

Selection & Specification Data

Generic Type	A single package, solvent based intumescent coating designed for the fire protection of interior structural steel.
Description	Firefilm® S1 is a decorative thin film intumescent coating designed for the fire protection of steelwork for up to a 3 hour fire rating, depending on the design. The recommended use for this product is fireproofing of interior steel beams, columns, tubes, and pipes.
Features	<ul style="list-style-type: none"> • UL/ULC listed – designs for many types of steel sections. Up to 3 hour fire ratings for both interior general purpose and interior conditioned space applications. • Decorative finish – provides a slightly textured, decorative finish. Compatible topcoats available in a wide range of colors. • Durable finish – provides a hard dust free surface resistant to normal wear. • Thin film coating – offers an economical solution to alternative fireproofing. • VOC compliant • Easy repair – if damaged it can be repaired easily using material as putty.
Color	Light Grey
Finish	Slightly Textured
Primers	Firefilm® S1 must be applied over a compatible primer. If the steel has already been coated with an existing primer, refer to Carboline Technical Service for advice before applying Firefilm® S1. Contact Carboline Technical Service for a complete list of approved primers.
Fireproofing Topcoats	For interior conditioned space, topcoats are optional. For interior general purpose, Carboline approved topcoats are required. Firefilm® S1 must be applied to the specified DFT and be dry before applying a topcoat. The choice of topcoat will depend on project requirements. Contact Carboline Technical Service for a complete list of approved topcoats.
Wet Film Thickness	45.0 (1,143 microns) per coat *During the drying process, the coating will shrink due to the evaporation of solvent. In order to calculate the wet film thickness required, the following formula can be used: $WFT=(DFT/Volume\ Solids) \times 100$
Dry Film Thickness	30.0 mils (762 microns) per coat *Firefilm® S1 must be applied to the specified DFT and be dry before applying a topcoat. The dry film thickness shall be checked using an electronic or magnetic thickness gauge.
Solids Content	By Volume 71%
Theoretical Coverage Rate	1139 ft ² at 1 mil (28 m ² /l at 25 microns) 38 ft ² at 30 mils (0.9 m ² /l at 750 microns) Allow for loss in mixing and application.
VOC Values	As Supplied 2.79 lbs/gal (334 g/l)

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Mesh	Use High Temp Mesh for 3 hour hollow section ratings. *Contact Carboline Technical Service for specific design details.
Limitations	Not for use in exterior environments or for interior steelwork that will be exposed to freeze/thaw cycling or long-term surface temperatures over 140°F (60°C) in normal use.

Substrates & Surface Preparation

General	All surfaces must be primed with compatible primer and be clean, dry and free of oil, grease, loose mill scale, dirt, dust or other materials which would impair the bond of Firefilm® S1 to the substrate.
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Performance Data

Test Method	Results
ASTM D2240 Hardness	Shore D - 70 (fully cured) Shore D - 25 (for topcoating)
ASTM D2794 Impact	0.16 ft. lb./in.
ASTM D4541 Bond Strength	200 psi (minimum)
ASTM D695 Compressive Strength	1,187 psi
ASTM E84 Surface Burning	Class A
Density	79 pcf

*All values derived under controlled laboratory conditions.

Application Equipment Guidelines

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Airless Spray	Use 1.0 gal. per minute electric airless (minimum) to provide an operating pressure of 3,000 p.s.i. (320 kg/cm ²). Must have 30 mesh inline filter installed. Remove rock catcher from siphon tube.
Spray Gun	Silver Gun with gun swivel, Contractor Gun (with filter removed) or equivalent
Spray Tips	0.025" - 0.029" (Use Graco heavy duty RAC non diffuser tips and housing)
Fan Size	4"-10" (depending on section being sprayed)
Hose Length	150' (45 m)
Material Hose	3/8" I.D. minimum
Whip Hose	1/4" I.D. minimum (optional)

Mixing & Thinning

Mixer	Use 1/2" electric or air driven drill with a slotted paddle mixer (300 rpm under load).
Mixing	Firefilm® S1 must be mixed using a 1/2" electric or air driven drill with a slotted paddle or Jiffy mixer blade. Mix material for a minimum of 5 minutes to achieve the necessary texture required before spraying.

Firefilm® S1

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Thinning It is not necessary to thin Firefilm® S1. If desired, Firefilm® S1 may be thinned up to 5% with Thinner #19 or Thinner #242E (maximum 16oz. per 5 gallons). Thinning will affect the film build properties and extend the cure time of the coating.

Application Procedures

Airless Spray A single coat built up with a number of quick passes allows greater control over quantities, thickness and finish. In most conditions, it is advantageous to apply two thin coats rather than one thick coat.

Application Rates At an ambient temperature of 70°F (21°C), the following application rates are applicable:
45 mils (1.1 mm) per coat (wet)
4 hour recoat time between coats
2 coats per day

*High Temp Mesh is required for 3 hour hollow section designs. Contact Carboline Technical Service for specific design details.

Wet Film Thickness Frequent thickness measurements with a wet film gauge are recommended during the application process to ensure uniform thickness.

Dry Film Thickness Final thickness must be measured using an electronic dry film thickness gauge. For method of thickness determination and tolerances refer to: AWCI Technical Manual 12-B (Standard Practice for the Testing and Inspection of Field Applied Thin Film Intumescent Fire Resistive Materials).

Application Conditions

Condition	Material	Surface	Ambient	Humidity
Minimum	70 °F (21 °C)	41 °F (5 °C)	41 °F (5 °C)	0%
Maximum	100 °F (38 °C)	125 °F (52 °C)	110 °F (43 °C)	85%

*Steel surface temperature should be a minimum of 5°F (3°C) above the dew point. Heavy rain or water running over the surface of recently applied Firefilm® S1 can cause surface patterning if the material has not formed a skin.

Curing Schedule

Surface Temp. & 50% Relative Humidity	Recoat
77 °F (25 °C)	4 Hours

*For optimum curing, it is recommended to apply one coat at 45 mils (1,143 microns) wet per day. Drying Time will vary with temperature and humidity conditions. Material is ready to be topcoated when an average Shore D hardness of 25 is achieved. Consult Carboline Technical Service for specific details. Air movement and thinner coats will assist drying. Higher film thicknesses will require longer drying times for topcoating.

Cleanup & Safety

Cleanup Pump, Gun, Tips and Hoses and mixer should be cleaned at least once per day with: Thinner #19, Thinner #242E, Thinner #2, Toluene, MEK, MIBK or Xylene.

Safety Follow all safety precautions on the Firefilm® S1 Material Safety Data Sheet. It is recommended that personal protective equipment be worn, including spray suits, gloves, eye protection and respirators when applying Firefilm® S1.

Overspray All adjacent and finished surfaces shall be protected from damage and overspray.

Cleanup & Safety

Ventilation In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour until the material is dry.

Maintenance

General If coating becomes damaged, rebuild required thickness by spray or trowel. When dry, smooth and finish with approved topcoat to match. Damaged areas must be abraded back to a firm edge by sanding or scraping. The topcoat should be abraded back by 1" (25.4 mm) from the damaged area. The surface must be clean and dry before re-applying Firefilm® S1. The coating shall then be built back to the original thickness, allowed to dry, then overcoated with the specified topcoat or system.

Testing / Certification / Listing

Underwriters Laboratories, Inc Firefilm® S1 has been tested in accordance with ASTM E-119 (UL 263) at Underwriter's Laboratories, Inc. Firefilm® S1 is listed by UL and ULC for the following designs:

Wide Flange Columns: X660

Tube Columns: X661

Pipe Columns: X662

Restrained and Unrestrained Beams: N619

Beams (Protected Deck): D946

*The product should be applied in accordance with the appropriate design.

City of New York Firefilm® S1 has been found acceptable for use in Class I and Class II buildings in accordance with report number: MEA 299-07-M

City of Los Angeles Report: RR25484

Packaging, Handling & Storage

Shelf Life 18 Months

*Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.

Shipping Weight (Approximate) 11 lbs. per gallon

Flash Point (Setaflash) 23°F (-5°C)

Storage Store indoors in a dry environment between 32°F - 100°F (0°C - 38°C)

Packaging 5 gallons



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