

ICC-ES Evaluation Report

ESR-1973

Reissued December 2023

This report also contains:

- CBC Supplement

Subject to renewal November 2024

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<p>DIVISION: 07 00 00 — THERMAL AND MOISTURE PROTECTION</p> <p>Section: 07 81 00 — Applied Fireproofing</p>	<p>REPORT HOLDER: CARBOLINE GLOBAL INC.</p>	<p>EVALUATION SUBJECT: FIREFILM® III INTUMESCENT FIRE-RESISTIVE COATING AND COLORCOAT</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)

Properties evaluated:

- Fire-resistance-rated construction
- Surface burning characteristics

2.0 USES

FIREFILM® III intumescent coating provides protection, with up to a three-hour fire-resistance rating, for interior structural steel columns in accordance with IBC Section 703.2 and 2021, 2018, 2015, 2012 and 2009 IBC Section 704 (2006 IBC Section 714). When installed in accordance with this report, the products are suitable for use in buildings of Type I and II construction in accordance with 2021, 2018, 2015 and 2012 IBC Section 603.1 Exception 21 (2009 IBC Section 603.1 Exception 20 or 2006 IBC Section 603.1 Exception 18). Colorcoat is a protective top coat used over the Firefilm® III.

3.0 DESCRIPTION

FIREFILM® III coating is a water-based intumescent coating that has a shelf life of six months when stored in unopened containers at temperatures not less than 50°F (10°C). Colorcoat is a single-component, low VOC siliconized alkyd coating that has a shelf life of 24 months when stored at a temperature not lower than 50°F (10°C) in unopened containers. When installed in accordance with this report, the combination of Firefilm III covered by Colorcoat has a Class A interior finish classification, as set forth in IBC Section 803, when tested in accordance with ASTM E84.

4.0 DESIGN AND INSTALLATION

4.1 Design:

Installation of FIREFILM® III coating is limited to dry interior locations.

4.2 Thickness:

Minimum average required dry-film thicknesses of the intumescent coating applied directly to structural steel columns are indicated in [Figures 1](#) through [10](#). Determination of the intumescent coating thickness must take into consideration the minimum average thickness of the individual thickness readings measured in accordance with Technical Manual 12-B, “Standard Practice of the Testing and Inspection of Field Applied

Thin-Film Intumescent Fire Resistive Materials: An Annotated Guide,” published by the Association of the Wall and Ceiling Industries (AWCI). Thicknesses must be verified using a calibrated dry-film thickness gauge.

4.2.1 Minus Tolerance: The thickness of the coating must be corrected by applying additional material at any location where the average measured thickness of the material is less than that indicated in this report, or where an individual measured thickness reading is less than 80 percent of the thickness specified in this report.

4.2.2 Plus Tolerance: An individual measured thickness exceeding the thickness specified in this report by 20 percent or more must be recorded as the thickness specified in the design plus 20 percent. The average dry-film thickness must not exceed by more than 10 percent the maximum thickness listed for the fire-resistance-rated assemblies indicated in this report.

4.3 Surface Conditions:

All structural steel to be coated with FIREFILM[®] III intumescent coating must be primed with a maximum nominally 1.2-mil-thick (0.03 mm) layer of a solvent-based, alkyd-type, anticorrosive primer for ferrous metals in industrial or light marine exposures. The primer must be recommended for use by Fire Protection Systems on their approved primer list. Primed surfaces must be free of any grease, oil, dirt, loose mill scale, rust or any other contaminant that would inhibit bonding of the FIREFILM[®] III coating to the primer.

4.4 Site Conditions:

FIREFILM[®] III coating must be applied when the ambient air temperature is at least 50°F (10°C) and the relative humidity is between 40 and 60 percent. When the substrate and ambient temperatures at the project site are lower than 50°F (10°C), a minimum substrate and ambient temperature of 50°F (10°C) must be reached and then maintained prior to, during, and for a minimum of 72 hours after application.

4.5 Application of FIREFILM[®] III:

FIREFILM[®] III intumescent material is spray-applied using a spray pump in accordance with Carboline's published installation instructions. The FIREFILM[®] III material may also be brush-applied. Where referenced in [Figures 1](#) through [10](#) showing the fire-resistance-rated assemblies recognized in this report, a self-adhesive, alkali-resistant, glass mesh cloth weighing 4.5 oz/yd² (152 g/m²) must be applied over the first coat of FIREFILM[®] III wrapped around W shapes or HSS tubular shapes.

4.6 Protective Topcoat:

FIREFILM[®] III intumescent material must be protected with a minimum 2-mil-thick (0.05 mm) coat of the COLORCOAT. The applicator must allow a minimum of 24 hours for the FIREFILM[®] III material to fully dry prior to the application of the protective coating. Before application of the COLORCOAT coating, the dry-film thickness of the FIREFILM[®] III must be measured for compliance with the minimum required fire-resistive thickness. The surface of the dried FIREFILM[®] III must be clean and free from condensation, grease or other surface contaminants that may interfere with the adhesion of the protective finish covering. The COLORCOAT also provides physical protection for the FIREFILM[®] III intumescent material on columns less than 8 feet (2438 mm) above any floor, landing, or occupied space.

4.7 Special Inspection:

Application of FIREFILM[®] III as described in this report requires special inspection as described in 2021 IBC Section 1705.16, 2018 and 2015 IBC Section 1705.15 (2012 IBC Section 1705.13, 2009 IBC Section 1704.13 or 2006 IBC Section 1704.11), as applicable. The special inspector must verify the cleanliness of the substrate, site conditions, product designation, application procedures, and applied material thickness. The special inspector must verify that the application complies with the manufacturer's instructions and this report.

5.0 CONDITIONS OF USE

The FIREFILM[®] III Intumescent Fire-Resistive Coating with Colorcoat described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Installation must comply with this report and the manufacturer's published installation instructions. If there are differences between this report and the manufacturer's published installation instructions, the more restrictive governs.
- 5.2** Application must be limited to dry interior locations.
- 5.3** Thickness of the intumescent coating material must comply with Section 4.2 and [Figures 1](#) through [10](#) of this report. Thickness of the protective coating must comply with Section 4.6 and [Figures 1](#) through [10](#) of this report.

5.4 Special inspection is required as set forth in Section 4.7.

5.5 The coating described in this report is permitted to be used in areas of a building such as on steel columns, as detailed in [Figures 1](#) through [10](#), located in ventilation shafts, plenums, and elevator shafts, where the minimum air velocity is anticipated to exceed 1,200 fpm (366 m/min).

6.0 EVIDENCE SUBMITTED

Reports of testing in accordance with [ICC-ES Acceptance Criteria for Sprayed Fire-resistant Materials \(SFRMs\), Intumescent Fire-resistant Coatings and Mastic Fire-resistant Coatings Used to Protect Structural Steel Members \(AC23\)](#), dated June 2019 (Editorially revised March 2021).

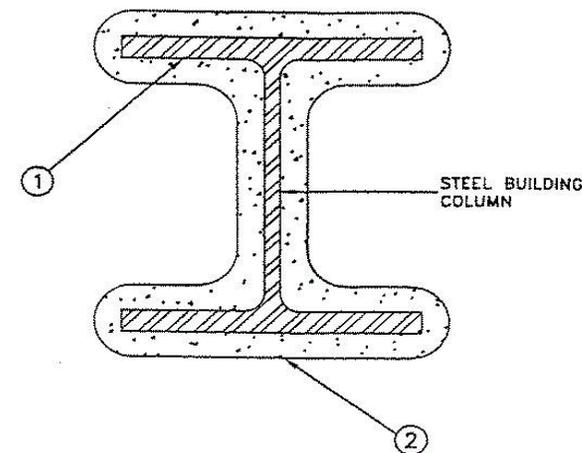
7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-1973) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 Containers of the intumescent material and the protective top coat must bear the company name (Carboline Global Inc.), product name (FIREFILM[®] III or COLORCOAT), storage and shelf-life information, and the ICC-ES evaluation report number (ESR-1973).

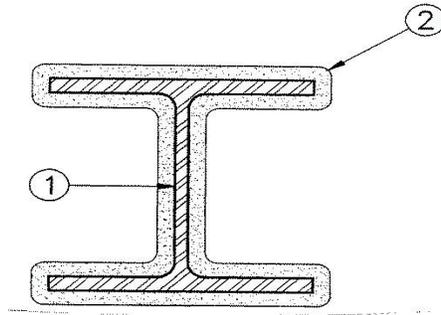
7.3 The report holder's contact information is the following:

CARBOLINE GLOBAL INC.
350 HANLEY INDUSTRIAL COURT
SAINT LOUIS, MISSOURI 63144
(314) 644-1000
www.carboline.com



1. **Steel Column** - Minimum size column W12 x 170 with W/D = 2.26 (For SI: W310 x 253 W-shaped column with M/D \geq 130). The column surfaces shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness of 0.130 in (3.3 mm).
3. **Protective Top Coat** (Not Shown) – Finishing protective topcoat, Type "COLORCOAT", silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 1—FIRE DESIGN NO. 1: FIRE-RESISTANCE RATING – 3 HOURS



1. **Steel Column** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

Fire-resistance Ratings, hr	Steel Column Size, in. (mm)	W-Shaped only Min Columns, W/D (M/D)	Required Minimum Thickness, in. (mm)
1	W6x15 (W150 x 22)	0.43 (24.4)	0.118 (3.00)
1	W8x31 (W200 x 46)	0.66 (38.0)	0.091 (2.30)
1	W10x49 (W250 x 73)	0.84 (48.7)	0.055 (1.40)
1	W12x120 (W310 x 179)	1.64 (95.2)	0.030 (0.76)
1	W14x283 (W360 x 421)	3.00 (174.0)	0.016 (0.40)
1½	W12x65 (W310 x 97)	0.92 (53.3)	0.118 (3.00)
1½	W8x67 (W200 x 100)	1.36 (78.7)	0.073 (1.85)
1½	W14x283 (W360 x 421)	3.00 (174.0)	0.039 (1.00)
2	W10x100 (W250 x 149)	1.63 (94.3)	0.12 (3.05)
2	W14x283 (W360 x 421)	3.00 (174.0)	0.055 (1.40)

Alternatively, the required dry film thickness "t" may be determined by the following equation:

W-Shaped:

FIGURE 2—FIRE DESIGN NO. 2: FIRE-RESISTANCE RATINGS – 1, 1½, AND 2 HOURS (SEE ITEM 2)

60 minutes	≤	T	≤	120 minutes
0.43 minimum	≤	W/D	≤	3.00 maximum
0.016 in. minimum	≤	t	≤	0.120 in. maximum

$$t = 0.0006725 \times (2.984T - 71.616) / (W/D)$$

t = minimum dry film thickness, in.

T = rating period in minutes up to a maximum of 120 minutes (2 hr) (see equation above).

W = weight of column section, lb/ft.

D = heated perimeter of column section, in.

Metric equation

W-Shaped:

60 minutes	≤	T	≤	120 minutes
24.4 minimum	≤	M/D	≤	174 maximum
0.4 mm minimum	≤	t	≤	3.05 mm maximum

$$t = (2.984T - 71.616) / (M/D)$$

t = minimum dry film thickness, mm (0.4 mm min, 3.0 mm max)

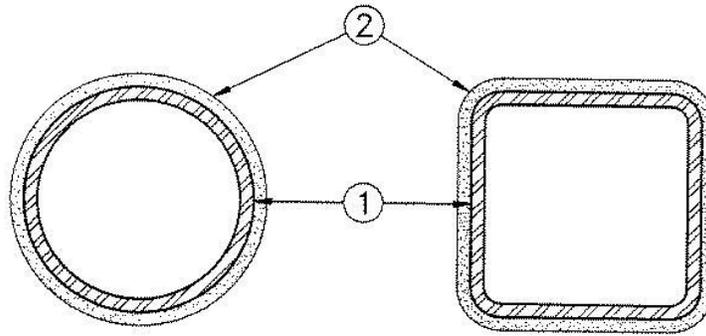
T = rating period in minutes up to a maximum of 120 minutes (2 hr) (see equation above).

M = mass of column section, kg/m

D = heated perimeter of column section, m

- 3. Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT", silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 2—FIRE DESIGN NO. 2: FIRE-RESISTIVE RATINGS – 1, 1½, AND 2 HOURS (SEE ITEM 2) (Continued)

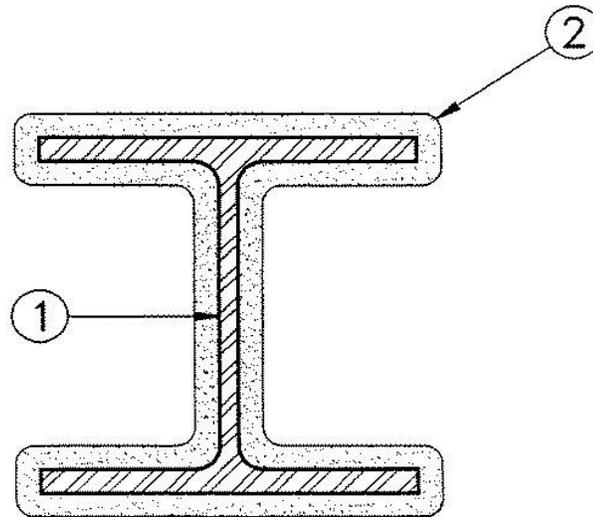


1. **Steel Column** - Square, rectangular, or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Steel Column Size, in. (mm)	Column A/P (M/D)	Required Minimum Thickness, in. (mm)
1	ST 5 x 3 x ⁵ / ₁₆ in. (127 x 76.2 x 7.95)	0.27 (54.4)	0.130 (3.30)
1	ST 12 x 12 x ¹ / ₂ in. (304.8 x 304.8 x 12.7)	0.47 (93.0)	0.045 (1.14)
1	SP 10 in. dia. x ⁵ / ₁₆ in. (237 dia x 7.95)	0.30 (60.4)	0.111 (2.81)
1½	SP 10 in. dia. x ⁵ / ₁₆ in. (273 dia x 7.95)	0.30 (60.4)	0.130 (3.30)
1½	ST 12 x 12 x ¹ / ₂ in. (304.8 x 304.8 x 12.7)	0.47 (93.0)	0.095 (2.40)
2	SP 8 in. dia. x ¹ / ₂ in. (215.9 dia x 12.7)	0.47 (93.0)	0.191 (4.85)
2	ST 8 x 8 x ¹ / ₂ in. (203.2 x 203.2 x 12.7)	0.44 (89.0)	0.186 (4.72)

3. **Top Coat** - (Not shown) - Finishing topcoat, Type "COLORCOAT" applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 3—FIRE DESIGN NO. 3: FIRE-RESISTANCE RATINGS – 1, 1½, AND 2 HOURS (SEE ITEM 2)

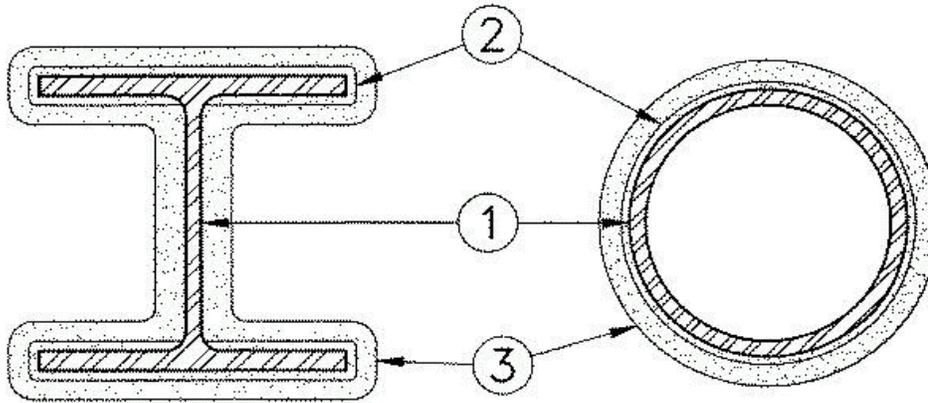


1. **Steel Column** - Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Column Description, in. (mm)	Column W/D (M/D)	Required Minimum Thickness, in. (mm)
1½	W8 x 31, W10 x 33 (W 200 x 46, W 250 x 49)	0.66 (38)	0.213 (5.4)
2	W12 x 120 (W 310 x 179)	1.64 (95.2)	0.095 (2.4)

3. **Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 4—FIRE DESIGN NO. 4: FIRE-RESISTANCE RATINGS – 1½ AND 2 HOURS (SEE ITEM 2)



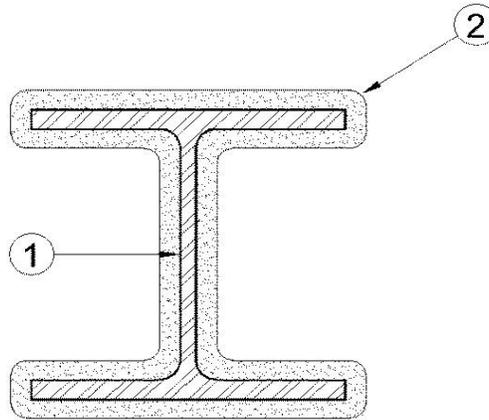
1. **Steel Column** - Wide flange steel and Tubular steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **Glass Fiber Mesh** - Self adhesive, alkali resistant glass fiber mesh, weighing 4.5 oz per sq yd (152 g/m²) applied over first coat of mastic coating around the W shaped column flanges or wrapped around tubular steel pipe column.
3. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Column Size, in. (mm)	Column W/D (M/D)	Required Minimum Thickness*, in. (mm)
2	W10 x 77 (W250x115)	1.28 (74.0)	0.138 (3.50)
2	SP 4 inch diameter by 0.673 wall thickness (102 mm dia by 17.1 mm wall thickness)	0.57 (A/P) (113.9)	0.174 (4.42)

* Thickness includes glass fiber mesh.

4. **Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 5—FIRE DESIGN NO. 5: FIRE-RESISTANCE RATING – 2 HOURS (SEE ITEM 3)

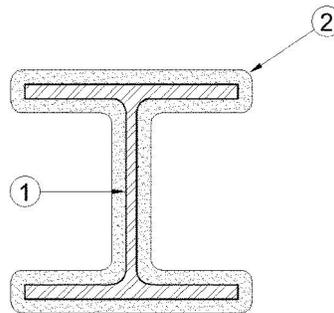


1. **Steel Column** — Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Steel Column Size	W-Shaped only Min Column W/D (M/D)	Required Minimum Thickness, In. (mm)
1	W8x24	0.59(34)	0.107 (2.72)
1	W10x49	0.84 (49)	0.045 (1.14)

3. **Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 6—FIRE DESIGN NO. 6: FIRE-RESISTANCE RATING – 1 HOUR (SEE ITEM 2)

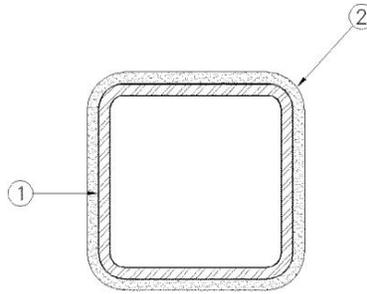


1. **Steel Column** — Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Column Description, In.	Column W/D (M/D)	Required Minimum Thickness, In. (mm)
3	W10x77 (W250x115)	1.28 (74.0)	0.269 (6.83)

3. **Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 7—FIRE DESIGN NO. 7: FIRE-RESISTANCE RATING – 3 HOURS



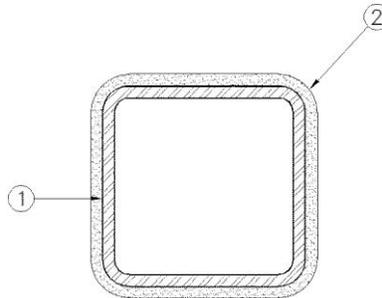
- Steel Column** — Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
- FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Column Size	Column, A/P* (M/D)	Required Minimum Thickness, In. (mm)
1½	ST 10 x 10 x 5/16 in. (254 x 254 x 7.94 mm)	0.30 (59.4)	0.188 (4.78)
2	ST 10 x 10 x 5/16 in. (254 x 254 x 7.94 mm)	0.30 (59.4)	0.257 (6.53)

*Where A is the cross-sectional area of the steel pipe or tube in inches² and P is the heated perimeter of the steel pipe or tube in inches.

- Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 8—FIRE DESIGN NO. 8: FIRE-RESISTANCE RATINGS – 1½ AND 2 HOURS (SEE ITEM 2)



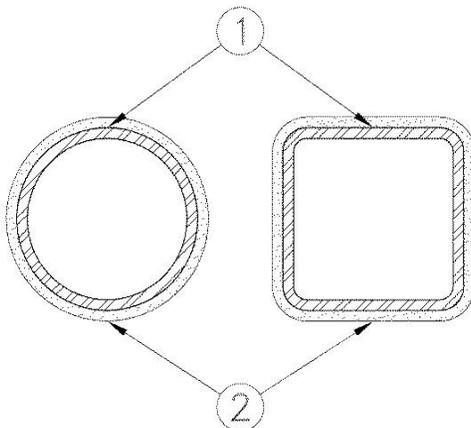
- Steel Column** — Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
- FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Column Size	Column A/P* (M/D)	Fire-resistance Rating (Hour)			
		1	1½	2	3
Required Minimum Thickness, inches (mm)					
ST 10 x 10 x 1/2 in. (254 x 254 x 12.7 mm)	0.46 (90)	0.045 (1.14)	0.094 (2.39)	0.186 (4.72)	0.324 (8.23)

*Where A is the cross-sectional area of the steel pipe or tube in inches² and P is the heated perimeter of the steel pipe or tube in inches.

- Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 9—FIRE DESIGN NO. 9: FIRE-RESISTANCE RATINGS – 1, 1½, 2 AND 3 HOURS (SEE ITEM 2)



1. **Steel Column** — Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil before application of coatings. Column shall be primed with metal alkyd primer.
2. **FIREFILM III** intumescent coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Fire-resistance Rating, hr	Steel Column Size	Column A/P* (M/D)	Required Minimum Thickness, In. (mm)
1	ST 5 x 3 x 1/4 in. (127 x 76 x 6.35 mm)	0.22 (43.8)	0.134 (3.40)
1	SP 8.625 in. diam x 1/4 in. (219 mm dia x 6.35 mm)	0.24 (47.5)	0.135 (3.43)

*Where A is the cross-sectional area of the steel pipe or tube in inches² and P is the heated perimeter of the steel pipe or tube in inches.

3. **Top Coat** (Not shown) - Finishing topcoat, Type "COLORCOAT" silicone alkyd paint applied at a minimum 0.002 in. (0.05 mm) dry film thickness.

FIGURE 10—FIRE DESIGN NO. 10: FIRE-RESISTANCE RATING – 1 HOUR (SEE ITEM 2)

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 81 00—Applied Fireproofing

REPORT HOLDER:

CARBOLINE GLOBAL INC.

EVALUATION SUBJECT:

FIREFILM® III INTUMESCENT FIRE-RESISTIVE COATING AND COLORCOAT

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that FIREFILM® III Intumescent Fire-Resistive Coating and Colorcoat, described in ICC-ES evaluation report ESR-1973, have also been evaluated for compliance with the code noted below.

Applicable code edition:

- 2019 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1. and 2.2 below.

2.0 CONCLUSIONS

The FIREFILM® III Intumescent Fire-Resistive Coating and Colorcoat, described in Sections 2.0 through 7.0 of the evaluation report ESR-1973, comply with CBC Sections 603.1 (Item 21), 703.2, 704 and 803.1, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 7, 8 and 17 and 2019 CBC Section 704.6, as applicable.

2.1 OSHPD:

The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

2.2 DSA:

The applicable DSA Sections of the CBC are beyond the scope of this supplement.

This supplement expires concurrently with the evaluation report, reissued December 2023.