Sarex

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Saraquest

Exclusive Insight

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 : 2005 (NABL certified lab)
- OHSAS 18001 : 2007
- ISO 14001 : 2015
- ISO 9001 : 2015

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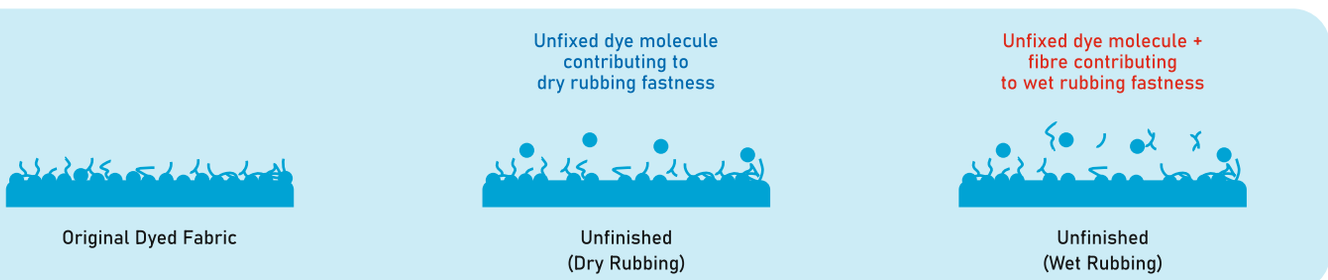
RUBFAST-716

Rubbing Fastness Improver For Indigo & Sulphur Denims

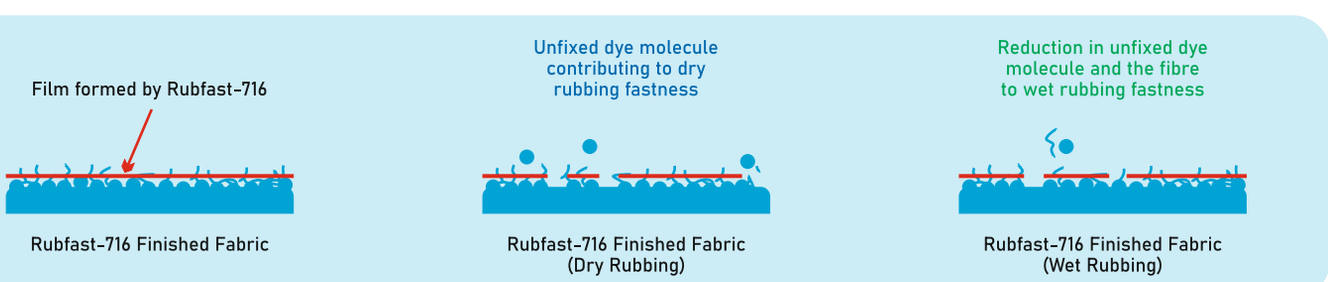
It is a well established fact that dyed cellulosic fabrics with proper washing-off of unfixed dye can improve the wash fastness of dark shades to a greater extent but corresponding improvement in wet rub fastness is not achieved. Through microscopic examination, it has been established that under wet rubbing condition, samples get damaged and microscopically small dye particles stain the adjacent white fabric. Achieving good wet rub fastness is always more of a challenge than dry rub fastness. Staining is more prominent for emerised or micro-sanded, dark shades of cotton fabric.

Colour fastness to rubbing is always required for every dyed or printed fabric. If the colour fastness to rubbing is good then its other properties like washing fastness and durability improves automatically because the rubbing is the test which analyze the fixation of colour on a fabric. In dyed and printed textile materials, the unfixed dye particles are mechanically held on the surface and these particles are rubbed off easily on the wearer skin or any other cloth of contact, so it is necessary to determine the rubbing fastness of dyed or printed textile materials. Rubbing is the transfer of colour from coloured textile material to other surfaces.

Rubbing action on Unfinished fabric



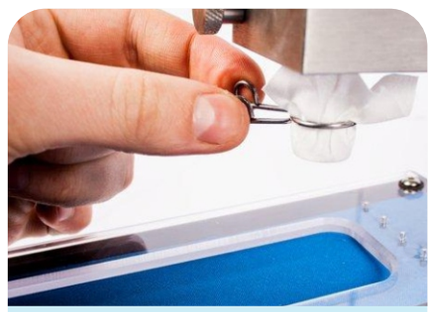
Rubbing action on Rubfast-716 finished fabric



The rubbing fastness is determined by using an instrument called crockmeter and it works on the principle of abrasion. When the crockmeter finger with test fabric slides over the specimen, due to friction there is colour transfer from the coloured specimen to the white crocking cloth. Due to the abrasion, the deep dyed fibres break into micro fibrils and stick onto the crocking cloth permanently. Rubbing fastness is a change in colour of the rubbed textile (by bleeding and fading) and crocking fastness is the migration of colour from the dyed surface to another surface by intense contact.

Electronic Crock meter

Crock meter finger



Rubbing process

Rubbing can occur under dry and wet conditions. In dry rubbing, initially the periphery of the coloured specimen get ruptured, so that the loosely or unfixed dye particles are removed and adhered to the surface fibres of the crocking cloth. In wet rubbing, unfixed dyes will dissolve in water and then it is transferred to the test fabric, hence resulting in poor wet rubbing fastness. In wet rubbing, both colour and the coloured short fibres are transferred to the crocking cloth.

Dye from dyed textile rubs off on adjacent substrates

Although, both dry and wet rub fastness tests are conducted in a similar manner, in case of wet rubbing, crocking cloth is in wet condition. Invariably, in all cases, moisture introduced into crocking cloth deteriorates wet rub fastness in comparison with dry rubbing. Due to the moisture present in the crocking cloth, the coefficient of friction in wet rubbing is nearly double than in dry rubbing tests, therefore the wet rubbing ratings of the same sample are always poorer than the dry ones. This is the reason why the processor and invariably their fabric is rejected by the customer on grounds of poor wet rub fastness.

Natural Indigo was obtained from plants of the genus Indigofera (*Isatis tinctoria, Indigofera tinctoria*), a name derived from its main country of origin, India. Its synthesis, followed by its marketing was achieved in 1897. Nowadays, production levels are reported to be around 17000 tons per year, establishing Indigo as one of the most demanding colorants throughout history. Sulphur dyes remain one of the most popular dye classes for cellulosic fibres and their blends. They are widely used to produce economical black, blue, brown, olive, yellow and green shades in medium to heavy depths. It is estimated that about one half of the volume of dye used for cellulosic fibres is due to sulphur dyes (80,000 tonnes annually in 90's), in which case about 80% is the CI Sulphur Black 1.

Vat and sulphur are the two types of dyes involving a reduction/oxidation mechanism. Until now in most industrial processes, vat dyes especially Indigo are reduced by sodium dithionite $Na_2S_2O_4$. The textile is dipped with the reduced dye, following by exposure to air to re-oxidize the dye. These two steps (dipping/exposing) would be repeated many times to obtain the desired shade. Likewise, the conventional method of application of sulphur dyes is from a dye-bath

containing sodium sulphide or thiourea dioxide as a reducing agent. This process is called ring dyeing. The ring dyeing effect results in low abrasion. The heavier the depth of shade the lower the crocking fastness rating. Indigo and sulphur dyestuffs present much lower crocking fastness at the same applied concentration compared to direct and reactive dyes. Especially ratings of fastness to wet crocking are unacceptable in the official crocking test scale.

Recent years have witnessed a drastic change in the textile processing industry with greater awareness and consumer demand for better quality and performance of textile fabrics/garments. To survive in this competitive arena, the processor has no other options but to meet the demanded quality standards, particularly the fastness characteristic of dyed fabric.

Keeping in view the problem of lower crocking fastness of indigo dyed and sulphur dyed denims, Sarex has developed a product **Rubfast-716** which especially improves the dry and wet rub fastness of indigo and sulphur dyed denim garments. This product also works very well on direct, reactive and pigment dyed & printed fabrics also.

Unique Features:

- Rubfast-716 improves dry and wet rubbing fastness of Indigo dyed and Sulphur dyed denim fabrics.
- It also works very well on Direct, Reactive and Pigment Dyed and Printed fabrics.
- Improves the fastness rating by 1 - 1.5 units on grey scale.
- Minimum body back staining during the process.
- Recipe is stable in hard water (upto 200 ppm water hardness).
- Can be applied by padding as well as by exhaust application.

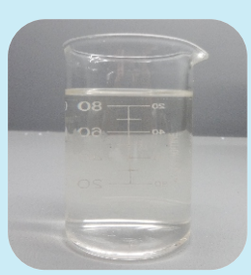
Test Method Used for Rubbing Fastness:

Rubbing fastness of the treated fabrics was evaluated on Crockmeter - Electronic : M238BB [SDL-ATLAS]. Standard Test Method, ISO 105-X12 Colour fastness to rubbing, was followed for testing rubbing fastness. This test method is designed to determine the amount of colour transferred from the surface of coloured textile materials to other surfaces by rubbing.

Recommended Procedure for Rubfast-716:

Step wise procedure for preparing Rubfast-716 solution

- Take required quantity of Rubfast-716 (30 g/l)
- To this, gradually add water (pH 5.8-6.2) and make the total volume
- Mix well to get uniform solution
- Solution of 30 g/l Rubfast-716 will appear Colourless to Straw white liquid with pH 3.7-4.2



Ideal solution of Rubfast-716

Colourless to Straw white liquid
Bath pH: 3.7-4.2

Application by Padding Process

(a) Prepare solution as per the above recipe:
Pad → Dry at 130-160°C

Application by Exhaust Process

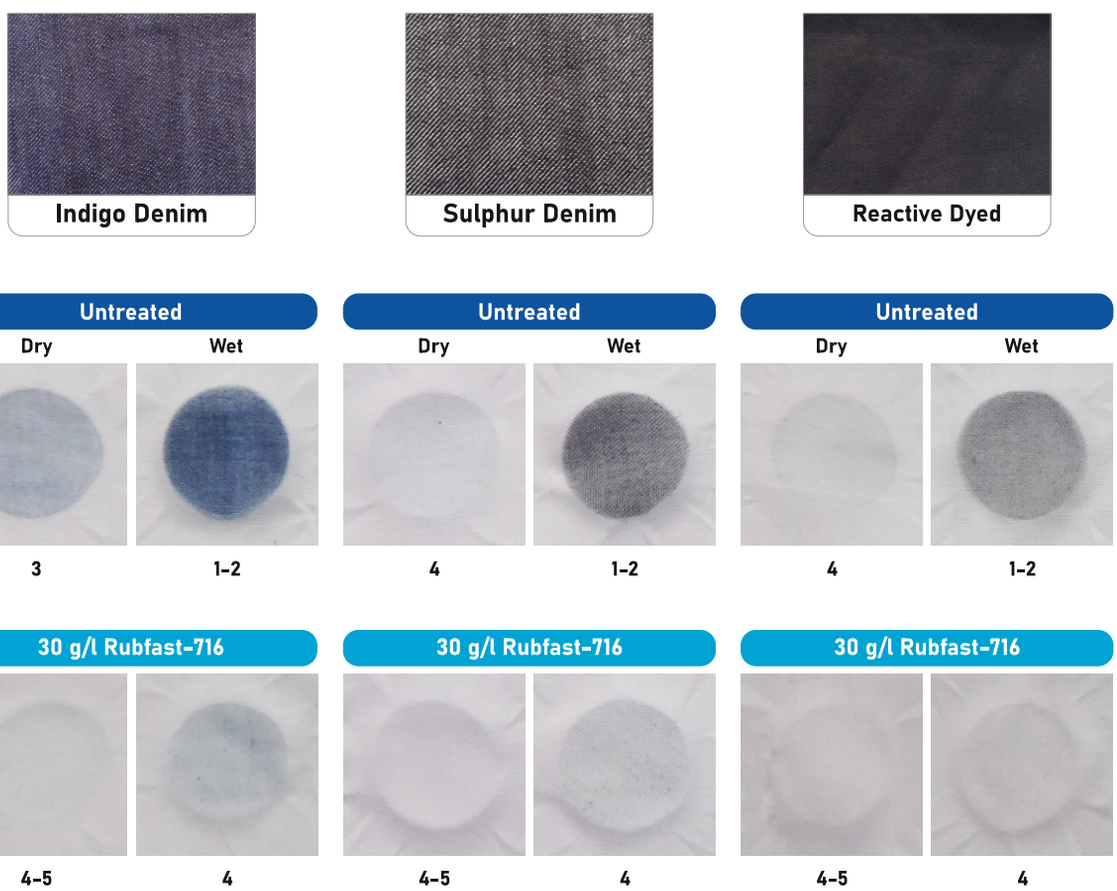
(a) Soft Flow & Yarn / Fibre / Garment Dyeing Machine:
Prepare solution in side tank with 3-5% (w/w) Rubfast-716 and run at 40°C for 20 min. Unload it. Dry and Cure at 150-160°C for 2-3 min.

(b) Jigger machine:
Prepare solution with 3-5% (w/w) Rubfast-716 and run 04 ends at 40°C.

Precautionary Measures:

- pH of water used for preparing the bath should not be more than pH 6.2
- Prepare the solution at room temperature (approx. 30°C).
- Ensure that the padding bath pH is 3.7-4.2 throughout the process.
- Fabric to be treated should be free from any ionic impurities.
- pH of the fabric should be neutral.
- Absorbency of the fabric should be instant.

Results and Discussion:



Significant improvement is observed in the wet rubbing fastness property with Rubfast-716

Rubbing fastness of the treated fabrics was evaluated on Crockmeter - Electronic : M238BB [SDL-ATLAS]

From the rubbing fastness results it could be clearly seen that Rubfast-716 is highly effective on indigo and sulphur dyed denim fabrics and Reactive dyed fabrics. Rubfast-716 improves the rating by 1.5-2 units of the treated fabrics.

SARAFLAM-PDR

Powder Flame Retardant For Textiles

Flammability refers to the ease with which a substance may ignite and support fire. Flame retardancy can be achieved by the use of flame retardant fibres or by the use of flame retardant finishes on fabrics. Flame retardants are applied on to the textile substrates to prevent fire from initiating and also minimizing the spread of fire or flame and thus reducing the damage. The use of flame retardants vary from fibre to fibre as every fibre behaves differently when subjected to flame as they have different physical and chemical nature. As a result, flame retardants have to be matched appropriately to each type of material for example flame retardant which is suitable for cellulosic are not suitable for synthetic fibres and vice-a-versa. The most difficult material to achieve flame retardancy is the Polyester/cotton blended fabrics.

Today, flame retardant fabrics are finding importance across all industrial and commercial workspaces, with workers working in direct contact with sparks, flame, fire etc. These could be uniforms for firefighting agents or workers of foundries, welding places, automotive, engineering industries, etc. wherein fire retardant fabric will find increased usage and application in automotive textiles.The purpose of flame retardant is to impart resistance on the substrate to flame and protect human lives from injuries.

Cotton-polyester blends pose a special flammability problem because the thermal and mechanical properties of the fibres are so different. Cotton tends to char on heating but generally maintains some structural integrity whereas polyester normally melts and flows at temperatures of ca. 260°C. If a mixture of the two fibres is burned, the molten polyester frequently tends to wick on the cotton char, resulting in the phenomenon of scaffolding. Considering the limitations of existing flame retardants and understanding the need of the consumer, Sarex has developed powder based flame retardant, **Saraflam-PDR** which is a non durable and which is suitable on all substrates including blends.

Work Wear

Home Furnishing

Automotive fabrics

Saraflam-PDR is a water soluble flame retardant available in powder form. It can be applied on 100% Cotton, 100% Polyester and Polyester/Cotton (P/C) blended fibres also. It is durable to dry cleaning but not durable to washing. It imparts soft handle and has minimum effect on shade. To get the desired results, sufficient add-on of the Saraflam-PDR should be given on the fabric.

Unique Features:

- Available in Powder form
- Cost effective
- Durable to dry cleaning
- Can be applied on all textile fibres and their blends
- Formaldehyde free, GOTS and Oekotex complaint

Application Condition:
A 100% Cotton Shirting, 100% Cotton Bottom weight fabric, 100% Polyester fabric, 100% Polyamide and Polyester/Cotton blended fabric were finished with 150gpl Saraflam-PDR, with 70% expression and dried at 110°C for 4-5mins.

Test Method:
The finished fabrics were evaluated for flame retardancy as per ASTM D 6413-94. Samples were weighed before being mounted in a frame and then placed in the flame chamber. The methane (C.P. grade) burner flame was adjusted to a height of 1.5" and the specimen set to 0.75" above the burner. The bottom of the specimen was exposed to the flame for 12 sec. at which point it was observed for melting and dripping behavior. The after-flame time, the length of time for which a material continues to flame after the ignition source has been removed, was recorded. Afterglow time, if any, was recorded.

Results & Discussion:
From Table 1 it is seen that the fabrics treated with 150gpl Saraflam-PDR shows excellent flame retardancy on 100% Cotton Shirting, 100% Cotton Bottom weight fabric, 100% Polyester, 100% Polyamide and Polyester/Cotton blended fabric. It is also evident that, the after glow time of treated fabric is zero indicating it is not propagating the flame after the flame is withdrawn.

Table 1 : Flame Retardancy action of Saraflam-PDR on 100% Cotton, 100% Polyester and Polyester/Cotton blended fabric

Sr. No.	Fabric	150gpl Saraflam-PDR	
		Char length (cm)	After Glow time (sec)
1	100% Cotton Shirting Unfinished	Completely Burn	-
	Finished	9	0
2	100% Cotton bottom weight Unfinished	24	45
	Finished	8	0
3	Polyester/Cotton Unfinished	Completely Burn	-
	Finished	6	0
4	100% Polyester Unfinished	Completely Burn	0
	Finished	7	0
5	100% Polyamide Unfinished	Completely Burn	0
	Finished	6.5	0

Conclusion:
Non-durable flame retardant like Saraflam-PDR is the need of the hour as it can be applied on all substrates including Polyester/Cotton blended fabrics which are one of the most difficult fabrics to be given flame retardancy. The revolution which is imminent in the future in the field of flame retardancy, Sarex is going to play a pivotal role in offering gamut of flame retardants for various substrates, which can pass the test methods required by the customers.

SARAKOL-BSI 667

Anti Back Staining Agent

Denim as a fabric, has received the widest acceptance among all textile products. Today, denim jeans are one of the most popular clothing item having an incredible influence on consumers, both socially and culturally. Denim garments are looked at as a major trend setter by our youth. The spread of denim culture all over the world brought with it a trend of fast changing fashions. This twill cotton fabric usually has warp threads indigo dyed while weft remains plain white. The warp faced fabric therefore looks blue on one side and white on reverse. The warp being ring dyed, creates denim's fading characteristics, which is unique compared to every other textile material. Such ring-dyed materials when subjected to treatment with stone or enzymes, randomly removes the dye from abraded portions of the fabric exposing white surfaces. With changing times, many new variants of denim came into existence.

To meet rapid change in demands of customers, technologists are trying to impart new designs and fashion on denim garments by means of different types of washing methods. Denim washing is one of the key areas in getting the faded look. One after another several washes were introduced such as stone wash, acid wash, moon wash, etc. Earlier stone washing used to be done to achieve soft feel and the desired appearance. As per the denim garment export market, this high quality garment has superior aesthetics and great value for price. During washing, the pumice stone, scraps off the dye particles from the yarn surface in the denim fabric. Difficulty in removing residual pumice from fabric, damage to equipment and clogging of machine drainage passage due to particulate material proved to be major drawbacks with the technique. Later on, the use of enzymes became a sustainable option to get the worn out look in denim.

The enzymes used are cellulase enzymes, specifically acting on the cellulose part, mainly on the surface of the fabric. This gives the desired look and at the same time, removes hairiness from surface thus giving a smooth and soft feel. Cellulases were first introduced in the 1980s, and nowadays more than 80% of denim finishers use cellulases or a combination of stones and cellulases to create the worn out look on denim. Cellulases work by loosening the indigo dye on the denim in a process known as biostoning. The cellulase enzyme hydrolytically degrade the cellulose part until it becomes glucose. This glucose is partially able to reduce the indigo, both on the fibre and in the treatment liquor. This reduced form has low affinity to cellulose fibre and thus soils the weft thread and the pocket lining / back staining.

In terms of the quality aspect, back staining plays a vital role in improving the appearance of the denim garment. Back staining implies soiling of the weft thread and the pocket lining by detached indigo or its reduced leuco form. Back staining mainly occurs during desizing or stone washing or enzyme stone washing. Denim and its various items like pants, shirts, jackets, belts, caps, etc, are the most preferred clothing for today's youth. This study discusses about the performance of Sarakol-BSI 667 in reducing or preventing back staining of indigo dyes on the weft yarn and pocket of denim garments.

Mechanism:
During stone washing or enzyme washing, the cellulose is degraded hydrolytically by cellulase enzyme partially until it becomes glucose.

Hydrolysis of Cellulose

Endo Gluconases	By means of the endo gluconases the cellulose is dissociated in a statistically distributed sequence
Exo Gluconases	The exo gluconases dissociate the cellulose chains into glucose molecules from the unreduced end
Cellobiohydrolasis	Separation of cellobiose (double bond glucose molecule) from the unreduced end of the cellulose
β- Glucosidasis	Dissociation of the cellobiose into glucose molecules

The glucose formed is partially able to reduce the indigo, both on the fibre and in the treatment liquor. This reduced form has low affinity to cellulose fibre and thus soils the weft thread and the pocket lining. As a whole, obtaining a good contrast between the blue and white yarns is often described as minimized back staining. In order to avoid such back staining which will reduce the garment value in the world market, anti back staining agents are used in the wash bath.

Sarex has developed an Anti back staining agent, **Sarakol-BSI 667** which are added in the bath along with other chemicals associated with the respective washes. Sarakol-BSI 667 is capable of prohibiting the action wherein the removed dyes re-deposit themselves on the garment.

Unique Features:

- An Anti back staining agent for denim garments available in powder form.
- It forms stable dilution (30% dilution)
- Prevents re-deposition of indigo on garment, particularly labels and pockets in denim garment, during processing.
- It produces salt pepper effect when combined with cellulase enzyme in denim fading.
- Can be added in desizing as well as bio-polishing of denim garments.
- Anti back staining, excellent dispersing and anti re-deposition action
- Prevents staining of labels and pockets in denim garment.

Application:

Bio-polishing:
0.5-1.0 g/l Biopol-HC + 0.5-0.6 g/l Celldet-R + 0.5-1% Sarakol-BSI 667 (on weight of garment/fabric)
pH 5-7, depending on enzyme, Temperature 55oC, Time - 45-60 min.

Stone Washing:
0.5-1% Sarakol-BSI 667 on weight of garment/fabric.

Procedure to prepare 30% Sarakol-BSI 667:

- Charge 70 parts water and begin stirring
- Increase temperature to 90°C
- Charge 30 parts Sarakol-BSI 667
- Maintain temperature of 90°C
- Continue stirring for 30 min to obtain homogenous product
- Continue stirring while lowering down the temperature to 30°C
- Mix thoroughly and filter

Results:

Denim fabric	Staining on adjacent Polyester/Cotton (P/C) fabric	
	Without Sarakol-BSI 667	With Sarakol-BSI 667
		

Enzymatic treatment carried out in presence of Sarakol-BSI 667
effectively prevents the re-deposition of indigo dye on the denim pockets.

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

M&S

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