



Rail product guide





Fire, Smoke & Toxic Fume Systems (FST)

Our diverse range of products is specifically designed to offer complete systems that meet European and Global FST standards & performance ratings. Our FST products are used in many industries including Rail, Building & Construction and Marine. Scott Bader aims to provide excellent technical support, expertise and advice to support our products.






Rail Application case study: VIP Chair for China High Speed Train manufactured by Shanghai Cedar Composites Co. Ltd using Crestapol® 1212



Scott Bader was established in 1921 and today we are an independent, multinational chemical company with over 650 employees worldwide. We are a common trusteeship company, which means Scott Bader is owned by all employees, and can operate with great agility and innovation for the customers and industries we serve.

Today Scott Bader is a US \$287 million global chemical company, with manufacturing facilities in Europe, The Middle East, India, South Africa, Saudi Arabia, Canada and South America.

Scott Bader FST Rail Systems and Certificates

Fire Retardant Resins	Application	Resin Type	Certificates						
			US		FR		GER	ES	EU
									
FST RESINS			ASTM E 162	ASTM E 662	NF P 92 -501	NF F 16-101	DIN 5510-2	M test (UNE 23721 & UNE 23727)	EN 45545-2
Crestapol® 1212 / ATH	HL & RTM	Urethane acrylate	Passed	Passed	M1	F0	S4 SR2 ST2	M1	HL2
Crestapol® 1213A*	HL & RTM	Urethane acrylate							HL2
FST RESIN & GELCOAT SYSTEMS									
NEW	Crestapol® 1211A + Fireguard GC 78PA	RTM							HL2 (R1) HL3 (R10) HL3 (R17)
	Crestapol® 1212 / ATH + Fireguard GC 70PA	HL & RTM							HL2 (R1) HL3 (R10)
	Crestapol® 1212 / ATH + Fireguard GC 72PA	HL & RTM	Passed	Passed	M1	F1	S4 SR2 ST2	M1	
	Crestapol® 1213A + Fireguard GC 70PA	HL & RTM							HL2 (R1)
	Crystic® FR1166 PAK + Fireguard GC 72PA	HL & RTM			M2	F1			
	Crystic® U 1131 TPA + Fireguard GC 967PA	HL & S					S4 SR2 ST2		
	Crystic® U 1131 TPA + Fireguard GC 72PA	HL & S	Passed	Passed	M2	F1			
	Crystic® 5046 PA + Fireguard GC 72PA	HL & S			M1	F2			

*Awaiting certification (HL2 expected).

These are just some of our systems and certificates.

For the full range, please ask a Scott Bader colleague for assistance.

Crestapol's FST performance is achieved by the addition of aluminium trihydrate (ATH). Due to the inherently low viscosity of Crestapol® Resins up to 200 phr of ATH can be incorporated to achieve a range of stringent fire, smoke and toxic fume standards (full details and certification can be found on page 7).

FST performance will also be dependent on glass content and profile thickness. Please contact Scott Bader Technical Services Dept. for advice on ATH loadings for specific applications.



Fireguard

**New Technology FST
Gelcoats and Topcoats
Protecting composites
from fire.**

NEW

Fireguard Gelcoat 70PA

- Very low smoke & very low surface spread of flame
- Halogen free
- Spray gelcoat

Fireguard Gelcoat 72PA

- Low smoke & surface spread of flame
- Halogen free
- Spray gelcoat

Fireguard Gelcoat 78PA

- Highest level of FST performance in Fireguard range
- New FST Intumescent technology based system
- Allows for design of lighter weight FST composite parts
- Developed to achieve European harmonised fire specifications
- Spray gelcoat

Fireguard Gelcoat 73PA

- Low smoke & low surface spread of flame
- Halogen free
- Brush gelcoat

Fireguard Topcoat 75PA Excel

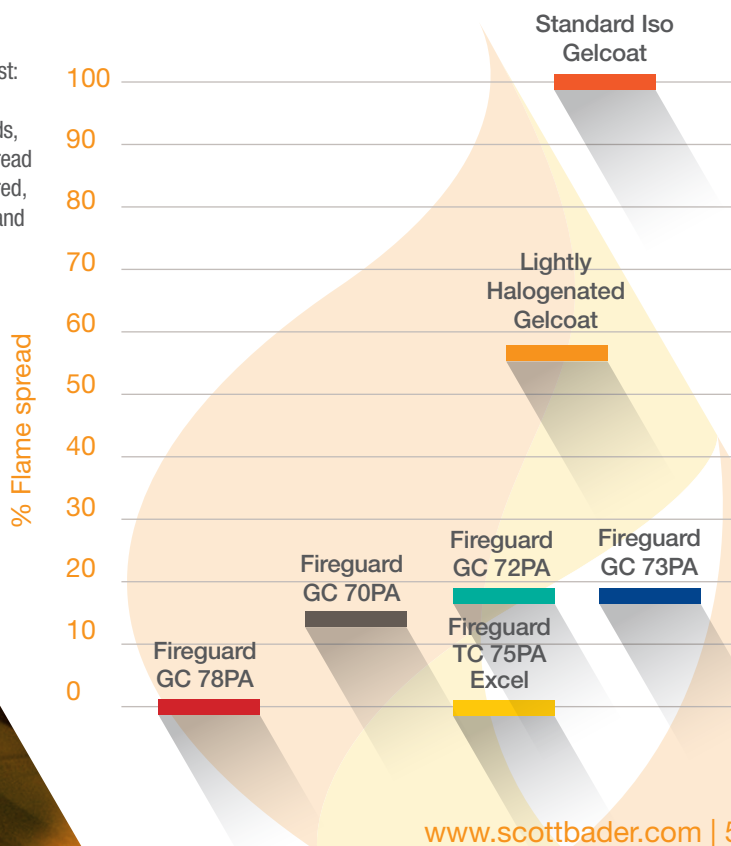
- Excellent Fire Retardant Performance
- Intumescent FST Technology
- Spray and brush grades available

In-house tests have shown that **Fireguard Topcoat 75PA Excel** can withstand a direct flame at **700°C** for over **60 minutes**



Spread of flame on a horizontal burn test after 5 minutes*

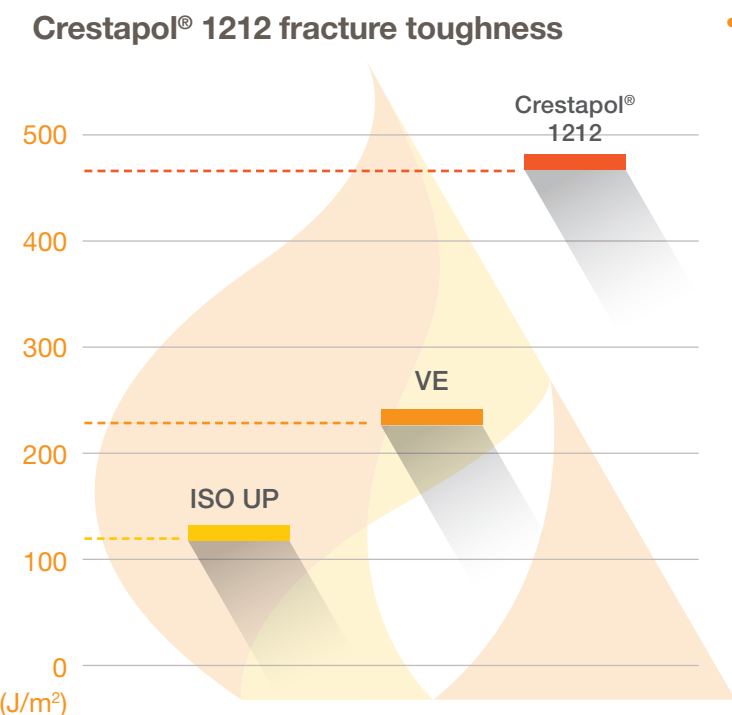
*Samples tested using the UL94-HB test: 20mm flame is applied to the 3mm thick gelcoat sample for 30 seconds, the resulting horizontal flame spread after 5 minutes is then measured, this is repeated three times and an average is taken.



Crestapol resins’ FST performance is achieved by the addition of aluminium trihydrate (ATH). Due to the inherent low viscosity of Crestapol® resins up to 200 phr of ATH can be incorporated to achieve a range of stringent fire, smoke and toxic fume standards.

Fire performance will also be dependent on glass content and profile thickness. Please contact Scott Bader Technical Services Dept. for advice on ATH loadings for specific applications.

Liquid properties		
Property	Unit of Measurement	Crestapol® 1212
Appearance	-	Clear yellowish brown
Viscosity @ 25°C 4500 sec ⁻¹	Poise	0.7
Density @ 25°C	gcm ⁻³	1.07
Volatile Content	%	49
Stability in the dark @ 20°C	Months	9



Crestapol® 1211A

- Compounded Version of Crestapol® 1212
- Pre-accelerated and Pre-filled with ATH
- Closed Mould Applications
- Liquid Cure System
- Designed to be used with Fireguard GC 78PA for lighter weight FST Composite Parts

Crestapol® 1212

- Urethane Acrylate based
- Thermosetting resin
- Very Low viscosity
- Flexibility to adjust ATH & Accelerator levels
- Pultrusion & Close moulding applications

Crestapol® 1213A

- Compounded version of Crestapol® 1212
- Pre-accelerated and Pre-filled with ATH
- Hand Lamination & Close moulding applications

Crestapol® 1214

- Urethane Acrylate based
- Comparable FST performance of Crestapol® 1212
- Low Profile technology for aesthetically demanding applications
- Pultrusion grade only

Crestapol® 1216

- Urethane Acrylate based
- Thermosetting resin
- Very Low viscosity
- Resin fully air cures
- Hand Lamination and Compression moulding



FST performance in Pultrusion

Fire requirement	Minimum ATH loading	Results
French NFP 92-501	170	M1
French NFP 16-101	170	F0
UNE 23721 : 1990 UNE 23727 : 1990	170	M1
DIN 5510	100	S4/SR2/ST2
ASTM 162	100	Is = 10 (limit <35) Meets Federal Railroad Admin requirements for surface flammability
ASTM 662	100	Ds (max) = 119 Dm (1.5) = 1 Dm (4) = 4
ASTM E84	165	smoke index 110, flame index 15
ISO 5658	170	HL2
ISO 5659-2	170	HL2
ISO 5660-1&2	170	HL2

Pultrusion guidelines

Typical formulation

Crestapol® 1212 and 1214	100 pbw
ATH*	100 - 200 pbw
BYK W996 #	3 - 6 pbw
Trigonox C ‡	1 pbw
Perkadox 16 ‡	0.5 pbw
(dispersed in solvent)	1.0 pbw
Internal release agent added @ 1 pbw on total resin + filler †	1 - 3 pbw
Pigment (if required)	2 - 5 pbw
Die temperature:	140°
(First section unheated to prevent gellation at die entrance)	
Start up approx	0.2 metre/minute

Registered trademark of BYK-Chemie GmbH

‡Perkadox and Trigonox are trademarks of Akzo Nobel Chemicals

†INT-PUL 341 is produced by Axel Plastic Research Laboratories, Inc.

Features

• High Reactivity

Offering the potential for high line speeds compared to other typical thermosetting resins.

• Mechanical Performance

The inherent “toughness” of the cured resin matrix results in profiles exhibiting excellent mechanical performance despite the presence of high levels of filler.

• Pigmentable

Crestapol® 1212 is pigmentable and fully compatible with polyester pigment pastes.



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