



**Sarex**

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# Saraquest

Exclusive Insight

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**CHEMISTRY BEHIND  
GOOD FEELINGS**

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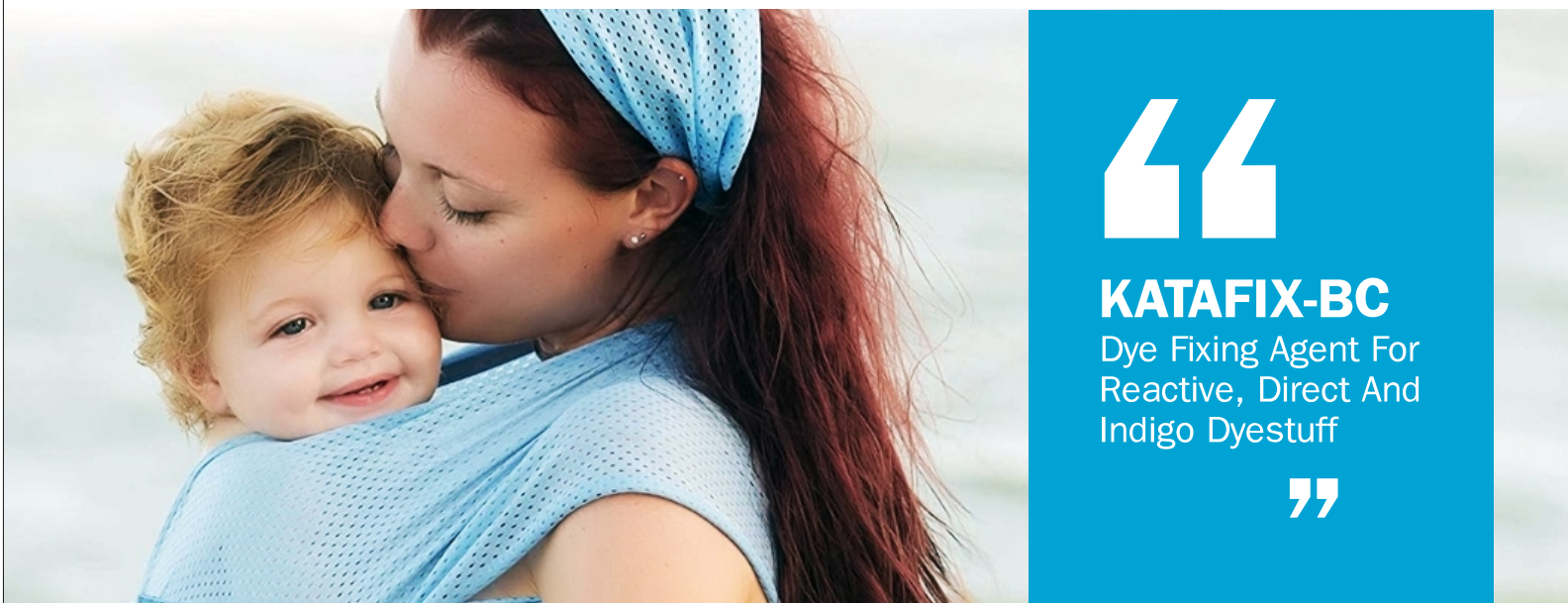
## Textile Chemical Manufacturing

“Customer Delight” is the key strategy of **Sarex Chemicals** as its main motto is to provide solutions to the customers rather than selling products.

**Sarex Chemicals** is a bluesign® system partner. Most of the products offered by Sarex are REACH Pre-Registered and more than 100 products are GOTS certified. Moreover, Sarex also has been accredited by :

- **ISO 17025 : 2017** (NABL Certified Laboratory)
- **ISO 45001 : 2018**
- **ISO 14001 : 2015**
- **ISO 9001 : 2015**

# KATAFIX-BC



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## KATAFIX-BC

Dye Fixing Agent For  
Reactive, Direct And  
Indigo Dyestuff

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**D**ye fixing agents are of considerable interest in the art of textile colouration. Dyed and printed fabrics often have unsatisfactory wet fastness, especially washing and water fastness. This is found with dyeing's carried out using direct dyestuffs, acid dyestuffs and to a lesser extent, reactive dyestuffs.

All direct dyestuffs are regarded as being substantive to cellulosic materials whereas the reactive dyes are considered substantive as well as reactive. Direct dyes are normally applied from an aqueous dyebath containing an electrolyte. They impart moderate to good light fastness but moderate to poor washing fastness. Although the dyeing process with direct dyes is simple, it lacks in the wet fastness properties. In case of all reactive dyestuffs, part of the dyestuff will react chemically with a hydroxyl group on the cellulosic fibre and part of the dyestuff will react with the water present in the dyebath to form hydrolyzed dye. The un-reacted and hydrolyzed dye may be removed by repeated washing however the washing-off process is costly and time consuming than dye fixing process.

The indigo dyeing of cellulosic yarns and fabrics, because of the essentially surface nature of such dyeing, creates a fabric subject to considerable and persistent wash down or loss of colour during extended use. For nearly two decades, customer preference and acceptance, particularly in denim fabrics such as jeans and overalls, has been highly favorable to the so-called washed-down look. Today, the tide of customer and styling preference has swung toward denims more stable to washing, in either home or commercial washing machines. Not only is more wash fastness being sought in jeans and overalls, but denim has been promoted to a high-fashion fabric for use in suiting's, slacks, dresses, and the like. Jeans are also now considered business casual in many creative workplaces.

In industry, cationic dye fixing agents are used to overcome the problem of poor wet fastness properties with direct and reactive dyeing's on cellulosic fabric and indigo dyed denim fabrics. In order to improve the fastness of dyed materials, an after treatment chemical "dye fixing agent" is typically applied to the dyed material. Due to non eco-friendliness of formaldehyde based dye fixing agents, a demand for non formaldehyde based fixing agents have increased.

### Properties of good fixing agent include:

- Good capability with cross linking agents
- No effect on the shade
- Stable to steaming and dry heat
- Good levelling and migration properties
- Good affinity for the fibre
- Improving overall fastness properties



# KATAFIX-BC

It is undesirable that dyestuffs exhibit a lack of wet fastness since the removed dyestuff may be absorbed by undyed textile material being washed in the same washing operation and in addition the dyed substrate does not retain its original shade. It is known to treat the textile after dyeing with a dyefixing agent in order to improve the wet fastness of the dyed substrates.

With this background Sarex has developed an all in one dye fixing agent, **Katafix-BC**. Katafix-BC is an all in one dye fixing agent for cellulosic's dyed with Reactive, Direct, Indigo and Sulphur dyestuffs. Below mentioned are the unique features of the product which meet the requisite of customers for improved fastness properties.

## ➡ UNIQUE FEATURES

- Katafix-BC is an all in one dye fixing agent for cellulosic dyed with Reactive, Direct, Indigo and Sulphur dyestuffs.
- Improves the Washing fastness, Perspiration fastness and Water fastness.
- For Indigo denims, can be applied after desizing and before or after stone washing or enzyme treatment.
- Applicable by exhaust as well as pad application.
- Formaldehyde free hence complies with OEKO-TEX® standard.

## ➡ MECHANISM

Katafix-BC has the capability to fix the unfixed dyes by forming a complex with the dyes and making them insoluble in water and thus improving the wet fastness properties of the dyed fabric.

## ➡ MATERIALS AND METHODS

Materials : 100% Cotton fabric, Indigo dyed Denim Cotton fabric

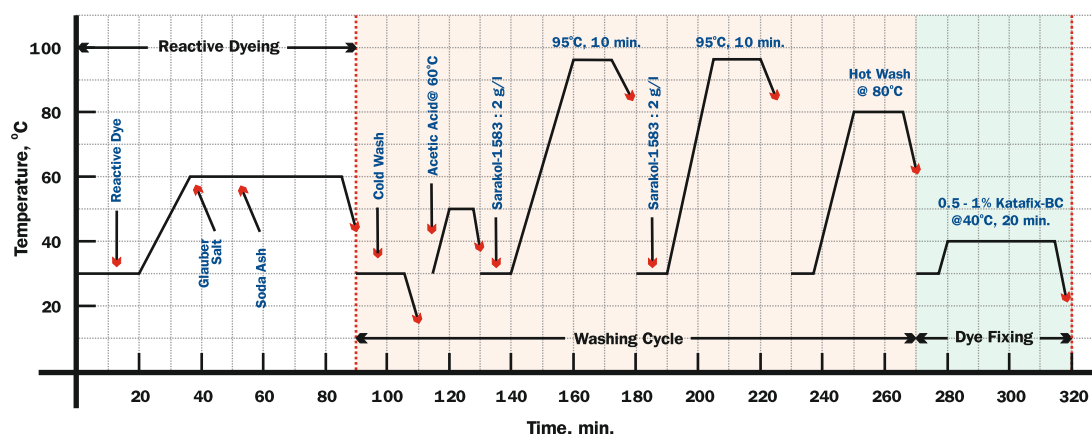
Chemicals : Katafix-BC

Dyestuff : C.I. Reactive Red 152 (6% shade), C.I. Direct Blue 94

## ➡ APPLICATION

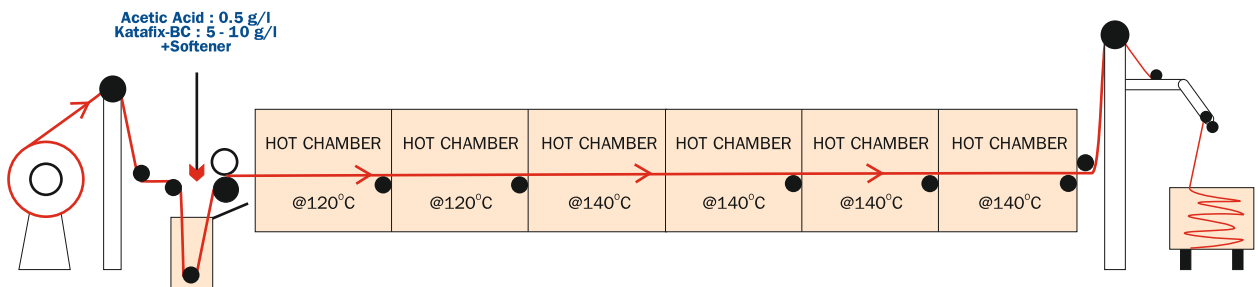
Dyeing of cotton fabric was carried out with 6% C.I. Reactive Red 152 and 4% C.I. Direct Blue 94 dyes as per the standard procedure. After the completion of dyeing process, the fabrics were subjected for dye fixing treatment. The recipe followed for the dyefixing is explained in the below given process flow diagram. To study the efficiency of dye fixing agents, the treated fabric were subjected for fastness study.

### For Exhaust Dyeing Process on Jiggers, Soft Flow, Winch, Yarn & Dyeing and other Batch Machines



# KATAFIX-BC

## Continuous Application on Stenter

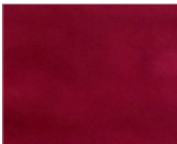




### Padding Solution

- Fill the tank with water
- Adjust the pH with Acetic acid
- Add Katafix-BC solution with stirring
- Add softener

## RESULTS

### Colour Fastness to Washing – ISO 105 C10, 60°C

		WO	PAN	PES	PA	CO	ACE
Cotton fabric dyed with C.I Reactive Red 152	 C.I. Reactive Red 152	Untreated					
		Treated with 0.5% Katafix-BC					
Cotton fabric dyed with C.I Direct Blue 94	 C.I. Direct Blue 94	Untreated					
		Treated with 3% Katafix-BC					
Indigo dyed Denim fabric	 Indigo Denim	Untreated					
		Treated with 2% Katafix-BC					

WO : Wool, PAN : Acrylic, PES : Polyester, PA : Nylon, CO : Cotton, ACE : Acetate

Katafix-BC is non-formaldehyde based cationic dye fixing agent for cellulosic fabrics dyed with Reactive, Direct, Indigo and Sulphur dyestuffs. Fabric dye fixed with Katafix-BC shows minimum staining on the multi-fibre proving its efficiency as an effective dye fixing agent. It is evident from the washing fastness results that Katafix-BC works effectively on all the anionic dyestuffs.

# ECOGUARD-NEW



## ECOGUARD-NEW

New Generation Fluorine Free Water Repellent



There is an increasing demand globally for fabrics that delivers fluid repellency, high-performance protection against water and water based stains with enhanced sustainability. Achieving these features in concert has been challenging, as traditional non-fluorinated DWR technologies can have undesired side effects that impact fabric quality.

Repellency of fluids is essential for occupational and personal protection and to enhance the serviceability of the textile material. Currently, high level of repellency is provided by fluorinated polymers. These polymers possess environmental toxicity and due to this, their use is increasingly restricted. The concerns associated with long-chain fluoro polymers have led to shift towards fluorine free water repellents which are safe to the environment and meets the environmental requirements. Also, fluorine free water repellents are more economical than fluorocarbons.

Sarex has developed a unique environmental friendly, durable fluorine free water repellent, **Ecoguard-NEW**. It is based on a newly developed sustainable chemistry which is superior to conventional Paraffin wax and Acrylate based products. Ecoguard-NEW is specifically designed to impart durable water and fluid repellency to various kinds of fabrics and is best suitable for cellulosic and its blends. It can also be applied on synthetic fibres, wool and their blends.

Other advantage of Ecoguard-NEW over Silicone, Paraffin and Acrylate based water repellent is that, the dosage is required comparatively less to achieve the desired results. This avoids unwanted consequences like chalk marks, seam slippage issues and harsh handle.

### ➡ UNIQUE FEATURES

- Passes AATCC 22, AATCC 193.
- Durable to dry cleaning unlike other fluorine free water repellent.
- More durable than conventional fluorine free water repellents.
- Product is bluesign® approved, REACH Registered and OEKO-TEX® compliant.
- It is based on sustainable chemistry and free from paraffin wax and formaldehyde.
- Blood and Alcohol Repellent for coverall fabrics.
- Gives good stain repellency against water based stains.
- Fulfils requirement of leading retailers like M&S and H&M.
- Suitable for Cotton, Polyester, Polyamide and their blends like CVC fabrics.

# ECOGUARD-NEW

## APPLICATION

100% Cotton, Polyester and Polyamide fabrics were selected to impart water repellent finishing. The fabrics selected were washed with 1 g/l Saragen-DAM to remove any impurities from the surface of the fabric. The fabrics were then finished with Ecoguard-NEW using padding application with 70% expression. The fabrics were dried at 130°C for 2 min. followed by curing at 160°C for 3 min. The pH of the padding bath was maintained 5.5 using acetic acid.

## RESULTS

Treated fabrics were tested by AATCC 22 for spray rating, AATCC 193 for Alcohol repellency. These fabrics were also tested for durability by AATCC135 and for Dry cleaning durability using perchloroethylene at room temperature.

Results of all are tabulated below in Table 1 and 2.

**Table 1 AATCC 22 Results of Ecoguard-NEW Treated Textile Substrates**

	Spray rating AATCC 22		
	100% Cotton	100% Polyester	100% Polyamide
100 g/l Ecoguard-NEW	100	100	100
After 20 Home Launderings	80	80	80
After 3 Dry Cleaning	80	80	80

**Table 2 AATCC 193 Results of Ecoguard-NEW Treated Textile Substrates**

	Alcohol Repellency AATCC 193		
	100% Cotton	100% Polyester	100% Polyamide
Unfinished	0	0	0
100 g/l Ecoguard-NEW	4	5	5

## CONCLUSION

Water and stain resistance are essential functions in the fast-growing sportswear, active clothing and casual apparel industry. At the same time, there is a global call for more sustainability in the textile industry. During the last decade, consumer demand has driven the need for brands to find alternatives and spurred the rapid development of fluorine-free technologies by suppliers. As a result, various apparel brands and some responsible manufacturers have eliminated traditional C6 water repellents from their production and the progress towards technologies free from per-fluorinated chemicals (PFCs) is under process. The above article highlights the efficacy of Ecoguard-NEW which shows durable results irrespective of the substrates on which it is applied. Treated fabrics showed durability to dry cleanings and normal home laundering conditions. Sarex following its objective to provide environmental friendly solutions is at the forefront to swing its focus to manufacture fluorine free water repellents.



# FEDA-SH (MOD)



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## FEDA-SH (MOD)

Soda Ash Substitute  
In Reactive Dyeing

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**R**eactive dyes are widely used dyes all over the world. Most of the dyeing operations of cellulosic fibres are done by reactive dyes which have the worldwide acceptance to the dyeing technologists. The textile material when introduced in the dye liquor, the dye gets exhausted on the cellulosic fibre in the presence of Glauber's salt at neutral pH. During this stage, the dye is absorbed by the fabric as a result of the "salting out" effect of the salt which had been added. The salting out step places the dye molecules in a very close proximity to the molecules of the fabric, but the dye is not yet held fast to the fibres of the fabric. After the absorption of dye on the fabric, there is a reaction step, during which an alkaline material is added to promote a chemical reaction between the dye and the fabric. Amount of alkali is the key factor in fixation of reactive dye. Under alkaline conditions, fixation is carried out in which covalent bond forms between reactive sites of fibre and dye molecule however this alkaline condition also facilitates the reaction of reactive group with the dye liquor resulting in deactivation or hydrolysis of the dye. Normally soda ash is used as the most commonly used alkali in the dyeing bath. Soda ash (sodium carbonate) is believed to be the best as a reaction promoter, giving high dye yields with minimal hydrolysis. It also works across the entire range of reactive dyes and is therefore the most general answer to pH adjustment. The important point is not the type or amount of alkali, but the pH of the bath.

The role of alkali is to cause acidic dissociation of some of the hydroxyl groups in the cellulose and it is the cellulosate ion (Cell-O-) that reacts with the dye. Though water is the competitor for reaction with the dye, cellulose fibre takes part in the reaction for most of the time. It is because the substantivity of a reactive dye to fibre is much greater than the substantivity of a reactive dye to the water. Hydrolysis of the dye is slower than the reaction with the alkaline cotton however the hydrolysis is significant and reduces the efficiency of the fixation process.

Dye fixation on cellulosic fibres is generally low, often less than 70%. The large amount of unfixed and hydrolyzed reactive dyes in wastewater may cause serious environmental problems since they are water-soluble and cannot be easily removed by conventional treatment systems. Also, the affinity for cotton for most of the reactive dyes is poor since both reactive dye and cotton carry anionic charges in water. Therefore, in order to suppress the hydrolysis of the dye and to promote the absorption of dye in a neutral salt bath, the fixing alkali i.e. soda ash is added to the salt solution which enables the reaction of dye molecule with cellulose. Soda ash is used to chemically bind reactive dyes to the fibres. The reactive dye reacts with the hydroxyl group of the fibre at pH of 10 or more, and binds to the fibre. The number of ionized hydroxyl groups increases 10 times and the reaction rate is about 10 times faster each time the pH of the bath is increased.



# FEDA-SH (MOD)

In the conventional dyeing operation the required amount of salt and alkali increases as the depth of shade moves from light to dark. Reactive dyes generally require 40-100g/l of electrolyte and 5-20g/l soda ash (alkali). Most of the electrolytes remain in the effluent after dyeing and such high concentrations of electrolyte and alkali may pose additional effluent problem. Looking at the shortcomings of using excessive amount of soda ash in reactive dyeing and also an upsurge in the prices of soda ash throughout the globe, a cost effective substitute for soda ash could be an ideal choice. Sarex has developed a product **Feda-SH (MOD)**, soda ash substitute, an alkali buffer which reduces hydrolysis of the dye and which enables dye-fibre interaction at lower dosages.

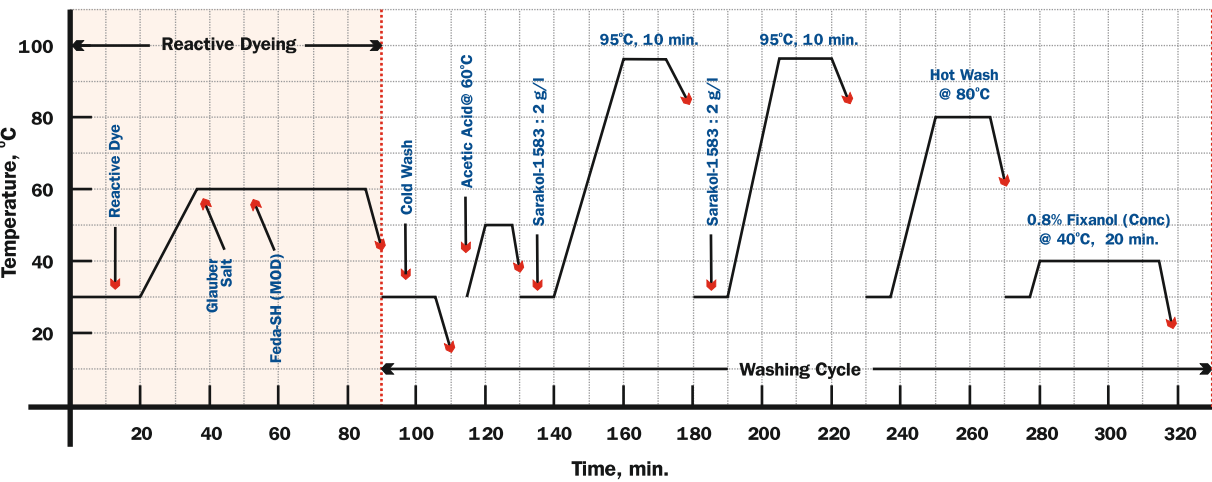
In this study, cotton fabric was dyed with reactive dyes using soda ash and its lower amount of Feda-SH (MOD). The colour yield and fixation efficiency were compared. After dyeing, pH of the wash liquor was compared in both cases. Colour uniformity and washing fastness test of the dyed fabric were also compared in both cases.

## UNIQUE FEATURES

- Cost effective alkali buffer for the replacement of soda ash and sodium silicate in Reactive dyeing.
- Requires 1/4<sup>th</sup> of the soda ash during dyeing.
- Posses good solubility in water therefore does not give powdery deposition in machines or on roller.
- Due to its lower dosage in dyeing, it reduces the TDS, COD, BOD load in the effluent.
- No adverse effect on Reverse Osmosis (RO) membrane.
- It can be applied by dosing system at 20% concentration.

## APPLICATION

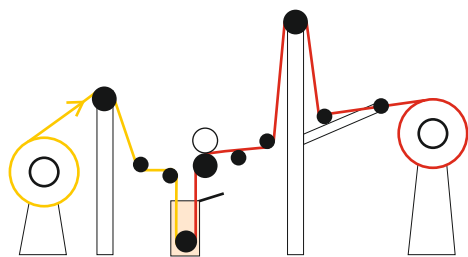
Exhaust dyeing process : Jiggers, Soft flows, Winch, Yarn & Fibre Dyeing and Other Batch Machines



Depth of Shade	Dosage of Feda-SH (MOD)
0.50%	2.5 g/l
0.6-2%	3-4 g/l
2.1% and above	4.5-5.5 g/l
Dark T.blue shade	5 g/l Feda-SH(MOD) with 1 g/l Caustic soda
Deep black	5 g/l Feda-SH (MOD) with 2 g/l Caustic soda

# FEDA-SH (MOD)

## Cold Pad Batch Process



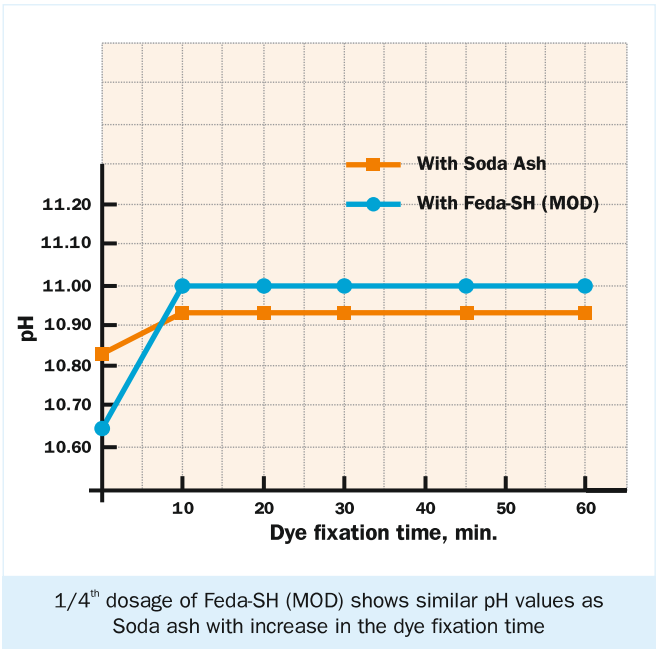
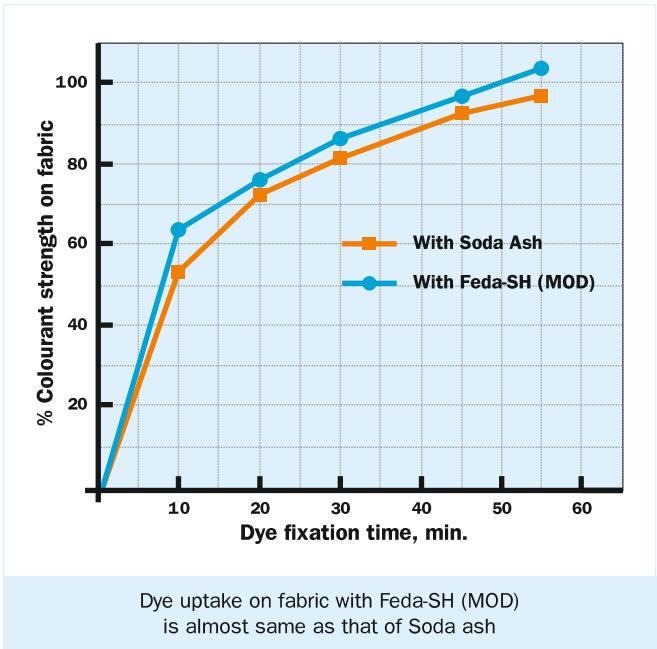
### RECIPES FOR COLD PAD BATCH DYEING USING FEDA-SH (MOD)

1	2	3	4
Dye : Upto 20 g/l Urea : 100 g/l Celldet-R : 1 g/l Feda-SH (MOD) : 10 g/l Solution Temp . : 25°C	Dye : Upto 21-40 g/l Urea : 100 g/l Celldet-R : 1 g/l Feda-SH (MOD) : 12 g/l Solution Temp . : 25°C	Dye : Above 40 g/l Urea : 100 g/l Celldet-R : 1 g/l Feda-SH(MOD) : 15 g/l Solution Temp . : 25°C	Dye : Dark Black & T. Blue Urea : 100 g/l Celldet-R : 1 g/l Feda-SH (MOD): 15 g/l Caustic soda : 2 g/l Solution Temp . : 25°C

Unlike Sillicate, Feda-SH(MOD) has no adverse effect on the Reverse Osmosis (RO) membrane used in effluent treatment plant.

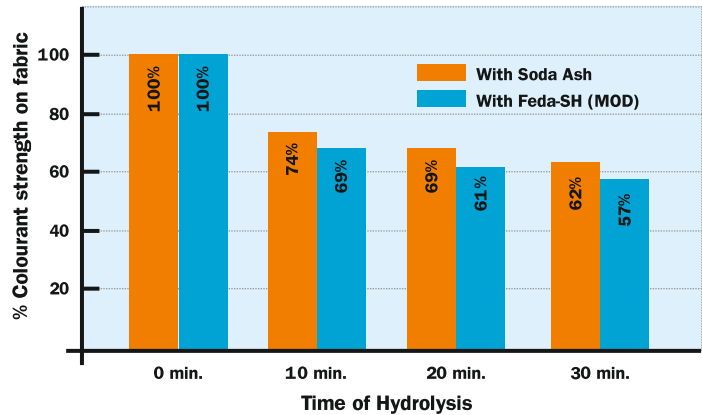
## RESULTS

### Effect of Dye Fixation Time on Dye Uptake and Dyebath pH



### Dye hydrolysis data of Feda-SH (MOD) and Soda ash

The dye solution (without fabric) was allowed to hydrolyze at dyeing temperature for 0, 10, 20 and 30 min. Dyeing was carried out in these hydrolyzed dye solutions for 45 min. The drop in colourant strength value of the fabrics were observed.



The study shows that the hydrolysis behavior of dye with Feda-SH (MOD) and Soda ash is similar

# FEDA-SH (MOD)

Shade and depth obtained with Feda-SH (MOD) and Soda ash



## ECONOMICS AND SAVINGS

ITEMS	CONVENTIONAL PROCESS		FEDA-SH (MOD) PROCESS		SAVINGS
	Name	Dosage	Name	Dosage	
1. Chemical Cost	Dyeing with Reactive Dyes	X%	Dyeing with Reactive Dyes	X%	The dosage of Feda-SH (MOD) is 1/4 <sup>th</sup> of Soda ash hence there is about 5% saving in dyeing cost and considerable reduction in inventory.
	Glauber salt	20 - 80 g/l	Glauber salt	20 - 80 g/l	
	Soda ash	10-20 g/l	Feda-SH (MOD) process	2.5 - 5g/l	
	Acetic acid	1 g/l	Acetic acid	1 g/l	
2. Utilities	The utilities consumption with Feda-SH (MOD) is same as with Soda ash.				

Feda-SH (MOD) needs only 1/4<sup>th</sup> of Soda ash dosage thus there is 2-4% saving in alkali cost and considerable reduction in inventory.



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



M&S



ISO  
45001:2018



ISO  
17025:2017



ISO  
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TWO STAR  
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## GET IN TOUCH



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