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 : 2017 (NABL certified lab)
- ISO 45001 : 2018
- ISO 14001 : 2015
- ISO 9001 : 2015

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DENIZYME-WF

Sustainable Washing Process Of Denims

A good pair of jeans is a chief element of a modern day wardrobe which is both fashionable and durable. Among the many fashion and apparel products, denim jeans and other denim products have a separate identity. Denim, a fundamental component of the casual wardrobe, has become a staple textile within the global apparel market. The market value for denim fabric was 90 billion U.S. dollars in 2019 and is expected to increase to 105 billion U.S. dollars by 2023. Denim or blue jeans is by far the most valuable product in the denim industry, though there has been an increase in value for every type of denim clothing item.

Back in the day, people just wore their jeans to eventually get a worn-in look. However for today's generation creating instant gratification, and recreating the look or effect requires a lot of people, time, chemicals, and resources. Jeans are almost never developed with the intention of embracing their original state and colour. Nearly, always finishes or after-treatments are applied in order to give the jeans a worn look. This finishing treatment can be a chemical one, a mechanical one or a combination of both. We may simply think of a worn pair of blue jeans as an old friend, but may not put a lot of thought into how these jeans were made. In fact, a great deal of water goes into growing cotton, washing it, and dyeing it blue.

Consumers are increasingly looking for sustainability in their clothing choices. When it comes to the discussion of sustainability in the fashion supply chain, the first subject comes in the discussion, is the denim manufacturing. Unfortunately, the world's most ubiquitous clothing article, the denim jean, is also one that has traditionally had major negative impacts on the environment. The denim industry is the one putting the most strain on the environment due to the washes, dyes and chemicals used and the overall water consumption needed to make just one pair of jeans (currently around 2,000 gallons or 7,600 litres of water).Industrial wash and finish are the primary stages in the denim supply chain that has become a key focus for denim brands to reevaluate their environmental impact. It is well documented that during the wash and finish process, also known as laundry, there are traditionally vast amounts of water and chemicals used to create the faded appearance. Chemicals like chlorine, potassium permanganate (PP) and sodium hypochlorite are just a few of the hazardous chemicals used at this stage. Large amount of greenhouse gases are released from the denim manufacturing unit and its impact on the environment is not so happening, as this ever fashionable garment.

Consumers are largely unaware of the detrimental impact of pre-treated denim. Ready made vintage jeans have been the standard since the late 60s when stone washing was first introduced. Despite ecological warnings and little progress in sustainable innovation, the success of stonewash has only grown since its inception in the late 60s. Infact, the demand for the neo-vintage effect even lead manufacturers to discover another environmentally impactful technique, acid wash

during the 1980s. While stone offered a ready made vintage appearance, acid wash championed an even bolder and sharper contrast, which made it an instant hit within youth of the time. The biggest environmental concerns of both stone and acid wash, centers around water in both, the consumption, contamination and toxic discharge. Traditional stone wash requires 70+ litres of water simply to eliminate sand residues, and to achieve acid wash with light base colour, it requires 2-3 baths as the bleaching agent needs rotation to work effectively.

The popularity and variety of jeans, including different colors, has had a major impact on the environment. For example, fading often requires pumice stone washing with harsh chemicals that simultaneously or subsequently decompose the indigo dyes, and the distressed look may require up to 20 chemical-intensive washes. The waste from these methods is often just dumped into rivers. Chemical residues, heavy metals (manganese, cadmium, chromium, mercury, lead and copper), strong bleaching and oxidizing agents, blue pigment dust, fine particles of pumice, and destroyed fibres are therefore a major problem for the local environment. Work practices are also often not designed to protect employees. The toxic environment surrounding denim production is known to cause several health problems, including respiratory disease, hearing loss, skin cancer, and brain damage.

Authorities are now demanding sustainable way of producing denim jeans and better working practices. Innovative washing processes and technologies are creating sustainable solutions. More efficient washing machines and eco-friendly chemicals, such as enzymes, are among the options being explored and implemented. The common goal is a reduction in water, chemical and energy consumption.

As supply chain needs continue to change, both brands and consumers alike are looking for more sustainable options without sacrificing the look and feel that consumers love about their favourite pair of jeans. Keeping in view the current shortcomings of denim processing i.e. consumption of large quantity of water, usage of hazardous chemicals for obtaining washed effects, health hazards of the bleach chemicals and sand residues and the generation of waste water., Sarex has come up with a new product **Denizyme-WF** which to a greater extent can be considered as a sustainable solution for denim processing as it enables water free bleaching of denim. This new process with Denizyme-WF will also prevent the waste water generation, will save huge amount of water and hours of electricity. With Denizyme-WF, it is now possible to achieve the same designs and overall look of denim while saving water, energy, time, and/or chemicals throughout the process. Following mentioned are some of the unique features of Denizyme-WF.

Unique Features:

- Water free bleaching
- Stone free processing. No need of Pumice stones
- Outstanding Stone fading effect and Puckering effect
- Reduced load in the effluent
- Sustainable and Green process
- Saves Water and Energy leading to Sustainable process
- Compliant with the Eco norms

Application:

Application – Water free Process:

Stage-1 : Prewash

Sarakol-BSI-667 : 0.5 %
Celldet-R : 0.5 %
Anticrease (Conc) : 1.0%
(1 : 100 dilution)

Treat at Room temperature for 15 min. and Drain

Stage-2 : Application of Denizyme-WF

Denizyme-WF : 3.0 %
pH : No need to maintain
Temperature : Room Temperature
Time : 45 min.

Note :
1. After every 15 min., sprinkle the product and run
2. Addition of Anti back staining agent is optional

Stage-3 : Washing

Cold wash for 5 min.

Stage-4 : Brightening

Sarabrite : 2.0%
Temp. : 40 – 50°C
Time : 15 min.

Stage-5 : Softening

Softening and Drying

Results:

Performance of Denizyme-WF comparison with the Regular Process

Unfinished Denim

Regular Process

Denizyme-WF Process

Denizyme-WF shows better results in terms of

i. Color Cutting
ii. Puckering effect (Which can be observed on the stich parts) & Less back staining

With the new development of Denizyme-WF from Sarex, the denim industry will soon witness drastic improvements from its latest innovations.This type of green process is a great example for saving water, energy, materials and reducing environmental pollution. Denim companies need to measure their environmental footprint to protect the environment, as the answer to the call of sustainable jeans, at the same time benefit from the business.

DIGIPRINT-7146

Digital Printing

Textile industry has taken a big leap in the digital printing sector. One of the most promising developments in the textile industry is digital fabric printing. Digital printing is a relatively young but an expanding printing method. It has opened the doors for numerous prospects to enhance the quality and maintain the growing demands of textile printing. Anything can be printed with ease and perfection on fabric using digital printing technology. In simple words, when digital images are reproduced on physical surface, it is called digital printing.

Digital textile printing is considered to be the next generation printing which is quite different from the conventional fabric printing. It is foreseen that the traditional flat or rotary screen printing and roller printing techniques may be superseded by digital printing technologies in the near future. Digital printing is a non-impact, dot-matrix printing technology in which droplets of ink are jetted from a small nozzle directly to a specified position on a substrate to create an image. The size of the smallest drop determines the finest detail that can be reproduced in the digital process. Dots as small as 3 pico litre (diameter about 18 microns) can be generated at the present level of ink jet technology. Digital printing is the only non contact printing method and because of this, it is the most ideal of all printing methods.

With fabric printing going digital, many textile entrepreneurs are coming forward to invest in digital printing technology as it is the most budding method of printing. In India, the textile industry is embracing digital printing technology by printing novel designs on saris and dress materials to meet the demands of domestic and international markets.

Advantages of Digital Printing:

- A major advantage of digital printing is its versatility. It can be used with varied combinations of ink type and substrates. Due to its advantages compared to conventional printing methods, it has become common in the industrial printing and packaging industry.

- Multiple colour shades can be printed on the fabric at a time which is not a case with traditional printing techniques. The digital textile printing system can supposedly produce 16 million colours and shades. Hence, the process is time saving and cost effective.

- The technique of Digital printing offers benefits such as speed, flexibility, creativity, cleanliness, competitiveness and eco-friendliness.

Ink-jet printing is generally carried out in three steps:

1. Pre-treatment
2. Printing
3. Post-Treatment (Fixing)

In digital printing, it is known to treat the textile materials which are to be printed by the digital printing process with a pre treatment product to improve the performance properties of printed textiles. This pre-treatment is intended to improve the holdout of the inks on the textile substrate and to provide a higher colour strength and also better fixation of the inks on the substrate. It would be desirable to have distinctly crisper contours (improved definition) for the prints on the substrate in order that higher resolutions may be achieved for the prints.

For digital printing of textiles using piezo or bubble jet printers, the fabric is first given a treatment by padding with a solution of thickener and a variety of agents to facilitate dye absorption and fixation followed by drying. This results in the droplets of dye being absorbed largely on to the surface fibres and produces sharper prints.

The general process route with textile Digital printing is to pad with necessary chemicals along with the addition of thickening agent to hold the ink in position before drying and fixation.

Sarex has developed such product **"Digiprint-7146"**, a pre-treatment auxiliary for Digital printing. The use of this product in pre-treatment process enhances the colour yield of the printed fabric. It also serves as an inhibitor for migration of ink droplet and thereby controls the levelness and sharpness of prints.

Unique Features:

- Digiprint-7146 forms a coating on fabric and makes it suitable for digital printing for cotton.
- Coating with Digiprint-7146 will help in achieving sharp and brighter prints, with higher color yield.
- It is easily washed off and hence maintains the original hand feel of the fabric.
- It is available in powder form and thus requires very small quantity for application.
- Digiprint-7146 forms a very soft film and does not show any crack marks during digital printing.
- It is a very low viscosity product and thus does not cause gumming up on the rollers and can be easily applied on the fabric.

Product Characteristics and Mechanism of Action:

A. Digiprint-7146 forms a uniform film on the fabric surface, which helps in covering the hairiness on the surface and thus protects the print heads from the fibres and in turn improves the life of print head.

B. Digiprint-7146 film is elastic in nature and does not shrink on drying hence it does not shrink the fabric and do not crack on fold.

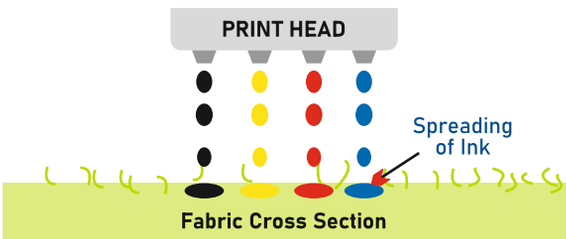
Poor coating agents shrink and makes the fabric wavy. Such wavy fabric do not stick well on printing blanket.

Digiprint-7146 coating does not crack on folding and thus does not show fold marks on printing.

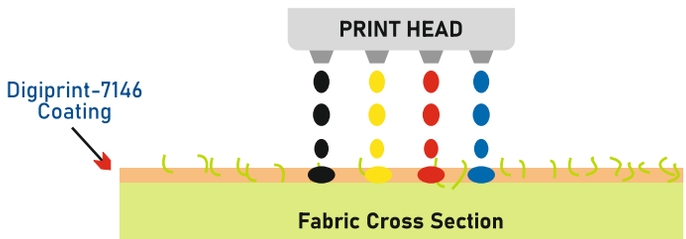
Film formed with poor and hard coating agent cracks and these cracks are visible on printed design.

Digiprint-7146 coating does not crack on folding, thus does not show fold mark after printing.

C. Digiprint-7146 film is non-porous in nature and does not allow the ink to spread when printed on fabric, thus giving very sharp prints.



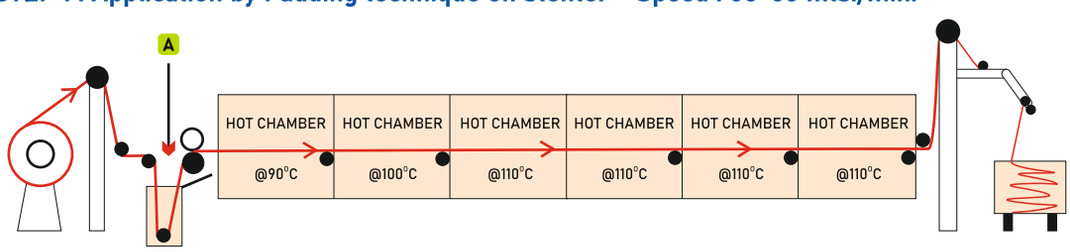
Uncoated fabric is porous in nature and due to capillary action the ink spreads during printing giving smudgy print.



Digiprint-7146 coated fabric is non-porous in nature and the ink does not spreads on printing giving sharp prints.

Application Process:

STEP 1 : Application by Padding technique on stenter - Speed : 50-60 mts./min.



A

Recipe:

Digiprint-7146	: 20-30 g/l
Urea	: 50-100 g/l
Sodium Bicarbonate	: 50-100 g/l
Resist Salt	: 20 g/l

Application on Garment by Spraying:

Spraying Recipe:

Digiprint-7146	: 10-15 g/l
Urea	: 100 g/l
Sodium Bicarbonate	: 35 g/l
Resist salt	: 20 g/l

Dry the garment at temperature of 100-110°C or Air drying.

STEP 2 : Printing on Digital printing machine

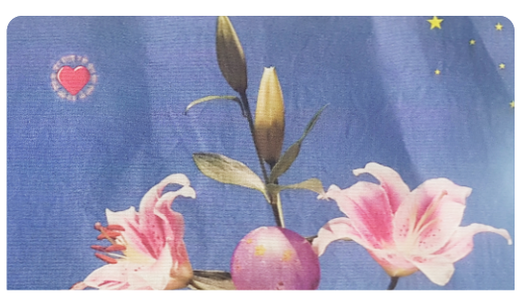
STEP 3 : Fixation by steaming : Steam at 100-102°C for 8 min. on Loop ager

STEP 4 : Washing off : Washing like regular printed fabric washoff process

Results:

Digiprint-7146 : Printing Results on the Fabric

Printed after pre-treatment with Digiprint-7146



Printed after pre-treatment with market product

Above results shows that, fabric Pretreated with Digiprint-7146 gives better colour depth, brightness and sharpness than conventional product available in the market.

TEXPRINT-FF

Crosslinking Agent For Pigment Printing

Coloration is a value added treatment for most textile materials which includes dyeing and printing processes. Dyeing is a process of applying color to the whole substrate. From the view of coloration, printing is a partial dyeing on fabrics to form an attractive pattern. The resulting multicolored patterns have attractive and artistic effects which enhance the value of the fabrics much more than the plain dyed ones. Coloration could be achieved with either dyes, by dyeing or printing in aqueous solution, or with pigment by using a print paste.

Pigment printing is not only the oldest but also the easiest printing method as far as simplicity of application is concerned. The use of pigments for printing of textile substrate has dramatically increased over the last 50 years. Pigments are used to produce printed products for a number of end uses including apparels, home furnishing, crafts and nonwoven articles. More than 80% of the printed goods are based on pigment printing due to its obvious advantages, such as versatility, ease of near final print at the printing stage itself, applicable to almost every kind of fibre or mixture and the ability to avoid any washing processes after fixation. Pigments offer great flexibility in processing, as they require no after-treatment other than drying and curing. The ease of handling also accounts for increase in pigment usage for solid shade dyeing and garment dyeing of textile substrates.

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 fibre. Pigments have no affinity to cotton and no mechanism to bond with the fibre. Organic pigments can be dispersed with a surfactant in water and this dispersion is then blended with a water soluble or a water based emulsion of a polymerizable resin. The water is removed by drying and the polymerization is produced by heat. Therefore, when a pigment is applied to a fabric, it is done so in conjunction with a binder. The binder selected must perform several functions in order to produce a low cost, colored, desirable, and sellable textile.

In pigment printing, insoluble pigments, which have no affinity for the fibre are fixed onto the textile with binding agents in the pattern required. This description is perhaps oversimplified, but it does obviously set pigments apart from dyes that are absorbed into the fibre and fixed there as a result of reactions specific to the dye. Printing paste is the main constituent of printing which enables the formation of the predefined patterns. The printing paste for pigment printing generally contains pigments, emulsifiers, binders, softeners, thickeners, antifoaming agents and crosslinking agents. It is therefore necessary to give individual consideration to each of the printing paste constituents. All the above constituents are not used simultaneously in any pigment printing paste depending on the class of pigment used and style of printing employed, suitable component are selected in making in printing paste. Binders and crosslinkers play important role in pigment printing achieving optimum fastness properties.

Currently, pigment printing is perhaps the most commonly and extensively used technique for printing textiles. However pigment printing has a few problems viz., relatively high temperature cure, stiff hand and poor crock fastness of printed goods. These disadvantages are related to binder and crosslinkers used. Thus, to improve the quality of pigment goods, the overall properties of the binders and crosslinkers need to be improved.

Most of the pigment printing binders in the market are macromolecule copolymers that are formed by emulsion polymerization processes from vinyl based monomers. They contain hydrophilic sections, which make them dispersible in print paste formulations and side chain functional groups, some of which are capable of forming films by crosslinking reactions.

Crosslinking agents are the glue that gives structure to binder films. Crosslinking is the process of chemically joining two or more molecules by a covalent bond. Crosslinking agents or crosslinkers are molecules that contain two or more reactive ends capable of chemically attaching to specific functional groups. One such product developed by Sarex is **Texprint-FF.** Texprint-FF is a formaldehyde free crosslinking agent for pigment printing. It is particularly effective for prints taken on knitted, cellulosic fabrics, polyester/cotton, polyester/viscose and polyamides fabrics. Addition of Texprint-FF to a pigment paste enhances its fastness properties especially wet rubbing fastness. It contains several reactive sites which helps the bonding of binder polymeric chain on the textiles fibres. It is formaldehyde free and hence suitable for the application on kids wear.

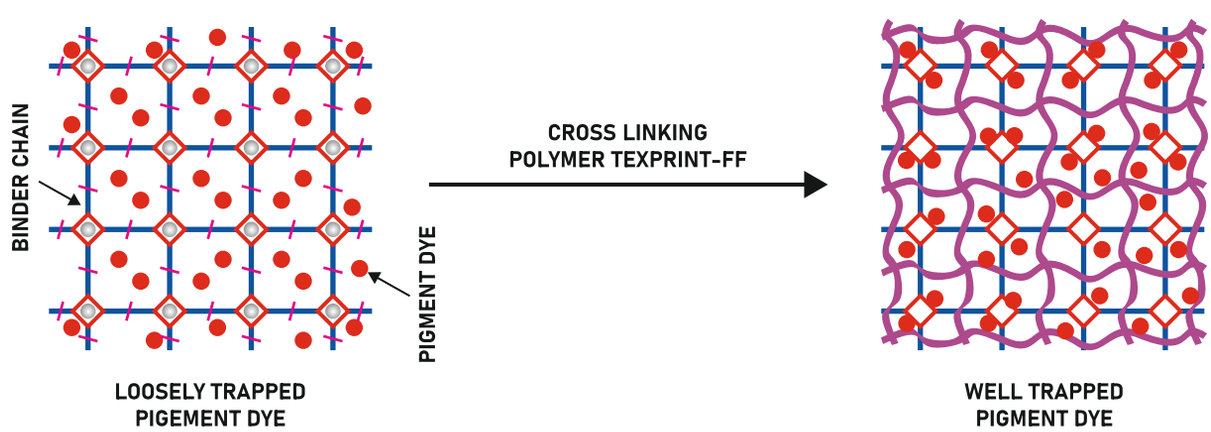
Unique features of Texprint-FF

- Texprint-FF improves wet rubbing fastness of fabric printed with pigment dyes.
- It is formaldehyde free crosslinking agent thus suitable to use for kids wear.
- Since it is an additive in print paste, there is no compatibility problem during finishing.
- It does not impair the handfeel of pigment printed fabric.
- It does not affect the runnability of print paste thus do not reduce printing speed on rotary machine.

Mechanism of Action:

Pigment printing uses binders which on curing form long chain polymer which entrap the pigment dye. But due to no self cross-linking property of binder, these pigments are loosely held and may come out during rubbing. Texprint-FF has property that it crosslinks the binder chains and thus help in holding the pigment particles more strongly and improves its rubbing fastness.

Schematic diagram of crosslinking with Texprint-FF



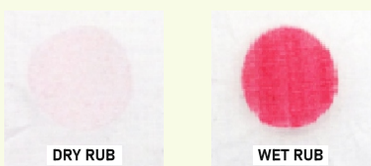
Application Process

Pigment Printing Recipe:

For Print depth upto 1%		For Print depth upto 2%		For Print depth upto 2%	
Pigment dye	: 1%	Pigment dye	: 1.1-2%	Pigment dye	: 2.1% and above
Cellbind -213	: 8%	Cellbind -213	: 12%	Cellbind -213	: 20-30%
Urea	: 5%	Urea	: 5%	Urea	: 5%
Synthick-P328	: 2-2.5%	Texprint FF	: 1.5%	Texprint FF	: 2-3%
		Synthick-P328	: 2-3%	Synthick-P328	: 3-3.5%

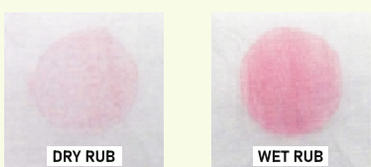
Product Performance

Without Texprint-FF



Results of Rubbing Fastness without Texprint-FF

With 3% Texprint-FF



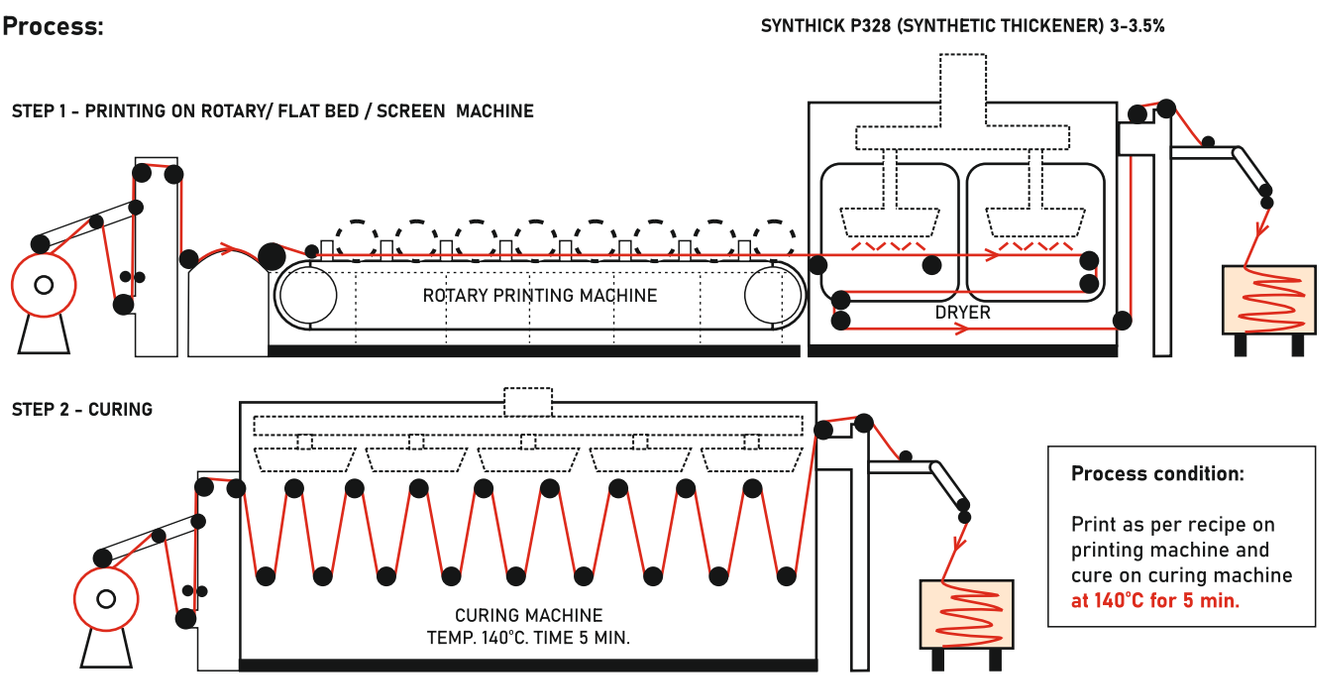
Cotton fabric printed with following recipe:

Pigment emulsion : 7%
Binder : 30%
Texprint-FF : 3%

Print → Dry → Cure at 140°C for 5 min.

The results shows significant improvement in wet rubbing fastness with the use of Texprint-FF

Process:



Process condition:

Print as per recipe on printing machine and cure on curing machine **at 140°C for 5 min.**

Conclusions :

Fabric printed with Texprint-FF shows no shade change or dullness. The feel of the printed fabric is same as other pigment printed fabrics. Treatment is durable to multiple home launderings. No reduction in light fastness observed with use of Texprint-FF.

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

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