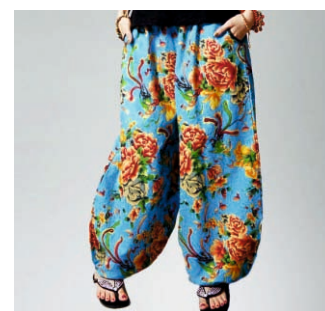


Saraquest

Exclusive Insight



**Chemistry Behind
Good Feelings**

Contents

Moisture Management Finish

- Estofeel (Conc)

Soft Finish for Rugs

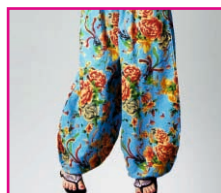
- Terrysoft-210

Levelleing Agent for Vat Dye

- Vatlav-CL

Digital Printing

- Sarasol-MB



Moisture Management Finish



Estofeel (Conc)

Sportswear require moisture management property for comfort. Comfort properties of textiles are more important than the aesthetic properties when the garments are next to skin. Good absorption of sweat and easy drying is one of the major requirements.

TEXTILE AS A BARRIER

For a person engaged in normal routine indoor activity, energy expended is 50 watts/ square meter/ hour. The metabolic heat generated is readily dissipated through the clothing as sweat. At rest, a body will give off, about 60 ml of water vapour per hour at ambient conditions. Moderate exertion (Walking) will increase the amount to about 450 ml per hour. During sport activity such as tennis or cycling, the metabolic heat increases six times and perspires 14 times (840 ml).

During sweating, human body humidity is more or less absorbed by the textile apparels. If the humidity remains in the fabric and is not transported to the surface for evaporation, cooling cannot occur. The body warms up and even more sweat is produced. During hard physical activity body sweats and in conventional clothing like cotton, the moisture traps

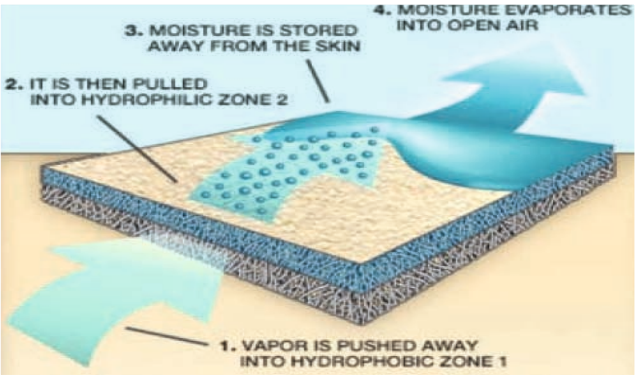
out. The sports and leisure wear exert a barrier for efficient transfer of excess heat resulting in a rise in core body temperature and skin temperature greater than 37°C which increases sweating. The moisture locks out between clothing and body and then it increases body temperature and perspiration even more. The excess heat moistens the fabric, which then reduces the body heat and makes the wearer uncomfortable/fatigue.



TEXTILE AS A COMFORT

Moisture transmission through textiles has a great influence on the thermo-physiological comfort of the human body. The body has an extremely efficient moisture management system which can be severely affected if the garment system does not work in synergy with the body. Garments which are next to skin, should absorb sweat quickly and

transport it to the outer surface of the garment. From the outer surface, sweat should be evaporated quickly to keep the body dry and cool. This phenomena is termed as moisture management. Absorbency, wicking, and moisture vapour transmission (MVT) properties are critical aspects for evaluating the comfort performance of textiles with moisture management finishes.



Factor which affects moisture management is absorbency and wicking. However, greater absorbency and wicking increases the ability for moisture to drawn into the fabric. It has been shown that fabrics which wick moisture rapidly through the fabric while absorbing little water help to regulate body temperature, improves performance and reduces fatigue.

Moisture is transported in textiles through capillary action or wicking. In textiles, the spaces between the fibres effectively form tubes, which act as capillaries, and transport the liquid away from the surface. As a rule, the narrower the spaces between the fibres in a fabric, the more effectively they will draw up moisture.

MOISTURE MANAGEMENT FINISH

The wicking behavior of a fabric mainly depends on its base fibre moisture properties. Hydrophilic fibres have a high surface energy and absorb moisture. Hydrophobic fibres have a low surface energy and repel moisture. Only special chemical finishing agents can be used to increase the

difference in surface energy of a fabric and enhances its ability to wick. The rate of wicking and rate of evaporation are the key factors in moisture management. The higher the rate of wicking and evaporation, the better is the fabric performance.

OPTIMIZING MOISTURE MANAGEMENT

Cotton fibres absorb high levels of moisture, but have very slow wicking rate. This makes cotton fibres less suitable for use against the skin during strenuous activity, as in the case of sportswear. Synthetic textiles have innumerable advantages, such as cost, durability and flexibility, but polyester and polyamide fabrics have limitations on sweat absorption and evaporation due to its inherent hydrophobic nature, Hence, there is a need to develop hydrophilising agents for synthetic textiles, to provide comfort properties.



SAREX has developed a specially finishing product **Estofeel (Conc)** for polyester and polyamide fabric. It adds excellent moisture management property to fabric.

Unique Feature of Estofeel (Conc)

Parameter	Advantages
Hydrophillic & Antistatic	Enhances comfort feel and better wicking for polyester and its blends
Concentrated	Economical recipe
Non yellowing	Suitable for whites and pastel shades
Versatile	Applicable by padding & exhaust method

Application:

Exhaust application:

0.5 % of 10 % solution of Estofeel (Conc)
pH - 5.5 - 6.0, Temperature - 130°C , Time - 30 - 45 mins.

Pad application:

5 g/l of 10 % solution of Estofeel (Conc)
pH - 5.5 - 6.0, % expression : 65-70 %
Drying : 120°C for 2 mins, Curing : 170°C for 1 mins

Results

M & S Moisture Management Testing

Recipe	M&S P 136 A Rate of Evaporation After 30 min
Polyester	
Unfinished	31%
5 g/l Estofeel (conc)(10 %)	32%
5 HL	31%
10 HL	32%
Polyamide	
Unfinished	22%
5 g/l Estofeel (conc)(10 %)	26%
5 HL	31%
10 HL	29%

Drop Test
Polyamide Fabric



Unfinished

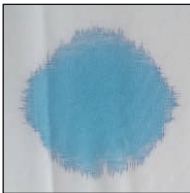


5 g/l Estofeel (conc)(10 %)

Polyester Fabric



Unfinished



5 g/l Estofeel (conc)(10 %)

Wicking Height by Nike Test

Recipe	Warp, cm			Weft, cm		
	5 min	15 min	30 min	5 min	15 min	30 min
Polyester						
Unfinished	4.7	8.6	12.0	4.8	7.8	10.7
5 g/l Estofeel (conc)(10 %)	9.8	15 min	-	8.7	13.3	20 min
Polyamide						
Unfinished	4.0	7.0	10.0	4.9	8.5	11.7
5 g/l Estofeel (conc)(10 %)	7.2	11.4	14.5	7.2	11.3	14.8

SOFT FINISH FOR RUGS



Terrysoft - 210

Rugs isn't just comfortable and stylish, it's a safe flooring option too, reducing slips and softening falls if they do occur. Whether you are looking for a way to add finishing touches to a new room or revitalize it, a rug is the easiest way to change the aesthetics of the place. Rugs defines the space, frames the ambience and conveys warmth.

Rugs give comfortness by cushioning your steps thereby providing a soft place to walk on, sit or play together. Rug also improves a home's acoustics because it absorbs noise rather than reflecting it back into the room.

Fibres used to make clothing is also used to manufacture rugs viz. cotton, wool, polyester etc. A soft, supple hand is particularly important for achieving high textile comfort. No matter whether the fabric is cotton, polyester or a blend, its softness depends on the frictional forces acting between the individual yarns and fibers. The more mobile a fabric's fibers are, and the lower the inter fiber friction, the softer the fabric feels. The trend in modern textile finishing is definitely toward softness and hydrophilicity – to achieve these properties the option is silicone textile softeners.

In rugs industry, it is demand of buyer that textile processor need to use softeners which does not impair the flammability of finished goods as compared to unfinished. By considering this demand of various buyers, Sarex has developed a softener Terrysoft-210 for cotton, polyester, wool and their blends. It imparts superior softness on rugs thereby giving fluffy floor for the feet. Terrysoft-210 does not impair the flammability of the finished goods.

Unique Feature of Terrysoft-210

Parameter	Advantages
Non yellowing	Suitable for whites and pastel shades
Universal	Single product for finishing for cotton, polyester, wool and their blends
Flame retardant	Does not impair the flammability as compared to unfinished
Versatile	Applicable by padding & exhaust method

Application:

Before finishing, material should be rinsed thoroughly to remove traces of detergents, alkali, salt used in earlier process. This improves the performance of Terrysoft-210.

Exhaust Application:

1-3 % Terrysoft-210
pH 5-6 adjusted with acetic acid.
At 30-40°C for 20-30 mins.

Pad application:

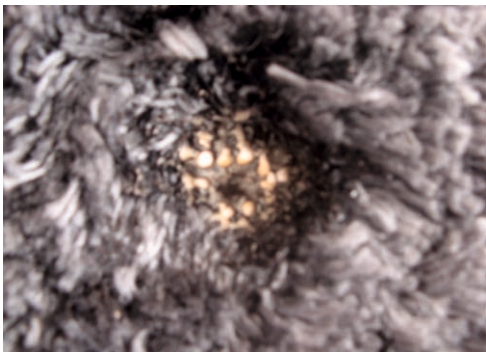
10 – 30 g/l Terrysoft-210
pH 5-6 with acetic acid
pad at 65-70 % pick up, dry below 160°C

Test Method to check flammability of rugs

This test consists of exposing eight 9" x 9" conditioned specimens to a timed burning tablet in a specified test chamber. In summary, each specimen is placed in the center of the floor of the test chamber, traffic side up. Place the flattening frame on the specimen, and position a camphor-timed burning tablet on one of its flat sides in the center of the 8" flattening frame hole. Ignite the top of the tablet by touching it with a lighted match, lighter, or other equivalent flame source. Allow test to continue until:

- 1. All flames and glowing disappear.
- 2. The flaming or smoldering has gone to within 1" of the flattening frame.

Results



Unfinished
(Burnt)



Finished with 2%
Terrysoft-210 (Burnt)

Nylon Rug



Unfinished
(Burnt)



Finished with 2%
Terrysoft-210 (Burnt)

Polyester Rug

LEVELLING AGENT FOR VAT DYES



Vatlev-CL

Vat dyes are most important dyes for dyeing and printing on cotton and cellulosic fibres. These dyes provide textile materials with the excellent overall colour fastness. Vat dyes are insoluble in water and for application onto cellulosic fibres are converted into water-soluble leuco derivatives by reduction in alkaline solutions. Commercially, they are available in different forms and different classes.

On the basis of temperature required for dyeing, vat dyes are classified as:

- Cold dyeing dyes(Ik class)
- Warm dyeing dyes(Iw class)
- Normal dyeing dyes(In class)
- Special dyeing dyes (In special class)

The Ik class of vat dyes are known for their optimum affinity at very low temperatures i.e. 20-30°C. The Iw class of vat dyes are exhausted at low temperatures i.e. 40-50°C. The In class of vat dyes requires use of retarding/levelling agents as they have greater affinity for fibre when dyed at 60°C. The In special dyes requires higher concentrations of alkali and reducing agents along with much higher dyeing temperatures.

Steps followed in Vat Dyeing:

Reduction

Conversion of insoluble vat dye into water soluble sodium leuco-vat anions.

Dyeing

Absorption of sodium leuco-vat anions by cellulosic fibres.

Rinsing

Removal of excess alkali and reducing agents by washing.

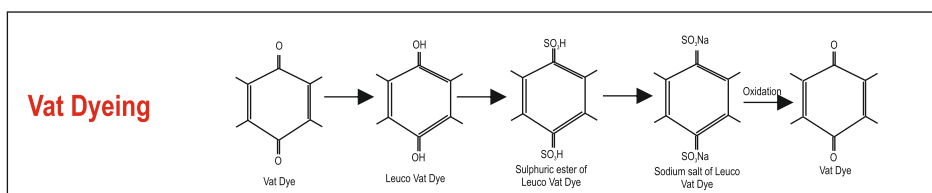
Oxidation

Conversion of water soluble dye into original insoluble form within the cellulosic fibres.

Soaping

The dyed fibres are treated with detergents to achieve desired shade with good fastness properties.

An ideal system of vat dyeing, the initial strike rate of dye should be low and the exhaustion of dye bath should be maximum and level dyeing must be obtained. Vat dyes of In class in their soluble leuco form have greater affinity to absorption for cellulosic fibres which causes difficulty to



produce even shades. In order to get level dyeing, it is very important to control the strike rate of the leuco vat dyes onto the cellulose.

Initial strike rate can be controlled by incorporating retarding/levelling agents. Levelling agents will compete with the dye molecules for the available sites in the fibre thereby reducing the rate of dyeing. Alternatively, these agents forms loose complexes and dye is gradually released as the temperature increases.

SAREX has developed a specialty product **Vatlev-CL** for exhaust dyeing of cotton. **Vatlev-CL** promotes level dyeing on cotton by reducing the initial strike rate of leuco vat dye by forming loose complexes.

Vatlev-CL also increases the migration of dyestuffs thereby improving the dye penetration preventing unlevel dyeing on yarn packages.

Unique Feature of Vatlev-CL

Parameter	Advantages
Levelling	Equalise exhaustion of dye thereby level dyeing obtained
Promotes dye penetration	Promotes surface levelness to prevent unlevel cheese dyeing
Shade change	No to slight impact on shade change depending on type of vat dyes
Stability	Stable to electrolyte, hard water, alkali and acids
Compatible	Does not impair the performance of anionic dispersing agents in dyebath

Application and Performance of Vatlev-CL

Application:

0.5-2 g/l Vatlev-CL is sufficient to obtain level dyeing. Higher concentration of Vatlev-CL may lead to retarding effect for certain dyes.

Levelling performance and test results to be incorporated

Levelling Performance of Vatlev-CL

Dye Shade : 1 % Vat Yellow 5G + 0.4 % Vat Blue BO



Without Levelling Agent



1 g/l Vatlev-CL



Digital Printing



Sarasol-MB

Digital printing has become one of the most important textile production printing technologies. It is the fastest growing technology for printing textiles. According to a report, between 2010 and 2013 digitally printed textile output rose by 200% to 70 million square meters. It has been influencing new workflows, business plans and creative processes. Although digital methods still account for less than 2 % of the global market for printed textiles, their share is likely to expand to 10% by the early part of the next decade.

Digital textile printing was started in the late 1980s as a possible replacement for analog screen printing. Digital textile printing is described as an ink jet based method of printing colourants onto fabrics (t-shirts, banners etc).

Although digital ink-jet printing onto fabric works in fundamentally the same way as any office type ink-jet prints onto paper, fabric has always been inherently more difficult to print due to its flexible nature. A major advantage of digital printing is its versatility; it can be used with varied combinations of ink types and substrates. This is considered as the “greenest” option as it significantly lowers water, energy and chemicals consumption.

Ink jet printing is one of the state of art technique available in terms of creativity, quality, productivity and assured reproducibility in spite of initial high investment. With ink jet, the amount of ink formulation applied can be as small as 20 mls/square metre.

Inkjet printing simply involves squirting droplets of ink onto a substrate to produce an image. Generally, the digital ink jet printing process includes pre-treatment, printing, fixing and washing.

Many formulations for pre treatment exist to produce a superior finished printed fabric. Fabrics must be crease-free and even in width having uniform surface with good absorbency.

Inks used in digital printing are thinner than those used for traditional printing, so the fabric also needs to be prepared by treatment with a thickening agent. As soon as a drop of ink touches the pre treated fabric, the thickener will hold the ink. This will not allow the ink to spread onto the fabric surface and produces stronger, sharper prints. The general process route with textile ink jet printing is to pad with

necessary chemicals along with the addition of thickening agent to hold the ink in position before drying and fixation.

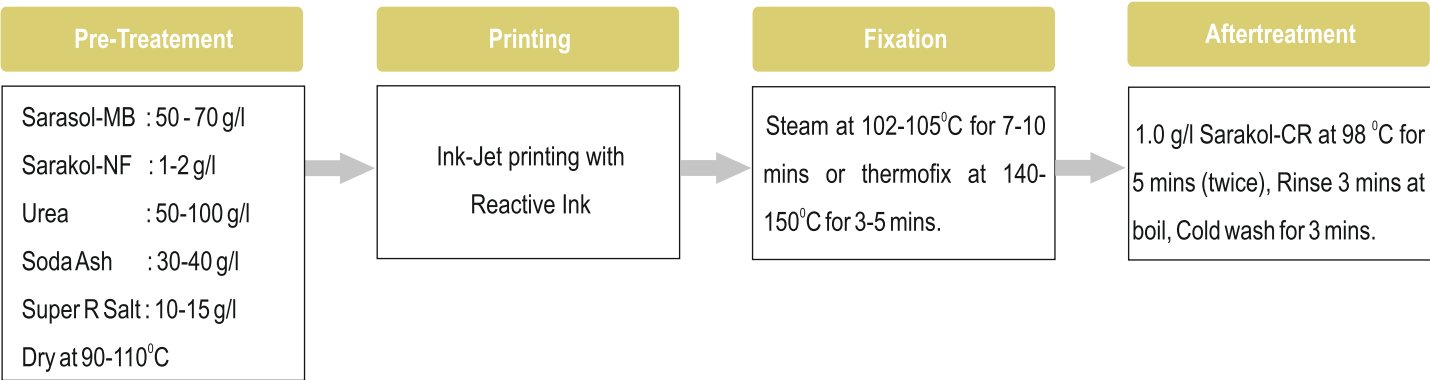
SAREX has developed a specialty product **Sarasol-MB** for pre-treatment in Ink-jet printing. **Sarasol-MB** is concentrated high viscosity thickening agent which prevents the spreading of ink. It also serves as an inhibitor of migration of ink droplet and thereby controls the levelness and sharpness of prints. Pre-treatment with **Sarasol-MB** enhances the colour yield of the printed fabric without affecting the feel.

Unique Feature of Sarasol-MB

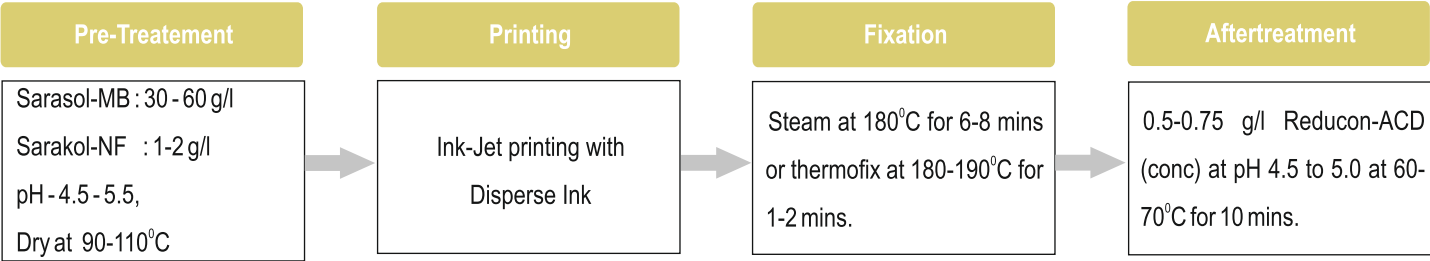
Parameter	Advantages
Performance	Improves colour value of Ink Jet printed fabric
Viscosity	Increases viscosity, so avoiding bleeding and spreading of prints
Print effect	Excellent Level and Sharp print
Handfeel	Handfeel of prints does not impair

Application and Results

Ink-Jet printing on Cotton or Viscose fabric



Ink-Jet printing on Polyester fabric



Cotton fabric treated with 50 g/l Sarasol-MB



Polyester fabric treated with 50 g/l Sarasol-MB



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