Sarex

Vol.8, Issue 29, January 2015

Saraquest

Exclusive Insight

Chemistry Behind Good Feelings

Contents

Pretreatment of Cotton with Low Temperature, Low Caustic

- Ketoprep-LA

Eco-friendly Water and Oil Repellent Finish

- Careguard-66 (New)

Rubbing Fastness Improver

- Rubfast-195

Cationizing Agent for Garment Dyeing with Pigments

- Catfix-511

Pretreatment of Cotton with Low Temperature , Low caustic.

Ketoprep - LA - Economical, Ecological, Efficient Pretreatment Process for Cotton

Cotton is most important natural fibre whose consumption is constantly increasing day by day. Natural cotton is hydrophobic and coloured. In order to make cotton fibres to use pretreatment process are needed to to make cotton fibre hydrophillic and white.

Generally combined scouring and bleaching is carried to make cotton fibre hydrophillic and white. Conventionally, scouring and bleaching is done with aqueous solution of Caustic (NaOH) and H_2O_2 at boil temperature. Though alkaline scouring is effective and cost effective process, it is inefficient. The use of high concentration of caustic also requires neutralization of scouring waste water. As it consumes large quantity of fresh water and energy and also increases total dissolved solids in effluent.

Also Hydrogen peroxide is most popular oxidant use to remove natural colorant of cotton fibres. Conventionally the hydrogen peroxide bleaching is carried out at high temperature (98^0C), which causes damage to the fibers and needs high energy costs. Thus low-temperature oxygen bleaching becomes one of the key technoloy for pretreatment. So it is clear that this process needs to be improved considerably to meet today's energy and environmental demands.

The Textile Industry is aware of the decrease in water and energy sources and is developing new technology and new chemical alternatives, but the challenge will lay in converting the technology in current textile facilities.

Globally, the textile companies are forced to reduce their consumption of water and energy due to

- The rising global consumption of resources like water and energy and increasing cost of same.
- Impact of the processes on the world climate.
- More stringent environmental obligations.

Present Concern of Textile Industry

- Reduction of energy consumption
- Reduction of water consumption

By considering today's demand of environment towards textile, **SAREX** has developed a product **Ketoprep-LA** for pretreatment of cotton. Which works at low temperature and at low dosage of caustic.

Unique Feature of Ketoprep-LA

Parameter	Advantages
Efficient	Gives very good whiteness index, absorbency, rewetting and softness
Low alkali	Less TDS, no harsh feel of cotton, less acid required for neutralization.
Low temperature	Saves time, energy and cost
Eco-friendly	Low BOD/COD and TDS
Less rinsing	Saves water

Application :

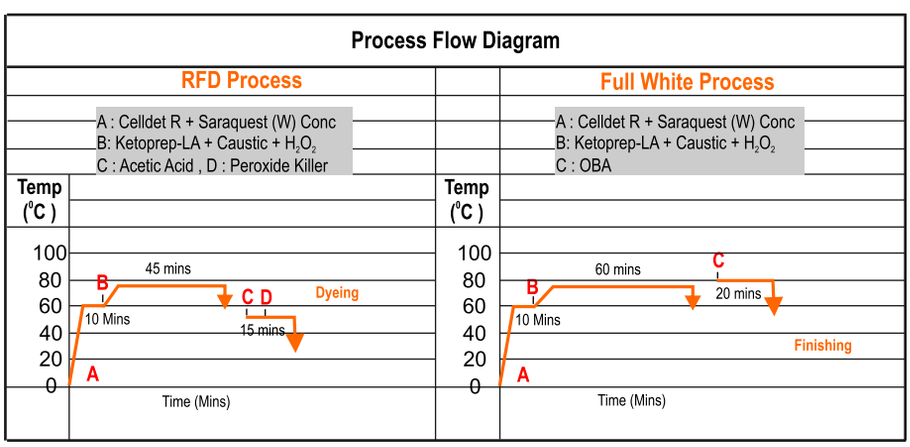
Application : Exhaust

Material : Cotton (Knits good, Yarn , Desized woven , Terry Towel)

Machine : Soft flow, Jet, Jigger, Package dyeing machine ....

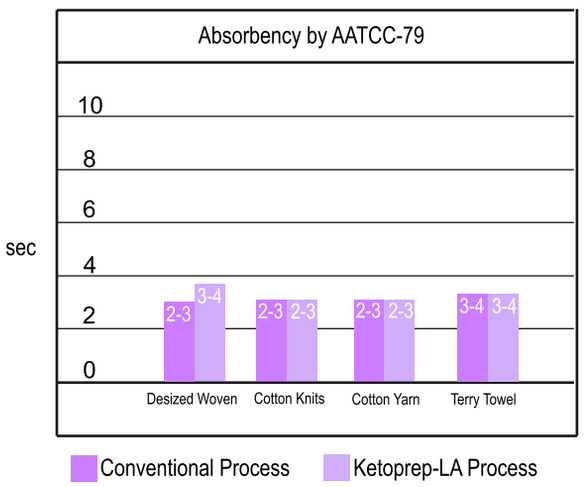
	Recipe for RFD (Ready for Dyeing)	Full White
Celldet-R	0.3-0.4 %	0.3 - 0.4 %
Ketoprep-LA	0.75 - 1.0 %	1.5 - 2.0 %
Saraquest (w) conc (optional)	0.1- 0.15 %	0.1- 0.15 %
Caustic Flakes	0.75- 1.25 %	1.5 - 2.0 %
H_2O_2 (50 % V/V)	2.0 - 2.5 %	6.0 - 8.0 %
Process Condition		
Temperature	75 ^{0}C	75 ^{0}C
Time	45 mins	60 - 75 mins

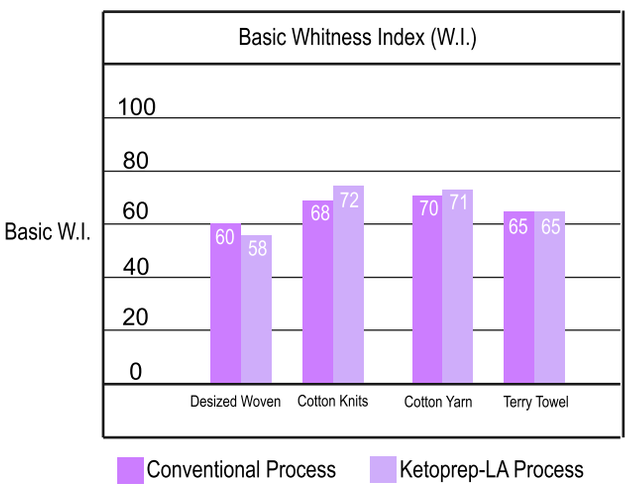
Note: Kindly ensure pH of bleaching bath should be 11.2 (initially)



Performance Data:

100 % cotton knits , Desized Cotton woven , 100 % cotton yarn and Terry towel are treated with Ketoprep-LA system (RFD) and performance data of finished fabric is evaluated .





Note : Application concentration will vary from substrate and preliminary trials are recommended to determine optimum results levels however recipe given in table should provide a suitable starting point.

Advantages of Ketoprep-LA Process

Economical - Cost saving

Due to low temperature bleaching process, considerable saving in water and energy consumption. Due to low caustic used in recipe less rinsing required results in less water consumption.

Efficient - Better Improved Quality

Good absorbency, outstanding soft, bulky and natural feel, less weight loss, rewinding properties of yarn are very good.

Ecological - Eco-friendly

Less TDS (Total Dissolved Substances) due to low alkali used in process.

Reproducibility : Improved Right First Time Production.

No danger of residual caustic which causes faulty dyeing. Less fibre swelling avoids channeling effect in yarn packages.

Eco-friendly Water and Oil Repellent Finish

Careguard-66 (New)

The oldest water repellent finishes for fabrics were simply coatings of paraffin or wax but they do not offer oil repellency and are washed out quickly. Perfluorochemicals (PFC's) are the only chemicals capable of repelling both water and oils and are durable to multiple washes

PFC's have nonstick properties; this family of chemicals is used in almost all the water and oil repellant finishes in the market today for all different end uses from utensils to apparels and technical textiles.

Most PFC products used for achieving durable water and oil repellency are based on C8-chemistry telomers. In the manufacturing of C8 chemistry based fluorocarbon, a trace amount of PFOA and PFOS can be generated as an unintended by product .These two byproduct perfluorochemicals (PFOS and PFOA) don't decompose in nature and have been found to have potential links to tissue problems, developmental delays and some forms of cancer.

Fluorocarbons based on C6 chemistry are produced without the formation of byproducts PFOA/PFOS

Chemical manufacturers worldwide are constantly facing questions over environmental concerns and issues relating to health and safety on a daily basis. For ecological reasons the fluorocarbon polymer technology is increasingly under pressure .
SAREX has launched PFOA and PFOS free fluorocarbon **Careguard-66 (New)** water and oil repellent based on C6 chemistry.

Mechanism of Water and Oil Repellent

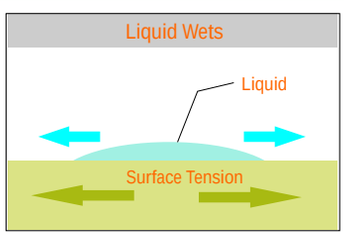


Fig (1).If the surface tension of solid is greater than or equal to the surface tension of liquid, the liquid will wet the fabric.

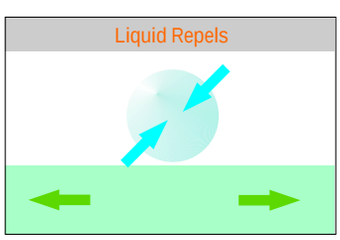
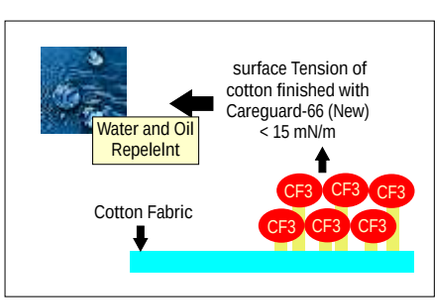


Fig (2). If the surface tension of solid is lower than to the surface tension of liquid, the liquid will repel the fabric.

What Required for Repellency?

Water repellent : Surface tension must be less than 20-22 mN/m.
Oil repellent : Surface tension must be less than 13-15 mN/m.



Unique Feature of Careguard-66 (New)

Parameter	Advantages
Water and Oil Repellency	Careguard- 66 (New) offers highly water and oil repellency performance levels.
Applicable on	Careguard- 66 (New) is applicable on cotton, polyester and its blends.
Durability	Careguard- 66 (New) can display water and oil repellency for 20 Home Laundering
Handfeel	Finished fabric stays pleasant to the touch
Eco-friendly	Careguard-66 (New) is free from PFOA and PFOS.

APPLICATION

- Careguard-66 (New) can be applied by padding, foam and spray process.
- To achieve maximum performances substrate is required, fabric to be free from surfactant / salts and are neutral prior to finishing.
- In order to remove traces of wetting agent, fabric to be washed with 1 g/l Saragen-DAM at pH-4.5-5.5, temperature- 85°C for

Process Parameter

pH : 4.0 to 4. 5, **Pad Expression** : 65 -70 % ,
Drying : 100-120^{0}C for 1 min , **Curing** : 170^{0}C for 1-2 min

Recipe	100 % cotton bottom weight / Cotton Shirting fabric		Polyester / Cellulosic & Polyester / Viscose Blends		100 % Polyester / 100 % Polyamide/ 100 % wool	
Careguard-66 (New)	40-60 g/l		25 - 40 g/l		25 - 40 g/l	
IPA	5 g/l		5 g/l		5 g/l	
Acetic Acid	0.5 g/l		0.5 g/l		0.5 g/l	
Results :	Initial	20 HL	Initial	20 HL	Initial	20 HL
Spray Testing	100	80	100	70-80	100	70-80
Oil Repellency	5	4	5	4	5	4

Application concentration will vary from substrate and preliminary trials are recommended to determine optimum results levels however recipe given in table should provide a suitable starting point.

Rubbing Fastness Improver

Rubfast-195

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 higher rating in rubbing fastness and, specifically, wet rub fastness.

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. Through microscopic examination it has been established that under wet rubbing condition, samples get damaged and microscopically small dye particles stain to adjacent white fabric.

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

- Nature of dye/pigment used for coloration
- Depth of shade
- Type of the substrate
- Efficiency of fixation and washing off of unfixed colour.

SAREX has an unique solution by offering a specialty finishing agent **Rubfast-195** which meets the requisite of customers for improved fastness properties. Fabrics, garments, home textile and denim finished with **Rubfast-195** exhibits excellent wet rubbing fastness.

Unique Feature of Rubfast-195

Parameter	Advantages
Rubbing Fastness	Rubfast-195 increases dry and wet rubfastness by 1 to 1.5 units
Effectivity on	Rubfast-195 is effective on all class of dyed and printed fabric.
Washing Fastness	Rubfast-195 does not hampered on basic washing fastness of fabric.
Handfeel	Does not hampers handfeel.
Light Fastness	Does not hampers

Application

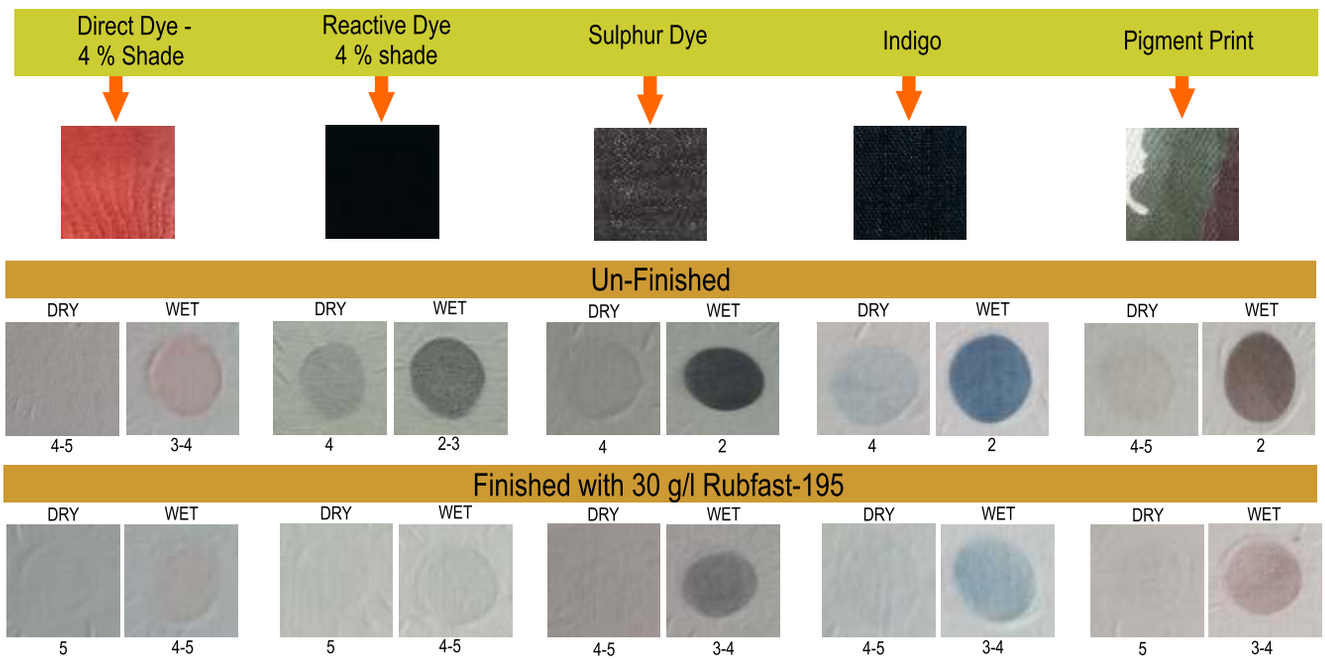
Pad-Application
Rubfast-195 : 20-30 g/l
pH : 4.0-4.5 ,
Pick up : 65-70 %
Pad-dry at 150-160^{0}C for 1-2 min

Exhaust Application
Rubfast-195 : 2-3 % (on the weight of fabric)
pH : 4.0-4.5, Temperature : 40^{0}C
Time : 30 min, M:L - 1:10
Followed by drying at 150 -160^{0} C for 1-2 min

Test Methods to Evaluate:
ISO 105-X12 and AATCC - 8 Crockmeter Method, Color fastness to crocking.

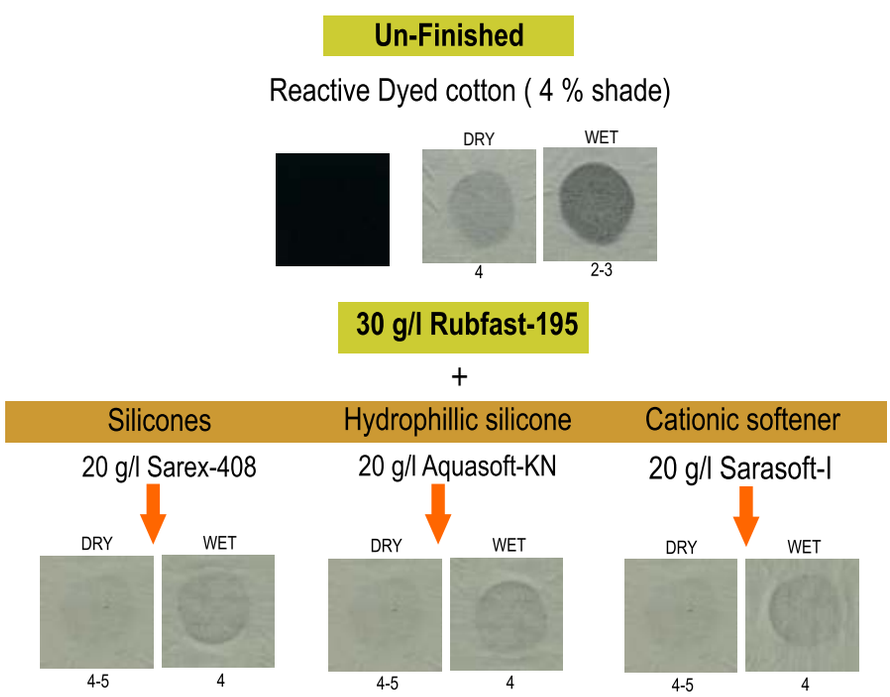
For small fabric samples and for printed samples AATCC developed the Rotary Vertical Crockmeter Method (AATCC Test method 116).

Performance of Rubfast-195 on various Dyes



It can be seen that there is improvement is dry and wet rub fastness of finished dyed / printed fabric

Compatibility of Rubfast-195 with Softeners



Cationizing agent for Garment Dyeing with Pigment

Catfix-511

In the recent years, the garment dyeing has been slowly emerging as a process to meet the ephemeral fashion trends adopted by the consumers and new machines and methods have made this process to wear a brighter future for it.

However, the garment dyeing is not coming without any strings attached to its, the cautions are often pronounced in terms of fabrics and their preparation, accessories used in the garments for safe operation. Along with raw stock dyeing, yarn dyeing and piece dyeing, garment dyeing has also taken its place as another form of dyeing textiles. In the case of garment dyeing, the volume of popular and unpopular colours can be increased or decreased as envisaged from the market requirements.

Garment dyeing is the obvious way to meet the needs i.e. quick response to fashion change, lead times have been reduced to 4 to 5 days from 2 to 3 weeks as minimum with other processing routes.

Despite their several advantages, reactive dyes still suffer from a limitation of hydrolysed dye formation during dyeing, which must be removed by a subsequent thorough wash-off treatment. A significant proportion of the total cost of reactive dyeing is attributed to washing-off stages and the treatment of the resulting effluents.

Pigments have been used for textile printing for many decades. One of the advantages of pigment coloration is that the subsequent washing-off can be avoided. Another possible advantage in dyeing with pigments is that some finishes may also be combined with the dyeing process.

Coloration of cotton cellulose with pigment emulsion has always played a key role in determining the aesthetic appeal and acceptability of the products made from them.

The unpopularity of pigment dyeing in exhaust technique is mainly due to the nagging unevenness problem. Moreover, many of the pigment manufacturers are yet to standardize the process for exhaust dyeing while others application techniques are firmly established and streamlined. Besides awaiting standardization, exhaust dyeing with pigments is also not free from the problem of fastness to rubbing.

Generally pigments are anionic in nature when dispersed in water and have no affinity towards cellulosic fibre. Hence cationic charge is introduced in cotton by treating it with cationizing agent. The pigment contains an anionic dispersing agents. Thus giving cotton and pigment substantivity for each other due to ionic attraction. The cationized substrate is then exhaust dyed with a pigment. However the problem of unevenness continues to be matter of concern and thus a process development is called for.

In order to overcome this problem **SAREX** has developed a cationizing agent **Catfix-511** , which optimize the exhaustion dyeing process and also control the unlevel dyeing.

Key Features of Cationizing Agent For Pigment Dyeing Process: Catfix 511

- Imparts good washing and rubbing fastness to pigment Dyeing Processes.
- Retains original tone of Dyeing Processes.
- Releases no formaldehyde.
- No adverse effect on Sea Water and Perspiration fastness of pigments dyeing processes.
- Does not impair light fastness properties of the pigment Dyeing Process.

Application :
Exhaust Process :
1. Standard Process
Treat the fabric with below given dosage of Catfix-511 depending on pigment concentration followed by rinsing

Pigment	Catfix-511 to be taken
1-2 %	2-3 %
2-3 %	4-6 %
>= 3 %	6-8 %

Bath pH : 9-9.5 (Buffer)
Bath Temp : 40^{0}C , 30 mins

2. One step process with Catfix-511 for Lighter shades upto 1.5 %
Catfix-511 : 2-3 %
Bath pH : 9.0 - 9.5 (Buffer)
Bath Temp : 40^{0}C , 15-20 mins

at the end of 15-20 mins add pigment at 40^{0}C and increase the temperature to 60^{0}C
Run for 20-30 mins, rinse and dry.

The pigment dyeing process is generally a three step process such as:

1.Cationization of the Fabric
Pigment dyeing is an electrical process whereby the goods to be dyed are given an electrical charge opposite that of the pigment. When the pigment is added to the bath, the opposite electrical charges attract each other, much like the north and the south poles of two magnets.

2.Pigment Exhaustion on the Fabric

The pigments are first mixed with water and a dispersing agent that imparts an anionic charge to the pigments. This solution is added gradually to the dyeing machine. The temperature of the bath is slowly increased and the machine is held at the dyeing temperature or up to 20 minutes. The fabric is held at an elevated temperature to increase the adsorption of the pigments.

3.Binder Application

A binder used in the exhaust pigment dyeing procedure for fixing pigment colors. It improves crock and wash fastness. After the pigment is exhausted , the binder is feed into the dyeing machine and exhausted onto the fabric over a period of time. Acetic acid is added to the bath, which facilitates binder polymerization, then the fabric is rinsed.

Garment dyeing with Pigments

Exhaust Method
⇩
Garment loading
⇩
Cationization
⇩
Rinsing
⇩
Pigment exhaustion
⇩
Binder exhaustion
⇩
Extraction
⇩
Tumble drying

Advantage of Pigment Dyeing

- Applicable to wide range of textiles and wide gamut of colours available
- Process of pigment dyeing is relatively economical.
- The process chemicals are environmentally friendly and least polluting
- The colours fades with the repeated use just like denims

Sarex

Sarex Chemicals

CORPORATE OFFICE
501, Waterford Building, 'C' Wing, C.D.
Barfiwala Marg, Juhu Lane,
Andheri (W), Mumbai-400 058, India
Tel. : (91-22) 6128 5566
Fax : (91-22) 4218 4350
E-mail : tcmktg@sarex.com
Web : www.sarex.com

PLANTS : N-129, N-130, N-131, N-132, N-232,
M.I.D.C., Tarapur - 401 506, India.

M & S | REACH | OHSAS 18001:2007 | ISO 14001:2004 | ISO 9001:2008 | EXPORT HOUSE | NABL | GOTS

Certificate No. T-2718

C E R T I F I C A T I O N S