



SHIELD INDUSTRIES, INC.

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FORCEFIELD® FIREGUARD E-84® INTUMESCENT COATING

CSI Sections:

09 07 13 Steel Coatings

09 07 23 Fire-resistant Concrete and
Masonry Coatings

09 29 82 Gypsum Fireproofing

09 96 43 Fire-retardant Coatings

09 96 46 Intumescent Paints

1.0 RECOGNITION

ForceField® FireGuard E-84® Intumescent Coating has been evaluated for use as a thin film intumescent coating that creates a fire retardant and fire-resistant barrier on a wide range of building surfaces as described in this evaluation report. The intumescent coating has been evaluated for durability and fire performance. Table 1 of this report summarizes the associated performance data for each application of intumescent coating. ForceField® FireGuard E-84® Intumescent Coating evaluated in this report is a satisfactory alternative to the following codes and regulations:

- 2018, 2015, 2012, 2009, and 2006 International Building Code® (IBC)
- 2018, 2015, 2012, 2009 and 2006 International Residential Code® (IRC)
- 2018, 2015, 2012, 2009, and 2006 International Existing Building Code® (IEBC)

2.0 LIMITATIONS

Use of the ForceField® FireGuard E-84® Intumescent Coating recognized in this report is subject to the following:

2.1 The coating shall be applied in accordance with this report, the manufacturer's instructions and the applicable code and listing. In the event of a conflict between the manufacturer's instructions and this report, the more restrictive shall prevail.

2.2 Application is limited to the substrates documented in this report.

2.3 The ForceField® FireGuard E-84® Intumescent Coating shall be applied to areas within the weatherproofing membrane or surfaces not exposed to weather. ForceField® FireGuard E-84® Intumescent Coating shall not be applied to interior steelwork or substrates that will be exposed to freezing and thawing cycling or long-term surface temperatures over 140°F (60°C) in normal use.

2.4 Coatings shall be applied by a trained and qualified applicator in accordance with Section 3.3 of this report.

2.5 For fire resistance, the ForceField® FireGuard E-84® Intumescent Paint qualified applicator shall affix a ForceField® FireGuard E-84® Intumescent Coating issued label to the substrate where the coating has been applied; at a minimum, one ForceField® FireGuard E-84® issued label shall be affixed every 10,000 ft² (929 m²) of surface area (Figure 1 of this report).

2.6 ForceField® FireGuard E-84® Intumescent Coating is produced in Cartersville, Georgia.

3.0 PRODUCT USE

3.1 General: ForceField® FireGuard E-84® Intumescent Coating complies with IBC®, IRC® and IEBC® for use in new and existing buildings. Applied to the substrates listed in Table 1 of this report, ForceField® FireGuard E-84® Intumescent Coating provides the following attributes:

1. Fire resistance ratings in accordance with Section 4.2 of this report.
2. Surface burning characteristics in accordance with Section 4.3 of this report.

The water-based intumescent coating is designed for the fire protection on a wide range of building surfaces as described in this evaluation report. The thin film intumescent coating creates a fire retardant and fire-resistant barrier when applied over concrete masonry, gypsum/wood/OSB, steel and PVC.

3.2 Design: ForceField® FireGuard E-84® Intumescent Coating shall be applied at coats of up to 25 to 30 mils (0.64 to 0.76 mm) per coat (wet thickness) in a minimum of two coats at various final thicknesses. The minimum total thickness required for the intumescent coating is shown in Table 1 of this report.

3.3 Installation:

3.3.1 General: ForceField® FireGuard E-84® Intumescent Coating has a dry film thickness of 13.5 to 16.2 mils (0.34 to 0.41 mm) per coat and have a solids content of 54 percent.



3.3.2 Substrate Preparation: Prior to application, the substrate surface needs to be cleaned by removing all oil, grease, or any loose particles that may interfere with the bond of ForceField® FireGuard E-84® Intumescent Coating. Concrete, masonry and steel substrates shall be primed with a compatible primer. Drywall substrates are recommended to be primed. For existing/used wood substrates, old and dried out wood shall be scraped and the surface primed.

3.3.3 Mixing and Thinning: A 0.5-inch (12.7 mm) diameter electric or air driven drill with a slotted paddle mixer (300 rpm under load) is required to mix the ForceField® FireGuard E-84® Intumescent Coating Mix material for a minimum of five minutes to achieve the necessary texture required. These products shall not be thinned or tinted.

3.3.4 Airless Spray: ForceField® FireGuard E-84® Intumescent Coating may be airless sprayed onto their approved substrate. A single coat, built up with a number of quick passes, allows greater control over quantities, thickness, and finish. A minimum of two coats shall be applied to achieve the final thickness.

3.3.5 Brushed or Rolled: ForceField® FireGuard E-84® Intumescent Coating may be brushed or rolled on their approved substrate. Brushing and rolling generally create an 11 to 12 mil wet application. Multiple coats will be required to meet specifications to the job requirements. Each coat shall cure for the required minimum cure time of 24 hours before applying the next coat.

3.3.6 Application Rates: Table 2 of this report lists application rates of each paint.

3.3.7 Wet Film Thickness: Table 2 of this report lists wet thicknesses for each application rate. Frequent thickness measurements with a wet film gauge are recommended during the application process to ensure uniform thickness.

3.3.8 Dry Film Thickness: Table 1 of this report lists the dry film thicknesses for each use and Table 2 of this report provides dry film thickness measurement procedures.

3.3.9 Equipment Guidelines: Listed in Table A of this report are the general equipment guidelines for the application of this product when spray applied.

TABLE A – EQUIPMENT GUIDELINES

Airless Spray	Airlessco LP540 or equivalent
Spray Gun	Standard airless spray gun
Spray Tips	0.019-0.021 in.
Fan Size	4-10 in. (depending on section being sprayed)
Hose Length	150 ft (45 m)
Material Hose	3/8 in. (9.25 mm) I.D. minimum
Whip Hose (optional)	1/4 in. (6.35 mm) I.D. minimum

3.3.10 Primer: Table 2 of this report summarizes the primer requirements.

3.3.11 Application Conditions: During application, the coating shall be a minimum of 70°F (21°C) and a maximum of 100°F (38°C), the substrate surface shall be a minimum of 50°F (10°C) and a maximum of 125°F (52°C), and the ambient temperature shall be a minimum of 50°F (10°C) and a maximum of 110°F (43°C). Also, the substrate surface temperature should be a minimum of 5°F (3°C) above the dew point. The ambient humidity shall be a minimum of 0 percent and a maximum of 85 percent. ForceField® FireGuard E-84® Intumescent Coating shall be protected from exposure to weather and protected from freezing.

3.3.12 Curing Schedule: For surface temperatures of 77°F (25°C) at 50 percent relative humidity, the minimum drying time before recoating is 24 hours. It is recommended to apply one coat per day. Drying time will vary with temperature. Thinner coats as well as air movement will reduce drying times. Another coat of ForceField® FireGuard E-84® Intumescent Coating may be applied when the previous coat has a Shore D hardness of 50 measured at 70°F (2°C). The paint may be top coated when a hardness of 60 is achieved after 4 to 5-day cure time.

3.4 Inspections: Under the IRC, other inspections may be required when determined to be necessary by the code official in accordance with Section R109.1.5 of the 2018, 2015, 2012, 2009, and 2006 IRC®.

Under the IBC, special inspection shall be required when determined to be necessary by the code official in accordance with Section 1705.1.1 of the 2018, 2015 and 2012 IBC®, or Section 1704.15 of the 2009 IBC®, or Section 1704.13 of the 2006 IBC®. A statement of special inspection in accordance with Section 1704.2.3 of the 2018, 2015 and 2012 IBC® or Section 1705 of the 2009 or 2006 IBC® shall be submitted.

4.0 PRODUCT DESCRIPTION

4.1 Product Information

4.1.1 General: ForceField® FireGuard E-84® Intumescent Coating is a water-based liquid, packaged in 5-gallon (18.9 L) pails, 55-gallon (208 L) drums, and totes. The coating has a shelf life of 14 months from the time of purchase when stored in unopened original containers between 33°F and 100°F (1°C and 38°C). Shipping weight is approximately 12 lbs. per gallon (1.44 kg/l).

The coating is white in color. The finish (depending on substrate conditions); is smooth and flat (except on gypsum/wood/OSB substrate).

4.1.2 Storage and Handling: The materials shall remain in the original unopened containers and packaging until installation. The materials shall be stored indoors out of



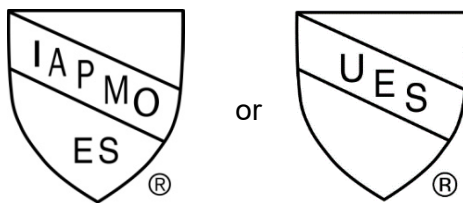
direct sunlight in a clean and dry location at temperatures between 33°F and 100°F (1°C and 38°C).

4.2 Fire Resistance: The ForceField® FireGuard E-84® Intumescent Coating is permitted to be used as a component of a fire-resistance rated assembly in accordance with IBC Section 703.2, based on testing in accordance with ASTM E119 or UL 263. Alternative methods in IBC Section 703.3 are also permitted. Fire-resistance based on testing in accordance with ASTM E119 or UL 263 may be established when the registered design professional specifies, and code official approves a fire-resistance-rated assembly, listing the ForceField® FireGuard E-84® Intumescent Coating described in this report, from the Guardian Directory. Listings are available for gypsum, structural steel and wood wall and floor/ceiling assemblies and masonry wall assemblies.

4.3 Surface Burning Characteristics: As listed in Table 1 of this report, ForceField® FireGuard E-84® Intumescent Coating provides Class A interior finish in accordance with Section 803.1 of the IBC when applied to the substrate at the thickness specified when tested in accordance with ASTM E84.

5.0 IDENTIFICATION

ForceField® FireGuard E-84® Intumescent Coating identified by the Shield Industries, Inc. name and trademark, product name, and evaluation report number (ER-442). The identification may also include the IAPMO Uniform Evaluation Service Mark of Conformity as shown below:



IAPMO UES ER-442

6.0 SUBSTANTIATING DATA

6.1 Manufacturer's descriptive literature and installation instructions. Test results are from laboratories in compliance with ISO/IEC 17025.

6.2 Report of Fire Propagation Characteristics testing, listings and analysis in accordance with ASTM E-119, NFPA 251, UL 263, ULC-101, and ASTM E2226.

6.3 Report of testing for Surface Burning Characteristics in accordance with ASTM E84.

6.4 IAPMO UES EC017, Evaluation Criteria for Field-Applied Fire Protective Coatings.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on ForceField® FireGuard E-84® Intumescent Coating to assess their conformance to the codes shown in Section 1.0 of this report and documents the product's certification. ForceField® FireGuard E-84® Intumescent Coating is produced at locations noted in Section 2.6 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

Table 1 - Class A Interior Finish

Shield Industries, Inc. - FireGuard E-84 Intumescent Coating

Substrate	Material Application Thickness (Mils)		Coverage Rate (ft ² /gal)	Rating
	Dry	Wet		
S. Yellow Pine Plywood	15	28	57.73	Class A
Oriented Strand Board	24	45	36.08	Class A
PVC	15	28	57.73	Class A
PVC	30	56	28.86	Class A

For SI: 1 mil = 0.0254 mm; 1 inch = 25.4 mm; 1 foot = 304.8 mm; 1 square foot = 0.093 m²; 1 gallon = 3.78 liters



EVALUATION REPORT

Number: 442

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Valid Through: 07/31/2024

Table 2 – Product Installation Specifications

Substrate	Coverage Rates	Application Rates*	Dry Film Thickness	Primer
Concrete Masonry	866 ft ² /gal at 1 mil 86 ft ² /gal at 10 mil 28.9 ft ² /gal at 30 mil 17.3 ft ² /gal at 50 mil	Up to 25-30 mil wet per coat depending on application and method (roll, brush, and spray), 24 hour recoat time between coats, 1 coat per day	Measured using an electronic dry film gauge. For method, refer to AWCI Technical Manual 12-B	Required, water-based styrene resin, comparable to Behr 436
PVC	866 ft ² /gal at 1 mil 86 ft ² /gal at 10 mil 28.9 ft ² /gal at 30 mil	Max 40 mil per coat depending on application method, 1 coat per day	Measured using an electronic dry film thickness gauge. The method is in AWCI Technical Manual 12-B.	NA
Steel	866 ft ² /gal at 1 mil 86 ft ² /gal at 10 mil 28.9 ft ² /gal at 30 mil	Up to 25-30 mil wet coat depending on application method (roll, brush, and spray), 24 hour recoat time between coats, 1 coat per day	Final thickness shall be measured using an electronic dry film thickness gauge such as a PosiTector 6000. The method is in AWCI Technical Manual 12-B	Shall be applied over a compatible primer (ALKYD, EPOXY). Generally not recommended for primers with zinc metals.
Gypsum/Wood/OSB	866 ft ² /gal at 1 mil 86 ft ² /gal at 10 mil 28.9 ft ² /gal at 30 mil	Up to 25-30 mil wet per coat depending on application method (roll, brush, and spray), 1 coat per day	Final thickness shall be measured using an electronic dry film thickness gauge. PosiTector 200 or equivalent may be used. Wet mil thickness dries to 54%	May be used as a finished coat primer.

Figure 1 – Substrate Label


 <p>GUARDIAN Fire Testing Laboratories, Inc. BUFFALO, NY WWW.FIRETESTING.COM DO NOT REMOVE THIS LABEL. E-475</p>	<p>_____ HOUR FIRE RATED _____, CLASS _____</p> <p>_____ DRY MIL INTUMESCENT COATING</p> <p>DATE: _____ APPLICATOR: _____</p>
	<p>ForceField® FireGuard E-84® Intumescent Coating has been applied to this substrate material. FireGuard E-84® has been listed with Guardian Fire Testing Laboratories, indicating that this product, having been tested by an ILAC-MRA testing agency to the standards listed below, has been subjected to rigorous manufacturing and formulation analysis per ISO/IEC 17020.</p>
	<p>TEST STD: ASTM E-119, UL 263, NFPA 251, ULCS101, UBC 7.1, ASTM E-2768, ASTM E-84, UL108, UL723, NFPA 252, NFPA 255, NFPA 286 1-3.4, 5.13, UBC 8.1, UBC 26-3</p>

Figure 2 – Wet Film Thickness Gauge

