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Saraqvest

Exclusive Insight



Sarex stands for quality products!



**Chemistry Behind
Good Feelings**

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Combined washing off agent for Polyester / Cotton blends

Combiwash-PC



Blends of polyester fibres with cotton or viscose are produced in largest quantity than any other blend fabrics. Factors contributing to this situation have been the relative ease of processing and versatility of application, leading to a wide range of dyed and finished effects. Without question, the exploitation of Polyester/Cotton (P/C) represents the most successful compromise between the contrasting physical properties of synthetic and natural fibres.

Dyeing of P/C fabrics/ yarns is normally a two step process due to the completely different dyeing conditions needed for the two components. Polyester is dyed first with any class of disperse dye at 130°C under acidic condition in a Jet m/c (fabric) or cheese dyeing m/c (yarn) followed by either Reactive or Vat dyeing of the cellulose under alkaline conditions. For highest fastness, the unfixed disperse dye on the polyester surface and the stain on the cellulosic component should be removed by a thorough soaping with a detergent or reduction clearing. In many cases, reduction clearing can be incorporated in the subsequent dyeing process of the cellulosic component as in the reduction & re-oxidation of Vat and Sulphur dyes. When Reactive dyes are used and when highest fastness standard is required, it may be necessary to give a reduction clearing separately before

the reactive dyes are applied. Hence the dyeing process becomes a three step process. To address the issue of productivity and raising environmental concerns, several attempts have been made in the past to shorten the processes. The key objective in the 'rapid dyeing' approach is to avoid the need for reduction clearing of polyester dyed sample, so that significant productivity improvements can be made.

Almost all P/C blends are subjected to apply resin finishing after dyeing process so it is necessary to pay attention for colour fastness after resin finishing. Generally, non-ionic processing/finishing chemicals are considered to accentuate migration and extraction of disperse dyes from polyester fibre.

Keeping in view the current scenario, **Sarex** has developed a new product **Combiwash-PC** which is a combined washing off agent for P/C blend fabrics which can be used in the final washing off stage once the dyeing of both components is completed. Combiwash-PC will wash-off the unfixed or loosely held disperse dyes/ reactive dyes on polyester and cotton fibre in one bath thereby reducing the process time and improving production efficiency.

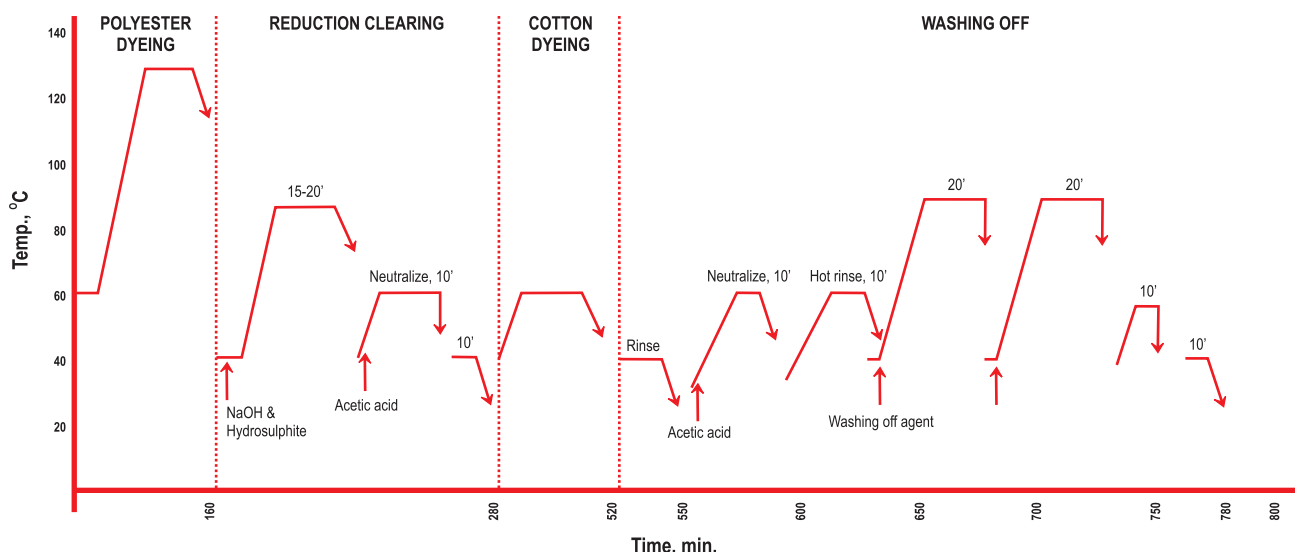
Washing off process with Combiwash-PC becomes shorter as the reduction clearing of polyester is not needed.

Combiwash-PC can also be a solution provider where polyester fabrics shows poor wash fastness after finishing with silicone. It can also be used where the fabrics shows water mark. It is most suitable to reduce dyeing cycle time of polyester and cotton or viscose blend yarn or fabric.

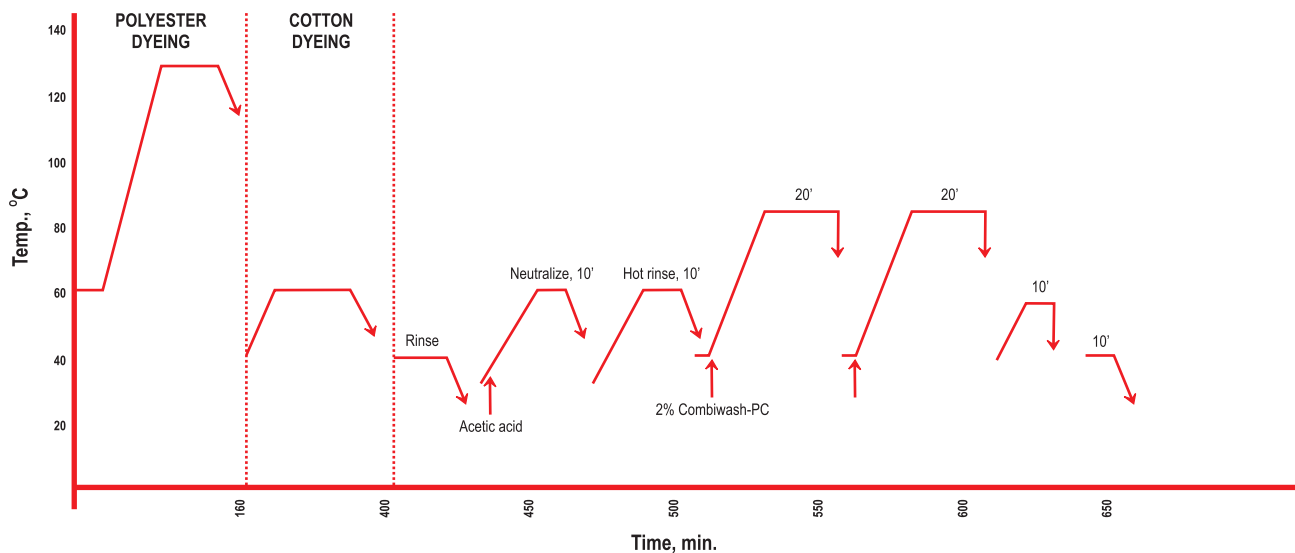
Unique Features:

- One step combined washing off agent for P/C blend fabric. Reduces the process cycle time and energy consumption.
- Reduction clearing is not needed hence the process becomes shorter.
- Solution providing product for thermo migration problem hence washing fastness of silicone finished fabric can be improved. Water mark problem can be corrected.

Conventional process:



Combiwash-PC process:



Recommended procedure:

1. Combined washing-off agent for P/C blend



- Perform disperse and reactive dyeing of P/C blend fabric.
- Rinse and drain.
- Neutralization with Acetic acid and drain.
- Hot wash and drain.
- Treat with 1.5-2% Combiwash-PC at 90°C for 15 min.
- Hot wash → Cold wash → Dry

2. Solution provider for clearing Thermo migration

Finishing of P/C blend fabric with silicones generally leads to thermo migration of dyes leading to poor fastness. To improve the fastness, treat the fabric with 3-5g/l Combiwash-PC at 80-90°C for 15 min.

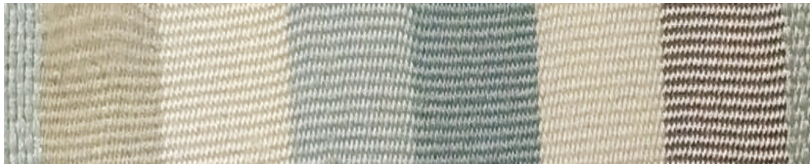

Results

Comparison of Conventional and Combiwash-PC process - Comparable washing fastness

Conventional process (Two bath two step process)	
Combiwash-PC process (Eliminating Reduction clearing step)	

Washing fastness found to be comparable with the Conventional Two bath-two step method

Solution provider for Thermo migration problem - Improved fastness

Fabric finished with Softener showing Thermo migration	
Washing with 3-5g/l Combiwash-PC	

No staining on multi fibre strip indicates complete removal of thermo migrated dye from the fabric

Dispersing agent for Polyester dyeing

Dyesperse-GT



Disperse dyes are sparingly soluble in water. Furthermore, the dyes as synthesized, are often crystalline and are of varying particle size. These characteristics are inadequate for practical purposes as difficulties will arise in dispersing the dyes in water and the resultant dyeings will be uneven and weak. In order to achieve the required particle size and particle size distribution, the disperse dye is milled, usually in the presence of dispersing agent. The dispersing agent, commonly anionic, ligninsulphonates or polycondensates of aryl sulphonic acids, facilitates milling by preventing agglomeration of the dye particles and enables the dye to be prepared in powder or liquid forms. The dispersing agent should be effective under the dyeing conditions and should be stable to hard water, high temperature and other dyeing assistants.

Disperse dye exist in the dye bath as a suspension or dispersion of microscopic particles, with only a tiny amount in true solution at any time. Dispersing agents increase the solubility of the disperse dye in water. It is seen that solubility of the dye in water is considerably increased by the dispersing agent and that different dispersing agents affect the solubility to different extents. Although the dispersing agent also facilitates dispersion of the dye in water, its main

function is to maintain a stable dispersion during dyeing. Additional dispersing agent is often added to the dyebath to maintain dispersion stability, especially in the case of liquid forms of the dye and when dyeing is carried out at high temperature.

Dispersion stability is of prime importance in exhaust dyeings since failure of the dispersion will result in agglomeration and possibly precipitation of the dye which, in turn, will result in uneven dyeing. The propensity of dispersion failure is greatest in the case of HT dyeing and additional dispersing agent can be added to the dyebath to maintain dispersion stability under these conditions.

Sarex has developed **Dyesperse-GT** which is an anionic dispersing agent recommended for processing of polyester and blends.

Unique features:

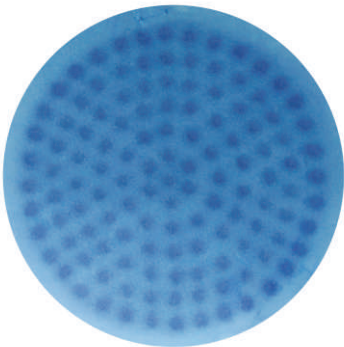
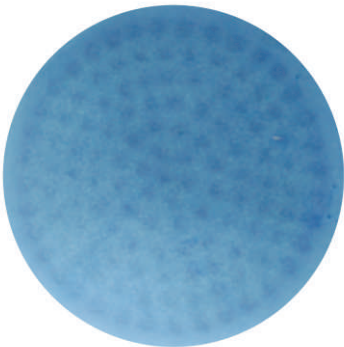
- Suitable for package dyeing of polyester tops, yarn and fibre which are dyed at low liquor ratio where the pump turbulence is high.
- Stable to hard water with high Total Dissolved Solids (TDS) hence works even under adverse conditions of process water.
- Improves dispersion stability of pad liquor in padding of ground shades with disperse dyes.

- Recommended in printing of polyester and blends with disperse dyes to improve dispersion stability and to avoid speckiness.

Recommended dosage:

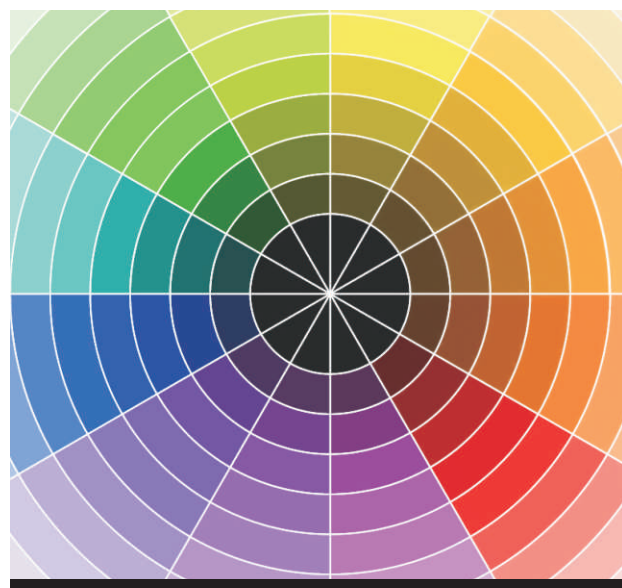
Dyesperse-GT : 1-2 g/l

Results
Dispersion behaviour

	
Without Dispersing agent	With 2g/l Dyesperse-GT

Dyesperse-GT is highly effective in dispersing at temperatures upto 130°C under hard water conditions.

Leveling agent cum Diffusion Accelerator Dyewell-002



The term “disperse dye” have been applied to the organic colouring substances which are free from ionizing groups, are of low water solubility and are suitable for dyeing hydrophobic fibres. Disperse dyes are unarguably the most important class of dyes used in dyeing cellulose acetates and polyester and are also of importance in the colouration of other hydrophobic fibres such as nylon, acrylic and polypropylene.

It is essential for disperse dyes to be able to withstand various dyeing conditions e.g., pH and temperature, resulting in negligible changes in shade and fastness. The process of dye transfer onto fibre involves three stages viz., Dissolution of the dye, Transfer of dye from the solution to the surface of the fibre & Diffusion of the dye monomolecular from the surface to the interior of the fibre.

Disperse dyes have low solubility in water, but they can interact with the polyester chains by forming dispersed particles. The general structure of disperse dye is small, planar and non-ionic, with attached polar functional groups like -NO_2 and -CN . Disperse dyes are quite volatile, and tend to sublime out of the polymer at sufficiently high temperatures.

The dye is generally applied under pressure, at temperatures of about 130°C . At this temperature, thermal agitation causes the polymer's structure to become looser and less crystalline, opening gaps for the dye molecules to enter. The interactions between dye and polymer are thought to be Van der Waal's and dipole forces.

The disperse dyeing of hydrophobic synthetic fibres is normally done by the immersion of the material to be dyed into an aqueous dye bath which contains the dyestuff and various additives and auxiliaries. In this procedure it is important to obtain a reproducible exhaustion of dye from the bath to the material and to obtain a uniform distribution of the dye on the material. This can be done by dyeing at temperatures in excess of 100°C (typically $125 - 135^\circ\text{C}$). The leveling agent in polyester dyeing enhances dye migration without substantially accelerating the exhaustion of dye onto the fabric being dyed. As temperatures cross the T_g of polyester, the dyes tend to rush on to the fibre thus creating unevenness. The role of the leveling agent is to control the rate of dyeing during the critical temperature range of 110°C to 130°C and also to help the dye to migrate from darker to lighter areas when the temperature is held at 130°C for 30 min.

Dye diffusion accelerators on the other hand tend to promote uniform exhaustion of dye combinations, thus creating an ideal condition for level dyeing. They tend to promote uniform shade build up and can also reduce the time required for leveling.

Sarex has developed a product **Dyewell-002** which is leveling cum diffusion accelerator which when used in polyester dyeing exhibits uniform and level dyeing.

Unique features:

- Low foaming leveling cum diffusion accelerator for high temperature polyester dyeing.
- Enables a good dyestuff pick-up and improved dyestuff yield.
- Enables to shorten the dyeing process by increasing the rate of heating.

Efficiency of Dyewell-002

The efficiency of Dyewell-002 was analyzed in combination dyeing.

Combination dyeing : 0.3% Disperse Red 167 + 0.3% Disperse Blue 79 + 0.3% Disperse Yellow 221

Dosage : 0.5g/l Dyewell-002, pH 4.5, MLR, 1:20

Start dyeing with combination dyes at 40°C. Raise to various temperatures (90°C, 100°C, 110°C, 120°C, 130°C and 130°C for 45 min) and remove the samples

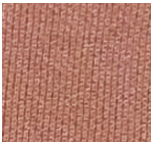
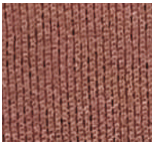
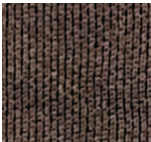
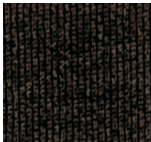
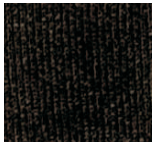


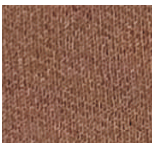


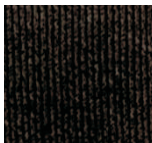
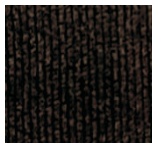
Recommended dosage:

In Exhaust dyeing of polyester tops, yarn, fibre & fabrics

- Set the bath with 0.5 - 0.7% Dyewell-002 and 0.5 - 1.0 g/l Saracid-RS (Acid buffer).
- Circulate at 60°C for 5-10 min.
- Add dyestuff dispersion, circulate for 5-10 min.
- Check and adjust pH to 4.5 - 5.5 and dye as per usual method.

For correction of faulty dyeings and leveling

- Set the dyebath with 1-2% Dyewell-002, 1-2% Saracid-RS (Acid buffer) and 10-20% dyestuff of the original recipe.
- pH to 4.5 - 5.5, 130°C, 40-60 min.
- Drain and reduction clear.

	90°C	100°C	110°C	120°C	130°C	130°C, 45 min
Without leveling agent						
With 0.5 g/l Dyewell-002						

On tone build up of dyes are observed in combination shades while using Dyewell-002

All in one product - Low alkali during bleaching

Polyprep-LC



Pretreatment is the process of removing natural impurities present in the cotton fibre. The natural impurities are pectin's, pectose, ash, wax, mineral compounds, etc. If those impurities present in the cotton fibres are not removed, then it will be difficult to dye or print the fabric uniformly. Normally caustic soda is used as a main reagent for scouring of the cotton fibre. Use of high quantities of caustic, however leads to harsher fabric handle owing to the fact that there is complete removal of the fats and waxes during the process. Also there is a significant weight loss observed in cases of alkaline scouring. Alkalinity is also required for efficient bleaching effects with peroxide in the bleaching process. The resultant fabric / yarn exhibits excellent absorbency and whiteness. Normal pretreatment process involves use of 2-3% Caustic along with 3-10% Peroxide along with wetting agent and stabilizer. There has been environmental concerns raised about the use of such high quantities of caustic soda in the process as it contributes significantly towards the Total Dissolved Solids (TDS) load in the effluent. All chemical companies are working towards novel chemistries which can eliminate the use of caustic or at least reduce their usage.

Sarex has introduced a new product **Polyprep-LC** which is a novel all-in-one product where we have to use less caustic

during bleaching. Bleached fabric with Polyprep-LC exhibits very good whiteness index and instant rewetting. Yarn bleached with Polyprep-LC exhibits lower coefficient of friction, improved strength and reduced hairiness to a certain extent which ensures lesser breakages during winding and knitting and eliminates the use of additional yarn softeners.

The application procedure does not require the use of peroxide stabilizer. Basic whiteness index of Ready for Dyeing (RFD) is achieved with less peroxide.

Unique features:

- Low alkali during bleaching thus low amounts of acid required during neutralization.
- Reduction in peroxide dosage. Basic whiteness index of RFD is achieved with less peroxide.
- Low BOD/COD and TDS in effluent bath hence eco friendly.

Recommended dosage:







Recipe for RFD (Ready for dyeing)

Polyprep-LC	: 0.6-0.8%
Saracream-HG (Conc)	: 0.05-0.1%
Caustic flakes	: 1.2-1.5%
Hydrogen Peroxide(50%)	: 2.0-2.5%
Temperature	: 95-98°C
Time	: 30-45 min

Recipe for Full White

Polyprep-LC	: 1.0-1.2%
Saracream-HG (Conc)	: 0.05-0.1%
Caustic flakes	: 2.0-2.5%
Hydrogen Peroxide (50%)	: 5.0-7.0%
Temperature	: 95-98°C
Time	: 60-75 min

Results

	RFD	RF OBA	Full White
Conventional Process			
	W.I. = 63 Absorbency = 2 - 3 sec	W.I. = 73 Absorbency = 1 - 2 sec	W.I. = 133 Absorbency = 1 - 2 sec
Polyprep-LC Process			
	W.I. = 65 Absorbency = 4 - 5 sec	W.I. = 75 Absorbency = 1 - 2 sec	W.I. = 133 Absorbency = 1 - 2 sec
RFD : Ready for Dyeing, RF OBA : Ready for OBA, W.I.: Whiteness Index			

Polyprep-LC founds to be comparable with the Conventional process in terms of Whiteness index and Absorbency.

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M & S



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OHSAS
18001:2007



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GOTS

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