Registered Office Address	Mumbai 210-212, Anand Estates, 2nd Floor 189/ A Sane Guruji Marg, Mumbai 400 011, India		
Registered office phn .no.	91-22- 2307 5019 /2307 5308		
Email Address	texplast@vsnl.com		
Website	http://www.texplast.com/		

Company Name		Tulsyan NEC	
Type of Unit		Medium	
Type of Unit - EOU UNIT		(blank)	
2: Type of Management		Public Limited	
Products		HDPE/PP Woven Sacks & FIBC	
Technical Textile segment		Packtech	
End user Industries		Packing bags	
PRODUCTS		HDPE/PP Woven Fabric/Sack	
Production 2010-11		11696 MT	
Capacity – 2012-13		25797 MT	
Production – 12-13		11696 MT	
Capacity Utilization 12-13		45.34%	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		78126	
Sales Turnover2011-12(in Rs. Lakh)		113013.13	
Sales Turnover2012-13(in Rs. Lakh)		114796.75	
EBITDA2010-11(in Rs. Lakh)		6105	
EBITDA2011-12(in Rs. Lakh)		5971.45	
EBITDA2012-13(in Rs. Lakh)		5271.69	
Net Profit2010-11(in Rs. Lakh)		3335	
Net Profit2011-12(in Rs. Lakh)		1328.64	

Company Name		Tulsyan NEC	
Net Profit2012-13(in Rs. Lakh)		379.79	
Other information			
Other Fixed Assets Gross value (on 31 MAR'13) (in Rs. Lakh)	The Company is also planning to put up a Thermal Power Plant of 35 MW at Gumudipoondi for captive consumption. Construction work on this project is due to begin during the current year 2010-11		
District	Chennai		
State	TN		
Factory Address	Chennai(TN), Hobli(KA),The Plastic division is located at Doddaballapur, Peenya & Malur.		
Registered Office Address	Registered Office 61, Sembudoss Street, Chennai – 600 001.		
Website	http://tulsyanec.net/index.html		

Company Name		Flexituff International Ltd.	
Type of Unit -		Large	
Type of Unit - EOU UNIT		OTHERS	
2: Type of Management		Private Limited	
Products		Bags	
Technical Textile segment		Packtech	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		87058	
Sales Turnover2011-12(in Rs. Lakh)		62638	
Sales Turnover2012-13(in Rs. Lakh)		49578	
EBITDA2010-11(in Rs. Lakh)		6939	
EBITDA2011-12(in Rs. Lakh)		10717	
EBITDA2012-13(in Rs. Lakh)		12121	
Net Profit 2010-11(in Rs. Lakh)		2744	
Net Profit 2011-12(in Rs. Lakh)		3436	
Net Profit2012-13(in Rs. Lakh)		2764	
Contact			
Registered Office Address	304 Diamond Prestige, 41-A A J C Bose Road, Kolkata, 700017, West Bengal		
Registered office phn .no.	033-32212690/40053995		
Email Address	investors@flexituff.com		
Website	http://www.flexituff.com		

Company Name		Karur KCP Pack.	
Type of Unit		Medium	

Company Name	Karur KCP Pack.
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	PP bags
Technical Textile segment	Packtech
End user Industries	(blank)
PRODUCTS	PP bags
Production 2010-11	10045 MT
Production 2011-12	9406 MT
Capacity 2010-11	18000 MT
Capacity 2011-12	18000 MT
Financial information	
Sales Turnover2010-11(in Rs. Lakh)	39294
Sales Turnover2011-12(in Rs. Lakh)	43704
Sales Turnover2012-13(in Rs. Lakh)	47152
EBITDA2010-11(in Rs. Lakh)	5015
EBITDA2011-12(in Rs. Lakh)	4884
EBITDA2012-13(in Rs. Lakh)	6097
Net Profit2010-11(in Rs. Lakh)	767
Net Profit2011-12(in Rs. Lakh)	861
Net Profit2012-13(in Rs. Lakh)	456
Contact	
Factory Address	R. S. No. 112, Thiruvandarkoil (P.O), Mannadipet Commune, Pondicherry – 605 102.
Phone Number	(0413) 2640559, 2640560, 2640561
Registered Office Address	330/1, Chinna Andan Kovil Road, Karur – 639 001. Tamil Nadu. India.
Registered office phn .no.	04324 240663 / 240163
Email Address	corporate_office@karurkcp.in
Website	http://www.karurkcp.in

Company Name	Neo Corp International
Type of Unit - SME or otherwise	Medium
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Polypacks
Technical Textile segment	Packtech
PRODUCTS	Sack/Fabrics
Production 2010-11	20085.22 MT
Capacity2010-11	21000 MT

Company Name	Neo Corp International
Capacity Utilization 12-13	95.64%
Financial information	
Sales Turnover2010-11(in Rs. Lakh)	24497
Sales Turnover2011-12(in Rs. Lakh)	30179
Sales Turnover2012-13(in Rs. Lakh)	42527
EBITDA2010-11(in Rs. Lakh)	3288
EBITDA2011-12(in Rs. Lakh)	4427
EBITDA2012-13(in Rs. Lakh)	4930
Net Profit2010-11(in Rs. Lakh)	1419
Net Profit2011-12(in Rs. Lakh)	1658
Net Profit2012-13(in Rs. Lakh)	1583
Contact	
Registered Office Address	220 Mahavir Industrial Estate, Op Mahakali Caves Rd Andheri(E), Mumbai, 400093, Maharashtra
Registered office phn	022-26879510
Email Address	contact@neocorp.co.in
Website	http://www.neocorp.co.in

Company Name	Gloster Ltd
Type of Unit	Medium
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Hessian cloth bags, Sacking cloth bags, Canvas and tarpaulin, Leno net, Chemical treated fabric, Spirally sewn bags, odourless bags
Technical Textile segment	Packtech, Geotech
End user Industries	(blank)
PRODUCTS	Jute Goods(from capitline)
Production (2010-11)	49244 MT
Export 2010-11	Rs. 7936.22 lakh
Export 2011-12	Rs. 7795.42 lakh
Export 2012-13	Rs. 9236.24 lakh
Financial information	
Sales Turnover2010-11(in Rs. Lakh)	30686.36
Sales Turnover 2011-12(in Rs. Lakh)	30860.34
Sales Turnover2012-13(in Rs. Lakh)	34622.84
EBITDA2010-11(in Rs. Lakh)	3258.8
EBITDA2011-12 (in Rs. Lakh)	3923.7

Company Name		Gloster Ltd	
EBITDA2012-13(in Rs. Lakh)		4168.75	
Net Profit2010-11(in Rs. Lakh)		1408.4	
Net Profit 2011-12(in Rs. Lakh)		1893.52	
Net Profit 2012-13(in Rs. Lakh)		2020.76	
Contact			
Registered Office Address	21, Strand Road Kolkata - 700 001 West Bengal (India)		
Registered office phn .no.	Phone +91 33 2230 9601 Fax +91 33 2210 6167,+91 33 2231 4222		
Email Address	info@glosterjute.com ,export@glosterjute.com ,sales@glosterjute.com ,purchase@glosterjute.com accounts@glosterjute.com ,rawjute@glosterjute.com edp@glosterjute.com , shares@glosterjute.com ananya@glosterjute.com , manidipa.lifestyle@glosterjute.com millmarketing@glosterjute.com , services@glosterjute.com projects@glosterjute.com , stores@glosterjute.com		
Website	http://www.glosterjute.com/		

Company Name		M/s PVN Group	
Type of Unit		Medium	
Type of Unit - EOU UNIT		OTHERS	
2: Type of Management		Private Limited	
Products	Polypropylene fabrics, polypropylene bags, leno bags, bopp bags, high-density polyethylene laminated paper bags, polypropylene multifilament yarn and shed net		
Technical Textile segment	Packtech		
Capacity2012-13	18000 MT		
Sales Turnover2012-13	Rs. 30000 lakh		
Registered Office Address	112, Minerva Industrial Estate, Near Hercules Hoist Co., Mulund West, Mumbai, Maharashtra 400080		
Registered office phn .no.	022 6151 0500		
Website	http://www.wovensacks.net		

Company Name		Cheviot Co. Ltd.	
Type of Unit		Medium	
Type of Unit - EOU UNIT		OTHERS	
2: Type of Management		Private Limited	
Products	Jute shopping bags, superior hessian cloth		
Technical Textile segment	Packtech company(Jute)		
PRODUCTS	Production cited in Annual Reports in general		
Production 2010-11	47769 MT		
Production 2011-12	48518 MT		
Production 2012-13	46650 MT		
Export 2010-11	17887.07 MT		
Export 2011-12	12575.3 MT		
Export 2012-13	11529.68 MT		
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		30244.33	
Sales Turnover2011-12(in Rs. Lakh)		29144.5	
Sales Turnover2012-13(in Rs. Lakh)		29021.11	
EBITDA2011-12(in Rs. Lakh)		3658.58	
EBITDA2012-13(in Rs. Lakh)		4095.51	
Net Profit2010-11(in Rs. Lakh)		2883.62	
Net Profit2011-12(in Rs. Lakh)		2886.91	
Net Profit2012-13(in Rs. Lakh)		3071.42	
Contact			
Registered Office Address	Mr. D.K. Mohta Compliance Officer Magma House (9th Floor), 24, Park Street, Kolkata 700 016, West Bengal		
Registered office phn .no.	Phone: +91-33- 3291 9624 / 3291 9625 / 3291 9628 Fax: +91-33- 2249 7269 / 2217 248		
Email Address	cheviot@chevjute.com		
Website	www.groupcheviot.net		

Company Name		Gopala Polyplast Ltd	
Type of Unit -		Medium	
Type of Unit - EOU UNIT		OTHERS	
2: Type of Management		Private Limited	
Products	Polyolefin woven sacks		
Technical Textile segment	Packtech		
Product(Capacity)	Woven bags		
Capacity2012-13	144000 MT		
Capacity expansion plan	192000 MT		

Company Name		Gopala Polyplast Ltd
Financial information		
Sales Turnover2010-11(in Rs. Lakh)		19175
Sales Turnover2011-12(in Rs. Lakh)		18927
Sales Turnover2012-13(in Rs. Lakh)		22201
EBITDA2010-11(in Rs. Lakh)		533
EBITDA2011-12(in Rs. Lakh)		658
EBITDA2012-13(in Rs. Lakh)		975
Net Profit2010-11(in Rs. Lakh)		25
Net Profit2011-12(in Rs. Lakh)		159
Net Profit2012-13(in Rs. Lakh)		180
Contact		
Registered Office Address	Plot No 485 Santej-Vasdar Road, Santej Tal Kalol, Gandhinagar, 382721, Gujarat	
Registered office phn .no.	02764-286305/286514/286654	

Company Name		M/s Jagadamba Polymers
Type of Unit		Medium
Type of Unit - EOU UNIT		OTHERS
2: Type of Management		Private Limited
Products		Polyolefin woven sacks
Technical segment	Textile	Packtech
PRODUCTS		Jumbo bags, woven sacks
Production 2012-13		16800 MT
Product(Capacity)		Jumbo bags, woven sacks
Capacity2012-13		20400 MT
Financial information		
Sales Turnover2010-11(in Rs. Lakh)		3849
Sales Turnover2011-12(in Rs. Lakh)		5342
Sales Turnover2012-13(in Rs. Lakh)		19000
EBITDA2010-11(in Rs. Lakh)		453
EBITDA2011-12(in Rs. Lakh)		697
EBITDA2012-13(in Rs. Lakh)		780
Net Profit2010-11(in Rs. Lakh)		121
Net Profit2011-12(in Rs. Lakh)		165
Net Profit2012-13(in Rs. Lakh)		316
Contact		
Registered Office Address	803, Narnarayan Complex, Navrangpura, Ahmedabad-380014.	
Registered office phn .no.	079-26565792	
Email Address	hans@shaktipolyweave.co.in	

Company Name		M/s Jagadamba Polymers
Website		http://www.shrijagdamba.com

Company Name		Jumbo Bags Ltd
Type of Unit		Medium
Type of Unit - EOU UNIT		OTHERS
2: Type of Management		Private Limited
Products		Polyolefin woven sacks
Technical segment	Textile	Packtech
Financial information		
Sales Turnover2010-11(in Rs. Lakh)		10346
Sales Turnover2011-12(in Rs. Lakh)		8303
Sales Turnover2012-13(in Rs. Lakh)		8688
EBITDA2010-11(in Rs. Lakh)		585
EBITDA2011-12(in Rs. Lakh)		759
EBITDA2012-13(in Rs. Lakh)		733
Net Profit2010-11(in Rs. Lakh)		65
Net Profit2011-12(in Rs. Lakh)		68
Net Profit2012-13(in Rs. Lakh)		9
Contact		
Registered Office Address	Jumbo Bag Limited "S.K Enclave", No-4, Nowroji Road, Chetput, Chennai 600031	
Registered office phn	044-2646 1415, 2645 1722	
Email Address	info@blissgroup.com	
Website	http://www.jumbobaglimited.com	

Buildtech

The profile of key manufacturers is shown in the following exhibit:

Company Name		SRF Limited
Type of Unit -		Large
Type of Unit - EOU UNIT		Others
2: Type of Management		Public limited
Products		Laminated Fabrics
Technical Textile segment		Buildtech
End user Industries		Used as flex fabric for Outdoor advertising
Production		55.9 lakh sq. m of fabric
Capacity 2012-13		90,000,000
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		306327
Sales Turnover 2011-12 (in Rs. Lakh)		353025

Company Name		SRF Limited
Sales Turnover 2012-13 (in Rs. Lakh)		332255
EBITDA 2010-11 (in Rs. Lakh)		90688
EBITDA 2011-12 (in Rs. Lakh)		83163
EBITDA 2012-13 (in Rs. Lakh)		62152
Net Profit 2010-11 (in Rs. Lakh)		48344
Net Profit 2011-12 (in Rs. Lakh)		38738
Net Profit 2012-13 (in Rs. Lakh)		25851
Total employees		3300
Total Assets (2012-13) – in Rs. lakh		385934
Contact		
Technical collaborations	Technical collaboration with Trvelite US for technology exchange	
Factory Address	Technical Textiles PO Box 4038, Korsten, Port Elizabeth, 6014, Republic of South Africa	
Phone Number	2741- 4068700, 2741- 4068700	
Registered Office Address	C-8 Commercial Complex, Safdarjung Development Area, New Delhi, 110016	
Registered office phn .no.	91-11-26857141	
Contact Person	Mr. Sheelam Seth	
Designation	Senior VP	
Email Address	Media Queries: Mukund Trivedy, Head of Corporate Communications E-Mail: mukund.trivedy@srf.com Redressal of investor complaints: Mr. Anoop K. Joshi, Vice-President Company Secretary E-Mail: ajoshi@srf.com Name of investor grievance redressal officer : Mr. Sanjiv Kumar Sharma, Chief Manager (Secretarial) E-Mail: Sanjiv.Sharma@srf.com	
Website	http://www.srf.com	
Fax Number		

Company Name		Entremonde Polycoaters Ltd.
Type of Unit -	Medium	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	PVC coated roof covers, tarpaulins	
Technical Textile segment	Buildtech	

Company Name		Entremonde Polycoaters Ltd.
End user Industries		As truck covers and home use, water proofing of roof
Exports (in Rs. Lakh)		Rs. 143 lakh
Key Raw Material (RM) Required		Textiles PVC, Pu resins, Plasticizers
Source of Raw Material Domestic(Share in %)		Import -Rs. lakh 652.04 Domestic -1746.95
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		3518
Sales Turnover 2011-12 (in Rs. Lakh)		3478
Sales Turnover 2012-13 (in Rs. Lakh)		-
EBITDA 2010-11 (in Rs. Lakh)		155.33
EBITDA 2011-12 (in Rs. Lakh)		226.99
EBITDA 2012-13 (in Rs. Lakh)		-
Net Profit 2010-11 (in Rs. Lakh)		48.65
Net Profit 2011-12 (in Rs. Lakh)		49
Net Profit 2012-13 (in Rs. Lakh)		-
Total Assets (2012-13) – in Rs. lakh		2223
Contact		
District	Mumbai	
State	Maharashtra	
Factory Address	2 manufacturing units at Nasik Kilfire House, 1st Floor C-17, Dalia Indl. Area, Off Link Road, Andheri (W), Mumbai - 400 053, INDIA.	
Registered Office Address	Off Link Road, Andheri (W), Mumbai - 400 053, INDIA.	
Registered office phn .no.	Tel : +91 22 26732563	
Contact Person	Mr. C M Ketan	
Designation	M.D	
Telephone	+91 22 26732563	
Email Address	epl@entremonde.com	
Website	http://www.entremonde.com/	
Fax Number	022-26732568	

Company Name		Gokak Mills
Type of Unit -		Large
Type of Unit - EOU UNIT		Others
2: Type of Management		Public Limited
Products		Canvas Tarpaulins
Technical Textile segment		Buildtech
End user Industries		Trucking industry
Key Machinery Installed -		Yarn plant - machinery imported from Rieter (Switzerland), Savio (Italy), Schlafhorst AG & Co. (Germany) and Truetzschler (Germany). It has also installed plant & machineries purchased from Laxmi Machine Works and

Company Name		Gokak Mills
		Kirloskar Toyoda Textile Machine
Key Raw Material (RM)		Cotton, staple fibre, yarn
Source of Raw Material		5.58% - imports
Domestic(Share in %)		94.42% - domestic
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		3,982.0
Sales Turnover 2011-12 (in Rs. Lakh)		4,842.0
Sales Turnover 2012-13 (in Rs. Lakh)		35953
EBITDA 2010-11 (in Rs. Lakh)		2680
EBITDA 2011-12 (in Rs. Lakh)		-3670
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)		940
Net Profit 2011-12 (in Rs. Lakh)		1948
Net Profit 2012-13 (in Rs. Lakh)		-1452
Total Assets (2012-13) – in Rs. lakh		27677
Contact		
Factory Address		Cotton Yarn (Grey and Dyed), Canvas and other products Gokak Falls, Dist. Belgaum, Karnataka
Registered Office Address		45/3 Gopalkrishna Complex, 1st Floor, Residency Cross Road, Bangalore-560 025
Registered office phn .no.		080 – 2558 9942, 080 – 2559 7442
Website		http://www.gokakmills.com/

Company Name		Bharat Textiles & Proofing Industries Ltd
Type of Unit -		Large
Type of Unit -		Others
2: Type of Management		Public Limited
Products		Canvas Tarpaulins
Technical Textile segment		Buildtech
End user Industries		Trucking industry
Capacity 2012-13		Cotton chemically processed canvas 1,050,000 lakh metres per annum -3,500 metres per day
Key Machinery Installed -		Shuttle-less Rapier Looms to weave canvas fabric
Key Raw Material (RM) Required		Yarn, dyes & chemicals, HDPE, Tarpaulin/Silpaulin-Canvas
Source of Raw Material		Mostly domestic
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		970
Sales Turnover 2011-12 (in Rs. Lakh)		1049
Sales Turnover 2012-13 (in Rs. Lakh)		571
EBITDA 2010-11 (in Rs. Lakh)		185

Company Name		Bharat Textiles & Proofing Industries Ltd
EBITDA 2011-12 (in Rs. Lakh)		183
EBITDA 2012-13 (in Rs. Lakh)		-
Net Profit 2010-11 (in Rs. Lakh)		58
Net Profit 2011-12 (in Rs. Lakh)		43
Net Profit 2012-13 (in Rs. Lakh)		16
Total Assets (2012-13) – in Rs. lakh		690
Contact details		
Factory Address		994 Sirupullaipet,Sathyavedu Gummidipondi Taluk, Tamil Nadu
Phone Number		
Registered Office Address		994 Satyavedu Road, Sirupuzhalpet, Gummidipoondi, 601201, Tamil Nadu
Email Address		klx@airtelmail.in
Website		http://www.bharattarpaulin.com

Company Name		Gujarat Raffia
Type of Unit -		Large
Type of Unit -		Others
2: Type of Management		Public Limited
Products		HDPE Tarpaulins
Technical Textile segment		Buildtech
Application		Trucking and home and industrial outdoor use
Capacity 2012-13		3,500 per annum
Key Raw Material (RM) Required		Eyelets, fabrics, graunules, sacks, tarpaulins
Source of Raw Material		100% domestic
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		2566
Sales Turnover 2011-12 (in Rs. Lakh)		2770
Sales Turnover 2012-13 (in Rs. Lakh)		2764
EBITDA 2010-11 (in Rs. Lakh)		160
EBITDA 2011-12 (in Rs. Lakh)		149
EBITDA 2012-13 (in Rs. Lakh)		-
Net Profit 2010-11 (in Rs. Lakh)		56
Net Profit 2011-12 (in Rs. Lakh)		57
Net Profit 2012-13 (in Rs. Lakh)		58
Total Assets (2012-13) – in Rs. lakh		2784
Contact details		
Factory Address		Plot No 455 Santej Vadsar Road,Santej Kalol(Taluk), Gandhinagar, Gujarat, 382721
Registered Office Address		Plot No.455 Santej Vadsar Road, Village Santej, Kalol, 382721, Gujarat
Registered office phn .no.		91-02764-286632/321312

Company Name	Gujarat Raffia
Email Address	pb@griltarp.com info@griltarp.com
Website	http://www.griltarp.com/

Company Name	Gujarat Crafts Ltd.
Type of Unit	Large
Type of Unit - EOU	Others
2: Type of Management	Public Limited
Products	HDPE Tarpaulins
Technical Textile segment	Buildtech
Key Machinery Installed -	Extruder / Tapeline Plant, Weaving Looms, Lamination Plant, Liner Plant, Circular Looms with facility of "Anti Slip Weave", Chain Stitching Machines, Flexography 2 Color / 3 Color printing with or without Heat Cut, Hydraulic Bale Pressing Machine, Micro Perforation Unit, Tarpaulin Making Machine
Key Raw Material (RM) Required	Fabrics, master batches, granules, M.B. GRNL, sacks, tarpaulins
Source of Raw Material	Mostly domestic
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	3899
Sales Turnover 2011-12 (in Rs. Lakh)	5153
Sales Turnover 2012-13 (in Rs. Lakh)	6637
EBITDA 2010-11 (in Rs. Lakh)	312
EBITDA 2011-12 (in Rs. Lakh)	362
EBITDA 2012-13 (in Rs. Lakh)	-
Net Profit 2010-11 (in Rs. Lakh)	63
Net Profit 2011-12 (in Rs. Lakh)	67
Net Profit 2012-13 (in Rs. Lakh)	111
Total Assets (2012-13) – in Rs. lakh	5128
Contact details	
Factory Address	Plot No 431 Santej-Vadsar Road, Village Santej Gandhinagar , Kalol, Gujarat, 382721
Phone Number	91-02764-286672
Registered Office Address	Plot No 431 Village Santej, Santej-Vadsar Road Gandhinagar, Kalol, 382721, Gujarat
Office phn .no.	91-2764-286673/321899
Contact Person	Mr. Ashok Chhajer
Designation	Chairman & Managing Director
Email Address	info@gujaratcraft.com
Website	http://www.gujaratcraft.com

Company Name	Binni Ltd.
Type of Unit -	Large
Type of Unit - EOU UNIT	Others
2: Type of Management	Private Limited
Products	Tarpaulins
Technical Textile segment	Buildtech
Financial information	
Sales Turnover 2011-12 (in Rs. Lakh)	609
Sales Turnover 2012-13 (in Rs. Lakh)	779
EBITDA 2010-11 (in Rs. Lakh)	
EBITDA 2011-12 (in Rs. Lakh)	140.68
EBITDA 2012-13 (in Rs. Lakh)	-12.55
Net Profit 2010-11 (in Rs. Lakh)	
Net Profit 2011-12 (in Rs. Lakh)	93.29
Net Profit 2012-13 (in Rs. Lakh)	-15.19
Total Assets (2012-13) – in Rs. lakh	17398
Contact details	
Registered Office Address	No.4, (Old No.10) Karpagambal Nagar, Mylapore, Chennai 600 004, India
Registered office phn .no.	Ph: 044-24991518
Email Address	E-mail: binnymills@bmlindia.com

Sportech

The profiles of the key players is shown as below:

Company name	Sanspareils Greenlands Pvt Ltd.
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Sports Composites - entire cricketing gear - gloves, guards, etc
Technical Textile segment	Sportech
End user Industries	For cricketing gear
Production	1.6 lakh guards and 2.6 lakh gloves
Exports (in Rs. Lakh)	Rs. 3419 lakh
Key Raw Material (RM) Required	PU coated fabrics, PVC coated fabrics, Cotton, Leather
Source of Raw Material Domestic(Share in %)	Coated fabrics are imported to large extent
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	7337
Sales Turnover 2011-12 (in Rs. Lakh)	8763
EBITDA 2010-11 (in Rs. Lakh)	PBDT 891.4
EBITDA 2011-12 (in Rs. Lakh)	PBDT 816.34
Net Profit 2010-11 (in Rs. Lakh)	484.82

Company name		Sanspareils Greenlands Pvt Ltd.
Net Profit 2011-12 (in Rs. Lakh)		430.94
Total employees		1500
Total Assets (2012-13) – in Rs. lakh		6196
Contact details		
District		Meerut
State		U.P
Factory Address		Meerut
Registered Office Address		Plot no 150, Gagol rd, Partapur, Meerut
Registered office phn .no.		0121-6541111
Contact Person Name & Designation		Kailash Chandra Anand - MD Tushar - Senior Manager Marketing
Telephone		0121-6541111
Email Address		mail@teamsg.in Tushar@teamsg.in
Website		www.sgcricket.com
Fax Number		0121-2513828

Company Name	Garware Wall Ropes	
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Public Limited	
Products	Sports net	
Technical Textile segment	Sportech	
End user Industries	Sports, protective nets, etc	
Production	7461MT of netting	
Exports (in Rs. Lakh)	Rs. 26300 lakh	
Capacity - 2012-13	8724 MT	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)		50130
Sales Turnover 2011-12 (in Rs. Lakh)		58082
Sales Turnover 2012-13 (in Rs. Lakh)		60305
EBITDA 2010-11 (in Rs. Lakh)		5494
EBITDA 2011-12 (in Rs. Lakh)		6120
EBITDA 2012-13 (in Rs. Lakh)		6413
Net Profit 2010-11 (in Rs. Lakh)		2443
Net Profit 2011-12 (in Rs. Lakh)		2401
Net Profit 2012-13 (in Rs. Lakh)		2467
Total employees		1200
Total Assets (2012-13) – in Rs. lakh		15414
Contact details		
Technical collaborations	JV - Garware Environmental Services Pvt. Ltd. is yet to start operations	
District		Pune

Company Name	Garware Wall Ropes
State	Maharashtra
Factory Address	Pune & Wai - 3 factories 10/66, Kirti Nagar Industrial Area, New Delhi
Registered Office Address	Plot no 11, Block D1 MIDC Chinchwad Pune - 411 019
Registered office phn .no.	011-25923367 020-30780000 020-30780195
Contact Person Name & Designation	Mr. Pradeep Patil
Designation	Head - Textiles
Telephone	09370313237 022-30780217
Email Address	papatil@garwareropes.com sales@garwareropes.com
Website	www.garwareropes.com
Fax Number	020-30780350

Company Name	Cosco India Ltd.	
Type of Unit -	Medium	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Sports Composites	
Technical Textile segment	Sportech	
End user Industries	In Footballs & Inflatables	
Exports (in Rs. Lakh)	Rs. 313 Lakh	
Financial information		
Sales Turnover 2011-12 (in Rs. Lakh)		8081.54
Sales Turnover 2012-13 (in Rs. Lakh)		9280.71
EBITDA 2010-11 (in Rs. Lakh)		
EBITDA 2011-12 (in Rs. Lakh)		372.21
EBITDA 2012-13 (in Rs. Lakh)		832.86
Net Profit 2010-11 (in Rs. Lakh)		
Net Profit 2011-12 (in Rs. Lakh)		-402
Net Profit 2012-13 (in Rs. Lakh)		11.514
Total Assets (2012-13) – in Rs. lakh		2231.66
Contact details		
District	Delhi	
State	Delhi	
Factory Address	1688 - 2/31, Near Railway Station, Gurgaon	
Phone Number	0124 - 225 1781	
Registered Office Address	2/8, Roop Nagar Delhi, India	
Registered office phn	011- 2384 3000	
Contact Person	Mr. Pankaj jain	

Company Name		Cosco India Ltd.
Name & Designation		
Designation	Director	
Telephone	011- 2384 3000	
Email Address	mail@cosco.co.in	
Website	www.cosco.in	
Fax Number	011- 2384 6000	

Company Name		Freewill Sport Pvt. Ltd.
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Sports Composites	
Technical Textile segment	Sportech	
End user Industries	In Footballs & Inflatables	
Exports (in Rs. Lakh)	Rs. 1407 lakh	

Financial information

Sales Turnover 2011-12 (in Rs. Lakh)	7503.9
Sales Turnover 2012-13 (in Rs. Lakh)	9215.7
Net Profit 2011-12 (in Rs. Lakh)	316
Net Profit 2012-13 (in Rs. Lakh)	446
Total Assets (2012-13) – in Rs. lakh	4946

Contact details

District	Jalandhar
State	Punjab
Factory Address	S- 32, Industrial Area Jalandhar, Punjab
Registered Office Address	S- 32, Industrial Area Jalandhar, Punjab
Registered office phn	0181 - 5057000
Contact Person Name & Designation	Mr. Kishore Thapar
Designation	0181 - 5057000
Telephone	0181 - 5057000
Email Address	freewill@nivasports.com
Website	www.nivasports.com
Fax Number	0181 – 229104

Company Name		Bata Ltd.
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Public Limited	
Products	Shoes components	
Technical Textile segment	Sportech	
End user Industries	Shoe making	
Exports (in Rs. Lakh)	Rs. 1471 lakh	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	169599	
Sales Turnover 2011-12 (in Rs. Lakh)	190170	
Sales Turnover 2012-13 (in Rs. Lakh)	212975	
EBITDA 2010-11 (in Rs. Lakh)	36050	

Company Name		Bata Ltd.
EBITDA 2011-12 (in Rs. Lakh)	30334	
EBITDA 2012-13 (in Rs. Lakh)	34182	
Net Profit 2010-11 (in Rs. Lakh)	22584	
Net Profit 2011-12 (in Rs. Lakh)	17160	
Net Profit 2012-13 (in Rs. Lakh)	19074	
Total Assets (2012-13) – in Rs. lakh	6027.52	

Contact details

District	Gurgaon
State	Haryana
Factory Address	Bata House 418/02 , M G Road Gurgaon sc - 17
Registered Office Address	6A, S N Bannerje Road Kolkata - 700 013
Registered office phn	033- 3980 2001
Telephone	0124- 3990100
Email Address	customer.servoce@bata.co.in
Website	www.bata.in
Fax Number	0124- 3990 116

Company Name		Liberty Shoes
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Public Limited	
Products	Shoes components	
Technical Textile segment	Sportech	
End user Industries	Shoe making	
Production	82.6 lakh pairs	

Financial information

Sales Turnover 2010-11 (in Rs. Lakh)	30658
Sales Turnover 2011-12 (in Rs. Lakh)	34726
Sales Turnover 2012-13 (in Rs. Lakh)	35455
Net Profit 2010-11 (in Rs. Lakh)	1029
Net Profit 2011-12 (in Rs. Lakh)	758
Net Profit 2012-13 (in Rs. Lakh)	717
Total Assets (2012-13) – in Rs. lakh	16008

Contact details

District	Karnal
State	Haryana
Registered Office Address	Liberty House, Liberty Road, P.O. Box No. 103, Karnal-132001 (Haryana) India.
Registered office phn .no.	Tel: +91-184-2252533, 2256100
Email Address	knl@libertyshoes.com customercare@libertyshoes.com
Website	http://www.libertyshoes.com/contactaddress.aspx?mpgid=54&1pgid=55

Company Name		Liberty Shoes
Fax Number	Fax: +91-184-2255636, 2256400	

Company Name	Jasch Group
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	PU coated fabrics - Synthetic leather
Technical Textile segment	Sportech
End user Industries	As artificial leather component for sport shoes
Production	31.8 lakh metres of PU/ PVC coated fabrics
Source of Raw Material Domestic	85% domestic 15% imported

Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	PU coated fabrics - 6548.22 Total - 7529.47
Sales Turnover 2011-12 (in Rs. Lakh)	PU coated fabrics - 6251.83 Total -8151
Sales Turnover 2012-13 (in Rs. Lakh)	8920
EBITDA 2010-11 (in Rs. Lakh)	PU coated fabrics - 387.91 Total - 842.89
EBITDA 2011-12 (in Rs. Lakh)	PU coated fabrics - 315.07 Total - 907.25
EBITDA 2012-13 (in Rs. Lakh)	
Net Profit 2010-11 (in Rs. Lakh)	276.2
Net Profit 2011-12 (in Rs. Lakh)	369
Net Profit 2012-13 (in Rs. Lakh)	185
Total employees	150
Total Assets (2012-13) – in Rs. lakh	7514

Contact details	
District	New Delhi
State	Delhi/ NCR
Factory Address	43/5, Bahalgarh Road, P.O Bahalgarh 'Sonipat District ,Haryana ,131021
Phone Number	0126-2240710 0126-2242694
Registered Office Address	Jasch House 5105/1 Behind Khalsa College Dev Nagar New Delhi - 110005
Registered office phn .no.	011-25733745
Contact Person Name &	Mr. S K Verma

Company Name	Jasch Group
Designation	
Telephone	0130-2230710
Email Address	manish@jaschgauging.com http://jaschindustries.com/joomlabeta/
Website	
Fax Number	011-25823732

Company Name	Kusumgar Associates
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Parachutes
Technical Textile segment	Sportech
End user Industries	Ski diving
Exports (in Rs. Lakh)	Rs. 1196 lakh
Key Raw Material (RM)	Yarn, NSF, Fabric
Source of Raw Material Domestic(Share in %)	Imports - 1650.00
Source of Raw Material Imports (Share in %)	Domestic - 1849.35

Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	5203
Sales Turnover 2011-12 (in Rs. Lakh)	5707
Sales Turnover 2012-13 (in Rs. Lakh)	
EBITDA 2010-11 (in Rs. Lakh)	628
EBITDA 2011-12 (in Rs. Lakh)	869
EBITDA 2012-13 (in Rs. Lakh)	
Net Profit 2010-11 (in Rs. Lakh)	91
Net Profit 2011-12 (in Rs. Lakh)	101
Net Profit 2012-13 (in Rs. Lakh)	
Total Assets (2012-13) – in Rs. lakh	5429.92

Contact details	
District	Mumbai
State	Maharashtra
Factory Address	Mumbai
Registered Office Address	R. O. 101, Manjushree, V. M. Road, J. V. P. D., Vile Parle (West), Mumbai - 400056
Registered office phn .no.	022-61125100 022-26184341
Contact Person Name & Designation	Mr. Y K Kusumgar Chairman
Designation	Chairman
Telephone	022 – 6112 5100
Email Address	mktalukdar@kusumgar.com info@kusumgar.com
Website	www.kusumgar.com
Fax Number	022-26115651

Company Name	Page Industries Ltd.
Type of Unit -	Others
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	High performance sports wear
Technical Textile segment	Sportech
End user Industries	Swimsuits
Production	3.7 lakh nos.
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	49160
Sales Turnover 2011-12 (in Rs. Lakh)	68340
Sales Turnover 2012-13 (in Rs. Lakh)	86350
EBITDA 2010-11 (in Rs. Lakh)	10200
EBITDA 2011-12 (in Rs. Lakh)	15140
EBITDA 2012-13 (in Rs. Lakh)	18500
Net Profit 2010-11 (in Rs. Lakh)	5850
Net Profit 2011-12 (in Rs. Lakh)	9000
Net Profit 2012-13 (in Rs. Lakh)	11250
Contact details	
Registered Office Address	Abbaiah Reddy Industrial Area, Jockey Campus 6/2 & 6/4, Hongasandra, Begur hobli, Bangalore - 560 068
Registered office phn	080 - 4047 6868
Telephone	080 - 4047 6868
Email Address	customercare@jckeyindia.com
Website	www.jockeyindia.com
Fax Number	080 - 2573 2226

Company Name	Leisure Export Worldwide
Type of Unit -	Medium
Type of Unit -EOU UNIT	100% EOU
2: Type of Management	Private Limited
Products	Sport Composites
Technical Textile segment	Sportech
End user Industries	Boxing gloves
District	Jalandhar
State	Punjab
Factory Address	S - 24, 25 Industrial Area, Jalandhar City,
Phone Number	8588873642 Telephone: +(91)-(181)-2290757 +(91)-(181)-2490757 +(91)-(181)-5083083
Contact Person	Mr. Mahajan

Company Name	Leisure Export Worldwide
Name & Designation	
Telephone	+(91)-8427211234
Website	www.indiamart.com/leisure-export-worldwide
Fax Number	+(91)-(181)-2290535

Clothtech

The profile of key players is as shown below:

Company Name	Ruby Mills
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Interlining
Technical Textile segment	Clothtech
End user Industries	In Apparels - Shirts
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	13577
Sales Turnover 2011-12 (in Rs. Lakh)	24691
Sales Turnover 2012-13 (in Rs. Lakh)	20712
EBITDA 2010-11 (in Rs. Lakh)	10207
EBITDA 2011-12 (in Rs. Lakh)	11079
Net Profit 2010-11 (in Rs. Lakh)	5756
Net Profit 2011-12 (in Rs. Lakh)	7209
Net Profit 2012-13 (in Rs. Lakh)	3048
Total Assets (2012-13) – in Rs. lakh	75955
Contact details	
District	Mumbai
State	Maharashtra
Factory Address	J. K. Sawant Marg, Dadar, Mumbai - 400 028
Phone Number	
Registered Office Address	Ruby House, J K Sawant Road, Dadar west, Mumbai
Registered office phn .no.	022 24387800
Contact Person Name & Designation	Mr. R N Mehta Incharge - Technical Textiles
Designation	
Telephone	022 24387800
Email Address	rmehta@rubymills.com info@rubymills.com
Website	www.rubymills.com
Fax Number	022-24378125

Company Name	Bombay Dyeing
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS

Company Name		Bombay Dyeing
2: Type of Management	Public Limited	
Products	Interlinings - for textile division	
Technical Textile segment	Clothtech	
End user Industries	In Apparels - Shirts	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	201400	
Sales Turnover 2011-12 (in Rs. Lakh)	228538	
Sales Turnover 2012-13 (in Rs. Lakh)	237523	
EBITDA 2010-11 (in Rs. Lakh)	26700	
EBITDA 2011-12 (in Rs. Lakh)	31700	
EBITDA 2012-13 (in Rs. Lakh)	33500	
Net Profit 2010-11 (in Rs. Lakh)	2100	
Net Profit 2011-12 (in Rs. Lakh)	5935	
Net Profit 2012-13 (in Rs. Lakh)	7570	
Total Assets (2012-13) – in Rs. lakh	377110	
Contact details		
District	Mumbai	
State	Maharashtra	
Registered Office Address	Neville House J N Heredia Marg Ballard Estate mumbai - 400038	
Registered office phn	022-66620000	
Contact Person	Mr. Nilesh Thakur	
Designation	Incharge – PSF	
Telephone	022-66620000	
Email Address	nilesh.thakur@bombaydyeing.com	
Website	www.bombaydyeing.com	
Fax Number	022-22614520 022-22615014	

Company Name		Supreme Non-wovens
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Interlinings - Non woven interlining, Pocket & thermal lining, Fabric interlining	
Technical Textile segment	Clothtech	
End user Industries	In Apparels - Shirts	
Exports (in Rs. Lakh)	Rs. 12.48 lakh	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	14915.29	
Sales Turnover 2011-12 (in Rs. Lakh)	17117.59	
EBITDA 2010-11 (in Rs. Lakh)	2625.22	
EBITDA 2011-12 (in Rs. Lakh)	2411.08	

Company Name		Supreme Non-wovens
Net Profit 2010-11 (in Rs. Lakh)	829.98	
Net Profit 2011-12 (in Rs. Lakh)	1023.44	
Contact details		
District	Mumbai/Vapi	
State	Maharashtra/ Gujarat	
Factory Address	Bhilad, Valvada & Vapi	
Phone Number		
Registered Office Address	Supreme House, Plot no 110, 16th Road, Chembur, Mumbai - 400071	
Registered office phn .no.	022-25284519	
Contact Person Name & Designation	Mr. Mohan Kavrie	
Designation	Director	
Telephone	022-25284519	
Email Address	mohan.kavrie@supremegroup.com mumbai@supremegroup.co.in amit.kavrie@supremegroup.com	
Website	http://www.supremegroup.co.in/nonwoven.html	
Fax Number	022-25208092	

Company Name		YKK India Private Limited
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Metalic and non-metallic Zipper	
Technical Textile segment	Clothtech	
End user Industries	In Apparels, Furnishings, Bags	
Production	350 Mn. Pieces	
Exports (in Rs. Lakh)	Rs. 7348 lakh	
Capacity 2012-13	40 Mn. Pieces	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	31245.06	
Sales Turnover 2011-12 (in Rs. Lakh)	32076.73	
EBITDA 2010-11 (in Rs. Lakh)	6578.4	
EBITDA 2011-12 (in Rs. Lakh)	4682.8	
Net Profit 2010-11 (in Rs. Lakh)	2569.25	
Net Profit 2011-12 (in Rs. Lakh)	1127.26	
Total employees	200	
Total Assets (2012-13) – in Rs. Lakh	34606	
Contact details		
Technical collaborations	100% subsidiary of YKK Corporation Japan.	

Company Name	YKK India Private Limited
	Technological collaboration with YKK , Japan
District	Gurgaon
State	Haryana
Factory Address	Plot no 699 HSIDC, Investate Bawal, Rewari, Haryana
Registered Office Address	Global business park 3rd floor, Tower A Mehrauli - Gurgaon rd Gurgaon - 122002
Registered office phn	0124-3924800
Contact Person Name & Designation	Mr. Vipin Kaushal General Manager
Telephone	0124-3924800
Email Address	info@ykkindia.com
Website	www.ykkindia.com
Fax Number	0124-3924898

Company Name	Spica Elastic Private Limited
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Elastic narrow fabric
Technical Textile segment	Clothtech
End user Industries	In Apparels, Furnishings, Bags
Production	96 Mn. Metres
Exports (in Rs. Lakh)	Rs. 5997 lakh
Capacity 2012-13	96 Mn. Metres
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	10458.6
Sales Turnover 2011-12 (in Rs. Lakh)	7326.98
EBITDA 2011-12 (in Rs. Lakh)	1433.19
Net Profit 2011-12 (in Rs. Lakh)	720.77
Total Assets (2012-13) – in Rs. lakh	8272
Contact details	
District	Pune
State	Maharashtra
Factory Address	22/2, Hadapsar Industrial Estate, Pune 411 013
Registered Office Address	22/2, Hadapsar Industrial Estate, Pune 411 013
Registered office phn .no.	020-26870051
Contact Person Name & Designation	Mr. D V Thite

Company Name	Spica Elastic Private Limited
Designation	Correspondece - For Ministry of textiles
Telephone	020-26870051
Email Address	dv.thite@spicaindia.com enquiry@spica.com
Website	www.spicaindia.com
Fax Number	020-26872212

Company Name	Sky Industries
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Velcro
Technical Textile segment	Clothtech
End user Industries	In Apparels, Furnishings, Bags
Production	127 Mn. Metres
Capacity - 2012-13	128400000 Mtr
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	7823
Sales Turnover 2011-12 (in Rs. Lakh)	8334
Sales Turnover 2012-13 (in Rs. Lakh)	6311
EBITDA 2010-11 (in Rs. Lakh)	450
Net Profit 2010-11 (in Rs. Lakh)	-72
Net Profit 2011-12 (in Rs. Lakh)	-472
Net Profit 2012-13 (in Rs. Lakh)	-35
Total Assets (2012-13) – in Rs. lakh	5719

Contact details	
District	Mumbai
State	Maharashtra
Factory Address	C-58, TTC Industrial Area, Thane Belapur Road, Pawane, Navi Mumbai - 400705
Registered Office Address	9 Chatrabhuj Jivandas House 285, Princes Street Mumbai - 400 002
office phn .no.	022-61240500
Contact Person Name & Designation	Mr. Maikal Raorani
Designation	Director
Telephone	022-66272500
Email Address	maikal.bom@skgroup.com sales@skgroup.com
Website	www.sky-india.com
Fax Number	022-2206 4687

Company Name	Shri Lakshmi Cotsyn Ltd.
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS

Company Name	Shri Lakshmi Cotsyn Ltd.	
2: Type of Management	Private Limited	
Products	Interlining	
Technical Textile segment	Clothtech	
End user Industries	In apparels	
Exports (in Rs. Lakh)	Rs. 27,682 lakh	
Capacity- 2012-13	800 Mn. Metres	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	179838	
Sales Turnover 2011-12 (in Rs. Lakh)	242213	
Sales Turnover 2012-13 (in Rs. Lakh)	194654	
EBITDA 2010-11 (in Rs. Lakh)	27398	
EBITDA 2011-12 (in Rs. Lakh)	44640	
EBITDA 2012-13 (in Rs. Lakh)	9155	
Net Profit 2010-11 (in Rs. Lakh)	10411	
Net Profit 2011-12 (in Rs. Lakh)	11047	
Net Profit 2012-13 (in Rs. Lakh)	-41554	
Total Assets (2012-13) – in Rs. Lakh	208417	
Contact details		
District	Kanpur	
State	Uttar Pradesh	
Registered Office Address	19/X - 1 Krishnapuram G T Road, Kanpur Uttar Pradesh - 208 007	
Registered office phn .no.	0512 - 2402893	
Contact Person Name & Designation	Mr. Nirmal Jhajharia Head - Technical Textiles	
Telephone	0512 - 2402893	
Email Address	shri@shrilakshmi.in	
Website	www.shrilakshmi.in	

Company Name	Precot Meridian	
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Sewing thread - Polyester	
Technical Textile segment	Clothtech	
End user Industries	In stitching, clothing, etc	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	57785	
Sales Turnover 2011-12 (in Rs. Lakh)	59404	
EBITDA 2010-11 (in Rs. Lakh)	8586	
EBITDA 2011-12 (in Rs. Lakh)	-1310	
Net Profit 2010-11 (in Rs. Lakh)	3260	
Net Profit 2011-12 (in Rs. Lakh)	-5599	
Total Assets (2012-13) – in Rs. lakh	23105	
Contact details		
District	Coimbatore	

Company Name	Precot Meridian	
State	Tamil Nadu	
Factory Address	737, greenfield Puliakulam rd, Coimbatore -641 0145	
Phone Number		
Registered Office Address	737, greenfield Puliakulam rd, Coimbatore -641 0145	
Registered office phn	0422-4321100	
Contact Person Name & Designation	Mr. Gopi Rajan Head - Technical	
Designation	Head - Technical	
Telephone	0422-4321100	
Email Address	gopirajan@precot.com wvg@precot.com	
Website	www.precot.com	
Fax Number	0422- 4321200	

Company Name	Siddhartha Filaments Private Ltd.	
Type of Unit -	Small	
Type of Unit -	OTHERS	
2: Type of Management	Private Limited	
Products	Hook and loop fasteners (Velcros) - fabrics, coins, tapes, adesive tape, fastneres and sandpaper,	
Technical Textile segment	Clothtech	
End user Industries	In Apparels, Furnishings, Bags	
Source of Raw Material Imports (Share in %)	100% domestic -	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	296.18	
Sales Turnover 2011-12 (in Rs. Lakh)	372.41	
EBITDA 2010-11 (in Rs. Lakh)	4.74	
EBITDA 2011-12 (in Rs. Lakh)	5.93	
Net Profit 2010-11 (in Rs. Lakh)	1	
Net Profit 2011-12 (in Rs. Lakh)	3.94	
Total Assets (2012-13) – in Rs. lakh	265	
Contact details		
District	Surat	
State	Gujarat	
Registered Office Address	No. 702, Trividh Chambers Ring road, Surat - 395002	
Registered office phn	+(91)-(261)-2329881 -84	
Contact Person Name & Designation	Mr. Sudarshan Shyamshukla Director	
Designation	Director	
Telephone	9737697377	

Siddhartha Filaments Private Ltd.	
Company Name	
Email Address	info@amithook-loop.com siddharthyarns@gmail.com
Website	www.hookloop.in
Fax Number	

Homotech

The profiles of key manufacturers of homotech are as follows:

Reliance Industries Limited	
Company Name	
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Fiberfill - Polyester - (brand - Recron)
Technical Textile segment	Homotech
End user Industries	For filling mattresses
Production	PSF - 612 KT Polyester - 1.627 Mn MT
Capacity	2.4 Mn tonnes
Capacity expansion plan	1.5 Mn MT polyester capacity at Silvasa
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	25865100
Sales Turnover 2011-12 (in Rs. Lakh)	33979200
Sales Turnover 2012-13 (in Rs. Lakh)	3711900
EBITDA 2010-11 (in Rs. Lakh)	4117800
EBITDA 2011-12 (in Rs. Lakh)	3981100
EBITDA 2012-13 (in Rs. Lakh)	3878500
Net Profit 2010-11 (in Rs. Lakh)	2028600
Net Profit 2011-12 (in Rs. Lakh)	2004000
Net Profit 2012-13 (in Rs. Lakh)	2100300
Contact details	
District	Mumbai
State	Maharashtra
Factory Address	Naroda, Gujarat
Registered Office Address	Makers Chambers - IV, Nariman Point, Mumbai 400 021.
Registered office phn	91-22-2278 5000
Contact Person Name & Designation	Mr. S P Gomber
Designation	Incharge - Textile & PSF
Telephone	079-66068888
Email Address	sp.gomber@ril.com
Website	www.ril.com
Fax Number	91-22-2278 5111

Ganesha Ecosphere Ltd. (earlier -Ganesh Polytex)	
Company Name	
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Fiberfill - Recycled PSF
Technical Textile segment	Homotech
End user Industries	For filling mattresses
Production	57600 MT
Exports	
Capacity	68,400 MT
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	29399
Sales Turnover 2011-12 (in Rs. Lakh)	38917
EBITDA 2010-11 (in Rs. Lakh)	3636
EBITDA 2011-12 (in Rs. Lakh)	4339
Net Profit 2010-11 (in Rs. Lakh)	1802
Net Profit 2011-12 (in Rs. Lakh)	2070
Total assets (2012-13)	10289
Contact details	
District	Kanpur
State	U.P
Registered Office Address	113/216 'B' 1st Floor Swaroop Nagar , Kanpur - 208004 (U.P.) -
Registered office phn .no.	0512-2555504-06
Contact Person Name	Mr. Sandeep Khandelwal
Designation	VP - Project & technical
Telephone	+91 9415108158
Email Address	sandeep@ganeshaeosphere.com gplworks@rediffmail.com
Website	http://www.ganeshaeosphere.com
Fax Number	0512-2555293

Hanung Toys & Textiles Ltd.	
Company Name	
Type of Unit -	Medium
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Stuffed toys
Technical Textile segment	Homotech
End user Industries	Stuffed toys
Production	30.4 Mn toys
Exports	Rs. 82718.43 lakh
Capacity	27.5 Mn toys
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	113685
Sales Turnover 2011-12 (in Rs. Lakh)	141310

Company Name		Hanung Toys & Textiles Ltd.
EBITDA 2010-11 (in Rs. Lakh)		22498
EBITDA 2011-12 (in Rs. Lakh)		27734
Net Profit 2010-11 (in Rs. Lakh)		12006
Net Profit 2011-12 (in Rs. Lakh)		11497
Total assets (2012-13)		63577
Contact details		
District	NOIDA	
State	Delhi/ NCR	
Factory Address	108-109 Nsez Noida 201 305 ,India	
Phone Number	0120-4140200	
Registered Office Address	E -93, Greater Kailash enclave - Part 1 New delhi - 110048 Marol Maroshi Rd Andheri East Mumbai - 400 059	
Registered office phn	011-26241572	
Contact Person Name & Designation	Mr. A K Gupta	
Designation	Head - Marketing & Soft toys	
Telephone	+91-9811564140	
Email Address	akgupta@hanung.com	
Website	www.hanung.com	
Fax Number	011-26241822	

Company Name		Hunter Douglas
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Blinds - Sunscreens, window blinds, shades	
Technical Textile segment	Hometech	
End user Industries	As curtains/ sunscreens	
Exports	Rs. 124.6 lakh	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	5918.75	
Sales Turnover 2011-12 (in Rs. Lakh)	6422.14	
EBITDA 2010-11 (in Rs. Lakh)	1194.33	
EBITDA 2011-12 (in Rs. Lakh)	790.02	
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)	809.79	
Net Profit 2011-12 (in Rs. Lakh)	496.52	
Net Profit 2012-13 (in Rs. Lakh)		
Total assets (2012-13)	1712.5	
Contact details		
District	Mumbai	

Company Name		Hunter Douglas
State	Maharashtra	
Factory Address	Mumbai	
Phone Number		
Registered Office Address	C- 102, Mangalya, Marol Maroshi Rd Andheri East Mumbai - 400 059	
Registered office phn	022-67617500	
Contact Person Name & Designation	Mr. Hrushikesh Vaishampaya Product Manager - Window Fashions	
Telephone	022-67617500	
Email Address	hrushikesh@hunterdouglas.in contact@hunterdouglas.in	
Website	http://wf.hunterdouglas.asia/en/contactus/contactus/sb.cn	
Fax Number	022-29208043	

Company Name		Alps Industries Ltd - Product name Vista blinds
Type of Unit -	Medium	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Blinds - sold under brand name Vista	
Technical Textile segment	Hometech	
End user Industries	For home décor	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	66966.17	
Sales Turnover 2011-12 (in Rs. Lakh)	Homefurnishing & fashin - 23.2% Total turnover - 64725.05	
Sales Turnover 2012-13 (in Rs. Lakh)		
Market share 2012-13		
EBITDA 2010-11 (in Rs. Lakh)	PBDT -7399.72	
EBITDA 2011-12 (in Rs. Lakh)	PBDT (-23189.52)	
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)	-27750.41	
Net Profit 2011-12 (in Rs. Lakh)	-9650.86	
Contact details		
District	Gaziabad	
State	Delhi/ NCR	
Factory Address	A- 3, Loni road Industrial Area Gaziabad	
Phone Number	+91 9560 5566 55	
Registered Office	57/2 Site IV	

Alps Industries Ltd - Product name Vista blinds	
Company Name	
Address	Industrial Area Sahibabad Gaziabad - 201010
Registered office phn	+91 9560 5566 55
Contact Person Name & Designation	Mrs. Rashmi Mishra
Designation	DGM - Corporate
Telephone	0120-4161700
Email Address	rashmi@alspindustries.com info@alspindustries.com
Website	www.vistafashions.com
Fax Number	0120-2896134

Chiripal Group of Companies	
Company Name	
Type of Unit	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Flock Fabrics (Velvets)
Technical Textile segment	Hometech
End user Industries	Apparel, furnishing, fashion accessories, Arts and crafts
Capacity	9 Mn. Metres
Key Machinery Installed	19
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	52988.78
Sales Turnover 2011-12 (in Rs. Lakh)	55163.62
EBITDA 2010-11 (in Rs. Lakh)	6987.94
EBITDA 2011-12 (in Rs. Lakh)	7679.99
Net Profit 2010-11 (in Rs. Lakh)	725.41
Net Profit 2011-12 (in Rs. Lakh)	950.19
Contact details	
District	Ahmedabad
State	Gujarat
Registered Office Address	Chiripal house Shivranjani crossing, Satellite Ahmedabad - 380 015
Registered office phn	079-26734660/ 62/63
Contact Person Name	Mr. Lalit
Designation	Chief Operating Officer
Telephone	+91-9879105130
Email Address	Lalit@chiripalgroup.com corporate@chiripalgroup.com http://www.chiripalgroup.com/
Website	http://www.chiripalgroup.com/
Fax Number	079-26768656

Company Name	Global Textile Alliance
Type of Unit	Medium
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Ticking fabrics
Technical Textile segment	Hometech
End user Industries	Used as mattress lining
Registered Office Address	SF - No. 149 Channapa Cheddy, Pudur Post Padhuvam Palli Village Coimbatore - 641 659
Contact Person Name & Designation	Mr. Senthil prabhu
Telephone	+91 - 994731313 '+91 - 994713131
Email Address	info@gtatextilesindia.com http://www.gtatextilesindia.com/
Website	http://www.gtatextilesindia.com/

Company Name	Dinesh Mills
Type of Unit - SME or otherwise	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Filter fabrics for Acs and vaccum cleaners and other worsted and woolen fabrics
Technical Textile segment	Hometech
End user Industries	Used in ACs and vaccum cleaners
Production	
Exports	Rs. 465 lakh
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	8233
Sales Turnover 2011-12 (in Rs. Lakh)	8649
Sales Turnover 2012-13 (in Rs. Lakh)	8633
EBITDA 2010-11 (in Rs. Lakh)	2158
EBITDA 2011-12 (in Rs. Lakh)	1933
EBITDA 2012-13 (in Rs. Lakh)	1756
Net Profit 2010-11 (in Rs. Lakh)	778
Net Profit 2011-12 (in Rs. Lakh)	501
Net Profit 2012-13 (in Rs. Lakh)	309
Total assets (2012-13)	18263.96
Contact details	
Registered Office Address	P.O Box No - 2501 Padra Road Vadodra - 390020

Company Name	Dinesh Mills
Registered office phn .no.	0265-2330060 -65
Contact Person Name & Designation	Shri J B Sojitra
Designation	Company Secretary
Telephone	0265-2330060 -65
Fax Number	0265-2336195

Company Name	Mayur Uniqouters
Type of Unit - SME or otherwise	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Furnishing fabrics
Technical Textile segment	Homotech
End user Industries	Artificial leather for sofa and other home use
Production	18 Mn. Metres
Capacity	22.2 Mn. Metres
Capacity Utilization 12-13	97%
Capacity expansion plan	Planning to add 6 lakh metres per month capacity as a fifth coating line Plans to add a 6th coating line by 2014-15 taking total capacity of 3.1 Mn. Metres
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	
Sales Turnover 2011-12 (in Rs. Lakh)	31909.37
Sales Turnover 2012-13 (in Rs. Lakh)	38327.47
EBITDA 2010-11 (in Rs. Lakh)	
EBITDA 2011-12 (in Rs. Lakh)	5382.61
EBITDA 2012-13 (in Rs. Lakh)	7025.95
Net Profit 2010-11 (in Rs. Lakh)	
Net Profit 2011-12 (in Rs. Lakh)	3337.06
Net Profit 2012-13 (in Rs. Lakh)	4362.55
Total employees	
Total assets (2012-13)	9645.8
Contact details	
District	Jaipur
State	Rajasthan
Factory Address	Village - Jaitpura Jaipur - Sikar Road Chomu , Jaipur - 303 704 Rajasthan & Village - dhodsar Khajroli road, Jaipur - Sikar Highway

Company Name	Mayur Uniqouters
	Chomu, Jaipur, Rajasthan
Registered Office Address	Village - Jaitpura Jaipur - Sikar Road, Chomu , Jaipur - 303 704, Rajasthan
Registered office phn .no.	01423 - 224001
Fax Number	01423 -224420

Company Name	Gujarat Flotex
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Furnishing fabrics - Flock
Technical Textile segment	Homotech
End user Industries	Used as sofa fabrics and in apparels
Production	8.3 Mn. Metres
Exports	Rs. 240 lakh

Financial information	
Sales Turnover 2011-12 (in Rs. Lakh)	7211
Sales Turnover 2012-13 (in Rs. Lakh)	8554
EBITDA 2011-12 (in Rs. Lakh)	589.38
EBITDA 2012-13 (in Rs. Lakh)	632.9
Net Profit 2010-11 (in Rs. Lakh)	
Net Profit 2011-12 (in Rs. Lakh)	141.9
Net Profit 2012-13 (in Rs. Lakh)	330.32
Total assets (2012-13)	1328.02

Contact details	
District	Ahmedabad
State	Gujarat
Factory Address	1039/2, Kadi, Chatral Rd. Chhatral, Taluka - Kalol, Dist. - Gandhinagar Gujarat
Registered Office Address	407, Sashwat, Opp. Gujarat College Elisbridge, Ahmedabad - 380086
Contact Person	Mr. J P Tausnival
Designation	Managing Director
Telephone	'91-79-26563204
Email Address	jpt@gujaratflotex.com
Website	http://www.gujaratflotex.com /

Company Name	Gujarat Flotex
Fax Number	

Protech

The profile of the key players is as shown below:

Company Name	Tata Advanced Material Limited
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Bullet Proof Jackets - Standard assault jackets, Tactical vest, Floatation jacket for naval force, Concealable vest, Executive vests
Technical Textile segment	Protech
End user Industries	As personal armour
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	10494
Sales Turnover 2011-12 (in Rs. Lakh)	9017
Sales Turnover 2012-13 (in Rs. Lakh)	
EBITDA 2010-11 (in Rs. Lakh)	-123
EBITDA 2011-12 (in Rs. Lakh)	-3854
EBITDA 2012-13 (in Rs. Lakh)	
Net Profit 2010-11 (in Rs. Lakh)	-1236
Net Profit 2011-12 (in Rs. Lakh)	-5832
Net Profit 2012-13 (in Rs. Lakh)	
Total Assets (2012-13) – in Rs. lakh	15231
Contact details	
District	Bangalore
State	Karnataka
Registered Office Address	10, Jigani Industrial Area Jigani, Bangalore - 562 106
Registered office phn .no.	080-66955500
Contact Person Name & Designation	Mr. Arun Rama Setty Manager - Defence Products
Telephone	9686400250
Email Address	arun.ramasetty@tamindia.com sales.dicd@tamindia.com
Website	www.tamindia.com
Fax Number	080-27825570

Company Name	Rajasthan Spinning and Weaving Mills Limited (A subsidiary of LNJ Bhilwara Group)
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Inherent fire retardant fabrics
Technical Textile segment	Protech
End user Industries	As fire protective cloths
Production	2.7 lakh metres
Key Machinery Installed - Name of machine	104 LOOMS
Financial information	
Sales Turnover 2011-12 (in Rs. Lakh)	200015
Sales Turnover 2012-13 (in Rs. Lakh)	247104
Net Profit 2011-12 (in Rs. Lakh)	-2179
Net Profit 2012-13 (in Rs. Lakh)	6787
Total Assets (2012-13) – in Rs. lakh	185046
Contact details	
District	NOIDA
State	U.P
Factory Address	Bhilwara
Phone Number	
Registered Office Address	Bhilwara Towers A -12, Sector 1 NOIDA - 201301
Registered office phn .no.	0120-2541810
Contact Person Name & Designation	Mr. Rajiv Jain Chief Operating Officer
Telephone	01483 - 223144 +91-9414113604
Email Address	rajiv.jain@lnjbhilwara.com
Website	http://rswmltd.org
Fax Number	0120-2531648

Company Name	Jayashree Textiles (A subsidiary of Aditya Birla Nuvo Group)
Type of Unit -	Large
Type of Unit -	OTHERS
2: Type of Management	Public Limited
Products	Chemical Coated Fire Retardant Fabrics - Fabric sold under brand name -"PYROGUARD"
Technical Textile segment	Protech

Company Name		Jayashree Textiles (A subsidiary of Aditya Birla Nuvo Group)	
End user Industries	As fire protective cloths		
Production	2 lakh ,metres		
Financial information			
Sales Turnover 2010-11 (in Rs. Lakh)	77400		
Sales Turnover 2011-12 (in Rs. Lakh)	104600		
Sales Turnover 2012-13 (in Rs. Lakh)	114400		
EBITDA 2010-11 (in Rs. Lakh)	9900		
EBITDA 2011-12 (in Rs. Lakh)	14100		
EBITDA 2012-13 (in Rs. Lakh)	15400		
Contact details			
District	Hoogly		
State	West Bengal		
Factory Address	PO: Prabhasnagar 712 249 Dist. Hooghly West Bengal India		
Phone Number			
Registered Office Address	PO: Prabhasnagar 712 249 Dist. Hooghly West Bengal India		
Registered office phn .no.	Tel: 26001200-700		
Contact Person Name & Designation	Mr. J S Kataria Head – FR fabrics		
Designation	Head – FR fabrics		
Telephone	-		
Email Address	s.krishnamoorthy@adityabirla.com		
Website	http://www.jayashree-abnl.com		
Fax Number			

Company Name	Mallcom India Limited
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	Fire/Flame retardant Apparel - Fire proximity anti static garments
Technical Textile segment	Protech
End user Industries	As fire protective cloths
Production	6 lakh garments
Exports (in Rs. Lakh)	Rs. 1104 lakh
Capacity2012-13	

Company Name	Mallcom India Limited
Key Machinery Installed -	7 prodction facilites across 3 states
Key Raw Material (RM) Required	Aramids, coated fabrics, cotton fabrics
Source of Raw Material Domestic(Share in %)	Imports - 1286.91 - 16.73% Domestic - Rs. 6404.37 lakh - 83.27%
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	11997.57
Sales Turnover 2011-12 (in Rs. Lakh)	13663.67
Sales Turnover 2012-13 (in Rs. Lakh)	16171
EBITDA 2010-11 (in Rs. Lakh)	1245.01
EBITDA 2011-12 (in Rs. Lakh)	939.93
EBITDA 2012-13 (in Rs. Lakh)	
Net Profit 2010-11 (in Rs. Lakh)	662.98
Net Profit 2011-12 (in Rs. Lakh)	346.59
Net Profit 2012-13 (in Rs. Lakh)	350
Total employees	2500
Total Assets (2012-13) – in Rs. lakh	10357
Contact details	
Phone Number	033-23448162
Registered Office Address	Mallcom Tower EN-12, Sector-V, Salt Lake City, Kolkata-700091
Registered office phn .no.	Phone : + 91 33 4016 1000
Contact Person Name & Designation	Mr. Giriraj Amal Mr. Viman Mukherjee Executive director
Designation	Mr. Viman – Factory Manager
Telephone	033-23448162
Email Address	viman@mallcomindia.com sales@mallcomindia.com mallcom@mallcomindia.com
Website	http://www.mallcomindia.com/site/index.php
Fax Number	033-4016 1010

Company Name	Entremonde Polycoaters Ltd.
Type of Unit -	Medium
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Private Limited
Products	High Altitude Clothing
Technical Textile segment	Protech
End user Industries	Army mountaineering
Exports (in Rs. Lakh)	Rs. 143 lakh
Key Raw Material (RM) Required	Textiles PVC, Pu resins,

Company Name	Entremonde Polycoaters Ltd.
	Plasticizers
Source of Raw Material	Import -Rs. lakh 652.04 Domestic -1746.95
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	3518 Multilayer clothing - 916
Sales Turnover 2011-12 (in Rs. Lakh)	3478 Multilayer clothing - 1147
Sales Turnover 2012-13 (in Rs. Lakh)	
EBITDA 2010-11 (in Rs. Lakh)	155.33
EBITDA 2011-12 (in Rs. Lakh)	226.99
EBITDA 2012-13 (in Rs. Lakh)	
Net Profit 2010-11 (in Rs. Lakh)	48.65
Net Profit 2011-12 (in Rs. Lakh)	49
Net Profit 2012-13 (in Rs. Lakh)	
Total Assets (2012-13) – in Rs. Lakh	2223
Contact details	
District	Mumbai
State	Maharashtra
Factory Address	2 manufacturing units at Nasik
Phone Number	
Registered Office Address	Kilfire House, 1st Floor C-17, Dalia Indl. Area, Off Link Road, Andheri (W), Mumbai - 400 053, INDIA.
Registered office phn .no.	Tel : +91 22 26732563
Contact Person Name & Designation	Mr. C M Ketan
Designation	M.D
Telephone	+91 22 26732563
Email Address	epl@entremonde.com
Website	http://www.entremonde.com/
Fax Number	022-26732568

Company Name	Arvind Mills Ltd.
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Fire/Flame retardant Apparel - Fire proximity anti static garments
Technical Textile segment	Protech
End user Industries	As fire protective cloths
Production	3.6 lakh metres

Company Name	Arvind Mills Ltd.
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	268532
Sales Turnover 2011-12 (in Rs. Lakh)	351187
Sales Turnover 2012-13 (in Rs. Lakh)	379514
EBITDA 2010-11 (in Rs. Lakh)	43819
EBITDA 2011-12 (in Rs. Lakh)	88885
EBITDA 2012-13 (in Rs. Lakh)	68015
Net Profit 2010-11 (in Rs. Lakh)	13480
Net Profit 2011-12 (in Rs. Lakh)	43423
Net Profit 2012-13 (in Rs. Lakh)	26122
Total Assets (2012-13) – in Rs. lakh	233966
Contact details	
District	Ahmedabad
State	Gujarat
Factory Address	Advanced Material Division Santej P.O – Khatraj, Tal - Kalol Dist - Gandhinagar - 382721
Phone Number	+91 2764 395 683
Registered Office Address	Railway Pura post Naroda Road P B No. 10010 Ahmedabad - 380025
Registered office phn	+91 2764 395 683
Contact Person Name & Designation	Mr. Punit Lalbhai
Designation	Executive Director - Head - Advanced Materials
Email Address	punit.lalbhai@arvind.in amd@arvind.com
Website	http://www.arvind-amd.com/
Fax Number	079-30138680

Company Name	Loyal Textile Mills
Type of Unit -	Large
Type of Unit -	OTHERS
2: Type of Management	Private Limited
Products	Bullet Proof Jackets - Standard assault jackets, Tactical vest, Floatation jacket for naval force, Concealable vest, Executive vests
Technical Textile segment	Protech
End user Industries	As personal armour
Production	338 lakh metres
Exports (in Rs. Lakh)	Rs. 71511 lakh
Key Raw Material (RM) Required	Yarn, Cloth, Dyes, Reflective bands Cotton Staple fibre

Company Name		Loyal Textile Mills
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	cloth - 17655 garments - 6903 Total - 96245	
Sales Turnover 2011-12 (in Rs. Lakh)	cloth - 21919 garments - 6688 Total- 91059	
Sales Turnover 2012-13 (in Rs. Lakh)	125393	
EBITDA 2010-11 (in Rs. Lakh)	12779.73	
EBITDA 2011-12 (in Rs. Lakh)	10102.43	
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)	3134	
Net Profit 2011-12 (in Rs. Lakh)	-197	
Net Profit 2012-13 (in Rs. Lakh)	504	
Total employees		
Total Assets (2012-13) – in Rs. Lakh	89882	
Contact details		
Technical collaborations	JV -with Ms - Gruppo P&P Loyal SpA of Itay and Scafer Loyal of Germany	
District	Chennai	
State	Tamil Nadu	
Factory Address	Corporate office - 83/41 1st Main road, R A Puram Chennai - 600 028	
Phone Number	044-42277374	
Registered Office Address	21/4 Mill Street, Kovilpatti - 628501 Tamil Nadu	
Registered office phn .no.	04632-220001	
Contact Person	Mr. Manikam Ramaswami	
Designation	Chairman & Managing Director	
Telephone	044-42277374	
Email Address	cmd@loyaltextiles.com	
Website	www.loyaltextiles.com	

Company Name		Tarasafe International Pvt. Ltd.
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Fire retardant apparels	
Technical Textile segment	Protech	
End user Industries	As protective clothing in Oil & gas and other sectors	
Exports (in Rs. Lakh)	Rs. 43 lakh	

Company Name		Tarasafe International Pvt. Ltd.
Financial information		
Sales Turnover 2011-12 (in Rs. Lakh)	2924	
Sales Turnover 2012-13 (in Rs. Lakh)	4454	
EBITDA 2010-11 (in Rs. Lakh)		
EBITDA 2011-12 (in Rs. Lakh)	341	
EBITDA 2012-13 (in Rs. Lakh)	587	
Net Profit 2010-11 (in Rs. Lakh)		
Net Profit 2011-12 (in Rs. Lakh)	171	
Net Profit 2012-13 (in Rs. Lakh)	239	
Total employees		
Total Assets (2012-13) – in Rs. lakh	2097.04	
Contact		
District	Ahmedabad	
State	Gujarat	
Factory Address	C / O D U T T A PROPERTIES BUDGE BUDGE TRUNK ROAD, BENEPUKUR (M O L L A R GATE) GOBINDPUR West Bengal INDIA 700141	
Phone Number	Tel: +91-33-2492-9410/799	
Registered Office Address	C / O D U T T A PROPERTIES BUDGE BUDGE TRUNK ROAD, BENEPUKUR (M O L L A R GATE) GOBINDPUR West Bengal INDIA 700141	
Registered office phn .no.	Tel: +91-33-2492-9410/799	
Contact Person	Mr. Basant Kumar Lohia	
Designation	Owner	
Telephone	Tel: +91-11-2391-7688/2394-0905	
Email Address	info@tarasafe.in	
Website	www.tarasafe.in	
Fax Number	Fax: +91-11-2394-0494	

Company Name		Rajda Industries and Exports Pvt. Ltd
Type of Unit -	Large	
Type of Unit - EOU UNIT	100% EOU	
2: Type of Management	Private Limited	
Products	Industrial Gloves	
Technical Textile segment	Protech	
End user Industries	In industries, labs	
Production	7 Mn. Pairs	
Exports (in Rs. Lakh)	Rs. 8018 lakh	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	5924.08	
Sales Turnover 2011-12 (in Rs. Lakh)	8018.54	

Company Name		Rajda Industries and Exports Pvt. Ltd
Sales Turnover 2012-13 (in Rs. Lakh)		
EBITDA 2010-11 (in Rs. Lakh)		295.43
EBITDA 2011-12 (in Rs. Lakh)		607.52
EBITDA 2012-13 (in Rs. Lakh)		
Net Profit 2010-11 (in Rs. Lakh)		73.49
Net Profit 2011-12 (in Rs. Lakh)		189.08
Net Profit 2012-13 (in Rs. Lakh)		
Total Assets (2012-13) – in Rs. lakh		3906
Contact details		
District	Kolkata	
State	West Bengal	
Registered Office Address	1702, Chatterjee International Centre, 33A, Jawaharlal Nehru Road, Kolkata - 700071, India	
Registered office phn .no.	Tel: +91-33-22261916 Mobile: +91 - 9831439660	
Contact Person	V V Raman	
Designation	Director	
Telephone	9831439660	
Email Address	vv.raman@rajda.in vvraman54@gmail.com	
Website	http://www.rajda.in	
Fax Number	033-22492815	

Company Name		Alok Industries Ltd.
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Fire Retardant fabrics and work wear aparels	
Technical Textile segment	Protech	
End user Industries	FR apparels High visibility clothing	
Production	22 Mn. Garments	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	638843	
Sales Turnover 2011-12 (in Rs. Lakh)	890086	
Sales Turnover 2012-13 (in Rs. Lakh)		
EBITDA 2010-11 (in Rs. Lakh)		
EBITDA 2011-12 (in Rs. Lakh)		262475
EBITDA 2012-13 (in Rs. Lakh)		187970
Net Profit 2010-11 (in Rs. Lakh)		40436
Net Profit 2011-12 (in Rs. Lakh)		38053
Net Profit 2012-13 (in Rs. Lakh)		
Total Assets (2012-13) – in Rs. lakh		1358816
Contact details		
State	Maharashtra	

Company Name		Alok Industries Ltd.
District	Mumbai	
Registered Office Address	17/5/1, 521/1, Village Rakholi/ Saily, Silvassa, The Union Territory of Dadra and Nagar Haveli-396 230	
Registered office phn .no.	Tel: +91 22 61787000	
Telephone	Tel: +91 22 61787000	
Email Address	info@alokind.com	
Website	www.alokind.com	
Fax Number	0260 2645289	

Company Name		Shri Lakshmi Cotsyn Ltd.
Type of Unit -	Large	
Type of Unit - EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	NBC suits, personal armour,	
Technical Textile segment	Protech	
End user Industries	In defence applications	
Exports (in Rs. Lakh)	Rs. 27682 lakh	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	179838	
Sales Turnover 2011-12 (in Rs. Lakh)	242213	
Sales Turnover 2012-13 (in Rs. Lakh)		
EBITDA 2010-11 (in Rs. Lakh)		27398
EBITDA 2011-12 (in Rs. Lakh)		44640
EBITDA 2012-13 (in Rs. Lakh)		9155
Net Profit 2010-11 (in Rs. Lakh)		10411
Net Profit 2011-12 (in Rs. Lakh)		11047
Net Profit 2012-13 (in Rs. Lakh)		-41554
Total Assets (2012-13) – in Rs. lakh		208417
Contact details		
District	Kanpur	
State	Uttar Pradesh	
Registered Office Address	19/X - 1 Krishnapuram G T Road, Kanpur Uttar Pradesh - 208 007	
Registered office phn .no.	0512 - 2402893	
Contact Person	Mr. Nirmal Jhajharia	
Designation	Head - Techical Textiles	
Telephone	0512 - 2402893	
Email Address	shri@shrilakshmi.in	
Website	www.shrilakshmi.in	

Indutech

The profiles of key players is show in the following exhibit:

Company Name		Axiom Cordages Limited	
Type of Unit		Medium	
Type of Unit - EOU UNIT		Yes	
2: Type of Management		Private Limited	
Products		Cordages	
Technical Textile segment		Indutech	
End user Industries		Indutech	
PRODUCTS		Cordages	
QuantityProduced(2010-11)		25000 meters	
QuantityProduced(2011-12)		30000 meters	
QuantityProduced(2012-13)		30000 meters	
Productsfor exports		Cordages	
Export 2011-12		700 meters	
Export 2012-13		700 meters	
Capacity 2010-11		30000 meters	
Capacity 2012-13		30000 meters	
Capacity Utilization 12-13		100%	
Manufacturing process		Weaving/Netting	
Key Machinery Installed -		JP	
Key Raw Material (RM)		PP / Synthetic	
Source of Raw Material		100% domestic	
Financial information			
Sales Turnover2010-11(in Rs. Lakh)		1500	
Sales Turnover2011-12(in Rs. Lakh)		2000	
Sales Turnover2012-13(in Rs. Lakh)		2000	
EBITDA2010-11(in Rs. Lakh)		100	
EBITDA2011-12(in Rs. Lakh)		200	
EBITDA2012-13(in Rs. Lakh)		200	
Net Profit2010-11(in Rs. Lakh)		20	
Net Profit2011-12(in Rs. Lakh)		30	
Net Profit2012-13(in Rs. Lakh)		30	
Total - Permanent employment(2012-13)		47	
Land & Building Gross value (on 31 MAR'13) (in Rs. Lakh)		1000	
Major Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		400	
Ancillary Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		200	
Contact details			
Registered Office Address		Eucharistics Congress Building No. 1, 5, Convent Street	
Contact Person		K K Agarwal	
Telephone		022-66582724/66562725	
Email Address		inquiry@foraxiom.com	
Website		www.axiomcordages.com	
Fax Number		022-66562798	

Company Name		CUMI	
Type of Unit		Large	
Type of Unit - EOU UNIT		OTHERS	
2: Type of Management		Private Limited	
Products		Coated abrasives	
Technical Textile segment		Indutech	
End user Industries		(blank)	
PRODUCTS		Coated abrasives	
Product segment		Abrasives sales	
Financial information			
Sales Turnover2011-12(in Rs. Lakh)		60920	
Sales Turnover2012-13(in Rs. Lakh)		60730	
Contact details			
Registered Office Address		1st Floor, Dare House Extn., No.234, NSC Bose Road,Chennai - 600 001	
Registered office phn .no.		044 3000 6065 / 6066	
Email Address		cumiref@cumi.murugappa.com	
Website		http://www.cumi-murugappa.com	

Company Name		Daramic Battery Separator India Pvt Ltd.	
Type of Unit		Medium	
Type of Unit -		OTHERS	
2: Type of Management		Private Limited	
Products		Battery separators	
Technical Textile segment		Indutech	
PRODUCTS		PE Separators	
Quantity Produced 2010-11		8,665,3 18 sq. m	
Product segment for financial		Gross Revenue for PE Belts	
Financial information			
Sales Turnover 2010-11 (in Rs. Lakh)		7642.77	
Sales Turnover 2011-12 (in Rs. Lakh)		9535.68	
Net Profit 2010-11(in Rs. Lakh)		819.05974	
Net Profit2011-12(in Rs. Lakh)		488.55961	
Contact details			
District		Bangalore	
State		Karnataka	
Registered Office Address		Daramic Battery Separator India Pvt. Ltd. Plot No. 25 KIADB New No. 5 BBMP 3rd Main Road, 1 st Phase Peenya Bangalore 560 025 India	

Company Name	Garware Wall Ropes
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Company Name	Garware Wall Ropes	
Type of Unit	Large	
Type -	OTHERS	
2: Type of Management	Public Limited	
Products	Ropes	
Technical Textile segment	Indutech	
PRODUCTS	Ropes and Cordages	
Production 2010-11	26440 MT	
Capacity 2010-11	31680 MT	
Financial information		
Sales Turnover 2010-11 (in Rs. Lakh)	50130	
Sales Turnover 2011-12 (in Rs. Lakh)	58082	
Sales Turnover 2012-13 (in Rs. Lakh)	60305	
EBITDA 2010-11(in Rs. Lakh)	5494	
EBITDA 2011-12(in Rs. Lakh)	6120	
EBITDA 2012-13(in Rs. Lakh)	6413	
Net Profit 2010-11(in Rs. Lakh)	2443	
Net Profit 2011-12(in Rs. Lakh)	2401	
Net Profit 2012-13(in Rs. Lakh)	2467	
Land & BuildingGross value (on 31 MAR'13) (in Rs. Lakh)	2145	
Major MachineryGross value (on 31 MAR'13) (in Rs. Lakh)	10300	
Other Fixed AssetsGross value (on 31 MAR'13) (in Rs. Lakh)	2969	
Contact details		
Any Technical Collaboration - Provide brief	JV - Garware Environmental Services Pvt. Ltd. is yet to start operations	
District	Pune	
State	Maharashtra	
Factory Address	Pune & Wai - 3 factories 10/66, Kirti Nagar Industrial Area, , New Delhi	
Registered Office Address	Plot no 11, Block D1 MIDC Chinchwad Pune - 411 019 011-25923367	
Registered office phn .no.	'020-30780000 020-30780195	
Contact Person	Mr. Pradeep Patil	
Designation	Head - Textiles	
Telephone	09370313237 022-30780217	
Email Address	papatil@garwareropes.com sales@garwareropes.com	
Website	www.garwareropes.com	

Company Name	Garware Wall Ropes
Fax Number	020-30780350

Company Name	Grindwell Norton	
Type of Unit	Large	
Type- EOU UNIT	OTHERS	
2: Type of Management	Private Limited	
Products	Coated abrasives	
Technical Textile segment	Indutech	
Product segment for financial	Abrasive sales	
Financial information		
Sales Turnover 2011-12 (in Rs. Lakh)	654,15.92	
Sales Turnover 2012-13 (in Rs. Lakh)	653,89.64	
Contact details		
Registered Office Address	Leela Business Park, 5th Level, Andheri-Kurla Road,Andheri (E), Mumbai - 400059.	
Registered office phn .	022-40212121	
Website	http://www.grindwellnorton.co.in	

Company Name	Hind Filters Ltd	
Type of Unit	Large	
Type of Unit - EOU UNIT	No	
2: Type of Management	Private Limited	
Products	Filter Rods	
Technical Textile segment	Indutech	
End user Industries	Indutech	
PRODUCTS	Filter Rod	
Quantity Produced(2010-11)	600 Million Rods	
QuantityProduced(2011-12)	700 Million Rods	
QuantityProduced(2012-13)	700 Million Rods	
Capacity2010-11	1000 Million Rods	
Capacity2012-13	1000 Million Rods	
Capacity Utilization2012-13	0.7	
Manufacturing process	Rod Maker	
Key Machinery Installed - Name of machine	Lee's	
Key Raw Material (RM)	Cellulose Fibres	
Source of Raw Material	100% domestic	
Financial information		
Sales Turnover 2010-11(in Rs. Lakh)	300	
Sales Turnover2011-12(in Rs. Lakh)	400	
Sales Turnover 2012-13(in Rs. Lakh)	400	
EBITDA 2010-11(in Rs. Lakh)	50	

Company Name		Hind Filters Ltd
EBITDA 2011-12(in Rs. Lakh)		100
EBITDA 2012-13(in Rs. Lakh)		100
Net Profit 2010-11(in Rs. Lakh)		40
Net Profit2011-12(in Rs. Lakh)		40
Net Profit 2012-13(in Rs. Lakh)		40
Total - Permanent employment(2012-13)		40
Land & BuildingGross value (on 31 MAR'13) (in Rs. Lakh)		500
Major MachineryGross value (on 31 MAR'13) (in Rs. Lakh)		150
Ancillary MachineryGross value(on 31 MAR'13) (in Rs. Lakh)		5000
Other Fixed AssetsGross value (on 31 MAR'13) (in Rs. Lakh)		100
Contact		
Any Technical Collaboration	No	
Registered Office Address	1521 4 1522, Makers Chambers V, Narima Point	
Contact Person	Mr Ramesh Gaud	
Telephone	022-22830306	
Email Address	hindfilter@hindgroupindia.com	
Website	www.hindfilters.com	

Company Name		L.G. Balakrishnan & Bros. Ltd
Type of Unit		Medium
Type of Unit		OTHERS
2: Type of Management		Private Limited
Technical Textile segment		Indutech
PRODUCTS		Drive belts, conveyor belts
Financial information		
Sales Turnover2010-11(in Rs. Lakh)		71170.88
Sales Turnover2011-12(in Rs. Lakh)		90691.64
Sales Turnover2012-13(in Rs. Lakh)		94062.78
EBITDA 2010-11 in Rs. Lakh)		8794.58
EBITDA2011-12(in Rs. Lakh)		10392.13
EBITDA2012-13(in Rs. Lakh)		9379.93
Net Profit2010-11(in Rs. Lakh)		4580.51
Net Profit2011-12(in Rs. Lakh)		4351.97
Net Profit2012-13(in Rs. Lakh)		3367.73
Contact details		
District	Coimbatore	
Registered Office	6/16/13, Krishnarayapuram Road, Ganapathy, Coimbatore - 641 006.	

Company Name		L.G. Balakrishnan & Bros. Ltd
Address		
Registered office phn	Phone No. 0422 - 2532325 Fax : 0091 422 253 2333	
Email Address	info@lgb.co.in	
Website	http://www.lgb.co.in/profile_about_us.html	

Company Name		Montex Glass Fibre Indus. Pvt.Ltd.
Type of Unit		Small
Type of Unit		EOU
2: Type of Management		Private Limited
Products		Fiber Glass Fabric
Technical Textile segment		Indutech
End user Industries		Indutech
PRODUCTS		Fiber Glass Fabric
Production (2011-12)		25 Lakh meters
Production 2012-13		30 Lakh meters
Capacity2010-11		50 Lakh meters
Capacity 2012-13		70 Lakh meters
Capacity Utilization12-13		50 Lakh meters
Manufacturing process		Inspect Coating
Key Machinery Installed - Name of machine		Fiberglass Machine
Key Raw Material (RM)		polyster
Source of Raw Material		100% domestic
Financials		
Sales Turnover2011-12(in Rs. Lakh)		3000
Sales Turnover2012-13(in Rs. Lakh)		3500
EBITDA2011-12(in Rs. Lakh)		300
EBITDA2012-13(in Rs. Lakh)		200
Net Profit2011-12(in Rs. Lakh)		50
Net Profit2012-13(in Rs. Lakh)		50
Permanent employment (2012-13)		95
Ancillary Machinery Gross value (on 31 MAR'13) (in Rs. Lakh)		Can't Say
Contact details		
State		Maharashtra
Phone Number		253-6698204
Registered Office Address		2/19-20, Bombay Mutual Annexe, Rustom Sidhawa Marg, Mumbai. 400001
		E-76, MIDC, Ambad Industrial Aria,Nasik

Company Name	Montex Glass Fibre Indus. Pvt.Ltd.
Telephone	022-22663502
Email Address	montexnsk@sify.com

Company Name	Owens Corning India Ltd
Type of Unit	Large
Type of Unit -	OTHERS
2: Type of Management	Private Limited
Products	Glass fibres, Composites
Technical Textile segment	Indutech

Financial information	
Sales Turnover2010-11(in Rs. Lakh)	1725.9
Sales Turnover2011-12(in Rs. Lakh)	42.6
EBITDA 2010-11(in Rs. Lakh)	1263.7
EBITDA 2011-12(in Rs. Lakh)	-212
Net Profit 2010-11(in Rs. Lakh)	678.5
Net Profit 2011-12(in Rs. Lakh)	-212

Contact details	
Registered Office Address	7th Floor, ALPHA, Hiranandani Garden, Powai, Mumbai - 400076, India
Registered office phn .no.	022-6668 1700
Email Address	csb-india@owenscorning.com
Website	http://www.owenscorningindia.com

Company Name	Sanrhea Technical Textiles Ltd.
Type of Unit	Large
Type of Unit	OTHERS
2: Type of Management	Private Limited
Products	Chafer fabric, liner fabric, belting fabric, diaphragm, impression and float fabrics
Technical Textile segment	Indutech
PRODUCTS	Fabric
Production - (2010-11)	2395112 kgs
Financial information	
Sales Turnover2010-11(in Rs. Lakh)	2675.1
Sales Turnover2011-12(in Rs. Lakh)	2710.3
Sales Turnover2012-13(in Rs. Lakh)	2896.2
EBITDA2010-11(in Rs. Lakh)	259.8
EBITDA2011-12(in Rs. Lakh)	258.3
EBITDA2012-13(in Rs. Lakh)	227.3
Net Profit2010-11(in Rs. Lakh)	97.3

Company Name	Sanrhea Technical Textiles Ltd.
Net Profit2011-12(in Rs. Lakh)	72.4
Net Profit2012-13(in Rs. Lakh)	18.1
Contact details	
Registered Office Address	Dr. Ambedkar Road, Near G.E.B., Kalol (North Gujarat) – 382 721 Dist Gandhinagar. India.
Registered office phn .no.	+91-(02764) – 227831, 225204
Email Address	info@sanrhea.com
Website	http://www.sanrhea.com/contact_us.html

Geotech & Oekotech

The profiles of key players of Geotech and Oekotech is as shown below

Company Name	Garware Wall Ropes
Type of Unit -	Large
Type of Unit - EOU UNIT	OTHERS
2: Type of Management	Public Limited
Products	Woven geo textiles and gabions
Technical Textile segment	Agrotech & Geotech
End user Industries	Fishing nets and twines
Production	826 Mn. Sq metres
Exports (in Rs. Lakh)	Rs. 26300 lakh
Capacity 2012-13	8724 MT
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	50130
Sales Turnover 2011-12 (in Rs. Lakh)	58082
Sales Turnover 2012-13 (in Rs. Lakh)	60305
EBITDA 2010-11 (in Rs. Lakh)	5494
EBITDA 2011-12 (in Rs. Lakh)	6120
EBITDA 2012-13 (in Rs. Lakh)	6413
Net Profit 2010-11 (in Rs. Lakh)	2443
Net Profit 2011-12 (in Rs. Lakh)	2401
Net Profit 2012-13 (in Rs. Lakh)	2467
Total Assets (2012-13) – in Rs. lakh	15414
Contact details	
Technical collaborations	JV - Garware Environmental Services Pvt. Ltd. is yet to start operations
District	Pune
State	Maharashtra
Factory Address	Pune & Wai - 3 factories 10/66, Kirti Nagar Industrial Area, New Delhi Plot no 11, Block D1
Registered Office Address	MIDC Chinchwad Pune - 411 019

Company Name	Garware Wall Ropes
Registered office phn .no.	011-25923367 '020-30780000, 020-30780195
Contact Person	Mr. Pradeep Patil
Designation	Head - Textiles
Telephone	09370313237 022-30780217
Email Address	papatil@garwareropes.com sales@garwareropes.com
Website	www.garwareropes.com
Fax Number	020-30780350

Company Name	Techfab India
Type of Unit -	Large
Type of Unit	100% EOU
Products	Nonwovens
Technical Textile segment	Geotech
End user Industries	* Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation
Key Raw Material (RM) Required	Poly Propylene/ HDPE, Master Batch, PP Repol 30 SG, Polyester Yarn, PP MF Yarn, DINP, PVC Resin, Polyester Staple Fibre, Glass Roving, Bitumen, PP Staple Fibers, G.I. Wire
Source of Raw Material	imported - 8.12%
Financial information	
Sales Turnover 2010-11 (in Rs. Lakh)	6811
Sales Turnover 2011-12 (in Rs. Lakh)	9467
Sales Turnover 2012-13 (in Rs. Lakh)	11357
EBITDA 2010-11 (in Rs. Lakh)	1004
EBITDA 2011-12 (in Rs. Lakh)	937
Net Profit 2010-11 (in Rs. Lakh)	359
Net Profit 2011-12 (in Rs. Lakh)	223
Net Profit 2012-13 (in Rs. Lakh)	466
Total Assets (2012-13) – in Rs. lakh	9427
Contact details	
Registered Office Address	712, Embassy Centre, Nariman Point, Mumbai - 400 021. (India)
office phn .no.	91-22-2287 6224 / 6225
Email Address	anant@techfabindia.com / tfi@vsnl.net
Website	http://www.techfabindia.com/

Company Name	SKAPS
Type of Unit -	Large
Type of Unit - EOU UNIT	100% EOU
Products	Woven - Tape, Mono filament

Company Name	SKAPS
Technical Textile segment	Geotech
End user Industries	* Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation
Production	12600 MT
Financial information	
Sales Turnover 2011-12 (in Rs. Lakh)	18000
Sales Turnover 2012-13 (in Rs. Lakh)	19800
Contact details	
Registered Office Address	PLOT NO A-20,SURVEY NO 423,MAHAGUJARAT INDUSTRIAL ESTATE,AHMEDABAD BAVLA HIGHWAY,TAL SANAND, AHMEDABAD - 382210., Gujarat, INDIA
Email Address	sumersingh@skaps.com
Website	http://www.skaps.com/

Company Name	Terram India Pvt. Ltd.
Type of Unit -	Large
Type of Unit - EOU UNIT	100% EOU
2: Type of Management	Private Limited
Products	thermally bonded nonwoven geotextiles
Technical Textile segment	Geotech
End user Industries	* Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation
Production	1.3 Mn. Kgs
Financials	
EBITDA 2010-11 (in Rs. Lakh)	-20.00
Net Profit 2011-12 (in Rs. Lakh)	-367
Net Profit 2012-13 (in Rs. Lakh)	-1174
Total Assets (2012-13) – in Rs. lakh	8804
Contact details	
Technical collaborations	It's a JV with Fibwerweb Geosynthetics Ltd., UK
Registered Office Address	A 704 Safal Pegasus Anandnagar Road Ahmedabad -380 015 Gujarat, INDIA
Registered office phn .no.	91-79-40064529
Contact Person	Parimal Parekh
Designation	Managing Director
Email Address	sales@terramgeosynthetics.com pparekh@terramgeosynthetics.com
Website	http://www.terramgeosynthetics.com/

Company Name		Strata Geosystems	
Type of Unit -		Large	
Type of Unit -		100% EOU	
2: Type of Management		Private Limited	
Products		Knitted geogrid	
Technical Textile segment		Geotech	
End user Industries		<ul style="list-style-type: none"> * Segmental Retaining Walls * Landslide Repair * Panel Faced Retaining Walls * Reinforced Foundations * Reinforced Steep Slopes * Track Bed Stabilization * Reinforced Embankments Over Soft Soil * Landfill Embankment 	
Production		3.6 Mn. Sq m	
Key Raw Material (RM) Required		Yarn, fabric, others, packing material	
Source of Raw Material		Import – 67.3%	
Financials			
Sales Turnover 2010-11 (in Rs. Lakh)		3795	
Sales Turnover 2011-12 (in Rs. Lakh)		5235	
EBITDA 2010-11 (in Rs. Lakh)		539	
EBITDA 2011-12 (in Rs. Lakh)		637	
Net Profit 2010-11 (in Rs. Lakh)		348	
Net Profit 2011-12 (in Rs. Lakh)		433	
Total Assets (2012-13) – in Rs. lakh		4425	
Contact			
Technical collaborations		JV with Strata Systems Incorporated , USA	
Factory Address		317, Tantia Jogani Industrial Premises, J. R. Boricha Marg, Lower Parel (E), Mumbai 400 011, India	
Phone Number		91 22 4063 5100	
Registered Office Address		317, Tantia Jogani Industrial Premises, J. R. Boricha Marg, Lower Parel (E), Mumbai 400 011, India	
Registered office phn		91 22 4063 5100	
Email Address		info@strataindia.com jrk@strataindia.com	
Website		http://www.strataindia.com/	

Company Name		Neocorp International Limited	
Type of Unit -		Large	
Type of Unit - EOU UNIT		EOU	
2: Type of Management		Public limited	
Products		Geotech - woven carpet backing fabric geotextiles fabric and ground covers	
Technical Textile		Geotech	

Company Name		Neocorp International Limited	
segment			
End user Industries		<ul style="list-style-type: none"> * Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Seperation 	
Production		20085 MT	
Capacity 2012-13		60 MT	
Key Raw Material (RM) Required		Fabrics/ tape, granules, sacks/ fabrics	
Source of Raw Material		Mostly domestic	
Financials			
Sales Turnover 2010-11 (in Rs. Lakh)		23107	
Sales Turnover 2011-12 (in Rs. Lakh)		28399	
Sales Turnover 2012-13 (in Rs. Lakh)		43011	
EBITDA 2010-11 (in Rs. Lakh)		3288	
EBITDA 2011-12 (in Rs. Lakh)		4427	
Net Profit 2010-11 (in Rs. Lakh)		1419	
Net Profit 2011-12 (in Rs. Lakh)		1658	
Net Profit 2012-13 (in Rs. Lakh)		1583	
Total Assets (2012-13) – in Rs. lakh		67364	
Contact			
Technical collaborations		Technical collaboration with Sungkwang Chemical Industrial Company, Korea	
Factory Address		Industrial Area Sector - 1, Plot No 62-63 Pithampur, Dhar, Madhya Pradesh	
Phone Number		91-07292-252284/252278/501632/33	
Registered Office Address		220 Mahavir Industrial Estate, Op Mahakali Caves Rd Andheri (E), Mumbai, 400093, Maharashtra	
Registered office phn .no.		91-22-26879510	
Email Address		Registered office: bom@neocorp.co.in Works: contact@neocorp.co.in	
Website		http://www.neocorp.co.in	

Company Name		Shri Ambica Polymer Private Ltd	
Type of Unit -		Large	
Type of Unit - EOU UNIT		EOU	
2: Type of Management		Private Limited	
Products		PP woven geotextiles	
Technical Textile segment		Geotech	
End user Industries		<ul style="list-style-type: none"> * Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation 	

Company Name		Shri Ambica Polymer Private Ltd	
Production		4572 MT	
Key Machinery Installed		Sulzer looms	
Key Raw Material (RM)		Non woven and woven fabric	
Source of Raw Material Domestic (Share in %)		Indigenous – 84.15%	
Financials			
Sales Turnover 2010-11 (in Rs. Lakh)		4767	
Sales Turnover 2011-12 (in Rs. Lakh)		5316	
EBITDA 2010-11 (in Rs. Lakh)		685.22	
EBITDA 2011-12 (in Rs. Lakh)		477.42	
Net Profit 2010-11 (in Rs. Lakh)		562.54	
Net Profit 2011-12 (in Rs. Lakh)		91	
Total Assets (2012-13) – in Rs. lakh		3,694	
Contact			
Registered Office Address		Safal Profitaire A/3 First Floor Nr. Auda Garden, Prahladnagar Ahmedabad - 380 015. Gujarat. India	
Registered office phn .no.		02694-222496	
Email Address		vyotika@ambicapolymer.com generall@ambicapolymer.com	
Website		www.ambicapolymer.com	

Company Name		Fiberweb India	
Type of Unit -		Large	
Type of Unit - EOU UNIT		Others	
2: Type of Management		Private Limited	
Products		Non-Woven Fabrics- Spunbond	
Technical Textile segment		Geotech	
End user Industries		<ul style="list-style-type: none"> * Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation 	
Production		98 Mn. Bags	
Capacity 2012-13		4000 MT	
Financials			
Sales Turnover 2011-12 (in Rs. Lakh)		4479	
Sales Turnover 2012-13 (in Rs. Lakh)		5114	
EBITDA 2010-11 (in Rs. Lakh)			
EBITDA 2011-12 (in Rs. Lakh)		399	
Net Profit 2011-12 (in Rs. Lakh)		255	
Net Profit 2012-13 (in Rs. Lakh)		-91	
Total Assets (2012-13) – in Rs. lakh		7927	
Contact			
Factory Address		Plot No 92/93B,100 Costel Highway, Nani Daman Daman & Diu, 396210	

Company Name		Fiberweb India	
Registered Office Address		Airport Road, Kadaiya, Nani Daman, 396210, Daman & Diu	
Registered office phn no.		91-260-2221458/1858/0766	
Email Address		Works: fiberweb@vsnl.net & fiberweb@fiberwebindia.com Marketing: fiberweb@vsnl.net & fiberweb@fiberwebindia.com	
Website		http://www.fiberwebindia.com	

Company Name		Flexituff International Ltd.	
Type of Unit -		Large	
Type of Unit -		OTHERS	
Type of Management		Private Limited	
Products		Geotextiles and geo bags	
Technical Textile segment		Geotech	
End user Industries		<ul style="list-style-type: none"> * Reinforcement of paved areas * Erosion Control * Road Stabilisation * Drainage * Landfill Separation 	
Financials			
Sales Turnover 2010-11 (in Rs. Lakh)		87058	
Sales Turnover 2011-12 (in Rs. Lakh)		62638	
Sales Turnover 2012-13 (in Rs. Lakh)		49578	
EBITDA 2010-11 (in Rs. Lakh)		6939	
EBITDA 2011-12 (in Rs. Lakh)		10717	
EBITDA 2012-13 (in Rs. Lakh)		12121	
Net Profit 2010-11 (in Rs. Lakh)		2744	
Net Profit 2011-12 (in Rs. Lakh)		3436	
Net Profit 2012-13 (in Rs. Lakh)		2764	
Contact			
Registered Office Address		304 Diamond Prestige, 41-A A J C Bose Road, Kolkata, 700017, West Bengal	
Registered office phn		033-32212690/40053995	
Email Address		investors@flexituff.com	
Website		http://www.flexituff.com	