

The Challenges of Outdoor wear Coloration





- Introduction
- Factors influencing fastness on Outdoor wear
 - ◆ Type of fiber and substrate used
 - ◆ Fastness specification
- Typical issues and solutions
- ColorWall™ colors fastness prediction



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- **Sport-specific clothing is worn for most sports and physical exercise, for practical, comfort or safety reasons**

- **Main fibers used for Outdoor wear fabric production**
 - ◆ **Polyester**
 - ◆ **Polyamide**
 - ◆ **Cationic Dyeable Polyester (CDP)**

- **Fabric technology used**
 - ◆ **Warp & circular knits**
 - **this represent the majority due to performance factors; e.g. stretch**
 - ◆ **Flat Woven**

- **Excellent wash fastness at 40 - 50 °C**
- **No bleeding and fading of the color**
- **No staining of contrast colors (color blocking) and logos**
- **No dye migration during transportation and storage**
- **Excellent light fastness**
- **Excellent water- and perspiration fastness**



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Fiber type

positive

- flat
- bright
- high
- round

Yarn Structure ¹

Lustering ^{1;2}

Fiber count ^{1;2}

Fiber cross section ^{1;2}

negative

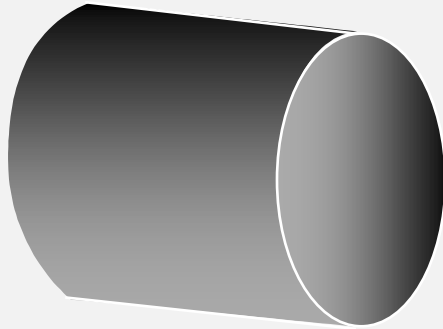
- texturised
- dull
- low
- multilobal

Superscript 1 → influence on light fastness

Superscript 2 → influence on wet fastness

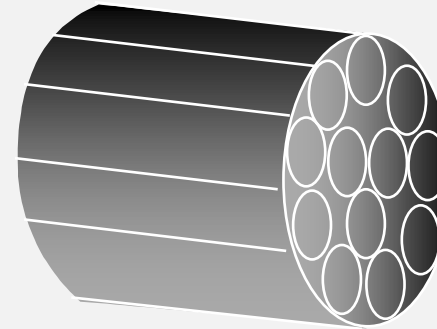
Fiber type

Conventional filament polyester



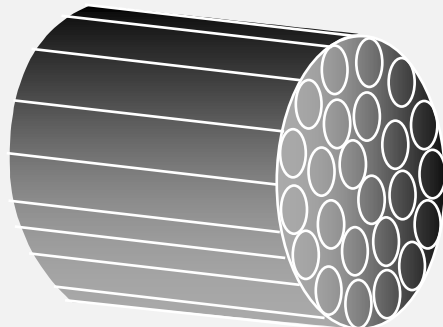
Typical dtexpf
range
dpf = 2.0-6.0

Weight reduced polyester silk



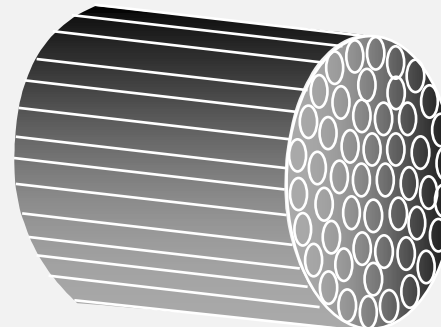
Typical dtexpf
range
dpf = 1.2-1.6

Polyester microfiber



Typical dtexpf
range
dpf = 0.30-0.99





Polyester ultra-microfiber

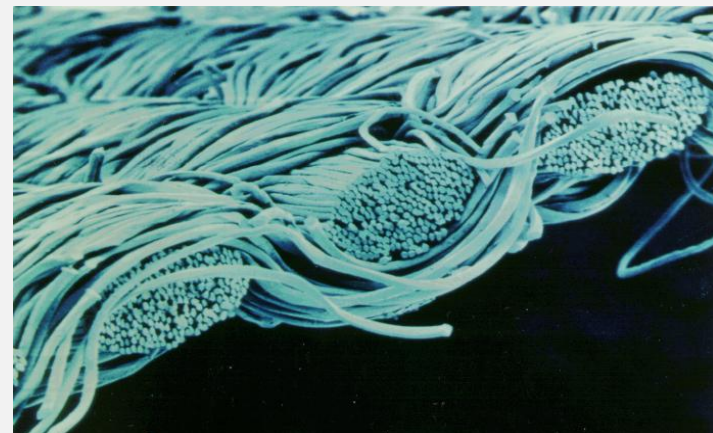


Typical dtexpf
range
dpf = 0.001-0.29

**Lower denier per fiber (dpf) is in general more critical for fastness,
e.g. light & wet fastness**

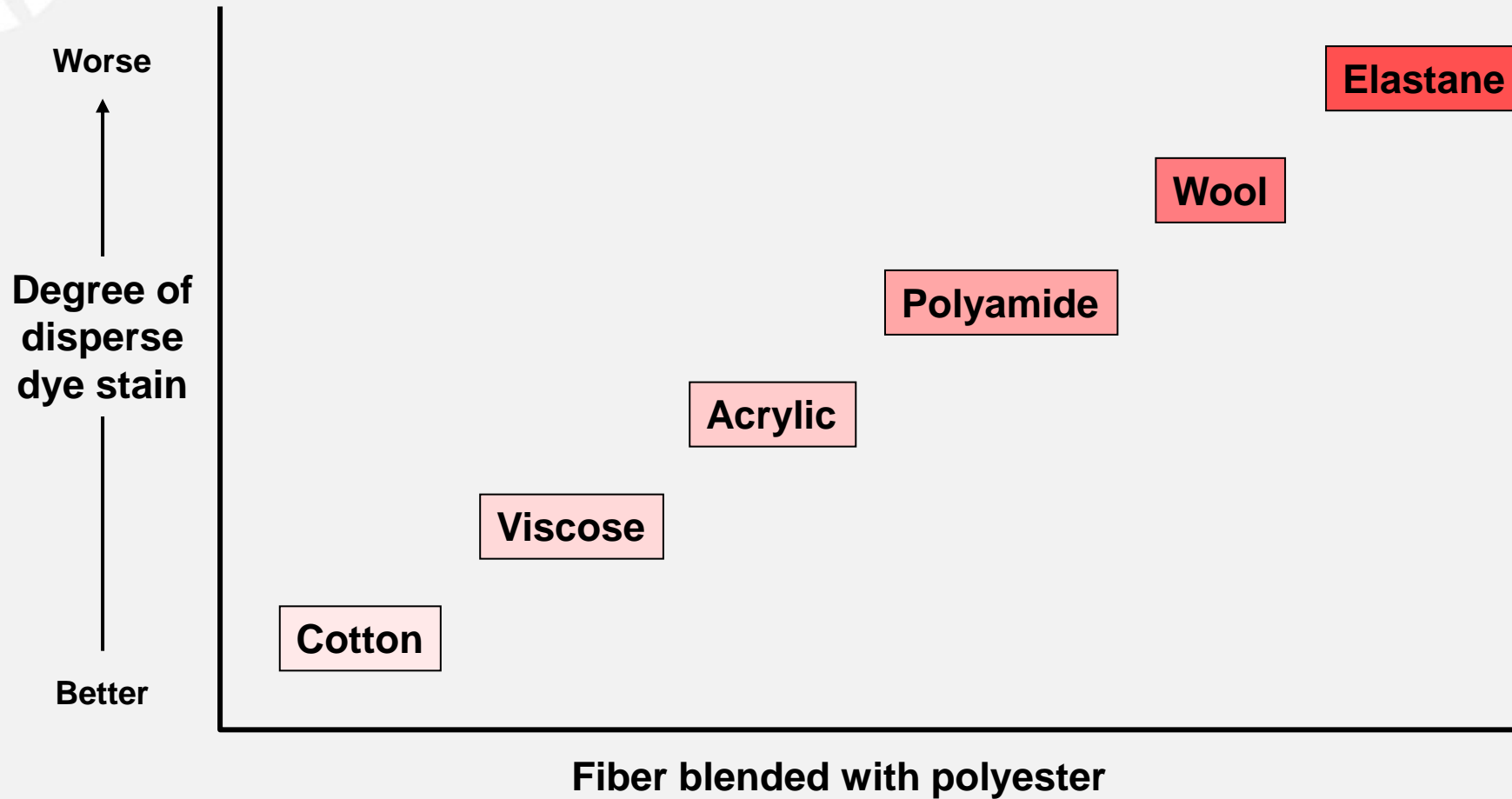
PES microfiber

-  **More dye needed to reach given depth of shade**
-  **Lower wet fastness properties**
-  **Increased thermal migration**
-  **Lower light fastness**



Factors influencing fastness on Outdoor wear

Fiber blend





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Fastness conditions (Wash Fastness)

Wash fastness test	Test conditions				
	Detergent	Beaker size / Liquor	Temperature / Time	Steel balls	Specimen size
adidas	4 g/l ECE	500 ml / 9:1	40 °C / 30 min	25	4 cm x 10 cm
Puma	4 g/l ECE 98 + 1 g/l sodium perborate tetra- hydrate + 0.15 g/l TAED 100% active	550 ml / 20:1	40 °C / 30 min	25	4 cm x 10 cm
Nike ISO 105-C06; B1M	4 g/l IEC	550 ml / 150 ml	50 °C / 45 min	50	4 cm x 10 cm
AATCC IIA	0.15% AATCC WOB	1200 ml / 150 ml	49 °C / 45 min	50	5 cm x 15 cm
M&S C4A	4 g/l ECE + 1 g/l sodium perborate tetrahydrate	550 ml / 50:1	50 °C / 30 min	none	4 cm x 10 cm
ISO 105-C06 B2S	4 g/l ECE + 1 g/l sodium perborate tetrahydrate	550 ml / 150 ml	50 °C / 30 min	25	4 cm x 10 cm
ISO 105-C06 C2S	4 g/l ECE + 1 g/l sodium perborate tetrahydrate	550 ml / 50 ml	60 °C / 30 min	25	4 cm x 10 cm

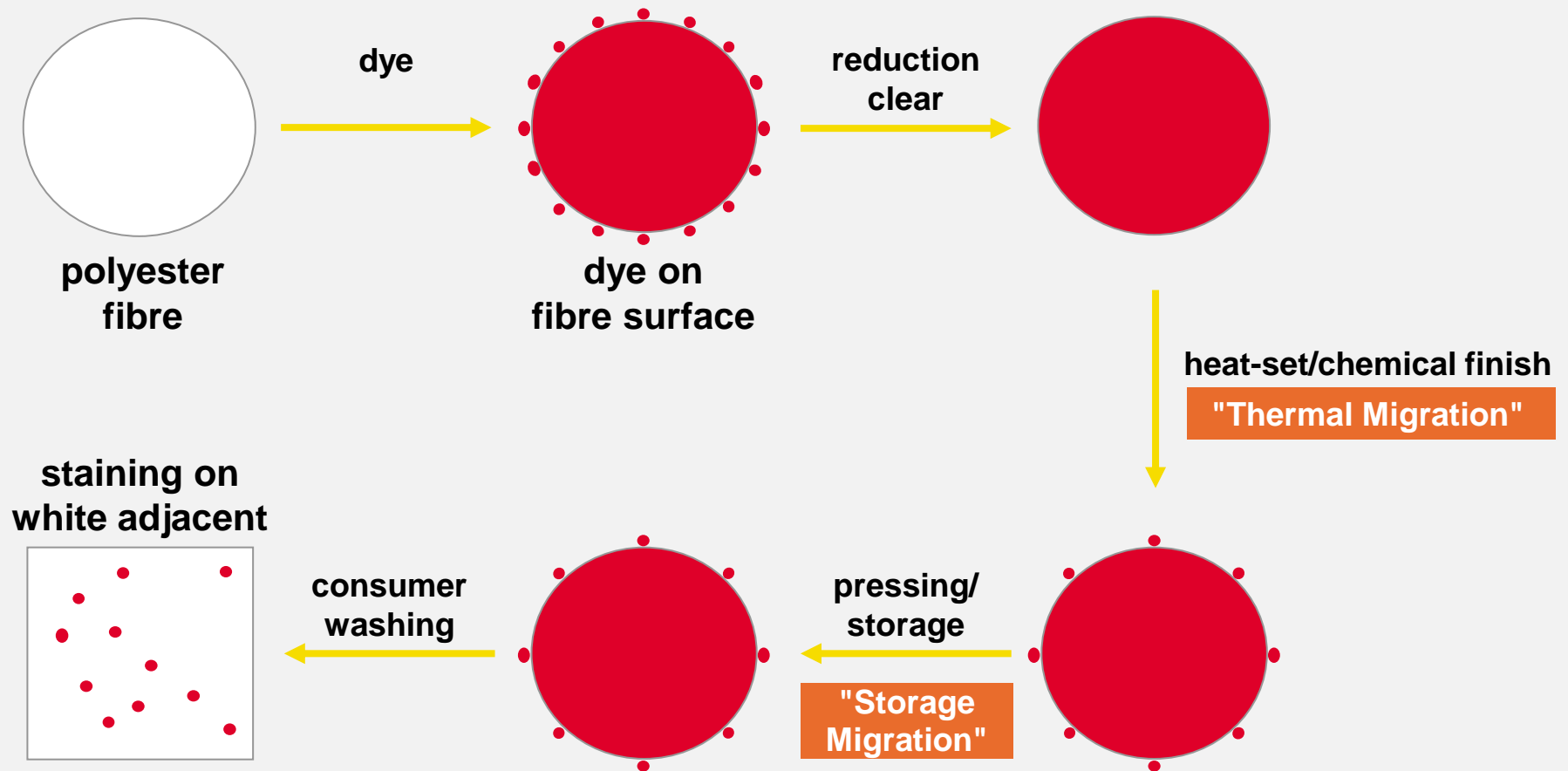
Fastness conditions (Light & Weathering Fastness)

	Color Fastness to Light		Color Fastness to Weathering
Test Method	ISO 105-B 02	AATCC 16 Option 3	ISO 105-B 04
Evaluation:	Blue Scale	American Blue Scale (L 2-9)	Blue Scale
Equipment:	Xenotest-Beta	Xenotest-Beta	Xenotest-Beta
Chamber temp.:	35 ± 5 °C	43 ± 2 °C	38 °C ±2
Black Panel/Std. temp.:	48±2 °C	63 ± 1 °C / 70°C	58± 2
Rel. Humidity	40	30 - 35%	0
Spraying cycle:			
Duration of spraying:	none	none	1 min
Duration of drying:	none	none	29 Min.
Exposition:	Continuous	Continuous	continuous
Irradiance :	42W/m ² (300-400nm)	48 W/m ² (300-400nm)	42W/m ² (300-400nm)
Filter System	Xenochrome 320	Xenochrome 320	Xenochrome 300



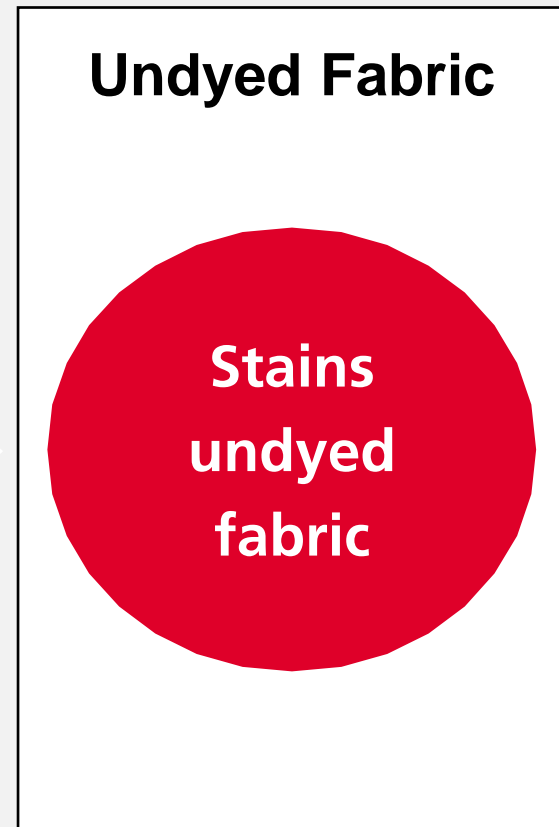
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Wash fastness ... the problems



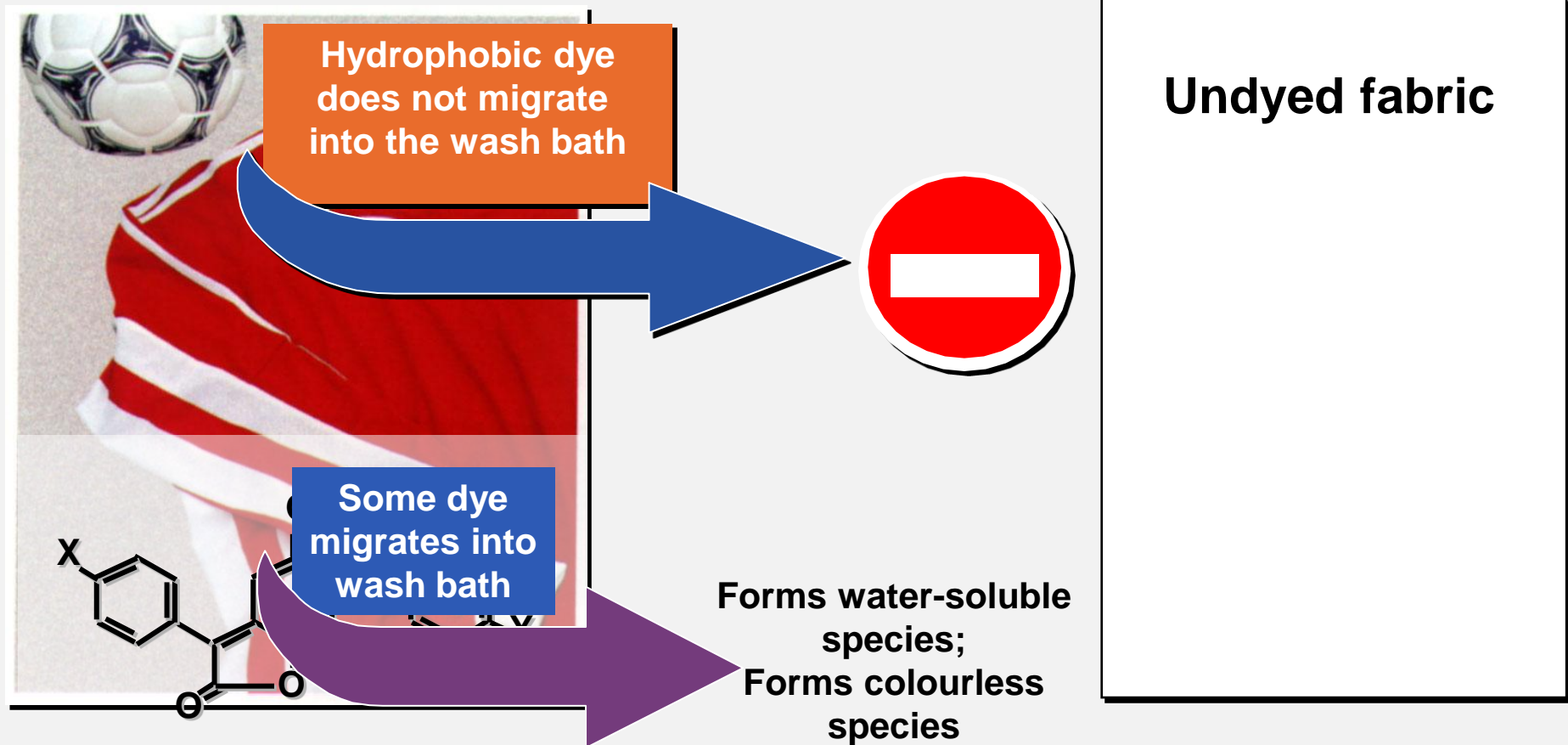
The problem with conventional dyes

Wash Bath Containing Detergent



The solution: High wash fast Dianix[®] dyes

Wash Bath Containing Detergent



The solution: High wash fast Dianix[®] dyes



Dyestuff selection



**Dyed with standard
disperse dyes**



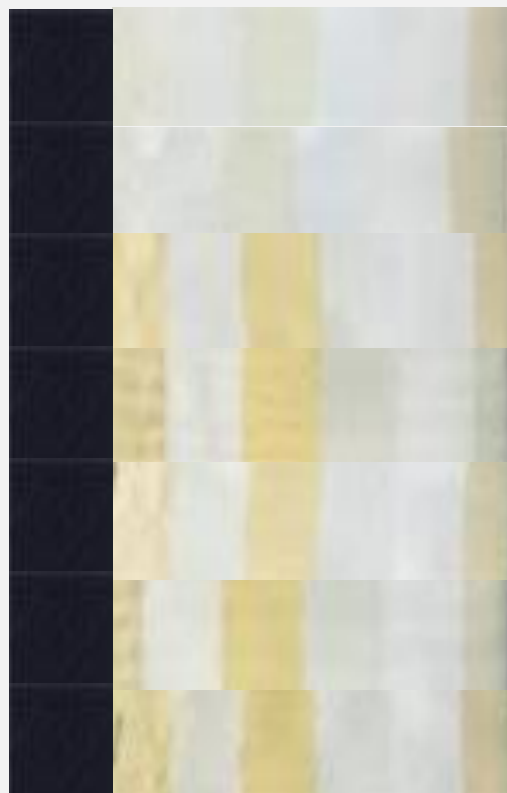
**Dyed with high wash fast
Dianix dyes**

The solution: High wash fast Dianix[®] dyes



Dyestuff selection

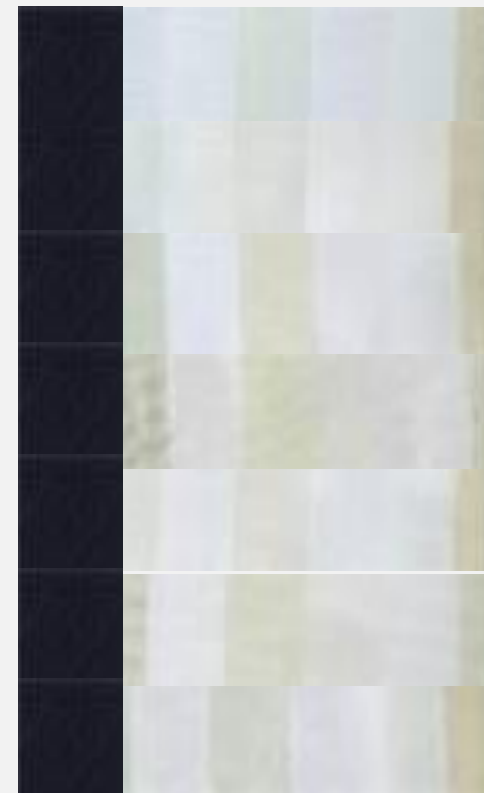
0.80% C.I. Disperse Orange 30
0.35% C.I. Disperse Red 167.1
1.96% C.I. Disperse Blue 79.1



Dyed with standard disperse dyes

ISO 105-E04, acid
ISO 105-E04, alkaline
washing Nike 50 °C
washing adidas 40 °C
ISO 105-C06-B2, 50 °C
M&S C4A, 50 °C
AATCC IIA, 49 °C

1.73% Dianix Yellow Brown XF
0.50% Dianix Rubine XFS
4.18% Dianix Navy XF



Dyed with high wash fast Dianix dyes

Dyeing: 30 min at 130 °C
Clearing: 20 min at 80 °C
Post-setting: 30 s at 195 °C

The solution: fastness improvement – process change



Dyeing: 130 °C for 60 min

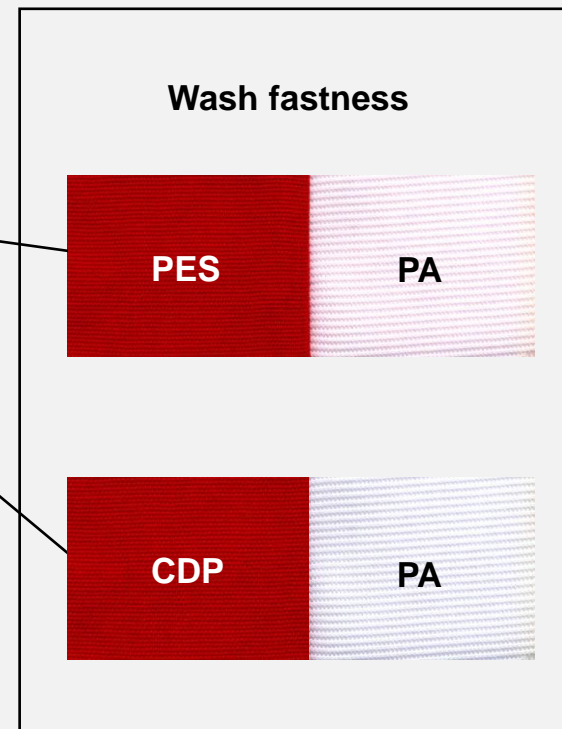
1. Reductive clearing: 5 ml/l Causic soda 32.5%, 3 g/l Hydrosulfite, 80 °C for 20 min; postset at 180 °C for 30 s

2. Reductive clearing: 5 ml/l Causic soda, 32.5%, 3 g/l Hydrosulfite, 80 °C for 20 min; dried at 120 °C for 30 s

Mat.: PES - MP1 (0.6 den)

		un- treated	treated	CA	CO	PA 6.6	PES	PAN	WO
1. Reductive clearing / A1NL Cherry Wood									
Dianix® Yellow Brown XF	1.6000								
Dianix Rubine XFS	5.4300								
Dianix Navy XF	0.2452								
2. Reductive clearing / A1NL Cherry Wood									
Dianix Yellow Brown XF	1.6000								
Dianix Rubine XFS	5.4300								
Dianix Navy XF	0.2452								
1. Reductive clearing / A1NA Cherry Pink									
Dianix Sport Red SF	4.8900								
Dianix Crimson SF	0.4460								
Dianix Rubine XFS	0.0188								
2. Reductive clearing / A1NA Cherra Pink									
Dianix Sport Red SF	4.8900								
Dianix Crimson SF	0.4460								
Dianix Rubine XFS	0.0188								

The solution: fastness improvement – material change



CDP fabric dyed with Astrazon[®] dyestuffs

The solution: fastness improvement – dye selection



Polyamide (+ Elastane) blends are used in the following Articles



Automotive

- automotive top lining
- automotive carpet

Apparel

- anorak fabric
- swimwear
- charmeuse
- lining
- foundation garments
- sewing yarn
- socks
- lace
- hosiery
- knitted velvets

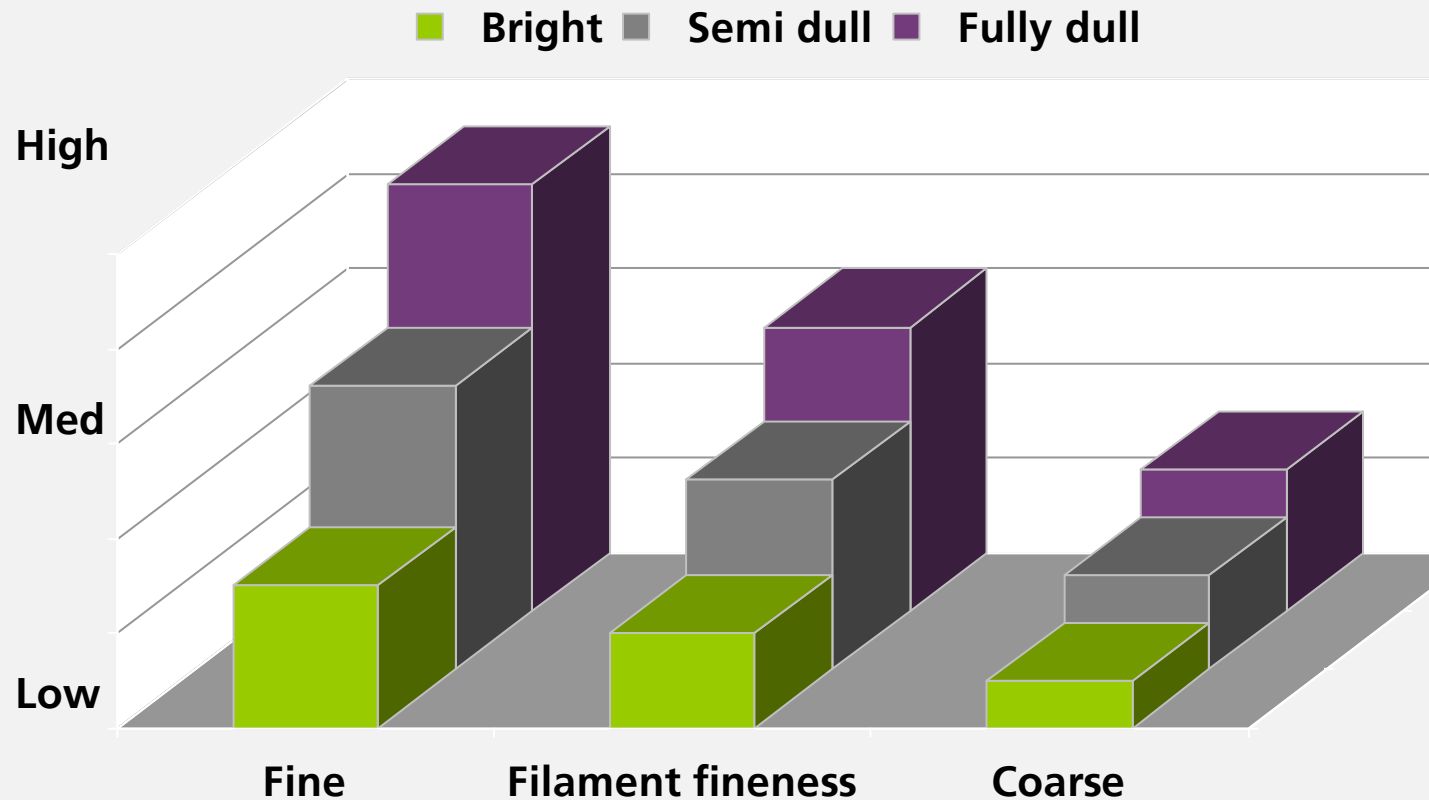
Technical textiles

- balloon fabric
- parachute fabric
- fishing net
- velcro tape
- upholstery fabric
- Nomex
- Oxford
- umbrella fabric
- zip fastener
- sail fabric
- container net

Carpet

- home carpet
- object carpet
- bathroom carpet
- outdoor carpet

The effects of decitex and lustre on dye requirement









- The amount of dye required to achieve a particular shade depends on filament fineness and on fibre lustre.
- Much more dye is needed to achieve a shade on a very fine fully dull yarn than on a coarse bright one.

++	Disperse dyestuffs	Dianix	::
↑ Covering of bairiness	Acid levelling dyestuffs (monosulphonated)	Telon	↓ Wet fastness
	Acid half milling dyestuffs (monosulphonated)	Telon A	
	Acid milling dyestuffs (disulphonated)	Telon M	
	Pre-metallised dyes (non sulphonated)	Isolan	
	Mix out of pre-metallised dyes	Isolan NHF-S	
	Pre-metallised dyes (monosulphonated)	Isolan S	
	Pre-metallised dyes (disulphonated)	Isolan 2S	
::	Reactive dyes	selected Levafix/Remazol	++

Dye selection; Acid & Metal Complex

	Telon	Telon A	Telon M	Isolan	Isolan NHF-S	Isolan 2S	
Combinability	+	+					
Leveling / Migration properties	++	+					
Covering barriness	++	+	+/-	+/-	-	--	
Blocking effect	--	--	+			+/-	
Light fastness	+	+		++			
Wet fastness			+	+	+	++	
Brillant shades			++				
Real trichromatics			--				
	Light shades	multiurpose dyes	Brillant shades	automotive article	medium to dark shades	dark shades	

Fastness Comparison: washfastness adidas 50 °C / without after treatment

I. Telon	II. Telon A	III. Isolan
<p>0.080% Yellow 4R micro 0.052% Red FRL micro 0.040% Blue BRL micro</p> <p>1.0% Sera Gal N-FS pH 7</p> <p>original  treated </p> <p style="text-align: center;">change of shade</p>	<p>0.096% Yellow A3R 0.019% Rubine A5B 0.044% Blue AFN</p> <p>1.0% Sera Gal N-FS pH 7.5</p> <p>original  treated </p> <p style="text-align: center;">change of shade</p>	<p>0.155% Yellow K-PRL 200% 0.020% Scarlet K-GLS 150% gran 0.090% Grey K-PBL 200% 0.5% Sera Sperse M-IS 1.0% Sera Gal N-FS pH 8</p> <p>original  treated </p> <p style="text-align: center;">change of shade</p>



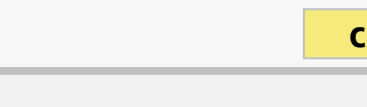
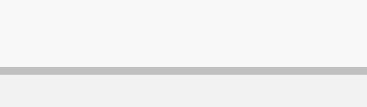
PA 6

- I.
- II.
- III.



Staining adjacent fabric

Fastness Comparison: washfastness adidas 50 °C / without after treatment

I. Telon A		II. Telon /Isolan	
0.230%	Yellow A3R	0.550%	Green M-6GW
0.075%	Rubine A5B	0.850%	Dark Blue 2S-GL
1.600%	Blue AFN		
1.0%	Sera Gal N-FS	0.5%	Sera Sperse M-IS
pH 5		1.0%	Sera Gal N-FS
		pH 5.5	
original		original	
treated		treated	

change of shade

PA 6

I.





II.

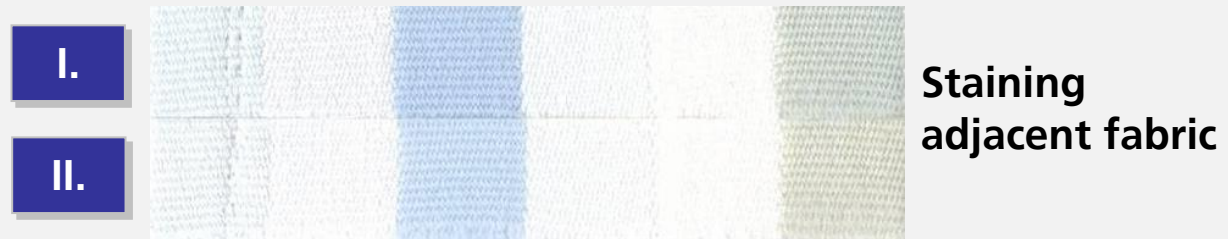


Staining adjacent fabric

Achievability issues shade and fastness





Fastness Comparison: washfastness adidas 50 °C / **without after treatment**

PA 6	I. Telon A	II. Telon A	PA 6.6
	0.230% Yellow A3R 0.075% Rubine A5B 1.600% Blue AFN	0.300% Yellow A3R 0.095% Rubine A5B 2.100% Blue AFN	
	1.0% Sera Gal N-FS pH 5	1.0% Sera Gal N-FS pH 5	
	original 	original 	
	treated 	treated 	
	change of shade		

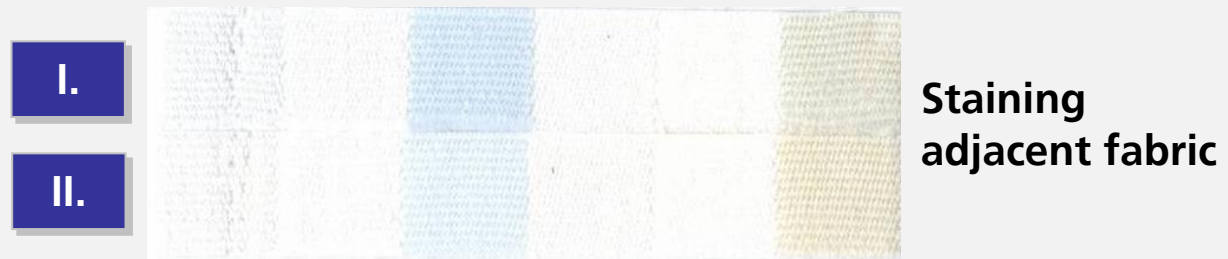


Achievability issues shade and fastness

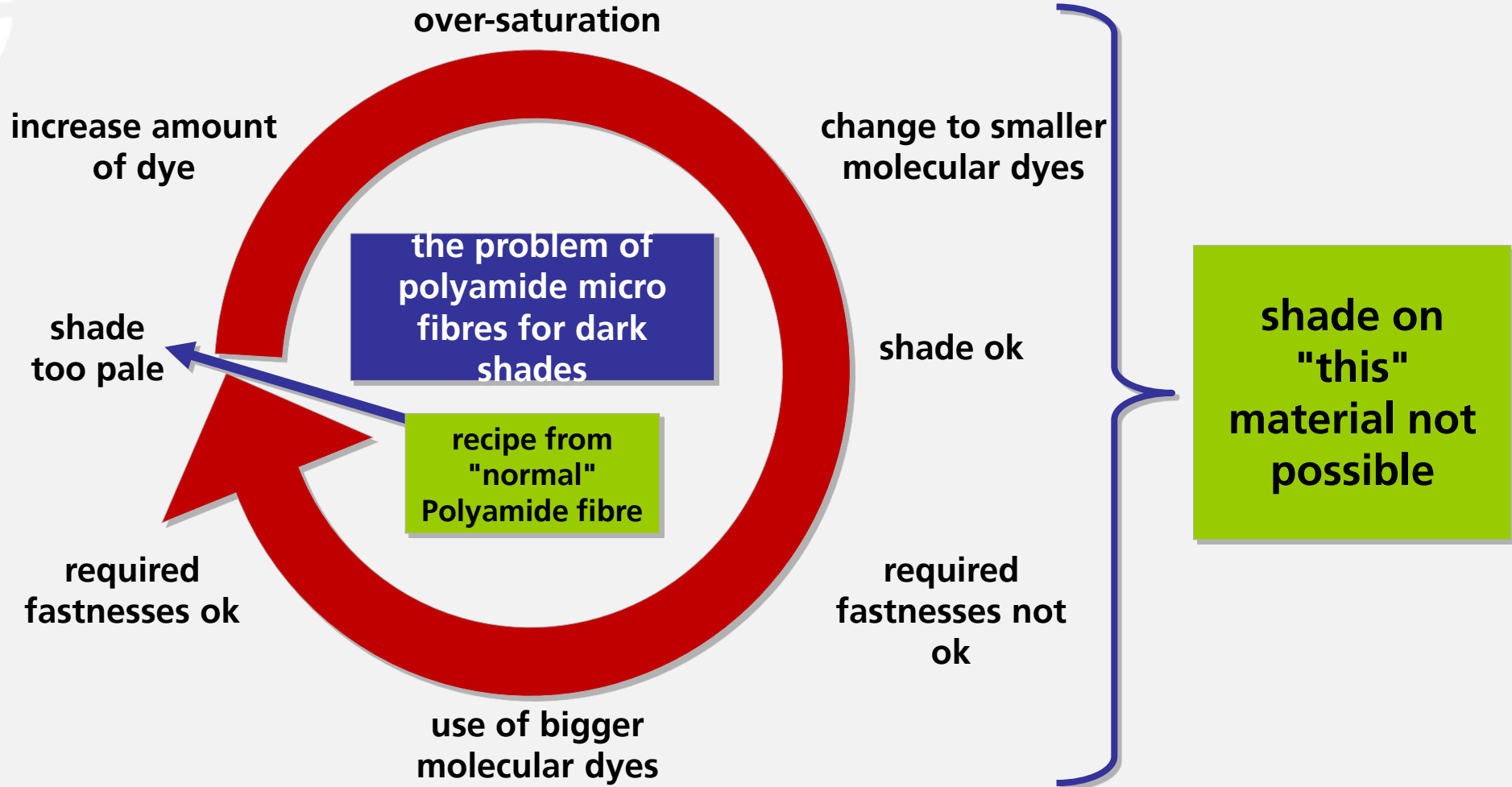
Fastness Comparison: washfastness adidas 50 °C / after treated with 4% Sera Fast N-BS

PA 6	I. Telon A 0.230% Yellow A3R 0.075% Rubine A5B 1.600% Blue AFN 1.0% Sera Gal N-FS pH 5 original  treated 	II. Telon A 0.300% Yellow A3R 0.095% Rubine A5B 2.100% Blue AFN 1.0% Sera Gal N-FS pH 5 original  treated 	PA 6.6
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change of shade



Achievability issues shade and fastness



Achievability issues shade and fastness

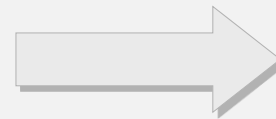
Fastness Comparison / Light Fastness Different adidas Shades / Different Recipes



ISO 105-B02 Light fastness
2 - 3



0.5% Telon Turquoise Blue M-5G



Blue scale

2

3

4

5

6

7

What can DyStar offer?

- **Global products conforming to all applicable chemical legislation**
- **Widest product selection available meeting retailer RSL**
- **Highest standards of hazard communication via high quality MSDS**
- **Assistance in communication of eco-specifications to supply chain partners**
- **A local contact partner for expert help in all major textile processing markets**
- **A reliable partner at the front-end of your supply chain**

Sustainable partner of textile supply chain

- **econfidence®** commitment in our products
- **econfidence®** in processing
- **econfidence®** in partnerships
- **econfidence®** in programs

econfidence®
from DyStar® 



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IDEAS Active Sports Design Network – Autumn/Winter 2014*15

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe PES		Color Fastness to			
	Dianix	Recipe PA Telon & Isolan	Washing	Light	Perspiration	Water
02 / 0401919	0.0052% Red AC-E 01	0,0028% T Red A2R	●	●	●	●
	0.0024% Blue K-FBL	0,0078 T Blue A2R				
04 / 1101065	0.0522% Yellow AC-E new	0,0420% T Yellow ARB	●	●	●	●
	0.0451% Red AC-E 01	0,0142% T Red A”R				
	0.0311% Blue AC-E	0,0511% T Blue A2R				
27 / 1100877	0.0843% Yellow AC-E new	0,0404% I Yellow GRL	●	●	●	●
	0.1008% Red AC-E 01	0,0369% I Scarlet K-GLS 150%				
	0.0545% Blue AC-E	0,0929% I Grey K-PBL 200%				
32 / 1101038	0.1000% Yellow AC-E new	0,0746% T Yellow ARB	●	●	●	●
	0.1182% Red AC-E 01	0,045% T Red A2R				
	0.0679% Blue AC-E	0,1015% T Blue A2R				
05 / 1100078	0.0685% Yellow AC-E new	0,0292% I Yellow GRL	●	●	●	●
	0.0800% Red AC-E 01	0,0079 I Scarlet K-GLS 150%				
	0.0696% Blue AC-E	0,1228% I Grey K-PBL 200%				
03 / 0900413	0.2635% Yellow S-6G	0,2398% I Yellow NHF-S	●	●	●	●
	0.1915% Rubine XFS	0,0107% I Red NHF-S				
	0.3391% Blue XF	0,4780% I Silver NHF-S				
01 / 1000211	0.1488% Flavine XF	0,9294% I Grey NFH-S	●	●	●	●
	0.3622% Chilli Red SF	1,2168% I Brown NHF-S				
	6.0543% Black XF	1,8300% I Silver NHF-S				

- Notes:**
- No fastness issues expected
 - Fastness issues may occur
- Predictions taking in consideration a microfiber substrate
Post setting 180°C for 30 sec without finishing*

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe PES	Recipe PA	Color Fastness to			
	Dianix	Telon & Isolan	Washing	Light	Perspiration	Water
42 / 0100162	0.0014% Yellow CC	0,0137% I Yellow GRL				
	0.0027% Yellow Brown CC	0,0005% I Orange K-RLS 135%				
	0.0002% Turquoise S-BG					
24 / 0100405	0.0746% Yellow S-6G	0,1664% T Yellow M-4GL				
	0.0055% Golden Yellow SF	0,0020% T Blue M-GLW				
	0.0008% Blue AC-E					
08 / 0101547	0.3455% Flavine XF	0,4283% T Flavine M-7G				
	0.0008% Golden Yellow SF	0,5439% T Yellow M-4GL				
	0.0068% Turquoise S-BG	0,0123% T Blue M-GLW				
45 / 0101324	0.0046% Yellow CC	0,2032% I Yellow GRL				
	0.0927% Yellow Brown CC	0,0625% I Scarlet K-GLS 150%				
	0.0191% Blue AC-E	0,0281% I Grey K-PBL 200%				
33 / 0101164	0.2215% Flavine XF	2,3680% I Yellow NHF-S				
	0.7474% Yellow Brown XF	0,0677% I Blue NHF-S				
	0.0961% Turquoise S-BG	0,1829 I Orange NHF-S				
38 / 0700055	1.2321% Yellow Brown XF	1,6082% I Yellow NHF-S				
	0.3655% Rubine XFS	1,1213% I Bordeaux NHF-S				
	1.2697% Turquoise S-BG	0,6946% I Grey NHF-S				
23 / 0101055	0.0081% Yellow CC	0,1059% I Yellow GRL				
	0.0337% Yellow Brown CC	0,0273% I Scarlet K-GLS 150%				
	0.0005% Blue AC-E					

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe		Color Fastness to			
	Dianix	Telon & Isolan	Washing	Light	Perspiration	Water
35 / 0101120	0.7482% Dianix Flavine XF	2,0000% T Yellow M-4GL	●	●	●	●
	0.0668% Dianix Golden Yellow SF	0,4440% T Orange M-GSN				
	0.0245% Dianix Scarlet XF					
17 / 0202074	0.8445% Dianix Flavine XF	2,1512% T Yellow M-4GL	● ●	● ●	●	●
	0.0378% Dianix Yellow Brown XF	0,1782% T Red M-GWN				
	0.1311% Dianix Sport Red SFN					
30 / 0200279	0.0202% Dianix Yellow SE-G	0,1061% I Yellow GRL	●	●	●	●
	0.0518% Dianix Yellow Brown CC	0,1507% I Scarlet K-GLS 150%				
	0.0225% Dianix Red CC	0,0012% I Grey K-PBL 200%				
20 / 0201554	0.1780% Dianix Golden Yellow SF	0,3769% T Orange M-GSN	●	● ●	●	●
	0.0843% Dianix Scarlet XF	0,0231% T Red M-R				
	0.0045% Dianix Rubine XFS	0,0436% T Red M-GWN				
46 / 0200201	1.1373% Dianix Golden Yellow SF	0,5709% T Yellow M-4GL	●	●	●	●
	0.3329% Dianix Brilliant Scarlet SF	1,9550% T Orange M-GSN				
	0.0031% Dianix Blue AC-E	0,0654% T Red M-BL				
41 / 0301240	0.3193% Dianix Flavine XF	1,0245% T Yellow M-4GL	●	●	●	●
	2.3683% Dianix Sport Red SFN	1,0277% T Red M-R				
	2.4330% Dianix Chilli Red SF	1,0147% T Red M-BL				
29 / 0302524	1.1329% Dianix Sport Red SFN	0,3021% T Red M-R	●	● ●	●	●
	0.6847% Dianix Crimson SF	0,1398% T Red M-GWN				
	0.0184% Dianix Blue AC-E	0,6237% T Red M-BL				

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe PES	Recipe PA	Color Fastness to			
	Dianix®	Telon & Isolan	Washing	Light	Perspiration	Water
18 / 0302932	0.0053% Yellow AC-E new	0,0011% I Yellow GRL	●	●	●	●
	0.0132% Red AC-E 01	0,0143% I Scarlet K-GLS 150%				
	0.0020% Blue AC-E	0,0034% I Grey K-PBL 200%				
11 / 0302987	0.0348% Yellow AC-E new	0,0179% I Yellow GRL	●	●	●	●
	0.0460% Red AC-E 01	0,0306% I Scarlet K-GLS 150%				
	0.0138% Blue AC-E	0,0270% I Grey K-PBL 200%				
48 / 0402538	0.0105% Flavine XF	0,4158% T Red M-BL	●	● ●	●	●
	1.6612% Brilliant Red SF	0,5106% T Red M-3B 80%				
	0.1020% Turquoise S-BG	0,0951% T Blue M-RLW				
34 / 0402387	0.0018% Flavine XF	0,0474% T Red M-BL	●	● ●	●	●
	0.1729% Brilliant Red SF	0,0749% T Red M-GWN				
	0.1229% Blue XF	0,2849% T Blue M-RLW				
07 / 0301095	1.0026% Yellow Brown XF	0,8501% I Yellow NHF-S	●	●	●	●
	1.2607% Crimson SF	1,3949% I Red NHF-S				
	0.4184% Blue XF	0,6571% I Blue NHF-S				
19 / 0401503	0.7554% Yellow Brown XF	1,3958% I Red NhF-S	●	●	●	●
	0.8387% Rubine XFS	0,7928% I Blue NHF-S				
	0.8253% Navy XF	0,4569% I Ultramarine NHF-S				
16 / 0701185	3.2949% Yellow Brown XF	1,3371% I Orange NHF-S	●	●	●	●
	0.3482% Rubine XFS	2,1300% I Black NHF-S				
	1.4512% Navy XF					

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe PES	Recipe PA	Color Fastness to			
	Dianix®	Telon & Isolan	Washing	Light	Perspiration	Water
31 / 0501014	0.0077% Yellow AC-E new	0,0051% T Blue AFN				
	0.0082% Red AC-E 01	0,0055% I Yellow GRL				
	0.0099% Blue AC-E	0,0138% I Grey K-PBL 200%				
06 / 0500382	0.0001% Yellow AC-E new	0,0014% T Yellow ARB				
	0.0017% Red AC-E 01	0,0003% T Red A2R				
	0.0059% Blue K-FBL	0,0211% T Blue A2R				
26 / 0500604	0.0026% Yellow AC-E new	0,0024% T Yellow A2R				
	0.0214% Red AC-E 01	0,0193% T Red A2R				
	0.1362% Blue AC-E	0,1927% T Blue AFN				
43 / 0501036	0.0001% Flavine XF	0,0127% T Red A2R				
	0.2014% Turquoise XF	0,4527% T Blue AFN				
	0.1641% Royal CW-SF					
39 / 0502959	0.0118% Flavine XF	0,0132% T Red M-BL				
	0.0454% Golden Yellow SF	0,1720% T Blue M-2R				
	0.5157% Royal CW-SF	0,3476% I Ultramarine NHF-S				
44 / 1100248	0.4094% Yellow Brown XF	0,0290% I Red NHF-S				
	0.0552% Rubine XFS	0,4741% I Blue NHF-S				
	0.7251% Navy XF	0,4324% I Silver NHF-S				
50 / 0503621	0.5497% Yellow Brown XF	0,7054% I Red NHF -S				
	0.5380% Rubine XFS	0.6732% I Blue NHF-S				
	2.1311% Navy XF	1.8235% I Ultramarine NHF-S				

ColorWall™ colors fastness prediction



ColorWall™ color	Recipe PES	Recipe PA	Color Fastness to			
	Dianix®	Telon & Isolan	Washing	Light	Perspiration	Water
21 / 0502626	0.0158% Yellow AC-E new	0,0345% T Blue AFN				
	0.0317% Red AC-E 01	0,0197% I Yellow GRL				
	0.0481% Turquoise S-BG	0,0164% I Grey K-PBL 200%				
28 / 0902947	0.0432% Yellow AC-E new	0,0242% T Yellow A3GL				
	0.0051% Red AC-E 01	0,0053% T Yellow A2R				
	0.0808% Turquoise S-BG	0,0755% T Blue A3GL				
22 / 0904304	0.1383% Luminous Yellow 10G	0,3367% T Yellow M-4GL				
	0.0122% Golden Yellow SF	0,5282% T Turquoise M-5G 85%				
	0.5324% Turquoise XF	0,0710% T Green M-BW				
25 / 0904542	0.0855% Luminous Yellow 10G	0,1807% T Yellow M-4GL				
	0.0149% Golden Yellow SF	0,8934% T Turquoise M-5G 85%				
	1.1304% Turquoise XF	0,2030% T Green M-BW				
14 / 0600332	0.0111% Luminous Yellow 10G	0,0339% T Yellow M-4GL				
	0.1805% Turquoise S-BG	0,4007% T Turquoise M-5G 85%				
	0.3010% Cyanine B	0,0833% T Green M-BW				

ColorWall™ colors fastness prediction



5ColorWall™ color	Recipe PES	Recipe PA	Color Fastness to			
	Dianix®	Telon & Isolan	Washing	Light	Perspiration	Water
49 / 0901239	0.1341% Flavine XF	0,2806% T Yellow M-4GL				
	0.0133% Golden Yellow SF	0,0819% T Green M-6GW				
	0.0466% Turquoise S-BG	0,0479% T Yellow NHF-S				
09 / 0904495	0.4860% Luminous Yellow 10G	1,5000% T Flavine M-7G				
	0.0091% Golden Yellow SF	0,0095% T Blue M-GLW				
	0.1276% Turquoise S-BG	0,2305% T Green M-6GW				
15 / 0901235	0.1448% Flavine XF	0,5846% T Yellow M-4GL				
	0.0449% Yellow Brown XF	0,0982% T Blue M-2R				
	0.0663% Blue AC-E	0,1051-5 I Yellow NHF-S				
13 / 0903203	0.0349% Flavine XF	0,0440% T Red M-BL				
	0.4693% Yellow Brown XF	1,0588% I Yellow NHF-S				
	0.2573% Blue XF	0,2862% I Blue NHF-S				
12 / 0903193	0.0363% Yellow S-6G	0,7652% T Blue M-GLW				
	0.2781% Yellow Brown XF	0,5388% I Yellow NHF-S				
	0.2703% Blue XF	0,1238% I Red NHF-S				
36 / 0900378	0.7755% Flavine XF	1,7674% T Blue M-GLW				
	0.3048% Golden Yellow SF	1,7360% I Yellow NHF-S				
	1.6747% Navy XF	1,3200% I Silver NHF-S				

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