

Textile finishing: Increased demand for Eco-friendly products

by Dr. Noor Ahmed Memon

In textile processing the concept of eco-friendly product and process had received significant appreciation all over the world; and the legislation and public enforcement in developed countries are known for this purpose. Indirectly, such enforcement had partly resulted in the growth and development of conventional textile processing in developing countries, where low-waged work force and reduced environment control are prevalent.

Consumers are now concerned about the green activities and choose products, which are non-toxic and cause no harm to both the humans and the environment. This trend for eco-friendly products has been extended to textile and apparel products, particularly those products which directly come into contact with the skin for prolonged period.

Finishing operation entails production of finished textile fabric from greige goods. Finishing operations are predominantly wet operations requiring large amounts of thermal energy for water heating and drying as well as dyes and chemicals.

Woven greige goods require some additional steps prior to dyeing, as compared to knit goods. As the first step in finishing woven goods, singeing burns protruding fibers by passing the fabric over an open flame or heated plates to produce a cleaner fabric and reduce hairiness. Sizes and other ingredients added during slashing in the weaving mill are removed in the de-sizing operation by washing them in a detergent solution at temperatures up to 200°F and then rinsing them with fresh water. The process produces a waste water stream of 100°F to 120°F.

Scouring is another washing process using steam and detergents to remove oils and mineral materials. The scouring can be done by batch in pressurized vessels known as kiers or on a continuous basis. In either case, high temperatures, to 250°F, and long retention times, up to 12 hours, are used to ensure thorough saturation and cleaning. Finally, the fabric is rinsed. A waste stream of warm, contaminated water is produced.

Next, the fabric is bleached, washed, and rinsed several times to achieve uniformity and improve its ability to absorb dyestuffs later in the finishing operation. Mercerizing is an optional step and consists of a caustic spray, tensioning, water rinse, water wash, acid dip, and final water wash, and produces a warm wastewater stream.

Knit goods do not require de-sizing and bleaching. The finishing process requires only

scouring to thoroughly clean the goods prior to dyeing. As with woven fabric, the step involves hot water washes and rinsing, and produces warm, contaminated waste water.

Natural dyes

Natural and organic dyeing is an ancient process found in almost every culture around the globe. The Egyptians used red cotton, dyed with madder root, to mummify their Pharaohs and were able to keep the secrets of the dark dye color a secret for centuries. The Spanish became addicted to the pinks and reds made by cochineal after colonizing central and South America. And indigo has long been used in Japan and Africa from farmers to nobles.

Natural dye became almost obsolete after the industrial revolution and later with the discovery of chemical and petroleum based dyes. Most textiles today are dyed chemically and can contain harmful substances such as lead, other heavy metals, and even arsenic. Naturally dyed fabrics, on the other hand, are completely biodegradable and non-toxic, if an organic substrate is being used. The natural dye process is environmentally sound. The water and energy used in the process is minimized, and the water runoff is clean and can be returned directly to the water table.

Eco-friendly fabrics

In the face of chemical-heavy production practices, along with runoff and air pollution, the textile trade is rapidly expanding its earth-friendly options. According to a recent report, in the U.S., Organic and Eco-friendly textile sales have seen double-digit growth in the past several years, and the industry projects further growth through 2010. Globally, sales are expected to increase from \$1.1 billion in 2006 to \$6.8 billion in 2010.

The rapid growth of organic textiles sales may be due in part to the introduction of organic lines by popular retailers such as Target, Ralph Lauren Home and Bed Bath & Beyond. By responding to consumer demand for organic goods, these powerhouse players have helped increase attention, awareness and distribution of these products to the market place.

Production of cloth

Pakistan textile sector is by far the most important sector of the economy contributing 67% to export earnings and engaging 35% of labour force.

There are hundreds of factories, having high-speed rotary textile printing and processing machines. However, most of the leading units working on high tech machines are owned by big industrial and commercial cartels. According to the estimates, textile finishing industry is embraces almost 731 units, the majority of which independent and complimentary to the weaving industry.

The weaving and made-up sectors have three different sub-sectors in weaving viz. integrated, independent weaving units and power loom sector. Cloth is being produced in both mill and non-mill sectors. Pakistan's fabric range from coarse to super varieties, with coarse and medium varieties consumed locally. The use of coloured cotton being unique and attractive has the potential to become a part of cotton fabric and apparel market, but there are some limitations to it. The natural coloured cotton is low in yield usually short staple and weaker in strength.

There are a large number of vertically integrated units, where production is controlled from fibre to the end product, and marketed abroad directly.

Production of cloth (mill sector) increased from 921 million sq. meters in 2004-05 to 1,107 million sq. meters in 2008-09, thus showing an average increase of 5% per annum. Out of total production of 1,017 million sq. meters cloth during 2008-09 in mill sector, 57% produced in grey form, 30% dyed and printed, and 13% blended and bleached. Production of cloth (mill-sector) is given in Table-1.

Table 1 : Production of Cloth

Year	Production (Million. sq mtrs.)
1999-00	437.2
2000-01	490.2
2001-02	568.4
2002-03	576.6
2003-04	683.4
2004-05	920.7
2005-06	915.3
2006-07	1,012.9
2007-08	1,016.4
2008-09	1,017.0

Source: Textile Commissioner's Organization Government of Pakistan.

**Table 2: Import of Textile Finishing Machines
(Rs. in Million)**

Machines	2005-06	2006-07	2007-08	2008-09
Drying Machines	511	244	119	121
Bleaching Machines	583	231	22	66
Dyeing Machines	1,499	672	738	234
Dressing Finishing Machines	361	152	94	62
Coating or Lamination Machines	77	59	32	104
Total	3,031	1,358	1,085	587

Source: Federal Bureau of Statistics, Government of Pakistan.

Import of machinery

At present Pakistan's textile sector has made considerable advances in production. Over the last ten years (1999-2009) this sector has invested \$ 7.0 billion in modernization and higher value addition. Import of textile printing and finishing machines decreased from Rs 3.03 billion in 2005-06 to only Rs 0.59 billion in 2008-09, thus showing decline of 80%. Import of textile printing and finishing machinery into Pakistan is given in Table 2 as above.

Import of organic chemicals

In recent years the usage of natural dyes and colours for fabric dyeing has witnessed its revival due to hazardous effects of synthetic dyes and chemicals. The natural dyes are eco-friendly, harmless and non-toxic in nature. Also, the usage of renewable sources of energy in textile and apparel industry has been increased due to many advantages associated with it.

Azo dyes are synthetic dyestuffs which contains the azoic group in their chemical structure are commonly used in textiles and under certain conditions the azoic groups may separate to produce carcinogenic and allergenic aromatic amines. These dyes may be absorbed through the skins with prolonged skin contact. Import of organic chemicals in Pakistan increased from US \$ 1,330 million in 2007-07 to 1,557 million in 2008-09. Import of organic chemicals into Pakistan is given in Table 3.

Table 3: Import of Organic Chemicals

Year	Value Million US \$
2006-07	1,330
2007-08	1,687
2008-09	1,557

Source: State Bank of Pakistan.

Export of fabrics

Textiles and clothing trade is a vital part of the world economy with many nations heavily dependent on this sector for foreign exchange earnings and employment generation. Today textiles and clothing trade accounts for nearly 6% of total world exports. Many of the least developed and small developing countries have built a huge dependency on the sector which often accounts for more than 90% of industrial exports and more than 50% of total employment.

The global trade in woven fabrics can be classified into two broad categories, cotton and blended fabrics and synthetic and artificial fabrics, commonly referred to as man-made fabric. Asia is fast emerging as major source of exports, especially of textiles, to the USA, EU and other countries of the world. Pakistan has emerged as one of the major cotton textile product suppliers in the world market.

Pakistan's textile products have become less competitive in the international market owing to tough competition from Bangladesh, India and China.

Export of cotton fabrics increased from 2.21 billion sq meters worth US \$ 2.03 billion in 2006-07 to 1.88 billion sq meters worth US \$ 1.93 billion in 2008-2009, thus showing decline of 8% per annum. Export of cotton fabrics from Pakistan is given in Table-4.

About 40% of the fabric exported from Pakistan is in unprocessed form. Dyed fabric is only 20% of the total fabric exports. Export of fabrics in unprocessed fabric results in low unit value realization. Major markets for Pakistan's fabric are Turkey, Spain, Bangladesh, Sri Lanka, Germany, USA and Belgium.

The Pakistan's textile industry is facing a new kind confrontation between yarn makers and downward processors. Spinners striking across the country to protest against the quota imposed on yarn exports, the yarn industry, however, took advantage of the sharp rise in cotton prices.

Yarn price still high in local market as the capping of export yet not have any positive impact on cotton yarn prices and local yarn users still face complexity.

On the other hand recent increase in petroleum prices will adversely affect on all industry and especially on value-added textile industry, which is already facing crisis situation. Rising inflation, capital cost and energy prices during the last few years have rendered Pakistani products less attractive for buyers in international market. The country's textile exports slumped to \$9.95 billion in 2008-09, compared to fiscal export target of \$12 billion, whereas, textile exports in the year 2007-08 were \$10.59 billion. The regression is mainly attributed to power shortages, the soaring cost of production and political turmoil, besides a stiff competition in the world market. ♦

Table 4: Export of Cotton Fabrics

Year	Quantity (Million sq. meters)	Value (US\$ Million)	Average (\$ sq. Meter)
1999-00	1,575	1,096	0.71
2000-01	1,736	1,035	0.60
2001-02	1,957	1,133	0.58
2002-03	2,036	1,346	0.66
2003-04	2,409	1,711	0.71
2004-05	2,399	1,863	0.78
2005-06	2,634	2,108	0.80
2006-07	2,211	2,026	0.90
2007-08	2,035	2,010	0.99
2008-09	1,882	1,929	1.02

Source: Export Promotion Bureau, Government of Pakistan.