PRECONTRAINT

902 S2

902-8636 **S2**

Serge Ferrari

Technical properties	Précontraint 902 S2	Standards
Application	Mobile or permanent structures	
Surface treatment	PVDF	
Making up	Weldable	
Yarn	PES HT 1100 Dtex	
Weight	950 g/sqm • 28 oz/sqyd	EN ISO 2286-2
Total thickness	0.72 mm	
Width	267 cm • 105.1 in	(+1mm /-1mm)
Tensile strength (warp/weft)	420/400 daN/5cm 480/450 lbs/in	EN ISO 1421 ASTM D 751-00 Cut Strip
Tear resistance (warp/weft)	55/50 daN 105/100 lbs	DIN 53.363 ASTM D 751-00 Trapezoid
Adhesion	12 daN/5cm	EN ISO 2411
Flame retardancy		
Euroclass	**B-s2,d0**/EN 13501-1	
Rating	**M2**/NFP 92-507 • **B1**/DIN 4102-1 • **Test 2**/NFPA 701 • CSMF T19	
Guarantee*		

> **The technical data here above are average values with a +/-5% tolerance**

Longevity				
Coating thickness at the top of the yarns	300 microns			
Varnish adhesion longevity	QUV A 4000 h	pass		Scotch tape test
Solar optical values	ASHRAE 74-1988		EN 410	
Solar Transmittance (Ts)	7%		7%	
Solar reflectance (Rs)	75%		80%	
Solar Factor (g)	11.5%		12.5%	
Visible light Transmittance (Tv)	--		5%	
Visible light Reflectance (Rv)	--		88%	
UV transmission			0%	
Visible light Transmittance (Tv)		9%		NFP 38511 (diffus-diffus)
Global thermal conductivity**				
Vertical / Horizontal position	U= 5.6 / 6.4 W/sqm/°C			
Acoustic performance				
Weakening index	13dBA			ISO 717-1
LEED Heat island Effect				
Non roof (up to 2 pts)	Solar Reflectance Index >95%			SSc 7.1
Roof (up to 1 pt)	Solar Reflectance Index >95%			SSc 7.2/GIB C9 (ND)
Environmental Impact: LCA (Life Cycle Assessment)				ISO 14041-44
Comparative analysis depending on end-of-life scenarios	Texyloop® Recycling	Incineration	Landfill	Functional unit = 1 sqm Material only / 902 S2 values
Resources depletion	0.032	0.133	0.133	Kilograms eq. Sb
Global warming	2.33	4.23	3.65	Kilograms eq. CO_2
Energy consumption	59.1	95.5	95.5	Megajoul eq.
Water consumption	149.3	310.1	308.6	Litre
Management systems				
Quality in conformity with				ISO 9001
Environmental communication in conformity with				ISO 14021
Certifications, labels, recycling capacity				

LCA and LEED reports
available on request

> **The values here above are given as an indication in order to allow our customers to make the best use of our products. Our products are subjects to evolutions due to technical progress, we remain entitled to modify the characteristics of our products at any time. The buyer of our products is responsible to check that the here above data are still valid.**

* Warranty: Please refer to the text of our warranty. The warranty is valid only after confirmation on case-by-case basis of warranty application. The warranty will not apply to mobile structures.
** Those data are obtained by calculation through simulations of the average conditions of use, those values must be considered as approximation.

The buyer of our products is fully responsible for their application or their transformation concerning any possible third party. The buyer of our products is responsible for their implementation and installation according to the standards, use and customs and safety rules of the countries where they are used.

→ Contact

- Headquarters: + 33 (0)4 74 97 41 33
- Your local representative:
  www.sergeferrari.com

→ TEXYLOOP®

- The Serge Ferrari operational recycling chain
- Secondary raw materials of high intrinsic value compatible with multiple processes
- A quantified response to combat depletion of natural resources

www.texyloop.com

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ref. 1774 • SEPT 2012/V1.01 • Studio Serge Ferrari

PRECONTRAINT

1002 S2

1002-8636 **S2**

Serge Ferrari

PRECONTRAINT
1002 S2

Technical properties	Précontraint 1002 S2			Standards
Surface treatment (top/back)	S2 PVDF / PVDF			
Yarn	PES HT 1100 Dtex			
Weight	1050 g/sqm • 31 oz/sqyd			EN ISO 2286-2
Width	267 cm • 105.1 in			(+1mm /-1mm)
Tensile strength (warp/weft)	420/400 daN/5cm 480/450 Lbs/in			EN ISO 1421 ASTM D 751-00 Cut Strip
Tear resistance (warp/weft)	55/50 daN 80/75 Lbs			DIN 53.363 ASTM D 751-00 Trapezoid
Adhesion	12 daN/5cm			EN ISO 2411
Flame retardancy				
Euroclass	**B-s2,d0**/EN 13501-1			
Rating	**M2**/NFP 92-507 • **B1**/DIN 4102-1 • BS 7837 • NFPA 701 • CSMF T19 • AS/NZS 1530.3 & 3877 group 1			
Warranty*				

GUARANTEE 15 YEARS Serge Ferrari

> **The technical data here above are average values with a +/-5% tolerance.**

ADDITIONAL INFORMATION				
Total thickness	0.78 mm			
Coating thickness at the top of the yarns	200/200 microns			
Varnish adhesion longevity	QUV A 4000 h	pass		Scotch tape test
Dimensional stability				
Elongation 24h -10daN/5cm (warp/weft)	<1% / <1%			EN 15977
Residual elongation	<0.4% / <0.4%			EN 15977
Solar optical values	ASHRAE 74-1988	EN 410		
Solar Transmittance (Ts)	6%	6 %		
Solar reflectance (Rs)	78%	81%		
Solar Factor (g)	12%	9.5%		
Visible light Transmittance (Tv)	--	4 %		
Visible light Reflectance (Rv)	--	90 %		
UV transmission		0%		
Thermal and Acoustic performances				
Thermal conductivity (vertical/horizontal)	ca. U=5.6 / 6.4 W/sqm/°C			Calculated
Acoustic Weakening index	ca. 14dBA			ISO 717-1
LEED Heat island Effect				
Solar Reflectance Index	SRI >95%			SSc 7.2/SSc 7.1 (Roof/Non Roof)
Environmental Impact: LCA (Life Cycle Assessment)				ISO 14041-44
Depending on end-of-life scenarios	**Texyloop® Recycling**	Incineration	Landfill	1 sqm membrane
Global warming	**2.572**	4.757	4.104	Kilograms eq. CO2
Energy consumption	**59.7**	103.3	103.3	Megajoul eq.
Water consumption	**139.6**	341.3	339.6	Litre
Management systems				
Quality in conformity with				ISO 9001
Environmental communication in conformity with				ISO 14021
Certifications, labels, recycling capacity				

LCA and LEED reports
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Serge Ferrari

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Flexlight
Perform 912 S2

Applications

Car parks

Shading structures

Consistency & Reliability

Provide consistent & reliable performances for shading structures

Advantages

— Dimensional stability due to Précontraint® technology
— Low wick treatment
— Low maintenance
— Lightweight & recyclable via Texyloop process

	Technical properties	Standards
Surface treatment (top)	S2 PVDF	
Yarn	Anticapillarity Low wick High tenacity Polyester 1100/1670 Dtex	
Weight	900 g/sqm	EN ISO 2286-2
Width	267 cm	(+1mm /-1mm)
Tensile strength (warp/weft)	420/400 daN/5cm	EN ISO 1421
Tear resistance (warp/weft)	55/50 daN	DIN 53.363
Adhesion	11 daN/5cm	EN ISO 2411

The technical data here above are average values with +/5% tolerance

	Flame retardancy	
Rating	**B1**/DIN 4102-1	

Additional Information (indicative)

	Dimensional stability	
Elongation 24h -10daN/5cm (warp/weft)	<1.2% / <1.2%	EN 15977
Residual elongation	<0.5% / <0.5%	EN 15977

	Thermal and Acoustic performances	
Thermal conductivity (vertical/horizontal)	ca. U=5.6 / 6.4 W/sqm/°C	Calculated
Acoustic Weakening index	ca. 12dBA	ISO 717-1

	Solar optical values 912 S2 8100 white	
Visible light Transmittance (Tv)	5,5%	EN 410
Visible light Reflexion (Rv)	94%	
Solar Transmittance (Ts)	6.5%	
Solar Reflexion (Rs)	83%	
Solar factor (g)	9,5%	
UV transmittance	0%	
Solar Reflectance Index (SRI)	> 85%	SSc 7.2/SSc 7.1 (Roof/Non Roof)

	Management systems	
Quality in conformity with		ISO 9001
Environmental communication in conformity with		ISO 14021

Certifications, labels, recycling capacity

Précontraint® technology

Serge Ferrari
lightweight + durable

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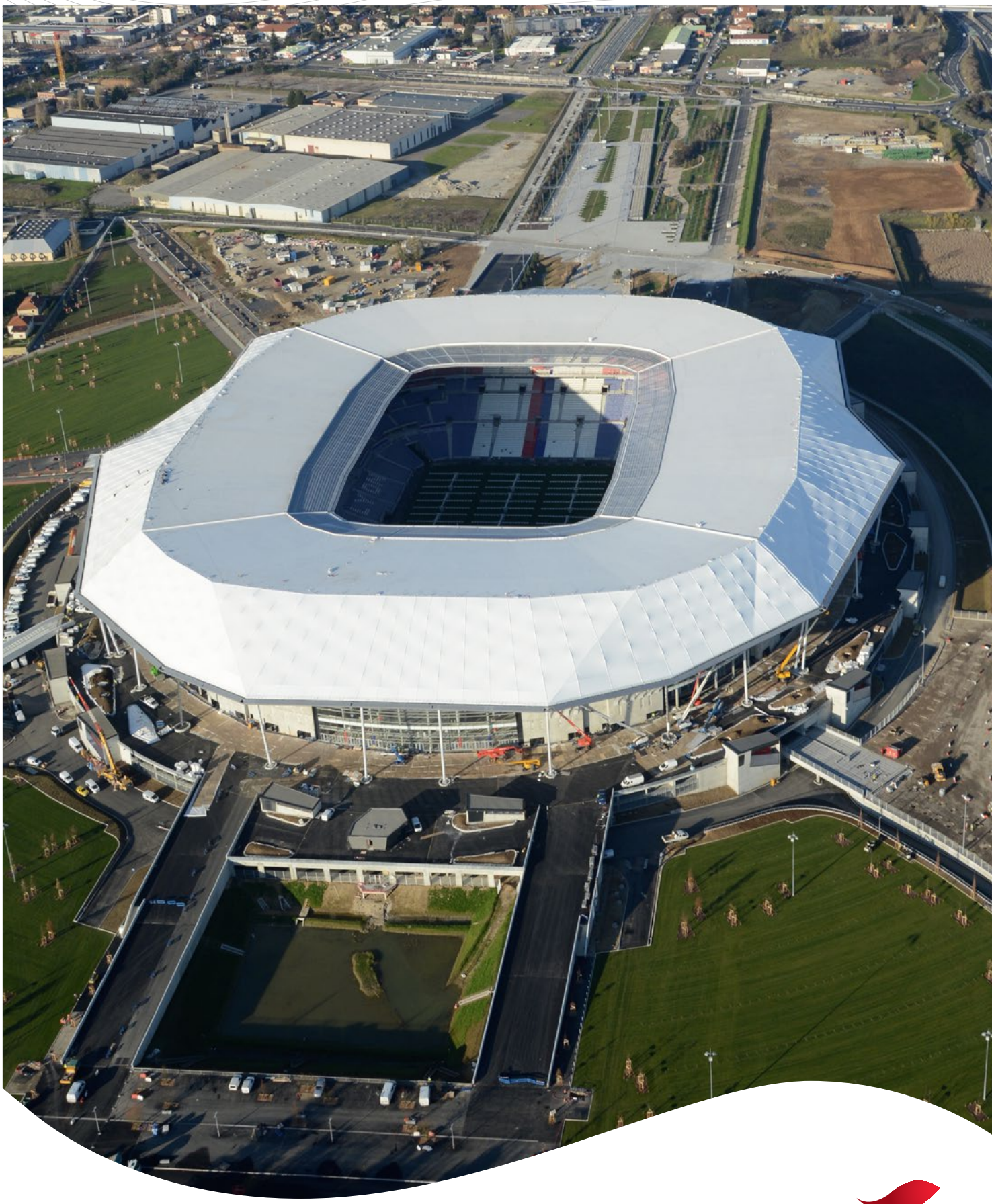
PRECONTRAINT

TX30



Serge Ferrari

PRECONTRAINT
TX30

Précontraint TX30 has been developed to meet the mechanical and aesthetical longevity requirements of the most demanding projects. In addition to the proprietary Précontraint technology benefits, the Précontraint TX 30 material combines an ultra resistant 30 YEAR coating formula and a CROSSLINK PVDF top coat.

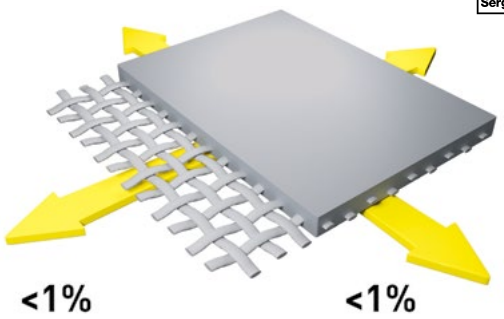
Dimensional stability / Low maintenance

The Serge Ferrari exclusive **Précontraint technology** provides unique dimensional stability compared to conventionally coated composites. It avoids re-tensioning and sagging.

- The polyester micro-cables are tensioned in both directions during the coating process resulting in flatter micro-cables and lower elongation and creep in both directions.

Elongation (EN 15997) : <1% / <1% (warp/weft direction)

Approx. 3 times lower elongation than Non Precontraint composites.



Natural light for architecture

Hold this section up to a light source to gauge the translucency of new Precontraint TX30-II

TX30-II 3000

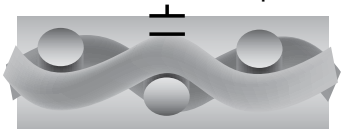
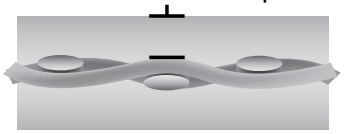
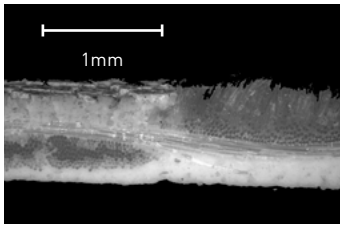
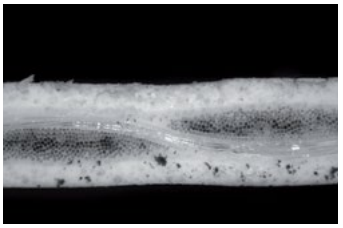
TX 30 I - II – III – IV and V samples are available on demand.

The 30 YEAR coating formula provides outstanding mechanical longevity

The mechanical longevity is directly linked to the quality and thickness of the coating which protects the yarns from the UV. The Précontraint TX30 longevity is served by:

- **A 30 YEAR coating formula** that is highly resistant to the erosion generated by weather aggressions (UV, rain...),
- A thicker coating protection at the top of the flat micro-cables resulting from the Serge Ferrari **Précontraint technology**.

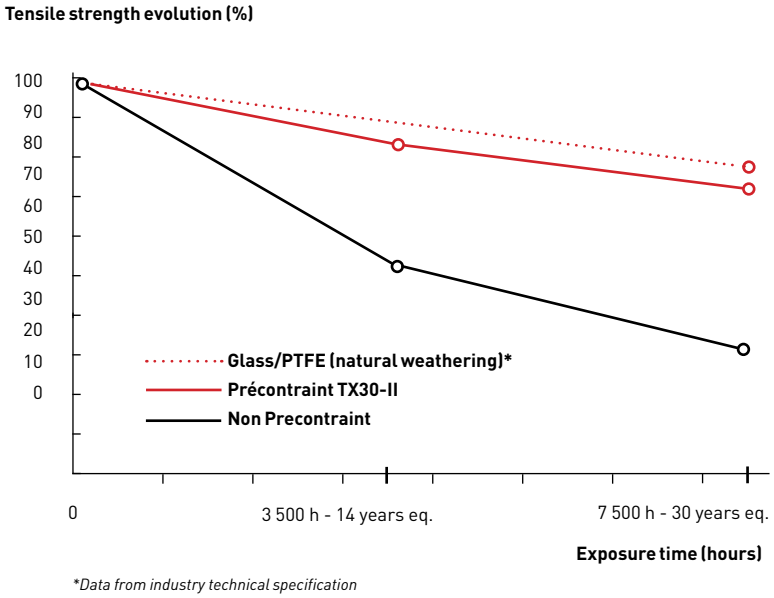
30 YEAR coating formula to stand the test of time

Product reference	Non Precontraint	Précontraint TX30
Before weathering	130 micron protection  > Less protection of the polyester micro-cables against UV	230 micron protection  > Greater protection of the polyester micro-cables against UV
After weathering 7500 h – 30 Year Florida Eq	 Erosion of the coating - Polyester micro-cables are naked and exposed to UV degradation. **> Drop of mechanical properties (see below)**	 Limited erosion – Polyester micro-cables are still well protected against UV by the coating. **> Better mechanical longevity (see below)**

Mechanical strength evolution

The mechanical strength has been measured at different intervals during the accelerated weathering.

Précontraint TX30 maintains a better mechanical resistance after 30 years thanks to a better protection of the polyester micro-cables.



**Data from industry technical specification*

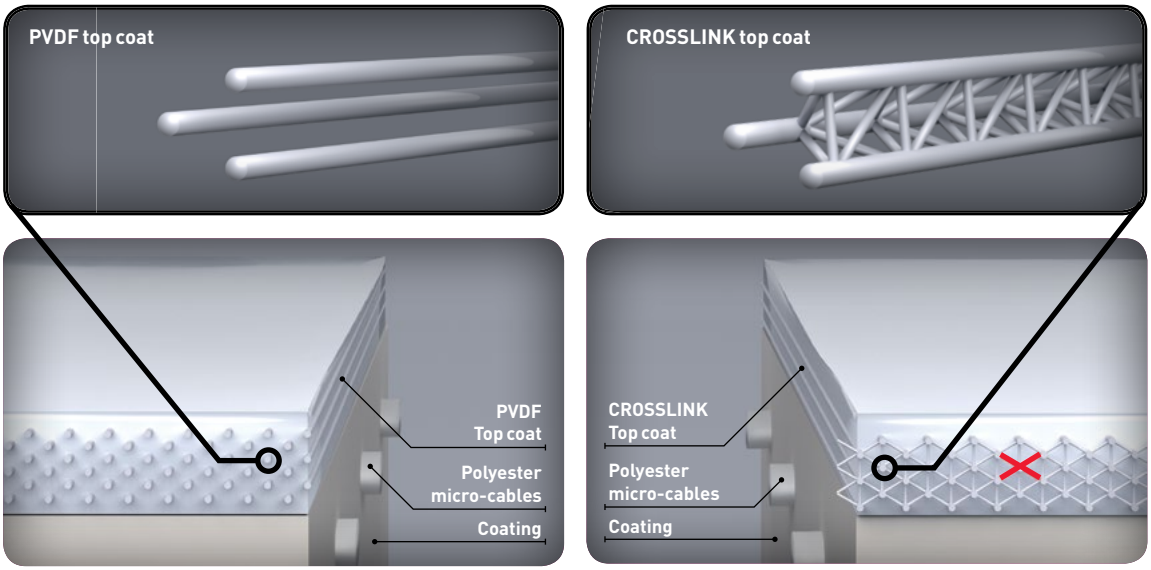
The above data are extracts from a long term accelerated weathering test based on ISO 10640. The weathering protocol was validated by comparing

TX30 CROSSLINK TOP COAT
for durable aesthetics

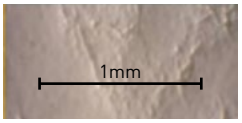
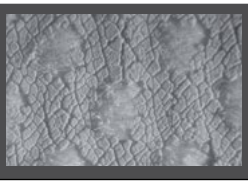
The CROSSLINK top coat formula generates irreversible links between molecular chains. This three-dimensional network provides long term benefits:

- durable aspect due to higher resistance to photo oxidation and micro-cracks,
- smoother surface to minimise ingrained dirt,
- easier and more efficient cleaning of the even surface.

TX30 CROSSLINK Top



Extreme surface resistance

Product	Standard	High end & durable composites	
Top coat	**Non Precontraint** Weldable PVDF	**Précontraint TX30** CROSSLINK Weldable after abrasion	**Glass / PTFE** Weldable with additional tape
Friction coefficient*	0.59	0.27	0.23
Accelerated weathering **4.500 H - 18 year Florida Eq.**			
Accelerated weathering **7.500 H - 30 year Florida Eq.**			
CLOSE UP **Yarn protection** 7.500 H – 30 year Florida Eq			
	Lots of micro cracks and exposed yarns – Irreversible degradation	*No micro cracks, aesthetics is preserved, easy cleaning*	*No micro cracks, aesthetics is preserved, easy cleaning*

**** a lower friction coefficient minimises the accumulation of dirt and pollution resulting in self cleaning properties.***

outdoor exposed and artificially weathered materials. Study available upon request.

MAIN FEATURES

- Proven design life > 30 years
- Remain bright and clean, minimal maintenance
- Optimized comfort: natural light and heat protection
- Texyloop recycling

APPLICATIONS

- Major construction projects
- Demanding structures requiring long life
- Large-scale permanent tensile structures

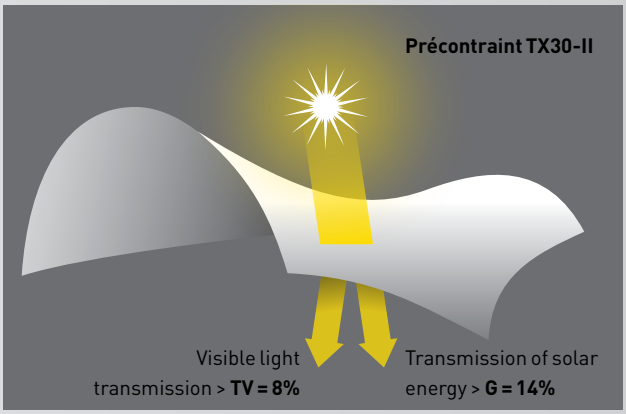
Mechanical and aesthetical longevity

Choose a design life in excess of 30 years

Précontraint TX30 matches the requirements of the most demanding projects.

This technology combines:

- Aesthetical longevity thanks to the **CROSSLINK PVDF surface treatment**
- Mechanical longevity thanks to the **30 YEAR coating formula**
- Outstanding dimensional stability through the **PRECONTRAINT technology**

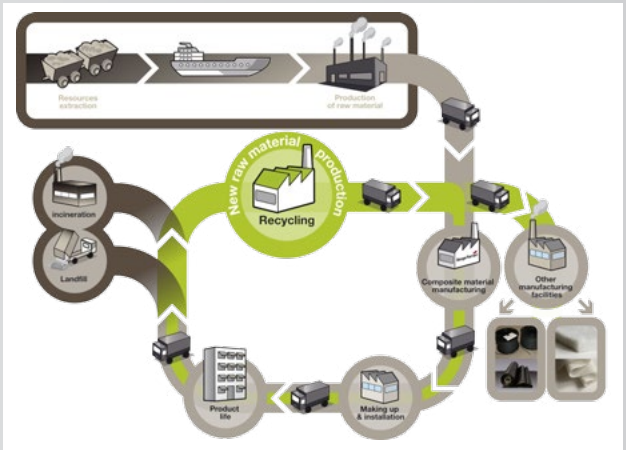


Optimum operating and energy costs

Optimise natural light and heat protection

Précontraint TX30 is engineered to optimise comfort and energy savings:

- **2 times more natural light transmission** than standard weldable pvdf membranes (Tv = 8% vs Tv = 4% for type II)
- **2 times more heat protection** than Glass /PTFE (solar factor G = 14 vs G = 23% for type II)



Recycling: 50% environmental impact reduction

Select an eco-responsible material

Précontraint TX30 is conform to the Serge Ferrari eco-design policy:

- **Reduced environmental impact** through its eco-conception (see life cycle assessment)
- **Recycling via Texyloop** to extend the life of the raw material and reduce the environmental impact.

PRECONTRAINT
TX30

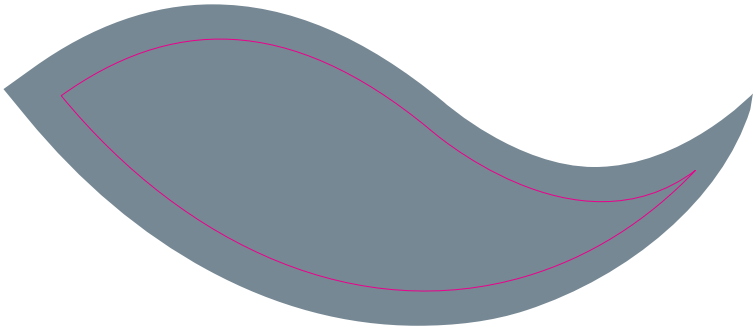
	Précontraint TX30 - II	Précontraint TX30 - III	Précontraint TX30 - IV	Précontraint TX30 - V	Standards
Application	**Static and permanent structures - Tropical climates**				
Surface coating	CROSSLINK PVDF				
Life expectancy	**> 30 years**				
Technical properties					
HT polyester cables	1100 Dtex	1100/1670 Dtex	1100/2200 Dtex	1670/2200 Dtex	
Weight	1050 g/sqm	1050 g/sqm	1350 g/sqm	1500 g/sqm	EN ISO 2286-2
Width	178 cm	178 cm	178 cm	178 cm	(+1mm /-1mm)
Tensile strength (warp/weft)	430/430 daN/5cm	560/560 daN/5cm	800/700 daN/5cm	1000/800 daN/5cm	EN ISO 1421
Tear strength (warp/weft)	55/50 daN	80/65 daN	120/110 daN	160/140 daN	DIN 53.363
Adhesion	12 daN/5cm	12 daN/5cm	13 daN/5cm	15 daN/5cm	EN ISO 2411
Flame retardancy					
Euroclass	**B-s2,d0**	**C-s2,d0**	**C-s2,d0**	**C-s2,d0**	EN 13501-1
Rating	Depending on the type and country, additional fire certificates available upon request **M2**/NFP 92507, **B1**/DIN4102, NFPA 701, CSFM T19, AS/NZS 1530-3, AS/NZS 3837 Group1				

> **The technical data (above) are average values with a +/-5% tolerance**

ADDITIONAL INFORMATION					
Assembly	Weldable after abrasion				
Total thickness	0.78 mm	0.78 mm	1.02 mm	1.14 mm	
Micro organism resistance	Degree 0, excellent	Degree 0, excellent	Degree 0, excellent	Degree 0, excellent	EN ISO 846 Method A
Dimensional stability					
Elongation 24h - 10 daN/5 cm (warp/weft)	**<1%/<1%**	**<1%/<1%**	**<1%/<1%**	**<1%/<1%**	**EN15977**
Residual elongation	<0.4%/<0.4%	<0.4%/<0.4%	<0.4%/<0.4%	<0.4%/<0.4%	EN15977
Solar optical values					
Visible light Reflectance (Rv)	84 %	84 %	85 %	85 %	
Visible light Transmittance (Tv)	**8%**	**7,5%**	**5,5%**	**5%**	
Solar Factor (g)	**14 %**	**13 %**	**11.5 %**	**10.5 %**	EN 410
Thermal and Acoustic performances					
Thermal conductivity (vertical/ horizontal)	ca. U=5.6 / 6.4 W/sqm/°C				Calculated
Acoustic weakening index	ca. 14dBA	ca. 14dBA	ca. 15dBA	ca. 16dBA	ISO 140-3 & ISO 717-1
LEED Heat island Effect					
Solar reflectance index	SRI > 84%	SRI > 84%	SRI > 84%	SRI > 84%	SSc 7.2/7.1 (Roof/Non Roof)
Environmental Impact (Life Cycle Assessment)					
Energy consumption: Landfill scenario	103.3	107.1	132.9	144.6	Megajoul eq.
Energy consumption: Recycling scenario	59.7	60.2	71.0	73.6	Megajoul eq.
Management systems					
Quality in conformance with					ISO 9001
Certifications, labels, recycling capacity & warranty*					

Environmental impacts: LCA and LEED reports available on request

GUARANTEE 20 YEARS Serge Ferrari



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Cover picture: OL Stadium - Lyon - France - © C. DESVIGNE

PRECONTRAINT

1202 S2

1202-8636 **S2**

Serge Ferrari

PRECONTRAINT
1202 S2

Technical properties	Précontraint 1202 S2			Standards
Surface treatment (top/back)	S2 PVDF / PVDF			
Yarn	PES HT 1100/1670 Dtex			
Weight	1050 g/sqm • 31 oz/sqyd			EN ISO 2286-2
Width	267 cm • 105.1 in			(+1mm /-1mm)
Tensile strength (warp/weft)	560/560 daN/5cm 630/630 lbs/in			EN ISO 1421 ASTM D 751-00 Cut Strip
Tear resistance (warp/weft)	80/65 daN 130/100 lbs			DIN 53.363 ASTM D 751-00 Trapezoid
Adhesion	12 daN/5cm			EN ISO 2411
Flame retardancy				
Euroclass	**C-s2,d0**/EN 13501-1			
Rating	**B1**/DIN 4102-1 • BS 7837 • NFPA 701 • CSMF T19 • AS/NZS 1530.3			
Warranty*				

> **The technical data here above are average values with a +/-5% tolerance**

ADDITIONAL INFORMATION				
Total thickness	0.78 mm			
Coating thickness at the top of the yarns	200/200 microns			
Varnish adhesion longevity	QUV A 4000 h	pass		Scotch tape test
Dimensional stability				
Elongation 24h -10daN/5cm (warp/weft)	<1% / <1%			EN 15977
Residual elongation	<0.4% / <0.4%			EN 15977
Solar optical values	ASHRAE 74-1988	EN 410		
Solar Transmittance (Ts)	6%	6%		
Solar reflectance (Rs)	75%	82%		
Solar Factor (g)	11%	9.2%		
Visible light Transmittance (Tv)	--	4%		
Visible light Reflectance (Rv)	--	91%		
UV transmission		0%		
Thermal and Acoustic performances				
Thermal conductivity (vertical/horizontal)	ca. U=5.6 / 6.4 W/sqm/°C			Calculated
Acoustic Weakening index	ca. 14dBA			ISO 717-1
LEED Heat island Effect				
Solar Reflectance Index	SRI >95%			SSc 7.2/SSc 7.1 (Roof/Non Roof)
Environmental Impact: LCA (Life Cycle Assessment)				ISO 14041-44
Comparative analysis depending on end-of-life scenarios	**Texyloop® Recycling**	Incineration	Landfill	1 sqm membrane
Global warming	**2.60**	4.846	4.193	Kilograms eq. CO_2
Energy consumption	**60.2**	107.1	107.1	Megajoul eq.
Water consumption	**140.3**	333.1	331.3	Litre
Management systems				
Quality in conformity with				ISO 9001
Environmental communication in conformity with				ISO 14021
Certifications, labels, recycling capacity				

LCA and LEED reports
available on request

> **ADDITIONAL INFORMATION above are non-contractual and given as an indication in order to allow our customers to make the best use of our products. Our products are subjects to evolutions due to technical progress, we remain entitled to modify the characteristics of our products at any time. The buyer of our products is responsible to check that the here above data are still valid.**

* Warranty: Please refer to the text of our warranty. The warranty is valid only after confirmation on case-by-case basis of warranty application. The warranty will not apply to mobile structures. The buyer of our products is fully responsible for their application or their transformation concerning any possible third party. The buyer of our products is responsible for their implementation and installation according to the standards, use and customs and safety rules of the countries where they are used.

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