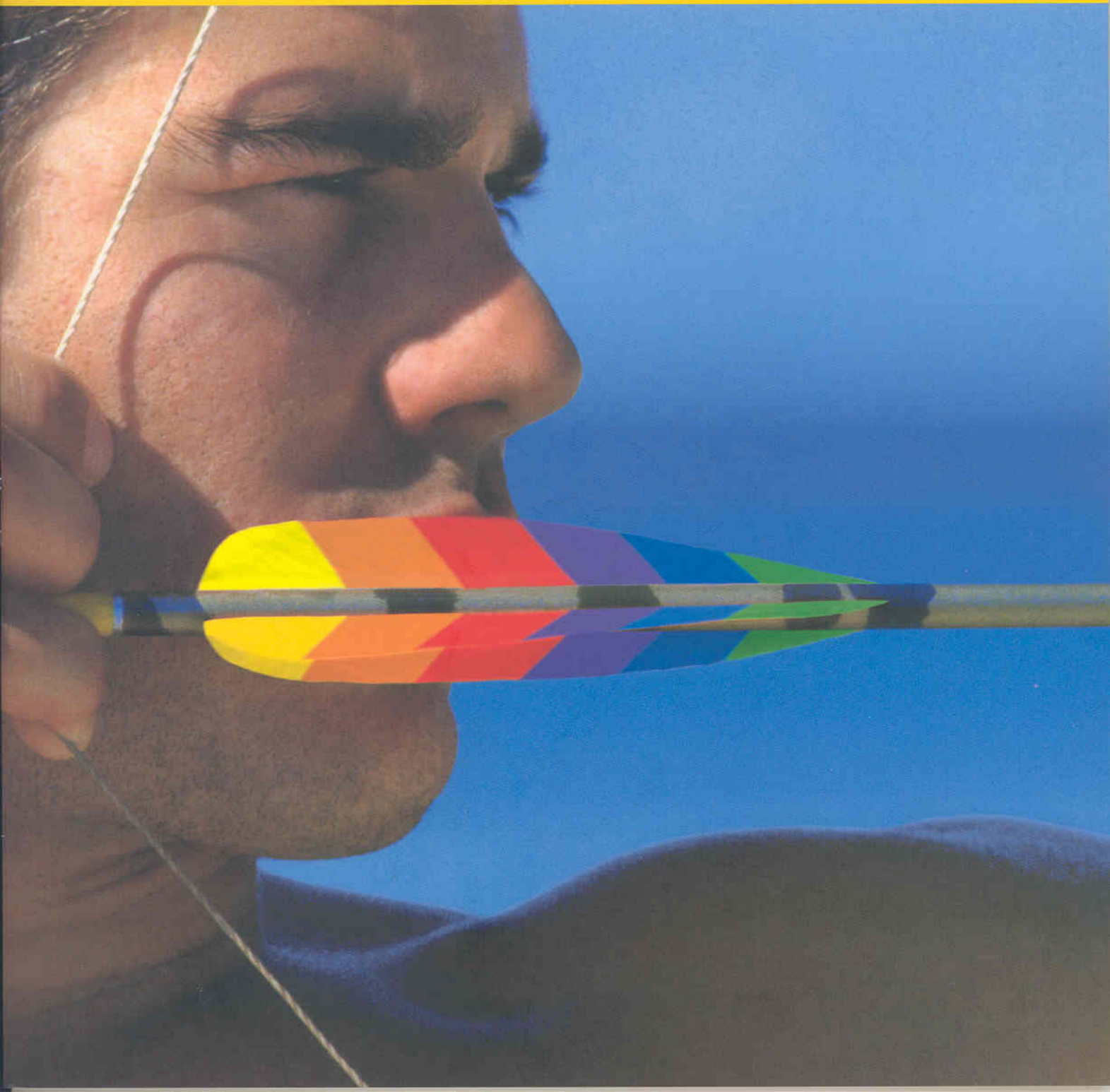


DyStar 

Working for your benefit.

Procion[®] PX

Livens up your reactive prints



Procion® PX

g/kg

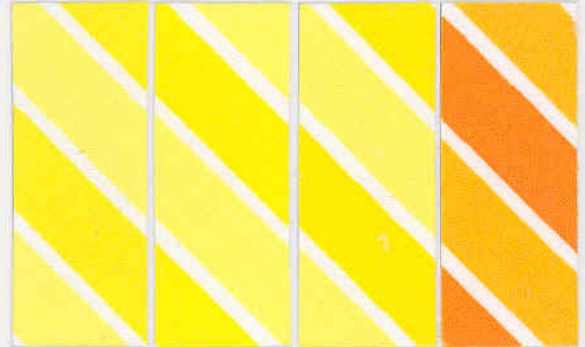
Flat-bed printing

on mercerized cotton
Full shade/reduction 1:3

The fastness properties were tested on prints of 1/1 S. D.
(and 1/6 S. D. in the case of light fastness).

	Dyestuff concentration		
	powder %	liquid %	
Fastness properties	Light (Xenotest) ISO 105-B02	1/1 S. D. 1/6 S. D.	
	Washing	ISO 105-C06-C25 60 °C	Effect Stain (CO)
		ISO 105-C06-E2S 95 °C	Effect Stain (CO)
	ISO 105-C08 95 °C	Effect Stain (CO)	
		Dry cleaning ISO 105-D01	Effect Stain (CO)
	Water, severe ISO 105-E01	Effect Stain (CO)	
	Chlorinated water ISO 105-E03 (20 mg/l act. chlorine)	Effect Stain (CO)	
	Perspiration (alkaline) ISO 105-E04	Effect Stain (CO)	
		Perspiration (acid) ISO 105-E04	Effect Stain (CO)
	Suitability for		Atmospheric steaming
		Superheated steam (PES/Cell.)	6–8 min 175 °C
		Thermofixation	5 min 150 °C
		Two-phase steaming	90 sec 125 °C
	Articles	Wool/silk ¹	
Seersucker			
Reactive resist under Remazol dyes			
Ecological profile	MAK amines		
	Metal complex		
	Organohalogenes in the reactive group		

Procion Yellow PX-8G	Procion Yellow PX-6GN	Procion Yellow PX-4G	Procion Golden Yellow PX-GR
35	35	35	40



100	100	100	100
40	33	–	25
7	6	6	6
5–6	5	5	5
5	5	5	5
5	5	5	4–5
5	5	5	4–5
5	5	5	4–5
4–5R	5	5	5
5	5	5	5
5	5	5	4–5
5	4–5	4–5	4
4D	5	1	4–5
5	5	5	4–5
5	4–5	4–5	4–5
5	5	5	4–5
5	4	4–5	4–5
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
○	○	○	○
●	●	○	●
○	●	○	○
–	–	–	–
–	–	–	–
+	+	+	+

¹ Limited suitability because fastness level is critical in some cases. Better alternative: selected Remazol dyes. Fixation with sodium acetate

Procion Yellow PX-R	Procion Orange PX-RN	Procion Red PX-4B	Procion Red PX-6B	Procion Red PX-8B	Procion Brilliant Blue PX-3R	Procion Turquoise PX-GR	Procion Blue PX-5R	Procion Navy PX-G	Procion Navy PX-2R
40	40	40	30	40	40	30	50	60	60



100	100	100	150	100	100	150	100	100	100
40	40	33	33	33	40	50	33	33	40
6	6	4-5	4	4-5	6	6	6	4-5 (as Navy)	4-5 (as Navy)
5-6	5	4	3	4	5-6	4-5	5	-	-
4-5G	5	4-5	5	5	5	4	4-5	5	5
5	4-5	5	4-5	5	5	4-5	5	4-5	5
4-5W,D	4-5	4-5	5	5	5	3-4	4-5	5	4-5G
5	4-5	4-5	4-5	5	5	3	4-5	4-5	5
5	5	4-5	5	4-5B	5	3-4	3-4	4-5	4-5
5	4-5	4-5	5	5	5	3	4-5	4-5	5
5	4-5	5	5	5	5	5	5	5	5
4-5G	5	4-5	4-5	5	5	5	5	5	5
5	4-5	4-5	4-5	4-5	5	3-4	4	5	5
4W,G,D	4-5	3-4W,B	4-5B	4-5B	3Y	2-3	4	5	4-5R
5	5	4-5	4-5	5	5	5	4-5	5	5
5	4-5	4-5	4	3	4-5	3	3	3-4	4-5
5	5	4-5	5	5	5	5	4	5	5
5	4	4	4	2-3	4-5	3	4-5	4	4-5
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	-	●	●	●
●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●
○	○	○	○	○	○	○	○	○	○
●	●	●	●	○	●	●	○	●	●
●	●	○	●	●	●	●	●	●	●
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	Cu	Cu	-	-
+	+	+	+	+	+	+	+	+	+

● = suitable ○ = limited suitability - = not suitable B = bluer G = greener R = redder Y = yellower W = weaker D = duller

Procion Brown PX-2R	Procion Black PX-N	Procion Black PX-G	Procion Black PX-GR	Procion Black PX-2R
40	30	75	60	80



100	100	–	150	100
40	40	40	40	40
6	5–6	5–6	5–6 (as Black)	5–6 (as Black)
5	5	5	–	–
5	4–5	4–5	5	5
4–5	5	5	5	5
4–5	4–5	4–5	5	4–5
4–5	5	5	5	5
5	4–5	4–5	5	5
4–5	5	5	5	4–5
4–5	4–5	4–5	5	5
5	5	5	5	5
4–5	3–4	3–4	5	4–5
3–4	3–4	3–4	5	4–5
5	4–5	4–5	5	4–5
4–5	4	4	3–4	4–5
5	5	5	5	4–5
4	4	4	4	4
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
●	●	●	●	●
○	○	○	○	○
●	●	●	●	●
●	●	●	○	–
–	–	–	–	–
–	Cr/Co	Cr/Co	–	–
+	+	+	+	+

Procion® PX

g/kg

Flat-bed printing

on mercerized cotton
Full shade/reduction 1:3

The fastness properties were tested on prints of 1/1 S. D.
(and 1/6 S. D. in the case of light fastness).

powder %	Dyestuff concentration		
liquid %			
1/1 S. D.	Light (Xenotest) ISO 105-B02	Fastness properties	
1/6 S. D.			
Effect	ISO 105-C06-C25		
Stain (CO)	60 °C		
Effect	ISO 105-C06-E2S		Washing
Stain (CO)	95 °C		
Effect	ISO 105-C08		
Stain (CO)	95 °C		
	Dry cleaning ISO 105-D01		
Effect	Water, severe ISO 105-E01		
Stain (CO)			
	Chlorinated water ISO 105-E03 (20 mg/l act. chlorine)		
Effect	Perspiration (alkaline) ISO 105-E04		
Stain (CO)			
Effect	Perspiration (acid) ISO 105-E04		
Stain (CO)			
Atmospheric steaming	8–12 min 102 °C	Suitability for	
Superheated steam (PES/Cell.)	6–8 min 175 °C		
Thermofixation	5 min 150 °C		
Two-phase steaming	90 sec 125 °C	Articles	
Wool/silk ¹			
Seersucker			
	Reactive resist under Remazol dyes	Ecological profile	
	MAK amines		
	Metal complex		
	Organohalogenes in the reactive group		

This pattern card illustrates the Procion PX dyes from DyStar that are suitable for printing on cotton and viscose. The table provides an overview of the suitability and fastness properties of the dyes.

Printing on cotton and viscose

1 Pretreatment of the goods

Careful pretreatment of the woven or knitted fabric is essential to ensure optimum results in reactive printing. All impurities in the fibre, lubricants, auxiliaries and processing chemicals that could react with reactive dyes or adversely affect the printing process must be removed. Maximum colour yield, brilliancy, levelness and wet fastness properties can only be obtained on cotton if it has been mercerised or at least treated with a caustic soda solution of at least 22 °Bé (16.4%). Regenerated cellulosic fibres should be treated in a tensionless state with a caustic soda solution of approx. 6–8 °Bé (4–5%). Alkaline pretreatment improves dimensional stability and facilitates washing-off of the prints.

2 Print paste preparation

2.1 One-phase printing

Alginate thickening

Water (soft)	965–875 g
Polyphosphate	5 g
Sodium alginate pdr	30–120 g
	1,000 g

Stock pastes

	CO	CV
Alginate thickening 3–12%	400–600 g	400–600 g
Urea	50–100 g	100–200 g
Ludigol® ¹ 1:4	40–60 g	40–60 g
Sodium bicarbonate or soda ash	20–30 g	20–30 g
Antifoam	1–2 g	1–2 g
Preservative	0.5–1 g	0.5–1 g
Balance (water or thickening)	x g	x g
	1,000 g	1,000 g

Print paste preparation

Stock paste	800 g
Procion PX dye	x g
Balance (water or thickening)	y g
	1,000 g

2.2 Two-phase printing

No alkali or urea is required for two-phase printing. The print paste merely contains the dye and thickening. The alkali required for fixation is padded onto the fabric in a separate operation.

Alginate stock paste

Neutral alginate thickening 3–12%	700 g
Ludigol 1:4	50 g
Preservative	0.5–1 g
Balance (water or thickening)	y g
	1,000 g

Print paste preparation

Alginate stock paste	800 g
Procion PX dye	x g
Balance (water or thickening)	y g
	1,000 g

3 Fixation

3.1 One-phase prints

Depending on the equipment available, these three conditions can be met by using the following fixation methods:

Fixation medium for one-phase printing	Substrate	Time min	Temperature	Alkali
Saturated steam	WO/silk	10–20	102 °C	sodium acetate
Saturated steam	CO, CV	8–12	102 °C	sodium bicarbonate or soda ash
Hot air*	CO	5	150 °C	
Superheated steam*	PES/CO	6–8	175 °C	
Hot air*	PES/CO	1	190–200 °C	

* with higher amounts of urea
¹BASF AG, D-67056 Ludwigshafen

²Rollin S.A., F-68702 Cernay

3.2 Two-phase prints

The dried prints are first impregnated open-width and crease-free with an alkaline fixation liquor and then fixed according to the equipment available.



To apply the alkaline fixation liquor a horizontal padder with a steel/rubber roller arrangement has proved effective. This should allow both face padding and immersion of the fabric, depending on its structure and weight. The padding roller that comes into contact with the printed side of the fabric should be made of steel (S) and the nip roller should be covered with rubber (R) (Texttractor®)².

Fixation liquors:

Electrolyte/alkali		Sodium silicate	
Water	x cm ³	a) Na ₂ O:SiO ₂ 1:2.0 (Procion PX)	1,000 cm ³
Soda ash	150 g		
Common salt	100 g		
Potash	80 g	b) Na ₂ O:SiO ₂ 1:3.0 (Remazol)	1,000 cm ³
Caustic soda 32.5 %	50 cm ³		
Sodium silicate (Na ₂ O:SiO ₂ 1:3.3)	50 cm ³		
	1,000 cm ³		

Fixation medium: superheated steam

Substrate: cotton, viscose

Time: 90 sec

Temperature: 125 °C

4 Washing-off

The only way to obtain a clean white ground, high brilliancy and good fastness properties is to carry out a **washing-off process specially for this purpose**.

A wide range of different washing units are used to wash off reactive prints (continuous open-width washers, rope washers and winch becks). Major differences include volume, movement of the goods, washing action, separation of baths, reaction time, etc.

The arrangement of the baths (pH, auxiliaries), reaction time and water temperature relationship depends on the unit being used.

Washing-off of prints can be divided into two stages. The first is to **treat the ground** and the second is to **maximize fastness properties**.

When **treating the ground** it is important to swell the dry thickening film and remove the swollen thickening, residual alkali, unfixed reactive dye and auxiliaries in order to obtain a clean white ground.

The best results are achieved with a specific water flow, e. g. by spraying the goods with a low liquor level, effective separation of the rinsebaths and rapid liquor exchange at 90–95 °C. If this is not possible, we recommend starting the washing-off process at a lower temperature.

In **two-phase methods** the swollen thickening, alkali, unfixed dye and auxiliary should be removed by spraying intensively at 40 °C, preferably without standing liquor.

After complete removal of the alkali the goods are washed first at 60–70 °C and then at 90–95 °C.

To prevent formation of sparingly soluble calcium alginate, the prints should be washed off in soft water.

To maximise fastness properties, all unfixed and hydrolysed dye components still present in the woven or knitted fabric must be completely washed off. The time/temperature relationship is important because this is essentially a diffusion process.

Not too much faith should be placed in the action of any detergent used in the washing-off process for water-soluble dyes.

It is far more important to ensure that the baths are close to the boil. As the temperature rises, the substantivity of hydrolysed dye declines and the rate of diffusion increases. This assists the removal of the hydrolysed dye from the fibre.