

# No Shedding Tears

Protect Yourself with Chlorine Fastness Improvers

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Research

## INTRODUCTION

In today's competitive business of apparel export, characterisation of quality is an important and indispensable aspect. These days, the consumer preference in all fields of textile use is for both wash-and-wear properties and wash-fastness at high temperatures.

A major source of customer complaints in the apparel market generates is the colour fastness of textile products. The fastness of colour is dependent on the type of dye, depth of shade, colour and process parameters in dyeing. Dyes behave differently when in contact with different agents. Keeping these facts in view, evaluation of the fastness of colours to washing and chlorine of dyed and printed textile products is a mandatory requirement for the consumer.

Invariably, textile processors do not want to use costly vat dyes, which are fast to chlorine, for cost reasons. As an alternative, cheaper reactive dyes are used, which do not essentially have chlorine fastness. Hence, there is a need to protect the fabric with chlorine fastness improvers.

Colour fastness to chlorinated pool water and sea water is getting more importance in the terry towel industry, for swimwear and beachwear garments, and also for knits and yarn dyed materials. Water in swimming pools generally contains around 5ppm of available chlorine for disinfecting. Germs and other pathogens can quickly travel from body to body in a swimming pool and chlorine helps to protect our bodies from these pathogens. Chlorine kills bacteria and viruses present in swimming pool water.

Chlorine affects swimsuits to an almost irreparable extent. This water can cause discoloration and fading of dye when it comes in contact with dyed garments. The fading or discoloration is due to oxidation caused by the chlorine. Fabric degradation from chlorine can make the swimsuits fade and become less elastic. Swimming in a chlorinated swimming pool is effectively equivalent to soaking the swimsuit in bleach for a couple of hours. Tap water in cities is normally disinfected to kill bacteria with chlorine at some ppm levels. When this water is used for laundering, it too can cause

Figure 1: Textile substrates that get exposed to chlorine

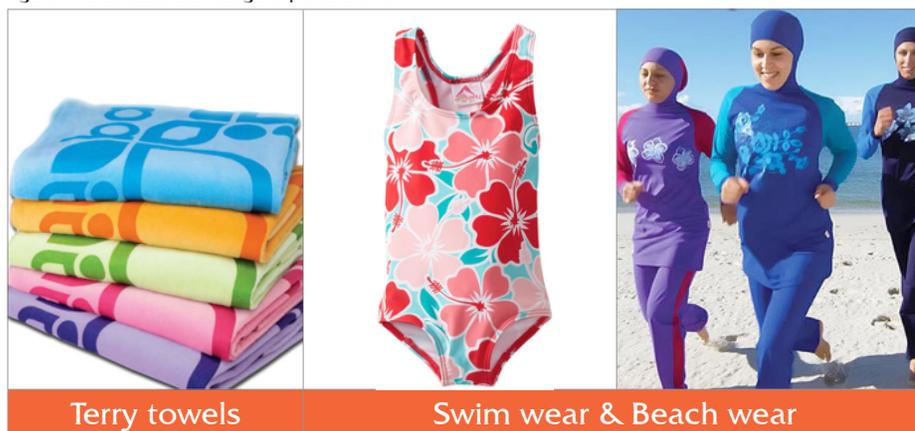


Table 1: Performance of Saradye-429(MOD) on 100% Polyamide dyed fabric

Fabrics	Recipe	100ppm chlorine	
		Rating	Tone
100% Blue dyed polyamide	Unfinished	2-3	Off
	30 g/l Saradye-429(MOD)	4	On
100% Royal blue dyed polyamide	Unfinished	1	Off
	30 g/l Saradye-429(MOD)	4-5	On
100% Pink dyed polyamide	Unfinished	2	Off
	30 g/l Saradye-429(MOD)	4-5	On

Table 2: Performance of Saradye-PLE on 100% Cotton dyed terry towel

Fabric no.	Recipe	50ppm		100ppm	
		Rating	Tone	Rating	Tone
Green coloured terry towel	Unfinished	2-3	Off	2	Off
	50g/l Saradye PLE	4-5	On	4-5	On
	50g/l Saradye PLE	4-5	On	4-5	On
Turquoise blue dyed terry towel	Unfinished	2-3	Off	2	Off
	30g/l Saradye PLE	4	On	4-5	On
	50g/l Saradye PLE	4	On	4-5	On
Purple dyed terry towel	Unfinished	2-3	Off	2	Off
	30g/l Saradye PLE	4	On	4-5	On
	50g/l Saradye PLE	4	On	4-5	On

discolouration or fading of colours.

The colour fastness of reactive, direct, metal complex and acid dye is very poor. Beach towels, swimming suits made of cotton and/ or polyamide, which are dyed or printed with

these dyes, are sensitive to high chlorine content in pool water and laundry wash liquors. Hence it becomes essential to confirm the fastness to chlorinated pool water of this merchandise. Also, it encourages the development of products

that can enhance the durability and colour fastness of these garments. Sarex has developed two products, viz. Saradye-429(MOD) and Saradye-PLE.

**Unique features of Saradye-429(MOD) - For Polyamides**

- Effective on acid dyed polyamide/ poly-acrylic fibre and their blends
- Treated fabric has no adverse effect
- Minimum effect on the light fastness or tone
- Durable up to five home launderings
- Durable up to 50ppm (available chlorine)
- Can be applied by exhaust as well as padding

**Unique features of Saradye-PLE - For Cellulosics**

- Effective on sulphur and reactive dyed/ printed cellulosics and cellulosic rich blends
- No adverse affect on light and wash fastness
- No change in tone of treated fabric
- Does not affect the original handle and absorbency of fabric
- Can be applied by exhaust as well as by padding

Figure 2: Chlorine fastness study with Saradye-429(MOD)  
 Chlorine fastness with Saradye-429(MOD) on dyed polyamide fabric by M&S C37 at 100 ppm

					
Unfinished	Unfinished	30g/l Saradye-429 (MOD)	Unfinished	Unfinished	30g/l Saradye-429 (MOD)
Exposed to 100ppm available chlorine			Exposed to 100ppm available chlorine		

Chlorine fastness with Saradye-429(MOD) on dyed polyamide fabric by ISO 105-E03 at 100 ppm

					
Unfinished	Unfinished	30g/l Saradye-429 (MOD)	Unfinished	Unfinished	30g/l Saradye-429 (MOD)
Exposed to 100ppm available chlorine			Exposed to 100ppm available chlorine		

Figure 3: Chlorine fastness study with Saradye-PLE

Chlorine fastness with Saradye-PLE on reactive dyed Terry towel						
ISO 105-E03				M&S C12A		
◆ Tested for 35 ppm available chlorine						
						
Original	Unfinished	30 g/l Saradye-PLE 35 ppm available chlorine	50 g/l Saradye-PLE	Original	Unfinished	4% Saradye-PLE
◆ Tested for 50 ppm available chlorine						
						
Original	Unfinished	30 g/l Saradye-PLE 50 ppm available chlorine	50 g/l Saradye-PLE	Original	Unfinished	4% Saradye-PLE
◆ Tested for 100 ppm available chlorine						
						
Original	Unfinished	30 g/l Saradye-PLE 100 ppm available chlorine	50 g/l Saradye-PLE	Original	Unfinished	4% Saradye-PLE

Procedure in brief: A specimen of the sample under test is treated with a weak solution of dilute chlorine under special conditions of temperature, time, pH and sometimes water hardness. The treated specimens are dried and evaluated using grey scale for colour change.

**RESULTS AND DISCUSSION**

Table 1 and Table 2 show the rating of finished fabrics subjected to 50 & 100ppm available chlorine. It can be seen that the fabrics finished

with Saradye-429(MOD) and Saradye-PLE posses substantial resistance to 50 and 100ppm chlorine with no effect on the tone of fabrics. The same can be seen in the Figure 2 and Figure 3.

**CONCLUSIONS**

Fabrics finished with Saradye-429(MOD) and Saradye-PLE show excellent fastness to chlorine and hence are the most promising solutions and are set to revolutionise the swimwear industry.

**MATERIALS AND METHODS**

Materials: 100% Polyamide dyed fabrics, 100% Cotton dyed terry towels  
 Chemicals: Saradye-429(MOD), Saradye-PLE

**EXPERIMENTAL**

**Padding application:**

Fabric substrates were padded with the required concentration of Saradye-429(MOD) with pick-up of 65-70%. The bath pH was adjusted to 5.0-5.5. After padding, the fabric was dried at 160oC for 2 min. The finished fabrics were evaluated for chlorine fastness by the ISO 105 E03 method for 100ppm available chlorine.

Terry towels were treated with 30-50g/l Saradye-PLE, keeping the bath at pH 5.0-5.5. The treated terry towel was evaluated for chlorine fastness by ISO 105 E03 and M&S C12A.

**TEST METHODS**

There are two main methods to evaluate colour fastness to chlorinated pool water.

- ISO105-E03:2010-Colour fastness to chlorinated water (swimming pool water)
- M&S C37-Colour fastness to chlorinated water (swimwear)
- M&S C12A-Colour fastness to chlorinated water (terry towels)