



Sarex

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Saraquest

Exclusive Insight



Chemistry behind good feelings

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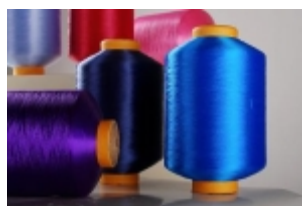
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The All-in-One product for Pretreatment of Cotton



UNIV-AIO

The most important natural cellulose fibre is cotton, whose use is constantly increasing. Natural cotton is hydrophobic and coloured. In nature non-cellulosic materials create a physical hydrophobic barrier to protect the fiber from the environment throughout its development. In order to make fibres to use, pretreatment processes are needed to make the fibre hydrophilic and white

Scouring of cotton textiles is an essential treatment in textile wet processing in order to obtain a sufficiently hydrophilic fabric. During scouring, waxes and other hydrophobic materials are removed from the cotton fibers. In textile processing the waxes and pectins impede wetting and wicking, subsequently obstructing aqueous treatments. Conventionally, scouring is done with hot aqueous solution of NaOH to remove hydrophobic components from the primary wall (e.g. pectin, protein and organic acids) and the cuticle (waxes and fats). However, alkaline scouring is a nonspecific process. The use of high concentrations of NaOH also requires neutralization of

waste water. Even though alkaline scouring is effective and the costs of caustic are low, the scouring process is rather inefficient because it consumes large quantities of water and energy and increases total dissolved solids in effluent. It is clear that this process needs to be improved considerably to meet today's energy and environmental demands.

In the past bleaching with bleaching powder or sodium hypochlorite was carried out at room temperature. However, hypochlorite bleaching units of textile bleaching processes generate AOX and hence they belong to the category of banned chemicals, being non-ecofriendly in nature. On the other hand, bleaching with hydrogen peroxide does not generate AOX in the effluents and the water consumption is also less. Hydrogen peroxide bleaching is performed under alkaline condition and large amount of caustic is required for this process. Peroxide bleaching also needs to be stabilized, using sodium silicate which is non ecofriendly and

imparts harshness to the fabric. Due to excess use of caustic and sodium silicate, hydrogen peroxide bleaching becomes non economical and non eco friendly process.

As far as scouring and bleaching is concerned, in earlier times this was supposed to be a two bath process, but currently majority of process houses do a one bath scouring and bleaching process.

Although process is robust but it has following drawbacks-

- **Damage caused to the cotton substrate:** The aggressive scouring treatment conditions frequently damage the fibre. Also there is a considerable strength loss due to oxy-cellulose formation while carrying out peroxide bleaching in alkaline condition.
- **More Effluent load:** The use of high concentrations of NaOH and peroxide stabilizer will increase in load of effluent.

- **Increase in cost of auxiliaries:** Deployment of caustic and peroxide in the scouring treatment makes the use of peroxide remover and acetic acid mandatory. This further increases the cost of the process.

Sarex Solution

By considering all above drawbacks of Pretreatment of cotton, **SAREX** developed a product **UNIV-AIO**. It is multifunction all in one product for cotton pretreatment. By use of UNIV-AIO single stage scouring and bleaching can be done without use of caustic, peroxide stabilizer and wetting agent.

Unique Feature of Univ-AIO

- Univ-AIO is a powder form very low foaming speciality product for pretreatment of cotton yarn, cotton knits, terry towels and their blends.
- Due to its unique formulation it acts as a wetting cum detergent and peroxide stabilizer.
- No caustic is required during bleaching
- Combined scouring and bleaching can be carried out using only peroxide along with Univ-AIO.
- Low TDS & COD in effluent
- Suitable for soft flow and jet dyeing machine.

Application:

Substrate : 100 % cotton woven fabric/
100 % cotton Knits / cotton terry towel

Recipe for RFD:

1.5-2.5% Univ-AIO
1.5-3.0% Hydrogen peroxide 50%
Treat at 95°C for 45 mins & 110°C for 15 min.

Recipe for full white fabric :

2.5-3.5% Univ-AIO
6.0-8.0% Hydrogen peroxide 50%
Treat at 95°C for 90 mins & 110°C for 45 min.

Note: Addition of 0.2-0.3 % of Celldet-R (wetting agent) may be recommended to give instant absorbency.

Foam height of UNIV-AIO

Concentration	Foam Height
1 g/l UNIV-AIO	40-60 mm

Performance data of UNIV-AIO on various substrate

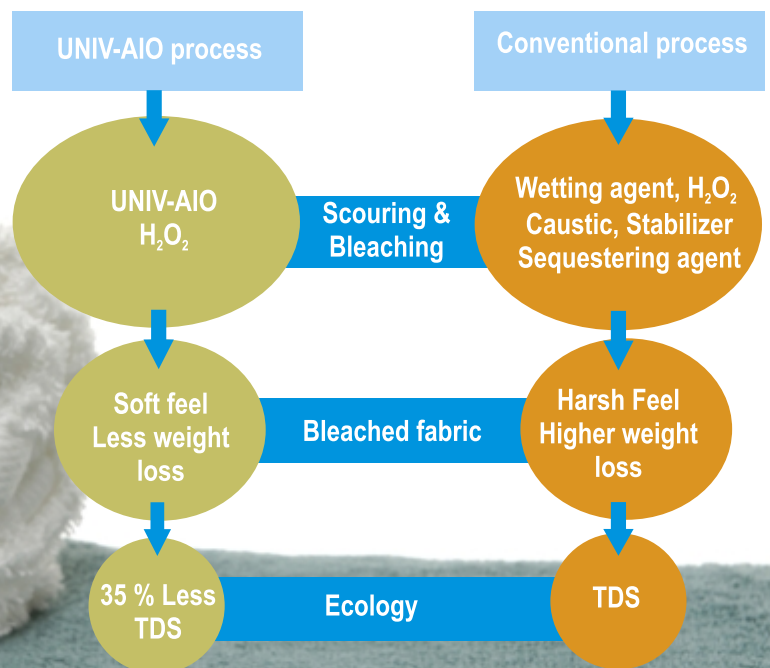
Bleaching Process	Cotton Knits			De-sized Cotton Woven Fabric			Cotton Terry Towel		
	Whiteness Index	Absorbency	Re-wetting Time	Whiteness Index	Absorbency	Re-wetting Time	Whiteness Index	Absorbency	Re-wetting Time
Conventional	61	< 1 sec	5-6 sec	60	1-2 sec	6-7 sec	55	2-3 sec	6-7 sec
UNIV-AIO	62	< 1-1 sec	6-7 sec	61	2-3 sec	7-8 sec	56	3-4 sec	7-8 sec



Advantages:

- **Smoother surface profile:** Presence of pectin in yarn helps to give a smoother profile. This binding agent prevents the hairiness of the cotton that gets generated due to abrasion with processing equipment's. Also pectin itself acts as a softener for the cotton. So the application of final softener can be reduced from 25- 40%. Smoother profile will also help in improving the loom running efficiency by 4% at least.
- **Lesser Weight loss:** Weight loss in UNIV-AIO process is not more than 2 %. In conventional process the weight loss is close to 4%. The total saving in the weight loss is about 2%. In this era, where the cotton prices have shown a steady inflation, this will be a considerable advantage to the process owner.
- **Environmental benefits:** Reduced effluent treatment cost, as avoiding caustic soda, which in turn reduces TDS. Use of Univ-AIO can achieve 35 % less TDS in the effluent.
- **Less Inventory / Cost effective :** In a conventional scouring recipe the 3-4 chemicals are used where as in UNIV-AIO process only peroxide is needed thus reducing cost of inventory and ease of operation.

Advantages of UNIV-AIO process over Conventional Process of Bleaching



Dye-fixing agents for polyamide



Sarafix-NEW & Nylofix-993

Polyamides (PA) are semi-crystalline polymers. Polyamides are of two types. Polyamides made of one basic material (e.g. PA 6) and polyamides, which are made of 2 basic materials (e.g. PA 66). Polyamides are highly elastic, tear and abrasion free, have low humidity absorption, fast drying, no loss of solidity in a wet condition, crease-free, rot and seawater proof thus providing very good mechanical properties, are particularly tough and have excellent sliding and wear characteristics.

Polyamide usually blended with elastane (EL) is the most popular fabric for swimwear today, That's because of its comforts to wear and in the water it feels like a second skin. Polyamide is also a popular fibre for production of laces & trims for lingere & fashion wear, socks/ stockings due to its elastic and strength properties.

The structure of nylon is characterized by having at its ends, functional group such as a carboxyl group ($-\text{COOH}$) and an amino group ($-\text{NH}_2$) and a large number of carbon-hydrogen bonds ($-\text{CH}_2$) and

amide groups ($-\text{NHCO}-$) at the middle of the molecular chain. Different types of dye such as acid dyes, acid mordant dyes, metal complex acid dyes, direct dyes and disperse dyes can be used for dyeing of polyamide fibers.

The factors which influence the dyestuff choice are

- Leveling or coverage of differences between degree of orientation and variation in end amino group content
- Wash fastness
- Light fastness

Colors range from delicate pastels to bold, bright shades. Sharp contrasts such as dazzling whites teamed with tropical floral prints are a top trend today The level dyeing characteristics of dyes and fastness properties of final dyeing depends on

- Migration behavior of dye
- Stability of bond between dye and fibre
- Diffusion characteristics of dye properties as well as fibre type.

Most popularly acid or metal complex dyes are used for dyeing & printing of nylon fabrics. Since the acid dye and the polyamide are combined by the ionic bond or the electrostatic force, the bonding is relatively weak, and only a mid-depth dyeing effect can be obtained and can lead problem of wash fastness.

A variety of fixing agents are known for application to polyamide fiber to improve wash fastness of dyed/printed fabric. These agents are typically compounds or low molecular weight polymers with anionic groups which can associate with the nitrogen-containing groups of the polyamide polymer and form a surface layer that reduces diffusion of the dye out of the treated fiber.



Focusing on the running race of improving wash fastness with minimum disadvantages like imparting the same hue to fabric. **Sarex** has an unique solution by offering as a specialty dye fixing agent **Sarafix-NEW** and **Nylofix-993** which meets the requisite of customers for improved fastness properties.

Unique feature of Sarafix-NEW

- Sarafix-NEW is a novel concentrated multipurpose after treating agent for dyed or printed PA and its blends.
- After treatment with Sarafix-NEW improves wet fastness properties.
- Sarafix-NEW prevents cross staining during print washing
- Light fastness or shade of dyeing is not affected.

Unique Feature of Nylofix-993

- It is in powder form dye fixing agent for acid & metal complex dyes and reserving agent for Polyamide and its blends.
- Prevents cross-staining during washing off printed goods
- Has no effect on shade or light fastness of dyeing
- It is low foaming formulation so it can be used in soft flow machine.



Application of Sarafix-NEW

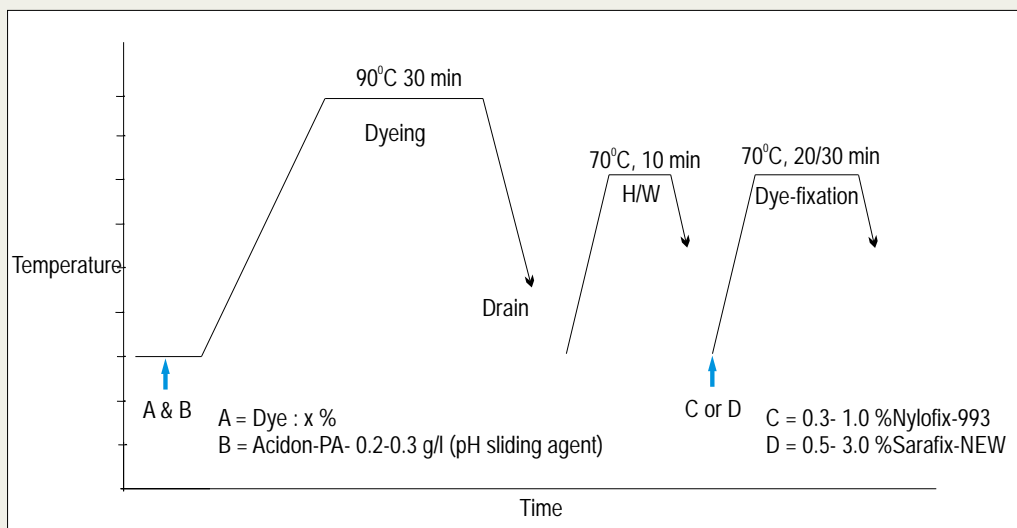
Sarafix-NEW : 0.5-3.0 %
 pH : 4-4.5
 Temp : 60-70 °C
 Time : 15-20 min



Application of Nylofix-993

Nylofix-993 : 0.3- 1.0 %
 pH : 4-5
 Temp : 70 - 80 °C
 Time : 15-20 min.

Fig.1 Schematic diagram of nylon dyeing followed by fixation process





Fastness of dyed nylon by **ISO 105 C10** at various concentration of **Sarafix-NEW**

Dyed Nylon Yarn

Staining on Multifibre



Blank



0.5 % Sarafix-NEW



1 % Sarafix-NEW



1.5 % Sarafix-NEW

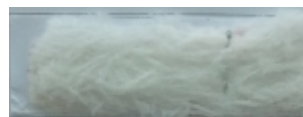
Fastness of dyed nylon by **ISO 105 C 10** at various concentration of **Nylofix-993**

Dyed Nylon Yarn

Staining on Un-dyed nylon yarn



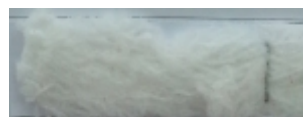
Blank



0.4 % Nylofix-993



0.6 % Nylofix-993



0.8 % Nylofix-993

Precautions:

Sarafix-NEW / Nylofix-993 should not to be mixed in concentrated form (e.g. in preparation tanks) with acids as this could cause precipitation. Any precipitate formed, however, can be re-dissolved with a little ammonia.

Rubbing Fastness Improver



RUBFAST-425

Recent years have witnessed a drastic change in the textile processing industry, with greater awareness and consumer demand for better quality textile fabrics and better performance in garments. To survive in this competitive arena, the processor has no other options but to meet the demanded quality standards, particularly the higher rating in rubbing fastness and, specifically, wet rub fastness.

During home laundering of garments of white / light colored material with dyed garments may get due to the transfer of dye from the dyed material. This is generally described as “staining or marking off”. The “colour fastness” of a textile is therefore defined as its resistance to these changes when subjected to a particular set of conditions. Hence, colorfastness needs to be specified in terms of these changes and expressed in terms of magnitude.

It is a well established fact that dyed cellulosic fabrics with proper washing-off of unfixed dye can improve the wash fastness of dark shades to an extent of rating 5 but corresponding improvement in wet rub fastness is not achieved.

Microscopic examination it has been established that during wet rubbing test, sample gets damaged and microscopically small dye particles stain to adjacent white fabric. Staining is more prominent for microsanded or dark shades cotton fabrics.

Achieving good wet rub fastness is always more of a challenge. Wet rub fastness for dark shades of dyed/ printed cotton and P/C blended fabric would depend upon following factors.

- Nature of dye/pigment used for coloration and its particle size
- Depth of shade
- Type of substrate
- Efficiency of fixation
- Efficiency of washing-off of unfixed colour
- Efficiency of after-treatment to fix unfixed dye

Although, both dry and wet rub fastness tests are conducted in similar manner but in case of wet rubbing, crocking cloth is in a wet condition. Moisture introduced into wet crocking cloth which deteriorates wet rubfastness in comparison with dry rubbing. Due to moisture present in the crocking cloth,

the co-efficient of friction in wet rubbing is nearly double than dry rubbing test.

In order to solve problems of wet rubbing fastness of cotton textiles-

Sarex has an unique solution by offering as a specialty finishing agent **Rubfast-425** which meets the requisite of customers for improved fastness properties. Fabrics, garments, home textile and denim finished with Rubfast-425 exhibits excellent wet rubbing fastness.

Unique Feature of Rubfast-425

- It can be applied by exhaust as well as by padding.
- It improves dry and wet rub fastness by at least 1 to 2 units.
- No change in shade / tone or hand feel.
- It improves rub fastness of various classes of dyed fabric including indigo dyed as well as pigment dyed / printed fabric.
- Improves wet rubbing fastness of emerised or microsanded fabric.

Application

Exhaust Application

Evaluation methods

Pad-Application

Rubfast-425 : 20-30 g/l
 pH : 4-4.5
 % pick up : 65-70 %

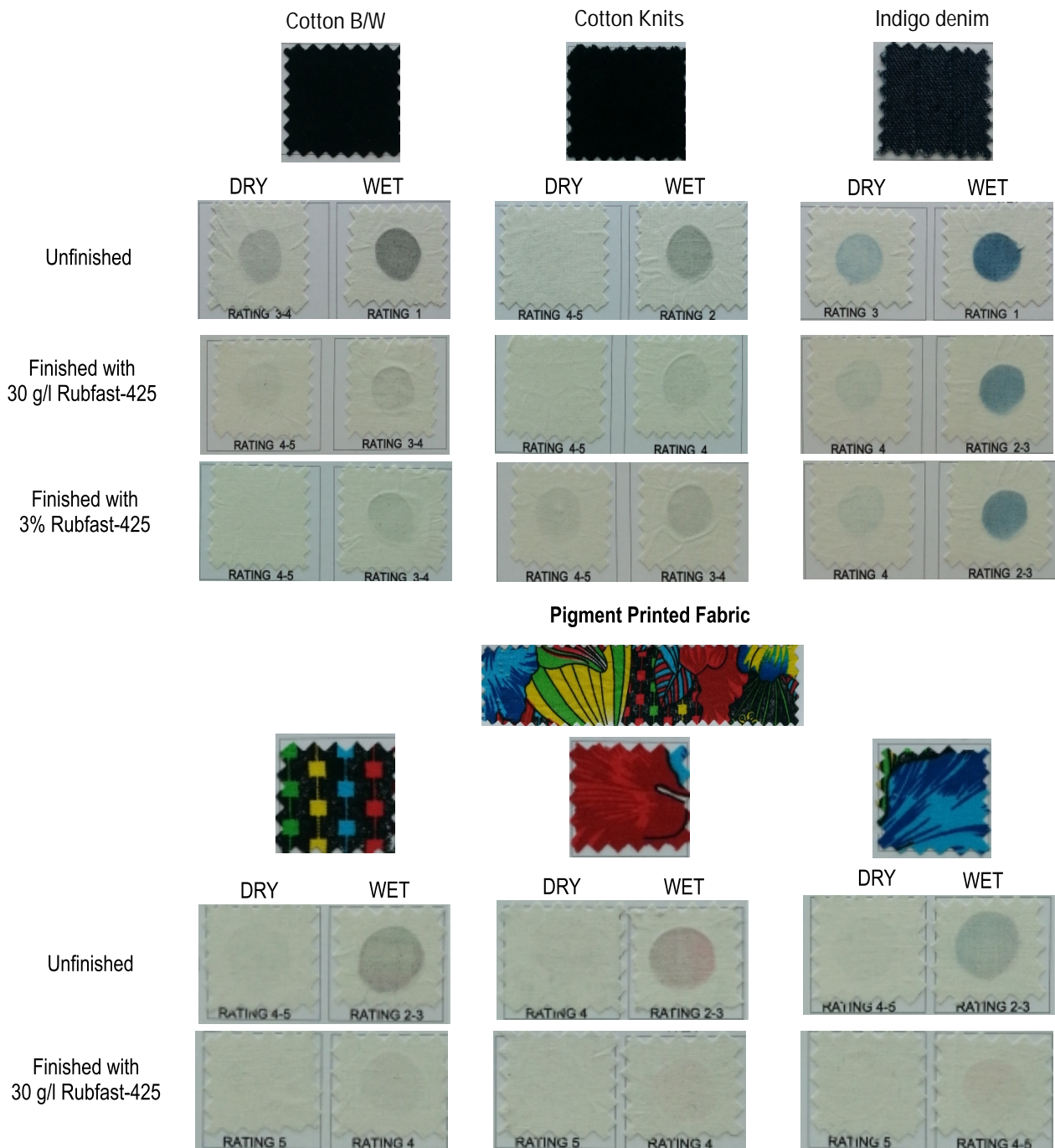
Rubfast-425 : 2-3 %
 pH : 4-4.5,
 M:L - 1:10,
 Temperature : 40°C for 20-30 min.

Pad-dry at 150-160°C for 1-2 min

Dry at 150 -160°C for 1-2 min

- ISO 105-X12 and AATCC Crockmeter Method, Test method 8: Color fastness to crocking.
- For small fabric samples and for printed samples AATCC developed the Rotary Vertical Crockmeter Method (AATCC Test method 116).

Dry and Wet rubfastness of Dyed / Printed finished fabric with Rubfast-425



It can be seen that there is improvement in wet rub fastness is 1.5 to 2 unit of dyed / printed fabric

Sarex Chemicals - *A step ahead*

We are proud to be **NABL (National Accreditation Board for Testing & Calibration Laboratories)** accredited Textile Chemical Laboratory in India to provide service to our valued customers.



Certificate Number : T-2718



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