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)
- OHSAS 18001 : 2007
- ISO 14001 : 2015
- ISO 9001 : 2015

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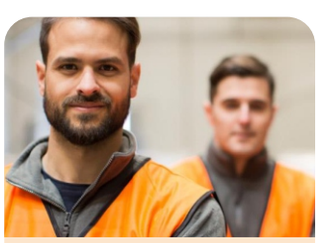
ECOGUARD-NEW

New Generation, Durable Fluorine Free Water Repellent

In medical textiles, exposure and transfer of blood and bodily fluids between patients and medical personnel during first-response care or within hospitals is of high concern, with the potential for transfer of bacteria and viruses. Repellency to blood and bodily fluids is essential for occupational protection and a repellent finish is needed for sufficient barrier properties, of which a high level of repellency is currently provided by fluorinated polymers. These polymers possess environmental toxicity and due to this, their use is increasingly restricted.The concerns associated with long-chain have led to shift towards fluorine free water repellents which are safe to the environment and meets the environmental requirements; the price is also 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 best suitable for cellulosic's and their blends.It can also be applied on synthetic fibres, wool and their blends. Ecoguard-NEW can be applied on sportswear, outdoor textiles, and protective wear and also on garments and apparels.



Work Wear

Medical Textiles

Apparels

Outdoor Wear

Unique Features:

- Passes AATCC 42, AATCC 22, AATCC 193.
- Durable to dry cleaning, unlike other fluorine free water repellent.
- More durable than conventional Fluorine Free water repellents.
- It 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.
- Fulfills requirement of leading retailers like M&S and H&M.
- Suitable for Cotton, Polyester, Polyamide and their blends like CVC (Chief Value Cotton) fabrics.

Results:

Treated fabrics were tested by AATCC 22 for spray rating, AATCC 193 for Alcohol repellency and AATCC 42 for Impact Penetration Test. These fabrics were also tested for durability by AATCC 135 and for Dry cleaning durability, using perchloroethylene at room temperature. Ecoguard-NEW was also applied on CVC fabric (60% Cotton & 40% Polyester) and was tested for AATCC 42 which is one of the most used fabric for manufacturing of medical gowns. Results of all are tabulated below in Table 1, 2 and 3.

Table 1 : AATCC 42 Results of Ecoguard-NEW treated textile substrates

Sr. No.	Samples	Impact Penetration Test (AATCC 42) Blood Repellency		
		100% Cotton	100% Polyester	CVC fabric
1	120 g/l Ecoguard-NEW	Pass	Pass	Pass
2	After 20 Home Launderings (HL)	Pass	Pass	Pass

Table 2 : AATCC 22 Results of Ecoguard-NEW treated textile substrates

Sr. No.	Samples	Spray rating AATCC 22		
		100% Cotton	100% Polyester	100% Polyamide
1	100 g/l Ecoguard-NEW	100	100	100
2	After 20 Home Launderings (HL)	80	80	80
3	After 3 Dry cleanings	80	80	80

Table 3 : AATCC 193 Results of Ecoguard-NEW treated textile substrates

Sr. No.	Samples	Alcohol Repellency AATCC 193		
		100% Cotton	100% Polyester	100% Polyamide
1	Unfinished	0	0	0
2	100 g/l Ecoguard-NEW	6	5	5

Conclusion:

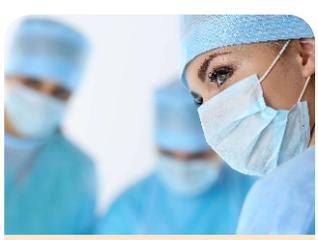
In this article, various textile substrates were treated with Ecoguard-NEW, and it was found that the treated fabrics showed durable results irrespective of the substrates. Treated fabrics were also durable to dry cleanings. Ecoguard-NEW also passed the AATCC 42 (Impact penetration Test) which is one of the most essential and demanded test method for manufacturing medical gowns in this pandemic period. Sarex, following its objective to provide environmental friendly solutions, is at the forefront to swing its focus to manufacture fluorine free water repellents.

ZOROGUARD-ZP

Zinc Pyrithione based Antifungal, Antiviral and Antibacterial agent

Mold and mildew are the common terms used to identify a whole range of microorganisms that survive on organic materials and cause damage. Textiles are particularly susceptible to damage through microorganism growth, a problem familiar to collection managers. A large number of fungi, bacteria, yeast, and algae have been identified as surviving on fabrics. Associated with a characteristic musty odor, microorganism growth appears as an irregular stain which generally ranges in color from gray to black although yellow, orange, and red stains are possible.

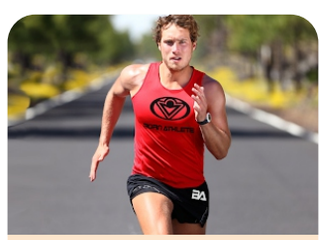
Antimicrobial finishes have been used in the textile market for decades. Antimicrobial treated textile fabrics possess a wide range of applications in the defense and civilian sectors. In hospitals, these treated fibres are used to mitigate cross contamination from microbes. Various types of antimicrobial finishes are currently available including oxidizing agents like aldehydes and halogens, quaternary ammonium compounds, metallic compounds like cadmium, silver, and natural antimicrobial agents like chitosan and neem. Each group of these antimicrobial finishes has both different properties and different modes of actions against microbes.



Personal Protective Clothing

Home Furnishing

Apparels



Sports Wear

To provide such functionality to fabrics, Sarex has developed highly effective antifungal, antiviral and antibacterial agent **Zoroguard-ZP**. Zoroguard-ZP treated fabric ensures protection of the treated textile and passively protecting the user. Zoroguard-ZP imparts freshness, comfort and longer life to the fabric.

The concept behind this shielding technology is to reduce and prevent the colonization and multiplication of fungus, bacteria and viruses which causes undesirable odors, staining and material fatigue through the antimicrobial treatment.

Unique Features:

- Zoroguard-ZP is a wide-spectrum antimicrobial, effective in preventing growth of bacteria and fungi including mold, mildew and algae.
- Being bacteriostatic in nature it is eco friendly and safe, both for manufacturer to apply and consumer to use.
- Leaching antimicrobial.
- Passes AATCC 30, ISO 18184:2019, AATCC 100, JIS L 1902 test methods.
- Excellent antibacterial and antiviral durability.
- Suitable for all substrates viz, Cotton, Polyester, Polyamide and their blends.
- Can be applied by padding, exhaust, soaking and spraying methods.

Materials & Methods:

A 100% Cotton, Polyester and Polyamide woven fabrics were treated with 30 g/l Zoroguard-ZP with 65% pick-up. The pH of 7 was maintained and the fabrics were dried at 120°C for 5 min.

Test Methods:

Assessment of antifungal activity (AATCC 30)

Potato dextrose agar medium was prepared and dispensed in Petri dish and the uniform spore suspension of *Aspergillus niger* and *Candida albicans* were inoculated into 50±2 ml of sterile distilled water containing few glass beads and shaken vigorously to bring the spores into suspension. About 1 ± 0.1 ml of inoculum was distributed evenly over the surface of the agar. The test specimens were cut into 3.8±0.8 cm and placed in contact with hardened agar medium over which 0.2 ± 0.001 ml of the inoculum was evenly distributed by means of a sterile pipette. The plates were incubated at 27°C for 5 days. At the end of the incubation period, the antifungal activity was reported by measuring the zone of mycostasis underneath and alongside of the fabric.

Evaluation of Antiviral Activity by modified AATCC 100 : 2012

Test and control fabrics were cut into appropriately sized swatches of 50 mm diameter and stacked. The numbers of swatches taken were 2-6 in order to absorb the entire liquid inoculums of 1 ml quantity. Stock virus was standardized to prepare a test inoculum. The test inoculums were supplemented with an organic soil load, if required.

Test and control materials were inoculated with the test virus and incubated in a humid environment at 35°C for 2 hours and 24 hours contact time.

The viral concentration is determined at "Time Zero" to verify the target inoculums using standard cell culture (e.g. TCID50) or plaque assay techniques. Assay plates were incubated for 48 hours for the virus-host cell system.

After the incubation period, following neutralization, the carrier suspensions were quantified to determine the levels of infectious virus survived and the assay is scored for titre of test virus.

Adequate control is implemented to verify neutralization effectiveness of the antimicrobial agent with Neutralizer used. Percent reductions are computed for test fabric relative to the Time Zero enumeration(s), and reported.

Test Microorganism information

MS2 Bacteriophage (MS2) is an RNA virus of the family *Leviviridae. Escherichia coli* '15597 are the hosts for MS2 bacteriophages. Due to its environmental resistance, MS2 bacteriophages are used as a surrogate virus (particularly in place of Picornaviruses such as Poliovirus and human Norovirus) in water quality and Antimicrobial studies.

TM100-TM 100 Test Method for Antibacterial Finishes on Textile Materials: Assess

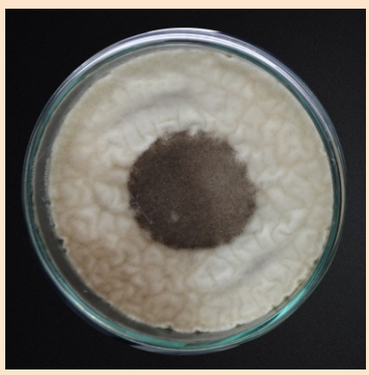
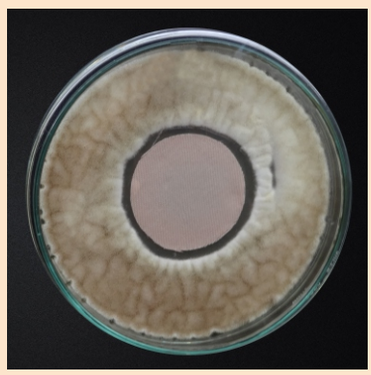
Finished fabrics were also tested with AATCC 100. This method is used to quantitatively test the antibacterial activity of the textiles over the contact period of 24 hours against *Staphylococcus aureus* and *Escherichia coli* and *Klebsiella pneumoniae*. These fabrics were also subjected to 25 home launderings by AATCC 135A test method and were again tested for antibacterial activity.

Results & Discussion:

It is plausible from Table 1 that treated fabrics showed excellent antifungal activity and also shows zone of inhibition against fungal growth.

Table 1 : Representation of Antifungal Activity (AATCC 30)

Finishing agent	Growth of Aspergillus Niger After 7 days
Unfinished	Growth on fabric
10 g/l Zoroguard ZP	No growth on fabric and shows inhibition zone

Unfinished	10g/l Zoroguard ZP
	
Complete growth on the fabric	No growth on fabric and shows Zone of inhibition

From Table 2, 3 and 4 it is evident that all the fabrics treated with 30 g/l Zoroguard-ZP shows antiviral property against MS2 Bacteriophage.

Table 2 : Antiviral activity on 100% Cotton Fabric tested using Modified AATCC 100:2012 against MS2 bacteriophage at 2 hours contact time

Recipe	MS2 Bacteriophage	
	Log reduction of virus after 2hrs	Reduction (%)
Control	0.00	0
30 g/l Zoroguard-ZP	1.00	90.10

Table 3 : Antiviral activity on 100% Polyester Fabric tested using Modified AATCC 100:2012 against MS2 bacteriophage at 2 hours contact time

Recipe	MS2 Bacteriophage	
	Log reduction of virus after 2hrs	Reduction (%)
Control	0.00	0
30 g/l Zoroguard-ZP	1.23	94.17

Table 4 : Antiviral activity on 100% Polyamide Fabric tested using Modified AATCC 100:2012 against MS2 bacteriophage at 2 hours contact time

Recipe	MS2 Bacteriophage	
	Log reduction of virus after 2hrs	Reduction (%)
Control	0.00	0
30 g/l Zoroguard-ZP	1.49	96.81

Table 5, 6 and 7 treated fabrics showed excellent antibacterial activity, while on the unfinished fabric there was heavy growth of bacteria. This is because fabrics finished with Zoroguard-ZP targets critical proteins in fungus cell which causes influx of Zinc into the cell eventually leading to cell death.

Table 5 : Antibacterial activity on 100% Cotton fabric tested using AATCC 100:2019

Recipe	Antibacterial activity					
	Initial			After 25 HL		
	S. aureus (%)	*E.coli* (%)	*K. pneumoniae* (%)	*S. aureus* (%)	*E.coli* (%)	*K. pneumoniae* (%)
Unfinished	0.0	0.0	0.0	0.0	0.0	0.0
30 g/l Zoroguard-ZP	100	100	100	99.87	99.89	99.43

Table 6 : Antibacterial activity on Polyester fabric tested using AATCC 100:2019

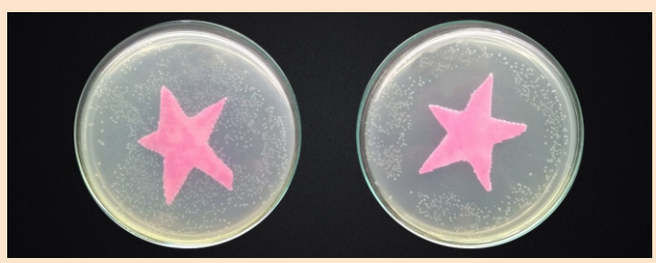
Recipe	Antibacterial activity					
	Initial			After 25 HL		
	S. aureus (%)	*E.coli* (%)	*K. pneumoniae* (%)	*S. aureus* (%)	*E.coli* (%)	*K. pneumoniae* (%)
Unfinished	0.0	0.0	0.0	0.0	0.0	0.0
30 g/l Zoroguard-ZP	100	100	100	99.81	99.18	99.25

Table 7 : Antibacterial activity on Polyamide fabric tested using AATCC 100:2019

Recipe	Antibacterial activity					
	Initial			After 25 HL		
	S. aureus (%)	*E.coli* (%)	*K. pneumoniae* (%)	*S. aureus* (%)	*E.coli* (%)	*K. pneumoniae* (%)
Unfinished	0.0	0.0	0.0	0.0	0.0	0.0
30 g/l Zoroguard-ZP	100	100	100	99.99	99.55	99.01

Representation of Antibacterial Activity

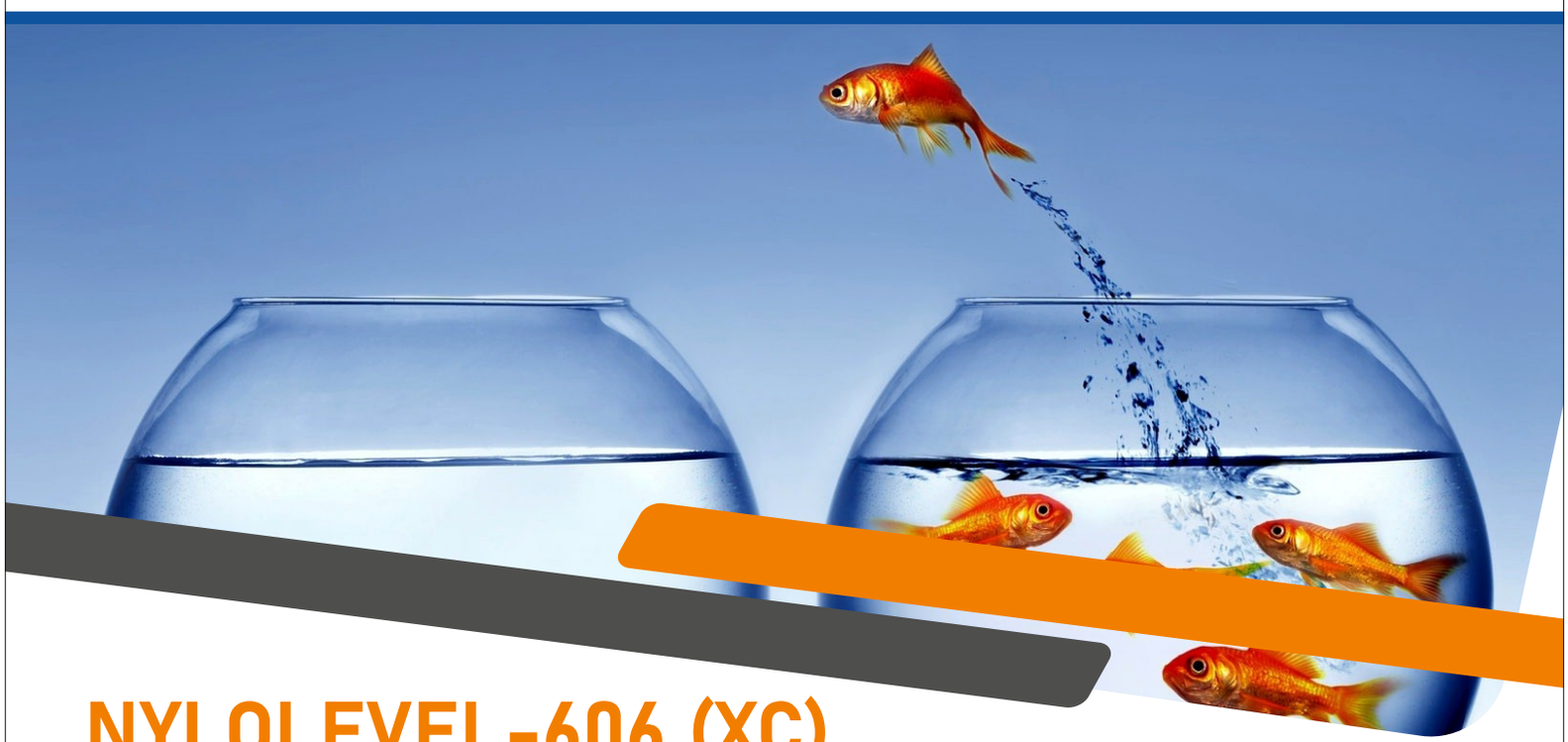
Gram Positive Bacteria (*Staphylococcus aureus*)
Unfinshed **Finished**



Gram Neagtive Bacteria (*Escherichia coli*)
Unfinshed **Finished**

Conclusion:

Zoroguard-ZP is a broad spectrum antimicrobial, and its multiple modes of action against bacteria and fungi prevent microbes from adapting and developing resistance against it. Moisture encourages the release of minute amounts of zinc, just enough to inhibit the microbe's metabolism and prevent reproduction with no risk of harm to humans. Zoroguard-ZP will comply Oekotex certification. Zoroguard-ZP effectiveness and durability depends on the "concentration used", "type of the textile fibre" and the "method of application".



NYLOLEVEL-606 (XC)

Leveling agent for polyamide fabrics

Polyamides occur both naturally and artificially. Examples of naturally occurring polyamides are proteins, such as wool and silk. Artificially made polyamides can be made through polymerization such as Nylons.

Nylon fibre is commonly dyed with acid dyes which are anionic in character, including premetallized acid dyes, in a batch process referred to an exhaust dyeing. For example, nylon fibre which has been made into fabric may be dyed in a jet dyeing machine, whereby a continuous loop of the fabric is circulated throughout the dye bath by impinging the dye bath liquor against the fabric in a venturi nozzle. Care must be taken during the dyeing process to obtain a uniform distribution of dye on the fabric, referred to as leveling.

Insufficient levelness can be prevented by means of suitable dyeing techniques and by means of leveling assistants. Leveling assistants reduce mainly the rate of dyeing, increase the rate of dye migration within the fabric and improve the levelness of dyeing.

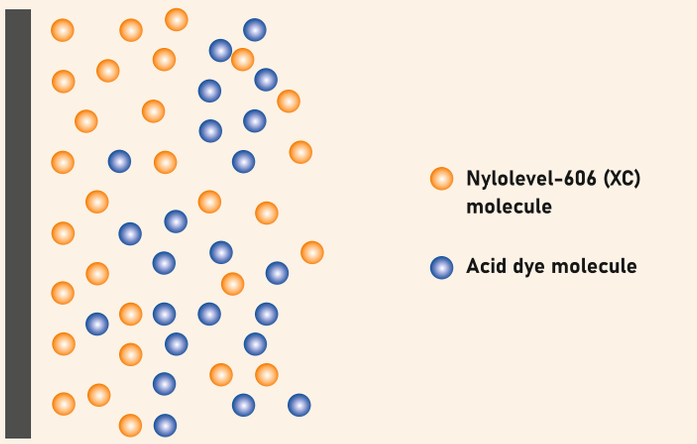
In every dye house, levelness of the dyeing is a major criteria, since unleveled goods are usually not saleable, causing loss to manufacturer.

Migration of applied dyes in a uniform manner throughout the dyed goods is called leveling and it may be a property of the dye or it may require some chemical assistance. Understanding the need, Sarex has developed a product **Nylolevel-606 (XC)**, an excellent leveling agent for polyamide fabrics which works on dye migration principle.

Unique features:

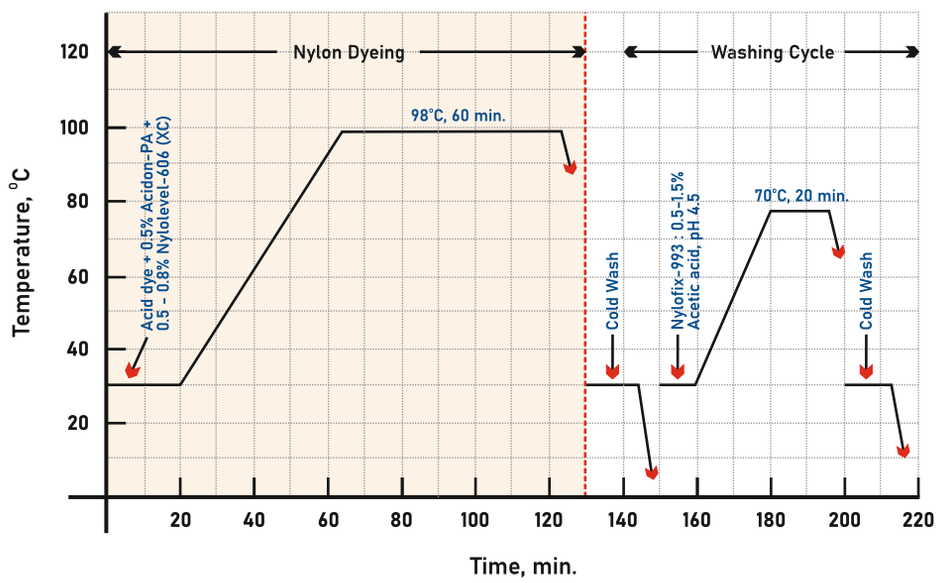
- Leveling agent for Polyamide fabrics dyed with Acid dyestuffs.
- Uniform and level dyeing obtained.
- Excellent migration.
- Covers barriness issue of nylon.
- Suitable for compound shades.
- Suitable for dyeing of nylon, wool and silk fabrics.

Schematic Representation : Mechanism of Nylolevel-606 (XC)



Nylolevel-606 (XC) molecules being nonionic will remain in the dye bath itself and will hinder the movement of fast moving acid dye molecules thereby reducing their initial strike rate leading to even dyeing.

Application Process



Nylolevel-606 (XC) : Leveling By Migration Principle

Three dyed fabric pieces of equal depth are combined with white RFD nylon fabric. The migration property is evaluated at 98°C, with and without Nylolevel-606 (XC). The above experiment shows almost equal and even distribution of each dyestuff on each fabric piece indicating good migration.

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

M&S

OHSAS 18001:2007

ISO 17025:2017

ISO 14001:2015

ISO 9001:2015

TWO STAR EXPORT HOUSE

GOTS

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