

Open-Width Dyeing of Knitwear

In India knit fabrics are commonly dyed in rope form on winches, jet or air/soft flow machines. This process while being relatively simple and scalable poses several disadvantages and problems which are familiar to any dyer experienced in his field.

Those are e.g.:

- Formation of crease marks
- Uneven dyeing (especially on viscose)
- Hairiness of surface “pilling” from mechanical friction
- Tension in fabric causing high rest-shrinkage values
- High consumption of water/steam/chemicals/dyestuffs
- Usage of salt causing problems in effluent treatment

An alternative to the dyeing in rope is the process of dyeing in open width, also called cold pad batch process (CPB). This process can be executed e.g. on a modern dye padder like the SCOUT COLOR® of ERBATECH GmbH of Germany.

CPB on knits has been successfully operated in Europe for more than 20 years. Most larger knit finishing companies in Europe are relying solely on this process for the dyeing of their cellulosic fabrics (cotton, viscose, modal, linen and their blends with elastane) because of its cost and operational advantages. The CPB method allows a low-cost and high-quality dyeing while avoiding some of the problems experienced in rope dyeing. Especially for viscose and blends with elastane the advantages of going open width are very strong.

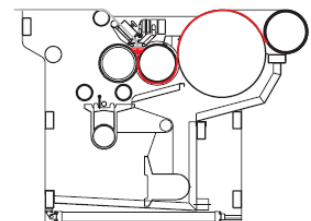


Dye padder for knitted fabrics

Advantages of CPB on knit fabrics:

- No crease marks due to open-width treatment
- No mechanical abrasion, avoiding hairiness and pilling
- Low tension in fabric during the CPB process
- Enhanced reproducibility of dyeing
- Lower water/steam/chemical consumption
- No usage of salt

For knit fabrics a nip dyeing system for the impregnation with the dyeing liquor is used. This system allows the fabric to impregnate and to be squeezed off in a short sequence. Rolling selvages are thereby avoided and the liquor content is kept at a minimum (below 6 litres). This tensionless process delivered by ERBATECH is key for the success of cold pad batch dyeing on knits.



Nip dyeing system



SCOUT COLOR® Dye Padder in operation

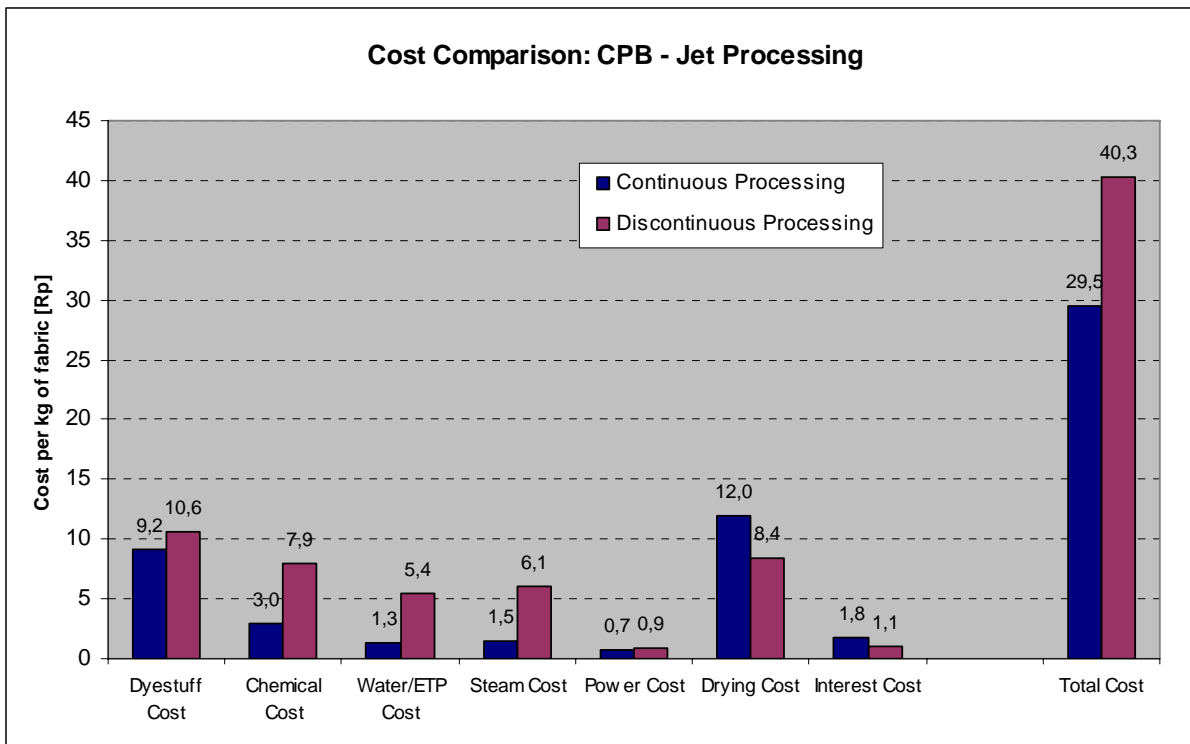
The dyeing on the padder is followed by turning of the fabric batches for several hours on hydraulically or electrically driven turning stations. Finally the dyed fabric is washed in an open-width continuous washing range. The total water consumption of the whole finishing process can be kept as low as 20 liters per kg of fabric.



SCOUT® Continuous Washing Range

The rising cost factors of energy, water and effluent treatment support the adoption of CPB dyeing among finishers in India. The high quality standard of processed fabrics in open-width improves the chances to fulfil the demands in global market against a strong competition from China.

Several larger processing houses in India have already decided to operate CPB for their dyeing operations on knits. The success of this technology will come faster as this alternative with its advantages is becoming more known in the market. The requirement of zero-discharge for all units in India is making the rethinking of conventional dyeing processes mandatory and bear the chance to finally bring India to the forefront of this industry globally.



Above chart shows the different cost factors for CPB as well as for conventional discontinuous processing. While capital costs and drying costs are higher the remaining cost factors are considerably lower per kg of fabric. The result is a reduction in overall cost by about 25% compared with the discontinuous process.

As the continuous process avoids pilling in the first place the commonly used final process of bio polishing for achieving a clean surface can be saved altogether.

After all the acceptance of new technological steps will be required to save the environment some of the burdens that arise from the fast economical growth of India as the next textile super power.

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