# Centre of Wool and Woollens - Amritsar

**Amritsar is the famous cluster for wool and woollen products. It's shoddy blankets are a known product in Army, Police, paramilitary forces, as barrack blankets and as relief material during relief at the time of natural calamities. Woollen Jerseys made at Ludhiana and Amritsar are widely used in Army, Police, paramilitary forces and elsewhere in the country during winter season. The cluster has however not been able to keep pace with the developments taken place elsewhere and the processing units in majority, are still operating with age old technology with some units having undertaken technology uopgradation with the help of Technology Upgradation Fund Scheme of Govt. of India or otherwise. Brief details of Amritsar cluster are given hereinbelow.**

## Historical Background and location :

**Founded in 1577 by Shri Ramdas, the fourth guru of Sikhs, Amritsar, the holy city, is the second largest city in Punjab. It is known worldover for its' 'Golden Temple' and famous freedom fighters monument "Jalianwala Bagh". It enjoys the pride of the mix of two cultures "India and Pakistan" at its border known as 'Wagah' border where thousands of people from the two countries witness the ceremonial flag hoisting and exchange by armies of the two countries, on a daily basis, truly reflecting the traditional and social linkage between the people of two nations, far away from vested political interests.**

**The name of the city is drawn from it's sacred pool around which 'Golden Temple' is built. This pond is known as "Pool of nectar", meaning thereby Amrit – sar and hence Amritsar.**

**Punjab is known world over for its' fertile land, hard working farmers and it's agriproducts. It houses major markets for agricultural products. It is well connected to Indian capital New Delhi by train and road, about 450 kms from N. Delhi. The international Wagah border is about 30 kms away from Amritsar.**

## 2. Industrial profile :

**Processing is one of the major activities after weaving in the cluster, for value addition. The cluster comprises of both small scale and a few composite units mostly working under private entrepreneurship. There are around 30 processing units in the cluster processing around 1300 lakh metres of fabrics and made ups. Major processing units are located in the outskirts. Batala, Majitha, Ajnala Road and some of the units are located in Ghee Mandi and Sultan Wind road area. In processing 50% of the units do dyeing activities, 33% printing and rest 17% are involved in finishing activities. Technology is mixed from old outdated, locally fabricated machines to high tech processing machines listed under 10% capital subsidy of Technology Upgradation Fund Scheme of Govt. of India, Ministry of Textiles.**

**The cluster also houses about 20 woollen / worsted spinning mills, 3 woollen composite units, 3 Acrylic blanket units, 120 warp knitting units, 10000 powerlooms in decentralised sector and 250 shuttleless looms.**

## 3. Product profile :

**Amritsar is a centre for woollen textiles. Main products are Blankets, Shawls, Stoles, Blazers, Dress material, suitings, shirtings and knitted fabrics, especially warp knitted fabrics. Imported merino and indigenous Kashmiri wool are used for making woollen products. Shoddy blankets made from the yarn manufactured from woollen rugs, waste are the speciality of Amritsar. Mink blankets are the new range of blankets from Amritsar and are marketed all over the country in cold season. Units are also engaged in the processing of dress material on job work from Western part of the country. Polyester-wool (P/W), Polyester/Viscose (P/V) suitings are most common. Yarn to manufacture these suitings comes from other parts of the country. 15% of the products are warp knitted. Processing activity in Amritsar generates around Rs.100 crore, 50% of which comes from dress material, 20% from suitings and shirtings, 15% from knitting and 15% from woollens. Dyes used are disperse, reactives, acids, vats and pigments. 70% are disperse, used on polyester dress**

**material, blended suitings and shirtings etc. Acid dyes are used on shawls, blankets and blazers. About 10% of total consumption of dyes is from acid dyes class. Reactives are around 5% on cotton mixed products, mainly shirtings. Vats and pigments are used to the tune of 5 and 10% respectively. Total consumption of dyes is estimated at 500 tons, valueing around Rs.1250 lakh. The chemical consumption is to the tune of 2100 tons, valueing Rs.630 lakh. Value addition over grey is to the tune of 15% in printing and 22% on finished ones. Poor value addition is due to low end technology used. Units carrying out speciality finishes are able to reach a value addition of upto 25% for white, upto 50% for dyed, upto 75% for printed and upto 120% for finished products. Job charges vary in the following ranges :-**

| Products | Approximate Job charges (Rs. per meter) |
|---|---|
| Dress material | 2 – 3 |
| Suiting and Shirtings | 10 – 18 |
| Printed fabrics | 5 – 10 |
| Knitted fabrics | 2 – 5 |
| Woollen Products | 10 – 20 |

**Embroidery on ladies dress material adds up value addition substantially.**

**Amritsar region contributes to around 2 –3 % of exports from India amounting to around Rs.200 crore worth shawls and Rs.300 crore worth blankets. A little amount of suitings are also exported. Major exports are to USA, Europe, Australia and other countries. Known composite units are OCM, Amritsar Swadeshi Woollen Mills, Essma Woollen Mills manufacturing their own blended suitings, shirtings and shawls. 70 – 80% of exports from these units are direct exports. Shastri Market is full of textile trade activities at Amritsar. Dress material from Amritsar are sent for domestic consumption, all over northern India. Ladies suits, suitings, shirtings, shawls and blankets have grod demand in Delhi, Sri Nagar, Mumbai and Bangalore markets.**

## 4. Infrastructure and support facilities :

**Industrial infrastructure at Amritsar has not developed well. Industry continues operating in old fashion, without much attention on upgradation in technology, roads, drainage and other common facilities. Markets are not well developed and inputs for processing are to be sourced from outside resulting in increased overheads and reduced margins. Industry is deteriorating and not growing up, inspite of noble schemes of Govt. of India, Ministry of Textiles, like Technology Upgradation Fund Scheme, including 10% capital subsidy scheme and Scheme of Integrated Textile Parks (SITP) for improvement of infrastructure and technology. There is no common effluent treatment plant, and the individual units have to go in for their own effluent treatment plant resulting in additional burden on them, thus reducing their margins. Investment in effluent treatment plants. for small units ranges from Rs.7 – 20 lakh and that in bigger units upto Rs.50 lakh.**

**Following associations are active at Amritsar :**

1. **Shawl club (India), 1st Floor, Keshwar estate, Chowk Katra Parja, Amritsar.**
2. **Textile Manufacturers Association, 80 court Road, Amritsar**
3. **Mink Blankets Association, 5 Rattan chand Road, Amritsar**
4. **Small scale woollen manufacturing Association, Opp. UCO Bank, Katra Ahluwalia, Amritsar.**
5. **Shoddy Weaver's Association, 1st Pandit Kishan chand Avenue, Tehsilpura Amritsar.**

**Following institutions support the cause of textile industry at Amritsar :**

i) **District Industries Centre, Mehta Road, Focal Point, Amritsar.**

ii) **Powerloom Service Centre (PSC Amritsar address)**

iii) **Regional Office of the Textile Commissioner (Amritsar address)**

iv) **Guru Nanak Dev University, Chhehrata Road, Amritsar (Applied chemical science & Technology course, Textile Processing – B.Tech course)**

v) **Punjab Institute of Technology P.O. Rayon & Silk Mills, G.T. Road, Amritsar (3 yrs diploma course each in spinning, weaving, designing)**

vi) **Government Institute of garment technology, Majitha Road, Amritsar (3 yrs diploma course in garment technology).**

vii) **Powerloom Service Centre of Textile Commissioner's office helps the industry in their quality testing requirement, training, trouble shooting, creation of awareness for quality, work culture, productivity and modernisation. It also assists in implementation of various developmental schemes of Govt. of India, Ministry of Textiles.**

viii) **Regional Office of the Textile Commissioner at Amritsar also creates awareness as above by organising Seminars, Conferences, Meetings and coordination with the Govt. agencies. It overseas the implementation of various Govt. schemes such as Technology Upgradation Fund Scheme (TUFS), 10% capital subsidy with 5% interest subsidy scheme for specified processing machines, garment machines and tchnical textiles, Scheme for integrated textile parks (SITP), Group Insurance Scheme for powerloom workers, Group Workshed Scheme for powerlooms, 20% capital subsidy scheme for powerlooms and 15% upfront capital subsidy scheme for SSI textile units etc.**

5. **Problems and Suggestions :**

i) **No dedicated supplier of dyes and chemicals at Amritsar. As a result these inputs are to be sourced from outside, adding up the cost of production and reducing margins. Efforts should be made to bring reputed dyestuff and chemical suppliers to supply these inputs locally.**

ii) **Most significant production of processing units is ladies dress material, the fabric for which is to be brought from outside as the same is not manufactured at Amritsar. Creating manufacturing facilities for such fabric at Amritsar itself, would increase the profit margins.**

iii) **No dedicated well developed market for textile products at Amritsar. The goods after processing and finishing have to be sent to markets of Delhi, Surat, Bangalore and Mumbai etc. Development of marketing infrastructure at Amritsar would enhance the growth.**

iv) **Lack of availability of trained and skilled workers impairs the quality and production. Training facilities for growing industry is the need of the hour.**

v) **Industry has not taken up appropriate modernisation inspite of availability of various options under Technology Upgradation Fund Scheme of Govt. of India, Ministry of Textiles. An appropriate awareness is required to be created in this regard.**

**Note : For wool process sequence, please see Annexure.**

**Source : Material used in this coverage is based on the cluster profile prepared by Regional Office of the Textile Commissioner, Amritsar under the guidance of Shri Ram Asrey Lal, Dy. Director (Chemical Proessing), O/o The Textile Commissioner, Mumbai and under the instruction of Shri J. N. Singh IAS, Textile Commissioner, Mumbai.**

## ANNEXURE

### Overview of wool finishing

**Wool fabrics are finished to increase their attractiveness and to impart the certain properties desired and expected by the customers. Wool fabric finishing processes are divided into two groups, wet and dry finishing. The wet finishing processes include scouring, crabbing, milling, shrink proofing, bleaching and dyeing, all being aqueous based technologies. After wet finishing the fabric is hydro extracted and dried. The resulted dry fabric is then processed through the dry finishing processes of conditioning, raising, shearing, pressing, decatising, steaming and inspection.**

### Objects

1. **To remove the contaminations of wool by scouring process. These contaminants may include lubricants and antistatic agents employed during the yarn and fabric production such as lubricants and machine oil stains, etc.**
2. **To remove the vegetable matters contains in the wool fibre, The carbonizing may be used to remove the vegetable matters**
3. **To increase the desirable fabric quality before dyeing process such as softness, fullness, control of the dimensional stability and fabric whiteness through crabbing, milling, shrink proofing and bleaching processes.**
4. **To Improve the fabric appearance as well as luster through surface finishing like drying, conditioning, raising, shearing, singeing and improving the fabric sustainability through pressing, decatising, productive clothing and other care finishing.**

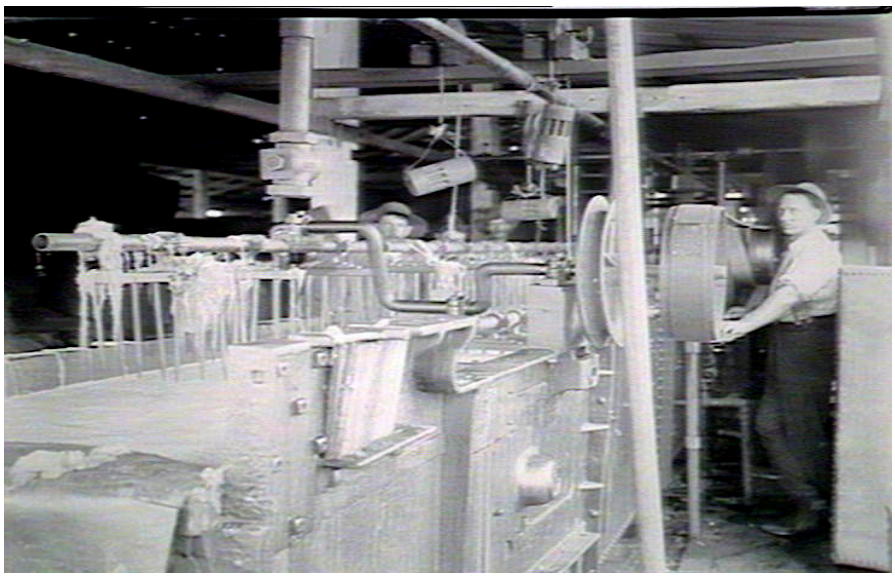
## Wool finishing process

### Scouring

**Woven and knitted fabrics which are taken straight from the loom or knitting machine are known as grey fabrics. Grey fabrics must be finished to produce high quality fabrics that are suitable for their intended use, e.g. suiting, knitwear and other fabrics.**

**Wool scouring is normally done at fibre stage and it is done by moving the wool through a series of tubes, which are filled with soapy water. The first tube is set a very warm 140F and then rinsed off in cold water. During this process the lanolin (grease of wool) is separated off and later used to make cosmetics and soaps.**

**The woolen fabrics produced from scoured wool are normally not reprocessed again. In some cases, the grey fabrics are again lead to the fabric scouring process. These contaminants may include 1. Residual wool grease that was deliberately left on the wool after raw wool scouring. 2. Chemical processing agents such as spinning lubricants, warp lubricants, antistatic agents, etc., 3. Soils from machine oils, factory dust, lint, etc., 4. Unfixed dyestuffs from stock or yarn dyeing processes.**



**Scouring machine**

## Carbonising

**The aim of carbonising is to remove the vegetable matter impurities from the wool fabric. The vegetable matter may include burrs, seed and leaf matter. The vegetable matters contains in wool are usually carbonised immediately after raw wool scouring. Thus woolen fabrics made from carbonised wool do not usually require fabric carbonising. If vegetable matter remains in the wool after combing, then it is necessary to carbonise such worsted fabrics. The carbonising process is based on the chemical differences between the protein of wool, the cellulose and linins of the vegetable matter.**

**The wool fabric is first treated with a diluted solution of sulphuric acid (3 – 6%) containing a suitable wetting agent. The acidified fabric is passed through a carbonizing oven for drying to evaporate the excess water then baked at 130 – 140 ‘ C. During baking the sulphuric acid converts the cellulose to dehydrocellulose, which is brittle and can be removed mechanically by creasing and beating.**

**Carbonising machine**

## Crabbing

**Crabbing is a pre-setting process used to impart the required amount of setting in the wool fabrics. The wool fabrics are first passed under higher tension and then treated in boiling water for 5-10 minutes. Finally, the wool fabric is cooled by passing the fabric through a cold water bath. High levels of settings are required if the wool fabric is to be dyed in rope form. Crabbing machines can be either batch or continuous type of machines.**

## Milling


**Milling Machine**

**Milling is the finishing process that makes use of the natural propensity of wool fibres to migrate and become entangled within the yarn and fabric structures. Milling is also known as fulling. Milling is achieved by intermittent mechanical action in the presence of suitable aqueous liquor. Milling can be carried out under mildly alkaline conditions or under strongly acid conditions with suitable lubricant. Sodium soaps or synthetic detergents are used for**

**alkaline milling whereas formic acid is commonly used for acid milling. Milling machines include stocks, rotary milling machines and combined scour/milling machines. Milling also achieves reduced air permeability, increased strength and a hiding of the weave structure.**

## Shrink Proofing

**Shrink proofing is the finishing process that is used to minimize felting shrinkage in wool fabrics. Shrink proofing treatments are commonly applied to wool in sliver form but may also be applied to wool in fabric form and to garments. The treatments may be divided into two main categories, destructive and additive treatments. Destructive treatments are done with chemicals, e.g. chlorination. This treatment is used to soften and round off the scales on the wool surface and addition of additives are done with polymers to either coat or mask the scales or spot weld the wool fibres together, or both.**

## Bleaching

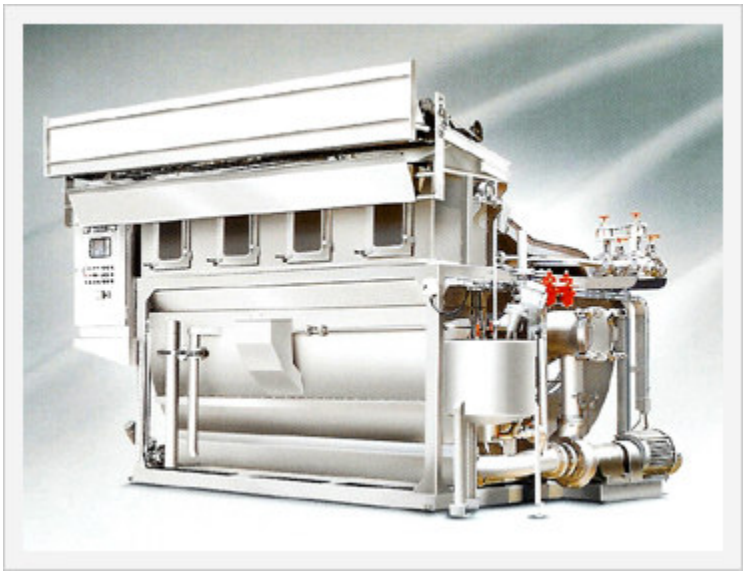
**Bleaching machine**

**Bleaching is a chemical process employed to destroy the natural creamy colorants in wool and produces whiter wool. Bright white wool is required for certain market applications, e.g. baby's knitwear and also for dyeing in pastel**

**shades. Bleaching may take place at the sliver, top, yarn or fabric stages of production. Hydrogen peroxide based bleaching recipes are commonly employed for the bleaching process.**

## Dyeing

**Dyeing can have a great influence on fabric quality. Wool fabric dyeing can be carried out in rope form or in open width form. Winch dyeing machine is mainly used for wool and acid dyes are commonly used to dye the woollen materials.**



**Dyeing**

**Dye solution is prepared by the mixer of dye powder, warm water and little amount of 5% concentrated acitic acid. This solution is kept for 15 minutes and 20% glauber salt (Sodium sulphate) is added as a retarding agent.**

**The fabrics are threaded up side by side and the dye bath is filled with dye solution. The winch is set to rotate and thus the fabric is kept moving so that it uniformly gets exposed with the dye solution. The fabric absorbs the dyes during submerged in the dye solution. It is almost free from tension and is more receptive to dye. From time to time, the dyer makes addition of dyes and dyeing agents such as 2% sulphuric acid through the perforated portion in front of the machine. After the dyeing is completed, the dye solution is cooled at around**

**70'C with addition of 3% dichromate and 1% acetic acid. Now, the dyed material is finally allowed to hot and cold wash.**

### Hydro-extraction

**Hydro-extraction process is used to dry the wool fabric and to remove the liquid water from textiles via mechanical force (squeezing via pad mangle) and centrifugal force or suction. The efficient removal of liquid water from the wool fabrics greatly reduces the energy costs of drying.**

### Scutching

**Scutching is the process employed in the textile industry to convert fabric from rope form to open width form. The twist in the fabric rope is detected electronically and the electronic signal is used to control an untwisting device which removes the twist from the rope. The untwisted fabric rope then passes through the opening rollers and guides to restore the fabric in the open width form. The fabric may then be rolled up on beams or folded and placed into trolley.**

### Back-rolling

**After scouring and rope dyeing, there is always the possibility of introducing creases or running marks in the fabric. Back-rolling process is used to remove such creases and running marks.**

### Drying

**Drying is the process of removing water from the wool textiles via the application of heat energy. As is well known, the conduction and convection methods are normally used for transferring heat energy from one object to another and both are employed in the textile industry. In conduction dryers, the fabric is brought into contact with a series of large diameter heated cylinders. Drum dryers are commonly used in the cotton industry, they have limited use in the drying of wool fabrics because of the risk of "glazing" the fabric surface that comes into contact with the hot metal surface.**

**Stenter Machine**

**Convection dryers employ hot air to dry the textile material. They are usually gas fired, and today the stenter would be the most commonly used and most important finishing machine. The stenter is fitted with two endless chain tracks that run the length of the stenter. The chains are fitted with tender hooks or clip s that hold the selvedges of the fabric as it passes through the stenter oven. Thus, the width of the fabric can be controlled by the separation of the chain tracks. The length dimensions of the fabric can be controlled by the relative difference in speeds of the feed rollers and the chain tracks. The wet wool fabric may be stretched by making the chains run faster than the feed rollers called under feed or allowed to shrink by making the feed rollers run faster than the chains called overfeed. When wet wool is dried in this way the fabric becomes cohesively set. Cohesive set is quite temporary and is lost upon the next wetting out of the fabric.**

## Conditioning

**As a result of over drying in the stenter, the dried wool fabric may contain less than its normal regain moisture for the prevailing atmospheric conditions. For example, at 65% RH the moisture regain of wool is typically 14-16% and this level of moisture content is required to achieve good results in subsequent dry finishing processes such as raising, cropping, pressing and decatising. Thus the dried fabric should be conditioned to normal regain before further processing**

**takes place. Wool fabric conditioning machines are based upon a number of principles including spraying water onto the fabric, passing moist air over the fabric and steaming the fabric.**

## Raising

**The aim of raising is to achieve desirable surface characteristics in the wool fabrics and to soften the handle. Raising is achieved using bristles or bent metal wires to catch and lift fibres out of the plane of the fabric surface and make the fibres protrude as a pile or nap. Since damp wool fibres are more pliable, and less fibre loss is suffered, the majority of wool fabrics are raised while damp. The typical wool regain employed would be 60-70% and lubricants may be also be used to reduce friction. Some fabrics may be pre-raised under damp conditions and then given a second raising after drying. Examples of wool fabrics that are raised include blankets, fleecy fabrics and velours.**

**Raising machine**

## Shearing

**Shearing or cropping uses rapidly rotating cylinder containing 14-20 helical blades to cut the fibres projecting from the fabric surface to an even or uniform**

**length. The helical blades are rotated and blade creating a continuous scissor-like cutting action. The length of the cut fibres is determined by the distance between the shearing bed and the fixed blade. The shearing bed may be either solid or hollow, the former providing closer cropping. Shearing faults are avoided by pushing the knots through to the back of the cloth and then first shearing the back of the cloth using a hollow shearing bed. Metal detectors are used to detect metal objects that may cause damage to the cutting heads. Modern machines are having two or more cutting heads.**


**Shearing machine**

## Singeing

**Singeing is a finishing process that uses a gas flame to burn away the surface wool fibres. Singeing is very common in the cotton industry because cotton fibres readily burn leaving almost no ash. Wool fabrics are resistant to burning, it is possible to remove the protruding fibres using a high temperature gas flame. Singeing cannot replace the shearing process because singed wool fabrics need to be scoured after singeing. Thus, the high productivity of singeing can only be exploited on grey state fabrics. Another great advantage of singeing is that it removes fibres right down to the surface of the fabric structure.**

## Pressing

**The objects of pressing are to improve the appearance and luster of a wool fabric and also to modify the handle by reducing the thickness of the fabric. Pressing produces a smooth, softer, handle. The effect is only temporary because pressing only imparts cohesive set to the fabric. Thus the effects of pressing are partially lost during steaming and completely lost when the fabric is wetted. It is essential that the wool fabric to be pressed is at normal regain and is initially cool. Pressing then employs the combination high pressure and heat energy to achieve the desired result. The heat and regain moisture make the wool pliable which allows the fabric to take up the configuration imposed upon it by the applied pressure. There are essentially three types of pressing machines employed in the wool industry being the paper press, rotary press and belt press.**

## Decatising

**Decatising Machine**

**The aim of decatising is to stabilise the properties of the fabric developed in finishing including the lustre and handle achieved in pressing. Decatising can also be used to improve the crease-resistance of wool fabrics. It is also known as**

**blowing. The wool fabric is interleaved with a cotton, polyester/cotton or polyester fabric and rolled up onto a perforated decatising drum under controlled tension. The fabric is steamed for 10 minutes and then cooled down by drawing air through the fabric roll. The piece is then reversed and steamed again in order to ensure that an even treatment is achieved along with the length of the fabric piece. There are several quite different types of decatising machines including batch decatising machines, continuous decatising machines, wet decatising machines and dry decatising machines known as autoclave and luster decatising machines.**

### Steaming

**Steaming is the final process of the wool finishing, which is also called as sponging. It is used to completely relax the fabric so as to achieve dimensional stability before sewing. London Shrinkage, a process in which the wool fabric was dampened with water and allowed to relax for 1-2 days, has been replaced by steaming machines. Steaming removes any tension put into the fabric during earlier finishing and hence reduces relaxation shrinkage.**

### Final Inspection

**The final inspection of the fabric is carried out on a perch. So this process is known as perching. The fabric is run over an inclined or vertical translucent plate and illuminated from face and back. Serious faults are marked with "strings" or tags in the selvedge. This is often the last quality control inspection. At final inspection, mending, spot cleaning, fault tagging, and downgrading are done as needed.**