



Vol. 17, Issue 62, July 2023

# Saraquest

Exclusive Insight

[www.sarex.com](http://www.sarex.com)

**CHEMISTRY BEHIND  
GOOD FEELINGS**



# TABLE OF CONTENTS

01	<b>PARAKOL-LTW</b> Low Temperature Reactive Washing Off Agent	03
02	<b>REATHICK-791 7 &amp; 612</b> Reactive Printing Thickeners	06
03	<b>CELLBIND-PD, CE &amp; VS</b> Binders For Pigment Dyeing & Printing	09

## TEXTILE CHEMICAL MANUFACTURING

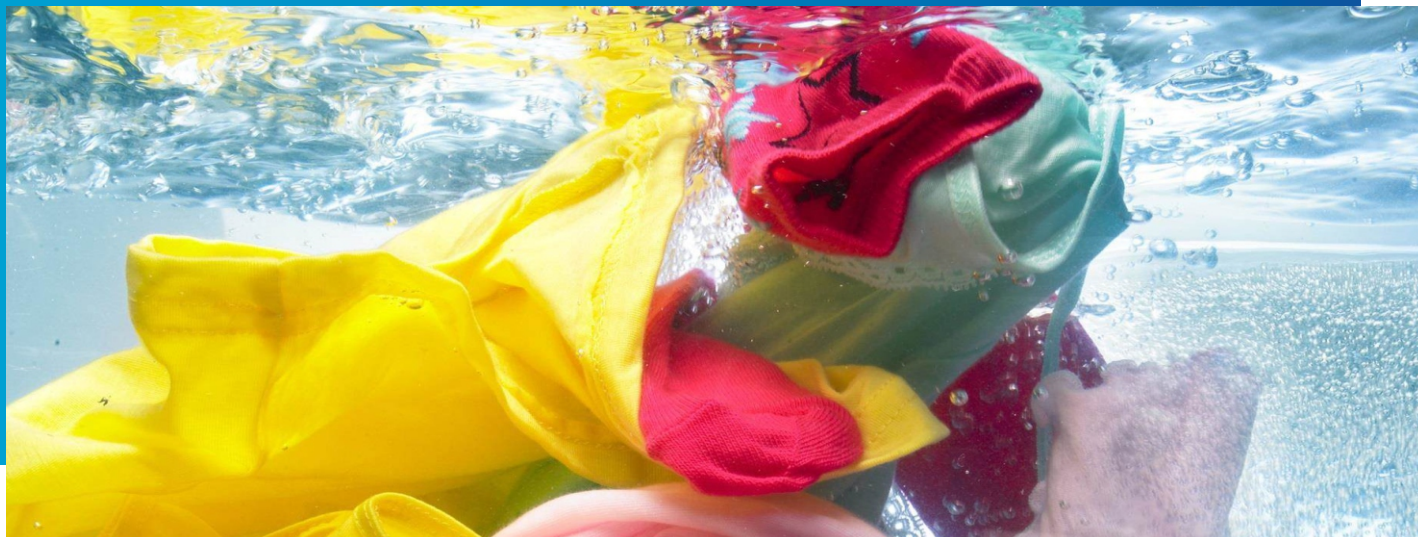
“Customer Delight” is the key strategy of **Sarex Chemicals** as its main motto is to provide solutions to the customers rather than selling products.

**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**







**R**eactive dyestuff belongs to the group of dyestuffs widely used for dyeing and printing of cellulosic fibre. Reactive dyes are extensively used for colouration of cellulosic fibres because of their excellent wash fastness which arises from covalent bond formation between dye and fibre. Due to the strong bonds between dyes and fibres, reactive dyeing's show particularly good fastness properties. Reactive dye contain reactive groups which react with the hydroxyl groups in cellulose under alkaline condition to form covalent bonds. However, this alkaline condition also facilitates the reaction of reactive group with the water, resulting in the hydrolysis of dye. The hydrolysed dyes adhere only superficially to the fibres and need to be removed from the goods after dyeing. Otherwise, dyestuff hydrolysates which is not removed from the dyed fabrics keep on getting removed during washing treatments causing poor wash fastness. So besides taking steps to reduce the hydrolysis as much as possible, this hydrolysed dye must be removed by rinsing and using an appropriate washing-off agent in order to retain the fastness properties. Deficient soaping often leads to the staining of white ground and re-deposition, resulting in insufficient wet and washing fastness. What is required in soaping after reactive dyeing, therefore, is powerful soaping properties that can strike a balance between the removal of unfixed dyestuff and prevention of re-deposition. Despite the fact that reactive dyes have attracted enormous scientific interest since their commercial introduction for the dyeing and printing of cellulosic fibres some 40 years ago, little published work has attended their wash-off. As mentioned, a variety of methods can be used for the wash-off of reactive dyeing's; the temperature, duration and the nature of the wash-off process depends on several factors including, for example, the depth of shade applied, the type of dye used, the type and construction of the substrate, etc. Since the purpose of washing-off is to remove either all the unfixed dye or at least a sufficient proportion of the unfixed dye such that the washed-off dyeing displays the desired, typically very good, fastness to wet treatments, it is important that wash-off is as effective as possible. Also, owing to the demands for increased productivity and reduced costs of dyeing, the wash-off process should be as efficient as possible, using a minimum of energy, water, chemicals and detergents.

With this background, Sarex has developed a product, Parakol-LTW, a low temperature washing off agent which enables washing off of Reactive dye at 60-65°C. Parakol-LTW is an excellent, highly efficient powder washing off agent with good efficiency. Normally, the washing off process is carried out at 98°C. In contrast, when using Parakol-LTW, washing off can be carried out at lower temperatures. Depending on the dyestuff and color depth, the fabric can be washed off between 60-65°C. Excellent wet fastness properties are achieved on cotton fibre/fabrics after soaping with Parakol-LTW.

### ● UNIQUE FEATURES

- Works at 60-65°C hence significant savings in energy.
- Excellent removal of reactive dye hydrolysate.

- Prevents the re-deposition of hydrolysed dye.
- Product is non-ionic in nature hence does not interfere in the subsequent processing and does not affect the hand feel of the treated substrates.
- Available in powder form hence easy to handle and easy to transport. It is readily soluble in water.

## ● APPLICATION

Reactive dyeing of cotton fabric was carried out with the below given percent shade.

Dyeing Recipe	Red Shade	Black Shade
C.I. Reactive Red 195	6.0%	–
C.I. Reactive Yellow 145	2.5%	–
Reactive Black GDN	–	8.0%
Glauber Salt	60g/l	60g/l
Soda ash	20g/l	20g/l
Sarakol-RDL	1g/l	1g/l
Saracream (Conc) (1.0%)	1g/l	1g/l
Sarawet-NF	1g/l	1g/l

Dyeing is carried out at 60°C for 30 min. keeping the MLR of 1:8. After adding 20g/l soda ash, dyeing is further continued for 90 min. at 60°C followed by drain. Below after treatment steps were followed after draining the dye bath:

- After dyeing, Drain
- Cold wash for 10 min. Drain
- Warm wash at 50°C for 10 min. Drain
- Neutralize with Acetic acid. Make bath pH 6-7, 60°C, 10 min. Drain.
- Treat with 1% Parakol-LTW at 60°C, 15 min. Drain
- Treat with 1% Parakol-LTW at 60°C, 15 min. Drain (For medium and very dark shades)
- Warm wash at 60°C for 10 min. and drain.
- Cold wash for 10 min. and drain.
- Cold wash for 10 min. and drain

### Note

- For package dyeing, the soaping should be carried out for minimum two cycles (02 “In-out” cycles and 02 “Out-in” cycles)

## ● EVALUATION METHODS

The efficacy of the soaping agent is evaluated by performing washing fastness of the soaped fabric. The washing fastness is performed by using standard test method ISO 105 C10.



● RESULTS

● Washing fastness of the soaped fabric - ISO 105 C10







Dye : 6% Reactive Red 195 + 2.5% Reactive Yellow 145	Dye : 8% Reactive Black GDN	
		Blank
		1% Parakol-LTW, 60°C (Twice soaping)
		Conventional, 95°C (Twice soaping)

Fig. 1 : Colour fastness to washing : ISO 105 C10

● Drain bath images after each rinse

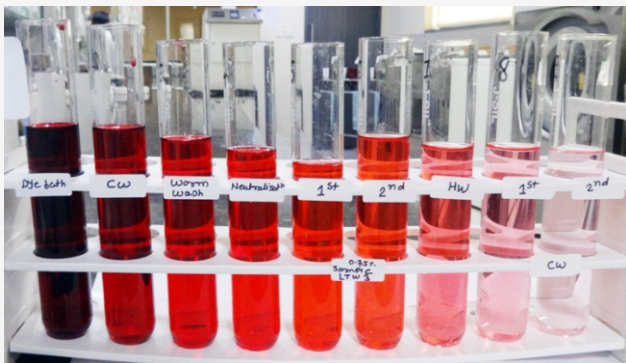
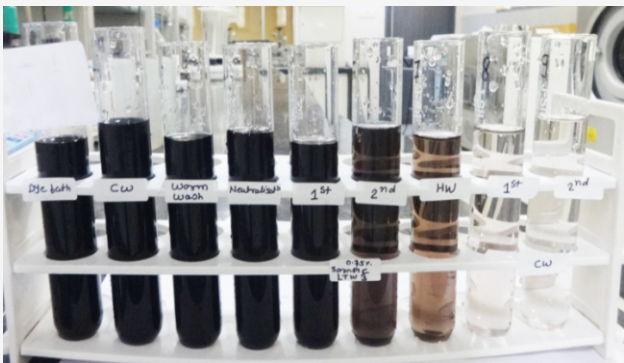
Dye : 6% Reactive Red 195 + 2.5% Reactive Yellow 145	Dye : 8% Reactive Black GDN
	

Fig. 2 : Drain bath photographs after each rinse

From the photographs it could be seen that the performance of Parakol-LTW at 60°C is excellent and is comparable with the Conventional washing off process which is carried out at 98°C proving its efficiency as a low temperature washing off agent.

# REATHICK-7917 & 612 | Reactive Printing Thickeners



**T**extile printing is an important method of decorating textile fabric. The coloration is achieved either with dyes or pigments in printing paste. A successful print involves correct colour, sharpness of mark, levelness, good hand feel and efficient use of dye and all of these factors depend on the type of thickener used. The thickener must be compatible with other ingredients present in printing paste.

Cotton fabric is the most commonly printed substrate, and reactive dyes are the most commonly used dyes in cotton printing. Natural thickeners viz., sodium alginate and guar gum are widely used for cotton printing with reactive dyes. The relatively high cost and limited supply of natural thickeners has spurred efforts to find alternatives. Synthetic thickeners, predominate in the printing of pigments due to their low solid content. They additionally offer advantage over natural thickeners in quick and easy paste preparation and viscosity adjustment, and consistency of quality and supply.

Today the pressure to print reactive dyes economically with high quality has led to the commercial development of synthetic thickeners in this application. There are many variables that might be examined, but generally a printer is looking for a paste that is easy to prepare, stable, and easy to remove. With this background, Sarex has developed two thickeners for Cotton printing with Reactive dyes., Reathick-7917 and Reathick-612. Key features of both these products are highlighted below:

## ● UNIQUE FEATURES - REATHICK-7917

- Synthetic thickener for Reactive printing.
- It is a sodium alginate substitute for Reactive printing on cellulosic substrates.
- It is highly suitable on viscose fabric.
- It exhibits excellent permeability with high brightness and high brilliancy in prints.
- It gives much better and cleaner print than sodium alginate.
- It is suitable for both, Flat bed and Rotary screen printing.

## ● UNIQUE FEATURES - REATHICK-612

- Hybrid thickener for Reactive printing.
- It is more suitable on cotton fabric.
- It exhibit prints with high brightness, levelness and high permeability.
- It gives much better and cleaner print than sodium alginate.
- It is suitable for both, Flat bed and Rotary screen printing.

- Rapid and controlled thickening and hence reduced stock preparation time.
- Stock thickenings show good viscosity retention on addition of dyestuffs.
- Can be printed over a wide range of viscosities and printing speeds.

## APPLICATION

### Reathick-7917 - Recommended recipe

Sodium Bicarbonate	: 2.5-3%
Super R Salt	: 1-2%
Urea	: 5%
Reathick-7917	: 3.5-5%
Water	: Balance quantity
Reactive dye solution	: As per the requirement

### Paste preparation method

It is recommended to use either demineralised water (DM water) or cooled steam condensate water for preparation of paste.

- Take the reactive dyes as per the recipe and dissolve it in water.
- To this, add Urea and Resist salt and dissolve completely.
- Then slowly add Reathick-7917 to get the desired viscosity.
- Add sodium bicarbonate just before printing. If required, adjust viscosity with the addition of small quantity of Reathick-7917.

### Note

- The dosages of thickener and auxiliaries can be adjusted according to actual practice.

### Reathick-612 - Recommended recipe

Sodium bicarbonate	: 2.5%
Sodium carbonate	: 0.5%
Super R Salt	: 1-2%
Urea	: 5-10%
Reathick-612	: 3-4%
Water	: Balance quantity
Reactive dye solution	: As per the requirement

### Paste preparation method

It is recommended to use either demineralised water (DM water) or cooled steam condensate water for preparation of paste.

- The alkalis are firstly added to the water and stirred until fully dissolved.
- To this, add Urea and Resist salt and dissolve completely.
- Then slowly add Reathick-612 to get desired viscosity. The stock is stirred using a high shear mixer for 20-30 min. to allow the full viscosity to develop.

### Note

- The dosages of thickener and auxiliaries can be adjusted according to actual practice.
- For viscose printing, higher quantity of urea (15-20%) is required



Printing procedure

The fabrics were printed with the above paste using screen printing method. The printed fabrics were dried and steamed at 100-102°C for 5 min.

Washing off

The printed fabrics were adequately washed off to remove residual thickener and unfixed color in order to ensure maximum fastness. The samples were washed with following procedure.




- 2 x Cold rinse (<30°C)
- 2 x Hot wash (90-100°C) with 1-2 g/l Sarakol-1583
- Rinses (80-90°C)
- Cold Rinse
- Neutralize to pH 6.5-7.5 if necessary
- Cold rinse.

Note



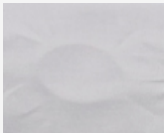

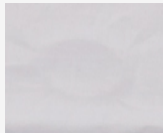

- Fabric printed with Reathick-612 thickener may also be washed at the boil throughout.
- This requires an open width washing range capable of maintaining temperatures at or close to the boil in all baths, and with counter flow.

PRINT PERFORMANCE

The printed fabrics were checked for their colour value, softness and hand feel and rubbing fastness property against the conventional printing with sodium alginate.

4% Reathick-791 7	4% Reathick-61 2	4% Conventional
		
Hand feel : Soft	Hand feel : Soft	Hand feel : Soft

Rubbing fastness of the printed fabrics

4% Reathick-791 7	4% Reathick-61 2	4% Conventional
 	 	 
Dry : 4 - 5+      Wet : 4+	Dry : 4 - 5+      Wet : 4+	Dry : 4 - 5+      Wet : 4

Reathick-7917 and Reathick-612 shows comparable printing effects against Conventional printing with sodium alginate thickener.



**T**extile printing is the branch of textile wet processing industry and is becoming increasingly popular for all fibres and varieties of fabrics as well as garments. Basically, printing is a form of dyeing in which the colours are applied to specified areas instead of the entire fabric. The resulting multicolored patterns have attractive and artistic effects which enhance the value of fabric much more than the plain dyed ones. Printing of cellulosic fibres is considered to account for more than 70% of all printed substrates and pigment printing is a major method. The use of pigments for printing of textile products has dramatically increased over the last 50 years. Pigments are used to produce printed products for the number of end uses including apparels, home furnishing, crafts and nonwoven articles. Over 18 billion linear yards of printed fabric produced worldwide each year, about 50% of this yardage is pigment printed.

Textile pigments are defined as colored organic substances which do not solubilize in water or other solvents easily and require a binding agent to hold them on the textile fabric. Pigments have no affinity to cotton and no mechanism to bond with the fabric. The use of pigment binder is therefore very important in producing pigment colored fabrics in the textile industry. Textile binders are necessary to form a matrix to entrap the pigment particle and must be stable to outside forces that would tend to dislodge the pigment from the textile substrate, such as washing or rubbing.

During the earlier stages of the development of binders for use in pigment printing, polyvinyl acetate was considered a good binder. However, it was realized that it produced too stiff handle. On other hand, Acrylate resins gave soft effects but pigments bound with them were not fast to rubbing. Binders are high molecular weight film forming agents produced by the polymerization of simple intermediates initially present in the paste in a homogeneous, dissolved or dispersed state. After evaporation of the solvent or other liquid vehicle, heating produces a thin coating or film. The film, several microns in thickness, encloses the pigment particles and adheres to the fibre. Since pigment coloration is an additive effect to the substrate, the components of this addition will tend to change the feel of the substrate or fabric. The fastness that can be obtained is, in many cases, adequate for the majority of end use specifications. The resulting hand or feel of the item being colored in this manner is important and is, by the nature of the process, going to be slightly harsher than the un-colored fabric. With proper selection of binder and the application system and variables, it is possible to produce an acceptable compromise in this regard. While handle is vital, it is not the only criteria used in selecting a binder. Durability, measured through color retention, is also important. Some of the softest binders have limited ability to hold the pigment onto the fabric so a binder system that can satisfy performance requirements on many levels is generally desired.

In pigment printing, insoluble pigments, which have no affinity for fibres, are fixed on to the fibres with binding agents or binders. Binders play important role in pigment printing in achieving optimum fastness properties. Depending upon the properties required in the binding film (softness, elasticity, plasticity, solvent stability), binders can be tailor-made by

choosing suitable base product. The binder used in the pigment printing process is usually based on styrene-butadiene, styrene acrylate or vinyl acetate acrylate copolymer. Pigment printing technology of textiles has been applied widely because of its simple operation techniques, complete color and excellent fastness. Generally, poly-acrylate, polybutadiene, polyvinyl acetate and polyurethane all can be used as pigment printing binder. Very small amounts are required to achieve the desired properties, which offer cost effective textile operations and ensure negligible environmental impact.

Following are the properties which a textile binder should fulfill:

- It should not get coagulated due to shear forces.
- The binder film must be clear and transparent.
- The binder film must be of even thickness, smooth, neither too hard nor too soft.
- It should be elastic in nature and should have good adhesion to the substrate without being tacky.
- It should have good resistance to chemical and mechanical stress.

Following are the unique features of the Binders offered by Sarex:

● **UNIQUE FEATURES - CELLBIND-PD**

- Cellbind-PD is a formaldehyde free binder.
- It is used for pigment dyeing and printing of cellulosic and its blends.
- It gives very good brightness and soft handle to dyed and printed fabrics.
- It imparts very good rubbing fastness.
- It can also be used as a coating agent to impart soft feel to the fabric.
- No roller build up on the mangle during pigment dyeing.

● **UNIQUE FEATURES - CELLBIND-CE**

- Cellbind-CE is an APEO/NPEO free binder for pigment printing of cellulosic and its blends.
- It gives very good brightness and feel to the printed fabrics.
- It increases the resistance to abrasion.
- It imparts very good wash and rubbing fastness.
- It can also be used as a coating agent to impart soft feel to the fabric.

● **UNIQUE FEATURES - CELLBIND-VS**

- Cellbind-VS is formaldehyde free binder for pigment printing of cellulosic and its blends.
- It gives very good brightness and soft and elastic handfeel to printed fabrics.
- It increases the resistance to abrasion.
- It imparts very good wash and rubbing fastness.
- It can also be used as a coating agent to impart soft feel.

**APPLICATION**

**Cellbind-PD - Recipe for Pigment dyeing**

Pigment emulsion : as per requirement			
Cellbind-PD	: 20-50 g/l		
Saralink-ULF	: 10-20 g/l		
MgCl <sub>2</sub>	: 3-6 g/l	<b>OR</b>	Cellbind-PD : 20-50 g/l
Water	: Balance quantity		Citric acid : 0.5 g/l
			Water : Balance quantity

**Process:** Print ➡ Dry in the drier at temperature above 130°C ➡ Cure at 150°C for 5 mins.



### Recipe for Pigment printing - For 100% Cotton (Woven or Knits)

Pigment emulsion	1%	> 1-4%	above 4%
Binder*	8%	12%	3 times the pigment
Synthick P-328	1.50%	2%	2-2.5%
Urea	5%	5%	5%
Saraprint-AC	–	2%	2%
Liquor ammonia	–	1%	2%
Water	balance	balance	balance

*\*Cellbind-PD, Cellbind-VS, Cellbind-CE*

**Process:** Print → Dry at temperature above 130°C → Cure at 150°C for 5 mins.

### Recipe for Pigment printing - For PES/Cotton blend (max. upto 67% Polyester)

Pigment emulsion	1%	> 1-4%	above 4%
Binder*	8%	12%	3 times the pigment
Synthick P-328	1.50%	2%	2-2.5%
Urea	5%	5%	5%
Saraprint-AC	1%	2%	2%
Liquor ammonia	–	1%	2%
Water	balance	balance	balance

*\*Cellbind-PD, Cellbind-VS, Cellbind-CE*

**Process:** Print → Dry at temperature above 130°C → Cure at 150°C for 5 mins.

### Coating recipe

Binder\* : 50-70 parts

Thickener : 2-4 parts

Water : Remaining

*\*Cellbind-PD, Cellbind-VS, Cellbind-CE*

### Note

- For pigment printing, it is very essential that the fabric pH should be acidic around pH 5.5-6.
- To get sharp prints, the fabric should be free of salts.

### CONCLUSION

There are a variety of different binders available to the textile processor. And there are many end use requirements that a particular binder has to fulfill. Sarex offers a range of textile binders, Cellbind-CE, Cellbind-PD and Cellbind-VS based on these end applications. These binders are extensively used in textile industries and are on high demand in the market for their unique features.

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



M&S



ROADMAP  
TO ZERO



ISO  
45001:2018



ISO  
17025:2017



bluesign®



SYSTEM  
PARTNER



ISO  
14001:2015



ISO  
9001:2015



TWO STAR  
EXPORT HOUSE



GOTS



## Sarex

Sarex stands for quality products!

### Company



#### Corporate Office:

501 - 502, Waterford,  
'C' Wing, C D Barfiwala Marg,  
Juhu Lane, Andheri (W),  
Mumbai - 400 058, India.



+91 (22) 6128 5566  
+91 (22) 4218 4218



+91 (22) 4218 4350



[tcexn@sarex.com](mailto:tcexn@sarex.com)  
[tcexp@sarex.com](mailto:tcexp@sarex.com)



[www.sarex.com](http://www.sarex.com)



#### Plants:

N-129, N-130, N-131,  
N-132 & N-232,  
MIDC, Tarapur - 401 506,  
India.