carboline®
Coatings - Linings - Fireproofing

VERSION 1.0

Firefilm III

IINTUMESCENT COATING BID SUBMITTAL

Prepared by:
Michael Hollman

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A/D Firefilm® III

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	A single package, water based intumescent coating designed for the fire protection of interior structural steel.
Description	A/D Firefilm III is a decorative, fiber free, 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/ULC and ITS 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 – Gives a smooth, decorative finish. Compatible topcoats available in a wide range of colors. • Advanced fiber free formulation - dust free surface. • Durable finish – Provides a hard, impact and abrasion resistant surface. • Topcoat finishes smooth to slight orange peel. • Thin film coating – space saving smaller column footprints. • Low VOC content. • LEED compliant
Color	White Contact your Carboline Representative for availability.
Finish	Smooth
Primer	A/D Firefilm III 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 A/D Firefilm III. Contact Carboline Technical Service for a complete list of approved primers.
Wet Film Thickness	45 mils (1,143 microns) per coat *During the drying process, the coating will shrink due to the evaporation of water.
Dry Film Thickness	30 mils (0.8 mm) per coat *AD Firefilm III 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.
VOC Values	**As Supplied** : 0.17 lb/gallon (20 g/L)
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.
Topcoats	For interior conditioned space, topcoats are optional. For interior general purpose, Carboline approved topcoats are required. A/D Firefilm III 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.

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 A/D Firefilm III to the substrate. The general requirement for interior steel is SSPC-SP2 or SP3. Contact Carboline Technical Service for recommendations and specific primer requirements.

SUBSTRATES & SURFACE PREPARATION

Painted/Primed Structural Steel	Existing coatings must attain a minimum 3A rating in accordance with ASTM D3359 Method A, X cut adhesion test. If acceptable, clean and lightly abrade in accordance with SSPC-SP2 or SP3 to roughen and de-gloss the surface. If not acceptable, the coating must be removed and areas re-primed with a compatible primer. If primer coating has acceptable adhesion, but is not compatible or compatibility is unknown, a tie-coat primer can be applied as a bonding or barrier coating. Contact Carboline Technical Service for a list of approved tie-coat primers and specific primer requirements. Primer recoat intervals may vary from the published product datasheet when using under intumescent fireproofing products. Consult Carboline Technical Service for recommended cure times before applying Carboline intumescent products.

PERFORMANCE DATA

All test data was generated under laboratory conditions. Field testing results may vary.

Test Method	Results
ASTM D2240 Hardness	Shore D 65-70 (fully cured) Shore D 60 (for topcoating)
ASTM D2794 Impact	152 inch-lbs (1.75 kg-m)
ASTM D4060 Abrasion	103 mg loss @ 1,000 cycles
ASTM D4541 Bond Strength	550 psi (3.79 MPa)
ASTM D4541 Bond Strength	Typical Field Value 200 psi (1.38 MPa)
ASTM E761 Compressive Strength	757 psi (5.2 MPa)
ASTM E84 Surface Burning	Class A
CAN/ULC-S102, Surface Burning	FS-0 & SD-35
Density	89 pcf (1,425 kg/m³)

All values derived under controlled laboratory conditions unless otherwise noted.

MIXING & THINNING

Mixer	Use 1/2" (12.7 mm) electric or air driven drill with a slotted paddle mixer (300 rpm under load).
Mixing	A/D Firefilm III must be mixed using a 1/2" (12.7 mm) 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.
Thinning	Do not thin.

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. (3.7 L) per minute electric airless (minimum) to provide an operating pressure of 3,000 psi (204 bar). Must have a minimum 30 mesh inline filter installed (Carboline recommends using a 60 mesh inline filter). Remove rock catcher from siphon tube.
Spray Gun	Silver Gun with gun swivel, Contractor Gun (with filter removed) or equilavent
Spray Tips	0.017-0.021" (Use Graco heavy duty RAC non diffuser tips and housing)
Fan Size	6-10" (152-254 mm) depending on section being sprayed

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.

Hose Length	150' (45 m)
Material Hose	3/8" (9.25 mm) I.D. minimum
Whip Hose	1/4" (6.35 mm) I.D. minimum (optional)

APPLICATION PROCEDURES

General	May be applied by spray, trowel, brush or roller. Spray application is recommended for the optimum production, coverage and finish. When applying by trowel, brush or roller, work from a small container and mix material frequently. The original pail should be kept tightly closed.
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: Spray / trowel: 45 mils (1.14 mm) per coat (wet) Brush / roll: 10 mils (0.25 mm) per coat (wet) 24 hour recoat time between coats
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)	50°F (10°C)	50°F (10°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. A/D Firefilm® III is sensitive to water and must be protected from exposure to weather and moisture. Protect from freezing.

CURING SCHEDULE

Surface Temp.	Dry to Recoat
77°F (25°C)	24 Hours

*For optimum curing, it is recommended to apply one coat at 45 mils (1.14 mm) wet per day. Drying time will vary with temperature and humidity conditions. Air movement and thinner coats will assist drying. The next coat of A/D Firefilm III can be applied when the previous coat has a minumum Shore D hardness of 50 measured at 70°F (21°C). Material is ready to be topcoated when an average Shore D hardness of 60 is achieved. Consult Carboline Technical Service for specific details. Higher film thicknesses will require longer drying times for topcoating.

TESTING / CERTIFICATION / LISTING

Underwriters Laboratories, Inc.	A/D Firefilm III has been tested in accordance with ASTM E-119 (UL 263) at Underwriter's Laboratories, Inc. A/D Firefilm III is listed by UL and ULC for the following designs: **Wide Flange Columns:** X639, X641, X642, X643, X645, X669, X670, Z608, Z610, Z612, Z626, Z627 **HSS Columns:** X642, X645, X671, X672, X673, Z611, Z617, Z628, Z629, Z630 **Beams/Floors:** N641, D941, D948, F906, F910, F912 *The product should be applied in accordance with the appropriate design.
Intertek	A/D Firefilm III has been tested in accordance with ASTM E-119 at Intertek Laboratories. A/D Firefilm III is listed by Intertek for the following designs: **Wide Flange Columns:** AD/IMF 180-01 **HSS Columns:** AD/IMF 90-01, AD/IMF 120-02, -03 **Beams/Floors:** AD/IMF 120-01 *The product should be applied in accordance with the appropriate design.
City of New York	MEA No. 108-94-S-4 (Beams) MEA No. 242-92-S-7 (Columns)
City of Los Angeles	Report: RR25440

CLEANUP & SAFETY

Cleanup	Pump, Gun, Tips and Hoses and mixer should be cleaned at least once per day with water.
Safety	Read and follow all caution statements on this product data sheet and on the SDS for this product. Employ normal workmanlike safety precautions. Use adequate ventilation. Keep container closed when not in use.
Overspray	All adjacent and finished surfaces shall be protected from damage and overspray.
Ventilation	When used in enclosed areas, thorough air circulation must be used during and after application until the coating is dried.

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 A/D Firefilm III. The coating shall then be built back to the original thickness, allowed to dry, then overcoated with the specified topcoat or system.

PACKAGING, HANDLING & STORAGE

Packaging	5 gallons (18.9 L)
Shelf Life	6 months (when kept at recommended storage conditions and in original unopened containers).
Storage	Store indoors in a dry environment between 33-100°F (1-38°C). Protect from freezing.

PACKAGING, HANDLING & STORAGE

Shipping Weight (Approximate)	64 lb. (29 kg) per 5 gallon pail (18.9 L)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. Carboline warrants our products to be free of manufacturing defects in accord with applicable Carboline quality control procedures. THIS WARRANTY IS NOT VALID WHEN THE PRODUCT IS NOT: (1) APPLIED IN ACCORDANCE WITH CARBOLINE'S SPECIFICATIONS, AND/OR (2) PROPERLY STORED, CURED, AND USED UNDER NORMAL OPERATING CONDITIONS. Carboline assumes no responsibility for coverage, performance, injuries, or damages resulting from use of the product. If this product is found not to perform as specified upon inspection by a Carboline representative during the warranty period, Carboline's sole obligation, if any, is to replace the Carboline product(s) proven to be defective or refund the purchase price thereof, at Carboline's sole option. Carboline shall not be liable for any other losses or damages. This warranty excludes (1) labor and costs of labor for the application or removal of any product, and (2) any incidental or consequential damages, whether based on breach of express or implied warranty, negligence, strict liability or any other legal theory. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated. The whole text of this Product Data Sheet, as well as the documents derived from it, have been written in English, and for legal purposes the English version shall prevail.

Safety Data Sheet

Prepared in Accordance with HCS 29 C.F.R. 1910.1200

1. Identification of the Substance/Mixture and the Company/Undertaking

1.1 Product Identifier 35ADS1NL

Product Name: A/D FIREFILM III

Revision Date: 02/06/2019

Supercedes Date: 01/04/2019

1.2 Relevant identified uses of the substance or mixture and uses advised against Monocomponent industrial coating - Industrial use.

1.3 Details of the supplier of the safety data sheet

Manufacturer:
Carboline Company
2150 Schuetz Road
St. Louis, MO USA 63146

Regulatory / Technical Information:
Contact Carboline Technical Services at
1-800-848-4645

Datasheet Produced by: Alotta, Vicki - ehs@stoncor.com

1.4 Emergency telephone number:
CHEMTREC 1-800-424-9300 (Inside US)
CHEMTREC +1 703 5273887 (Outside US)
HEALTH - Pittsburgh Poison Control 1-412-681-6669

2. Hazard Identification

2.1 Classification of the substance or mixture

Hazardous to the aquatic environment, Chronic, category 3
Reproductive Toxicity, category 1B

2.2 Label elements

Symbol(s) of Product

Signal Word

Danger

Named Chemicals on Label

BUTYL BENZYL PHTHALATE

HAZARD STATEMENTS

Reproductive Toxicity, category 1B	H360-1B	May damage fertility or the unborn child.
Hazardous to the aquatic environment, Chronic, category 3	H412	Harmful to aquatic life with long lasting effects.

PRECAUTION PHRASES

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P284	Wear respiratory protection.
P308+P313	IF exposed or concerned: Get medical advice/attention

2.3 Other hazards

No Information

Results of PBT and vPvB assessment:

The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

3. Composition/Information On Ingredients

3.2 Mixtures

Hazardous Ingredients

CAS-No.	Chemical Name	%
13463-67-7	TITANIUM DIOXIDE	10 - <25
108-78-1	MELAMINE	2.5 - <10
1344-28-1	CALCINED ALUMINA	0.1 - <1.0
13701-59-2	BARIUM METABORATE MONOHYDRATE	0.1 - <1.0
85-68-7	BUTYL BENZYL PHTHALATE	0.1 - <1.0
9004-62-0	HYDROXYETHYLCELLULOS	0.1 - <1.0

CAS-No.	GHS Symbols	GHS Hazard Statements	M-Factors
13463-67-7			0
108-78-1		H303	0
1344-28-1			0
13701-59-2	GHS07	H302-332	0
85-68-7	GHS08-GHS09	H360-400-410	0
9004-62-0	GHS06	H300	0

Additional Information: The text for GHS Hazard Statements shown above (if any) is given in Section 16.

4. First-aid Measures

4.1 Description of First Aid Measures

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.

AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.

AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Irritating to eyes and skin. May be harmful if swallowed.

4.3 Indication of any immediate medical attention and special treatment needed

No information available on clinical testing and medical monitoring. Specific toxicological information on substances, if available, can be found in section 11.

When symptoms persist or in all cases of doubt seek medical advice.

5. Fire-fighting Measures

5.1 Extinguishing Media:

Carbon Dioxide, Dry Chemical, Foam, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known.

5.2 Special hazards arising from the substance or mixture

No Information

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. The product is not flammable.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective equipment. Evacuate personnel to safe areas. For personal protection see section 8.

6.2 Environmental precautions

Do not allow material to contaminate ground water system. Prevent product from entering drains.

6.3 Methods and material for containment and cleaning up

Prevent further leakage or spillage if safe to do so.

6.4 Reference to other sections

Please refer to disposal requirements or country specific disposal requirements for this material. See Section 13 for further information.

7. Handling and Storage

7.1 Precautions for safe handling

INSTRUCTIONS FOR SAFE HANDLING : Keep containers dry and tightly closed to avoid moisture absorption and contamination. Prepare the working solution as given on the label(s) and/or the user instructions. Ensure all equipment is electrically grounded before beginning transfer operations. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation/personal protection. Avoid breathing vapors, mist or gas. Wash thoroughly after handling.
PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

CONDITIONS TO AVOID: Do not freeze.
STORAGE CONDITIONS: Do not freeze. Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3 Specific end use(s)

No specific advice for end use available.

8. Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with Occupational Exposure Limits (US)

Name	CAS-No.	ACGIH TWA	ACGIH STEL	ACGIH Ceiling
TITANIUM DIOXIDE	13463-67-7	10 MGM3 10 MGM3	N/E	N/E
MELAMINE	108-78-1	N/E	N/E	N/E

CALCINED ALUMINA	1344-28-1	N/E	N/E	N/E
BARIUM METABORATE MONOHYDRATE	13701-59-2	N/E	N/E	N/E
BUTYL BENZYL PHTHALATE	85-68-7	N/E	N/E	N/E
HYDROXYETHYLCELLULOS	9004-62-0	NE	NE	N/E

Name	CAS-No.	OSHA PEL	OSHA STEL
TITANIUM DIOXIDE	13463-67-7	15 MGM3	N/E
MELAMINE	108-78-1	N/E	N/E
CALCINED ALUMINA	1344-28-1	5 MGM3 15 MGM3	N/E
BARIUM METABORATE MONOHYDRATE	13701-59-2	0.5 mg/m3	N/E
BUTYL BENZYL PHTHALATE	85-68-7	N/E	N/E
HYDROXYETHYLCELLULOS	9004-62-0	NE	N/E

FURTHER INFORMATION: Refer to the regulatory exposure limits for the workforce enforced in each country.

8.2 Exposure controls

Personal Protection

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

EYE PROTECTION: Ensure that eyewash stations and safety showers are close to the workstation location. Safety glasses with side-shields.

HAND PROTECTION: Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Impervious gloves. Request information on glove permeation properties from the glove supplier. Lightweight protective clothing

OTHER PROTECTIVE EQUIPMENT: No Information

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	White Liquid
Physical State	Liquid
Odor	Mild Ammoniacal
Odor threshold	N/D
pH	8-9
Melting point / freezing point (°C)	N/D
Boiling point/range	149 F (65 C) - 471 F (244 C)
Flash Point	None
Evaporation rate	Slower Than Ether

Flammability (solid, gas)	Not determined
Upper/lower flammability or explosive limits	0.6 - 36.0
Vapour Pressure, mmHg	17 @20C
Vapour density	Heavier than Air
Relative density	Not determined
Solubility in / Miscibility with water	Dilutable
Partition coefficient: n-octanol/water	Not determined
Auto-ignition temperature (°C)	Not determined
Decomposition temperature (°C)	Not determined
Viscosity	Not Determined
Explosive properties	Not determined
Oxidising properties	Not determined

9.2 Other information

VOC Content g/l:	45
Specific Gravity (g/cm3)	1.48

10. Stability and Reactivity

10.1 Reactivity
No reactivity hazards known under normal storage and use conditions.

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4 Conditions to avoid
Do not freeze.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

11. Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity:

Oral LD50: N/D

Inhalation LC50: N/D

Irritation: No information available.

Corrosivity: No information available.

Sensitization: No information available.

Repeated dose toxicity: No information available.

Carcinogenicity: No information available.

Mutagenicity: No information available.

Toxicity for reproduction: Reproductive Toxicity, category 1B
Reproductive Toxicity, category 1B
Reproductive Toxicity, category 1B
Reproductive Toxicity, category 1B
Reproductive Toxicity, category 1B

STOT-single exposure: No information available

STOT-repeated exposure: No information available

Aspiration hazard: No information available

If no information is available above under Acute Toxicity then the acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50	Gas LC50	Dust/Mist LC50
13463-67-7	TITANIUM DIOXIDE	25000 mg/kg, oral (rat)	Not Available	Not Available	No Information	No Information
108-78-1	MELAMINE	3161 mg/kg, oral, rat	Not Available	3248 mg/m3 8 Hr, Inh, Rat	0.000	0.000
1344-28-1	CALCINED ALUMINA	N/E		N/E		
13701-59-2	BARIUM METABORATE MONOHYDRATE	Not Available		Not Available	0.000	0.000
85-68-7	BUTYL BENZYL PHTHALATE	2330 mg/kg, oral, rat	6700 mg/kg, dermal, rat	6700 mg/m3, 4h Inh, rat	0.000	0.000
9004-62-0	HYDROXYETHYLCELLULOS	>5.0 G/KG, ORAL , RAT		NOT AVAILABLE		

Additional Information:
No Information

12. Ecological Information

12.1 Toxicity:

EC50 48hr (Daphnia):	No information available.
IC50 72hr (Algae):	No information available.
LC50 96hr (fish):	No information available.

12.2 Persistence and degradability: No information available.

12.3 Bioaccumulative potential: No information available.

12.4 Mobility in soil: No information available.

12.5 Results of PBT and vPvB assessment: The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

12.6 Other adverse effects: No information available.

CAS-No.	Chemical Name	EC50 48hr	IC50 72hr	LC50 96hr
13463-67-7	TITANIUM DIOXIDE	No information	No information	No information
108-78-1	MELAMINE	No information	No information	No information
1344-28-1	CALCINED ALUMINA	No information	No information	No information
13701-59-2	BARIUM METABORATE MONOHYDRATE	No information	No information	No information
85-68-7	BUTYL BENZYL PHTHALATE	No information	No information	No information
9004-62-0	HYDROXYETHYLCELLULOS	No information	No information	No information

13. Disposal Considerations

13.1 WASTE TREATMENT METHODS: Do not burn, or use a cutting torch on, the empty drum. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of in accordance with local regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

14.1	**UN number**	None
14.2	**UN proper shipping name**	Not Regulated
	Technical name	N/A
14.3	**Transport hazard class(es)**	None
	Subsidiary shipping hazard	N/A
14.4	**Packing group**	N/A
14.5	**Environmental hazards**	No information available.
14.6	**Special precautions for user**	No information available.
	EmS-No.:	Unknown
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code**	No information available.

15. Regulatory Information

15.1 Safety, health and environmental regulations/legislation for the substance or mixture:

U.S. Federal Regulations: As follows -

CERCLA - Sara Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Reproductive toxicity

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
BARIUM METABORATE MONOHYDRATE	13701-59-2

Toxic Substances Control Act:

All components of this product are either listed on the TSCA Inventory or are exempt.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS-No.
AMMONIUM POLYPHOSPHATE	68333-79-9
WATER	7732-18-5
PENTAERYTHRITOL	115-77-5
VINYL ACRYLIC COPOLYMER EMULSION	TRADE SECRET

Pennsylvania Right-To-Know

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS-No.
AMMONIUM POLYPHOSPHATE	68333-79-9
WATER	7732-18-5
PENTAERYTHRITOL	115-77-5
VINYL ACRYLIC COPOLYMER EMULSION	TRADE SECRET

CALIFORNIA PROPOSITION 65

WARNING: Cancer and Reproductive Harm -- www.P65Warnings.ca.gov

International Regulations: As follows -

* Canadian DSL:

All chemical ingredients included on inventory (DSL)

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

16. Other Information

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H300	Fatal if swallowed.
H302	Harmful if swallowed.
H303	May be harmful if swallowed
H332	Harmful if inhaled.
H360	May damage fertility or the unborn child.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Reasons for revision

No Information

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

PART 1 GENERAL

1.01 WORK INCLUDED

A. This specification covers labor, materials, equipment, and application necessary for, and incidental to, the complete and proper installation of intumescent fire protection for application to steel structures and supports in accordance with all applicable requirements of contract documents.

B. This specification shall be supplemented by the applicable requirements of building codes, insurance rating organizations and all other authorities having jurisdiction.

1.02 RELATED WORK

A. Specified elsewhere:
   1. 01010 - Project Summary
   2. 01410 - Testing Laboratory Services
   3. 05100 - Structural Metal Framing
   4. 05120 - Structural steel and metal fabrications with reference to primer receiving fire protection materials
   5. 05500 - Structural steel and metal fabrications with reference to primer receiving fire protection materials
   6. 07270 – Firestopping and Smoke Seals
   7. 09900 - Painting

1.03 QUALITY ASSURANCE

A. Application of fireproofing shall be performed by a qualified applicator acceptable to the Carboline Company, St. Louis, MO.

B. A Certified Installation Certificate must be completed and submitted at end of project.

C. Provide materials and construction for hourly ratings listed in the Underwriters Laboratories, Inc. Fire Resistance Directory or as calculated by the American Iron and Steel Institute formula.

D. The intumescent fire resistive material shall be manufactured under the Follow-Up Service program of UL/ULC and/or Intertek and bear the UL/ULC and/or Intertek label (mark).

E. Field constructed mock-up: Apply sample section to representative substrates on site. Mock-up should include primer, fireproofing at required thickness, density, and finished surface, and all finish coatings.

F. The product shall be approved by the architect and applicable authorities having jurisdiction.

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. E84 Surface Burning Characteristics
   2. E119 Fire Tests of Building Construction
   3. D2240 Durometer Hardness
   4. D2794 Impact Resistance
   5. D4060 Abrasion Resistance
   6. D4541 Bond Strength

B. Underwriters Laboratories, Inc. Fire Resistance Directory (UL 263 / ASTM E119).

C. CAN/ULC-S101 Standard Methods of Fire Endurance Tests of Building Construction and Materials

D. Steel Structures Painting Council (SSPC) Surface Preparation Standards

E. American Iron and Steel Institute, Designing Fire Protection for Steel Columns.

F. AWCI Technical Manual 12-B "Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide", Latest Edition

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's current Product Data and Application Instructions.

B. Fireproofing manufacturer's certification that the materials to be supplied comply with the specifications and are suitable for the use intended.

C. Fireproofing manufacturer's certification that the minimum performance standards as required under Section 2.01-A can be met and test reports supplied as requested.

D. Schedule of Underwriters Laboratories, Inc. designs or American Iron and Steel Institute calculations to achieve the required hourly ratings.

E. At completion of project, Certified Installation Certificate.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data. Packaged materials shall bear the appropriate labels, seals and UL label (mark) for fire resistive ratings and shall be stored at temperatures between 33º F (1º C) and 100º F (38º C), in a dry interior location away from direct sunlight. PROTECT FROM FREEZING.

B. Materials shall be used prior to expiration date.

1.07 SITE CONDITIONS

A. When the temperature at the job site is less than 50º F (10º C), a minimum substrate and ambient temperature of 50º F (10º C) shall be maintained prior to, during, and a minimum of 72 hours after application. If necessary for job schedule, the General Contractor shall provide enclosures and heat to maintain proper temperatures and humidity levels in the application areas

B. General Contractor shall provide ventilation for proper drying of the fireproofing during and after its application. In poorly ventilated areas, forced air shall be used to achieve a total air exchange of four times per hour until the material is substantially dry.

C. Relative humidity shall not exceed 85% throughout the total period of application and drying for the intumescent fire resistive material, and must not exceed 85% throughout the application and drying for the protective decorative topcoat.

1.08 SEQUENCING

A. Coordinate application of fireproofing with related work specified in other sections to comply with the following requirements:
   1. Prevent deterioration due to exposure to unfavorable environmental conditions.
   2. Protect fireproofing from abrasion and other damage likely to occur during construction operations after its application.
   3. The installation of piping, ducts, conduit or other suspended equipment shall not commence until the application of the thin-film fire resistive material is complete in that area.
   4. Install fireproofing allowing sufficient time for inspection, testing, and correction of defective fireproofing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Compatible metal primer shall be approved and applied in full accordance with the primer manufacturer's written instructions.

B. The intumescent fire resistive material shall be supplied by Carboline. Intumescent fire resistive material shall be applied in accordance with drawings and/or specifications, and shall have been tested in accordance with the procedures of UL 263 or ASTM E119 or CAN/ULC-S101, and reported by Underwriters Laboratories, Inc., Underwriters Laboratories of Canada or Intertek.

C. Intumescent fireproofing shall be applied to provide compliance with all drawings, specifications, and the following performance criteria:
   1. ASTM E84 (UL723, CAN/ULC-S102): Surface Burning Characteristics of Building Materials. Flame Spread Maximum: 15 and Smoke Developed Maximum: 25.
   2. ASTM D2240: Durometer Hardness (Shore D Only). Minimum: 70 Shore D.
   3. ASTM D2794: Impact Resistance. Intrusion minimum: 152 inch-lb. (1.75 kg-m).

4. ASTM D4060: Abrasion Resistance. Maximum 103 mg/1000 cycles.
5. ASTM D4541: Bond Strength. Minimum: 125 psi. (861 kPa).

D. Fireproofing shall be investigated for interior use by Underwriters Laboratories, Inc.

E. Fireproofing shall be free of asbestos, mineral fibers, polystyrene, or other known materials which may be considered hazardous either during mixing, application curing, or chemical release in a fire.

F. Topcoat materials shall be as required for color-coding, aesthetics or additional surface protection, approved by the thin-film fire resistive material manufacturer and applied in full accordance with the coating manufacturer's written instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. All surfaces to receive thin-film fire resistive material shall be clean, dry and free of oil, grease, loose mill scale, dirt, dust or other materials which would impair bond of the thin-film fire resistive material to the surface. Any cleaning of the surfaces to receive fire resistive material shall be the responsibility of the General Contractor or steel erector, as outlined in the structural steel section.

B. Confirm compatibility of surfaces to receive thin-film fire resistive material. Steel surfaces shall be primed with a compatible primer approved by the thin-film fire resistive material manufacturer.

C. Verify that objects which will penetrate fireproofing such as clips, hangers, support sleeves, etc. are securely attached to the substrate.

D. Verify that substrates are not obstructed by ducts, piping, equipment, or other construction which might interfere with fireproofing application. If obstruction(s) are evident, General Contractor to have responsible trade remove obstruction until fireproofing is completed in the area.

E. Do not proceed with fireproofing application until all unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates, removing dirt, dust, oil, grease, loose material, incompatible primers, or other substances which may impair bonding of fireproofing to the substrate.

B. Provide drop cloths, masking, or other satisfactory protection for surfaces not to receive fireproofing to prevent damage from overspray.

3.03 APPLICATION

A. The thin-film fire resistive material shall be applied at the required dry film thickness per the appropriate design number guidelines and manufacturers written application instructions.

B. Comply with manufacturers current instructions for equipment and application procedures.

B. Apply fireproofing in thickness required to achieve fire resistance ratings.

C. Before proceeding with the work, the applicator shall apply the thin-film fire resistive material to a section witnessed by the architect's or owner's representative. The application shall be subject to their approval and shall be used as a guide for texture and thickness of the finished work.

3.04 FIELD QUALITY CONTROL

A. In addition to continuous Wet Film Thickness checks performed by applicator during application, the installed intumescent material shall be inspected by a qualified independent testing laboratory for thickness in accordance with the AWCI Technical Manual 12-B "Standard Practice For The Testing and Inspection Of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide", Latest Edition, before application of the topcoat.

B. The results of the above tests shall be made available to all parties at the completion of each area and approved prior to the application of topcoat.

3.05 PROTECTION

A. Coordinate installation of fireproofing with other trades in order to minimize the need to cut or remove fireproofing. As other trades successfully complete installation of their work, maintain protection of fireproofed portions of the structure by repairing any areas which have been removed or damaged.

B. If applicable, the General Contractor shall install barriers to prevent other trades from entering the application area till the material dries.

C. Areas subject to overspray that are to remain permanently exposed as detailed on the drawings, must be covered by drop cloths or other satisfactory protection to prevent contact with fireproofing material.

3.06 PATCHING AND REPAIR

A. All patching of and repair to thin-film fire resistive material, due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage. Patching shall be performed by an applicator with expertise in the installation of fire resistive or similar materials. Repair shall be in accordance with design number guidelines and manufacturers written application instructions.

3.07 CLEANING

A. Upon completion of installation, all excess material, overspray and debris shall be cleared and removed from the job site.

B. At completion of fireproofing work, application equipment shall be removed from site.

3.08 SCHEDULE

A. Fire resistance rating in hours shall be the following:

	Hour	Rest.	Unrest.
Floor Assembly	_____	_____	_____
Primary Floor Beams	_____	_____	_____
Secondary Floor Beams	_____	_____	_____
Roof Beams	_____	_____	_____
Columns, Supporting Floor			_____
Columns, Supporting Roof			_____
Rapid Rise Fire Exposure			_____

END OF SECTION

Certificate of Compliance

Certificate Number 20070823-R20543
Report Reference 2007 August 23
Issue Date 2007 August 23

Underwriters Laboratories Inc.®

Issued to: A/D Fire Protection Systems Inc.
420 Tapscott Rd., Scarborough
ON M1B 1Y4, Canada

This is to certify that representative samples of Mastic and Intumescent Coatings
Model A/D FIREFILM III

Have been investigated by Underwriters Laboratories Inc.® (UL) or any authorized licensee of UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 263 Fire Tests of Building Construction and Materials
ASTM E119

Additional Information: See addendum for system listings

Only those products bearing the UL Classification Mark should be considered as being covered by UL's Classification and Follow-Up Service.

The UL Classification Mark includes: UL in a circle symbol: with the word "CLASSIFIED" (as shown); a control number (may be alphanumeric) assigned by UL; a statement to indicate the extent of UL's evaluation of the product; and, the product category name (product identity) as indicated in the appropriate UL Directory.

Look for the UL Classification Mark on the product

Issued by:
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Kenneth Rhodes
Underwriters Laboratories Inc.

Certificate of Compliance

Certificate Number 20070823-R20543
Report Reference 2007 August 23
Issue Date 2007 August 23

Underwriters Laboratories Inc.®

This is to verify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Type A/D FIREFILM III coating with Type A/D COLORCOAT top-coat investigated per the requirements of UL 263 for Conditioned Interior Space Purpose and Interior General Purpose in Design Nos. D941, D948, X639, X641, X642, X643, X645, X669, X670, X671, X672 and X673. In addition to standardized environmental exposures, the mastic coatings were also exposed to optional exposures, one percent carbon dioxide and one percent sulfur dioxide air mixtures, and chlorine at 5 ppm.

Issued by:
Mona Couloute
Mona Couloute
Underwriters Laboratories Inc.

Reviewed by:
Kenneth Rhodes
Kenneth Rhodes
Underwriters Laboratories Inc.

05-10

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materials testing limited

Product Development
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ISO 17025 Accredited

Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5 SCARBOROUGH, Ontario M1B 1Y4 Phone: (416) 292-2361 Fax: (416) 298-5887	**Laboratory #:** **Report Date:** **Received Date:** **Customer P.O.#:**	403264E-05 January 2nd, 2006 November 11th, 2005 6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III		

TEST REPORT

RE: TESTING OF WATER BASED THIN-FILM INTUMESCENT COATINGS FOR IMPACT RESISTANCE

On November 11th, 2005, CMTL received one (1) sample of AD Firefilm III water based thin-film intumescent coating for determination of various physical characteristics.

The submitted sample was identified as:

Sample #1 - AD Firefilm III (65 mil)

The sample was tested for impact resistance (ASTM D2794-93 (2004)) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

This report is subject to the following terms and conditions. 1. This report relates only to the specimen provided and there is no representation or warranty that it applies to similar substances or materials or the bulk of which the specimen is a part. 2. The content of this report is for the information of the customer identified above only and it shall not be reprinted, published or disclosed to any other party except in full. Prior written consent from Cambridge Materials Testing Limited is required. 3. The name Cambridge Materials Testing Limited shall not be used in connection with the specimen reported on or any substance or materials similar to that specimen without the prior written consent of Cambridge Materials Testing Limited. 4. Neither Cambridge Materials Testing Limited nor any of its employees shall be responsible or held liable for any claims, loss or damages arising in consequence of reliance on this report or any default, error or omission in its preparation or the tests conducted. 5. Specimens are retained 6 months, test reports and test data are retained 7 years from date of final test report and then disposed of, unless instructed otherwise in writing.

Cambridge Materials Testing Limited

Per Steve Brown
QUALITY ASSURANCE

Per Derek Wild
TECHNICIAN

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AD Fire Protection Systems Inc.
Laboratory #403264E-05

RESULTS OF TESTING

ASTM D2794-93(2004): Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

The panels were conditioned for a minimum of 24 hours at 23±2°C and 50±5% relative humidity prior to testing.

The panels were tested in accordance with ASTM D2794-93(2004) (0.625" Ø indentor and support plate with 0.64" Ø hole). The panels were ~0.12" thick [0.025" steel panels were specified by ASTM D2794-93(2004)]. The 8 pound weight was used for this test and the panels were subjected to direct impacts. Failure was determined by using a magnifier to examine the area for cracks.

Sample #1 – AD Firefilm III (65 mil)

Height	Pass	Fail
16"	1	0
17"	1	1
18"	3	1
19"	2	4
20"	0	2

The point at which the results changed from mainly passing to mainly failing was 19".

Impact Failure Point was 152 inch-pounds

05-10

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Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5 SCARBOROUGH, Ontario M1B 1Y4 Phone: (416) 292-2361 Fax: (416) 298-5887	**Laboratory #:** **Report Date:** **Received Date:** **Customer P.O.#:**	**410160-06** February 10th, 2006 February 1st, 2006 6638
Attention:	Ted Rozum		
Specimen:	AD Firefilm III		

TEST REPORT

RE: TESTING OF WATER BASED THIN-FILM INTUMESCENT COATINGS FOR ABRASION RESISTANCE

On February 1st, 2006, CMTL received two (2) samples of AD Firefilm III water based thin-film intumescent coating for determination of various physical characteristics.

The submitted samples were identified as:

Sample #1 - AD Firefilm III (65 mil)
Sample #2 - AD Firefilm III (125 mil)

The samples were tested for abrasion resistance (ASTM D4060-01) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

This report is subject to the following terms and conditions: 1. This report relates only to the specimen provided and there is no representation or warranty that it applies to similar substances or materials or the bulk of which the specimen is a part. 2. The content of this report is for the information of the customer identified above only and it shall not be reprinted, published or disclosed to any other party except in full. Prior written consent from Cambridge Materials Testing Limited is required. 3. The name Cambridge Materials Testing Limited shall not be used in connection with the specimen reported on or any substance or materials similar to that specimen without the prior written consent of Cambridge Materials Testing Limited. 4. Neither Cambridge Materials Testing Limited nor any of its employees shall be responsible or held liable for any claims, loss or damages arising in consequence of reliance on this report or any default, error or omission in its preparation or the tests conducted. 5. Specimens are retained 6 months, test reports and test data are retained 7 years from date of final test report and then disposed of, unless instructed otherwise in writing. * Test performed at CMTL-Cambridge location.

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Per Steve Brown
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Per Derek Whitt
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AD Fire Protection Systems Inc.
Laboratory #410160-06

RESULTS OF TESTING

ASTM D4060-01: Abrasion Resistance of Organic Coatings by the Taber Abraser*

The panels were tested in accordance with ASTM D4060-01 (CS10 wheels, 1000g load). Per AD Fire Protection System's instructions the panels were evaluated at 1000 and 2000 cycles. The panels were conditioned under ambient laboratory conditions for a minimum of 24 hours prior to testing.

Sample #1 – AD Firefilm III (65 mil)

Panel I.D.	After 1000 cycles	After 2000 cycles
Replicate #1a	Wear Index: 112.4 No visual evidence of wear through to the substrate.	Wear Index: 101.2 No visual evidence of wear through to the substrate.
Replicate #1b	Wear Index: 102.4 No visual evidence of wear through to the substrate.	Wear Index: 97.2 No visual evidence of wear through to the substrate.

Sample #2 – AD Firefilm III (125 mil)

Panel I.D.	After 1000 cycles	After 2000 cycles
Replicate #2a	Wear Index: 100.5 No visual evidence of wear through to the substrate.	Wear Index: 94.0 No visual evidence of wear through to the substrate.
Replicate #2b	Wear Index: 106.0 No visual evidence of wear through to the substrate.	Wear Index: 113.7 No visual evidence of wear through to the substrate.

05-10

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Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5 SCARBOROUGH, Ontario M1B 1Y4 Phone: (416) 292-2361 Fax: (416) 298-5887	**Laboratory #:** **Report Date:** **Received Date:** **Customer P.O.#:**	**403264A-05** **REVISED** December 8th, 2005 November 11th, 2005 6630
Attention:	Ted Rozum		
Specimen:	Water Based Coatings		

TEST REPORT

RE: TESTING OF WATER BASED THIN-FILM INTUMESCENT COATINGS FOR DUROMTER HARDNESS

On November 11th, 2005, CMTL received two (2) samples of AD Firefilm III water based thin-film intumescent coating for determination of various physical characteristics.

The submitted samples were identified as:

Sample #1 - AD Firefilm III (65 mil)
Sample #2 - AD Firefilm III (100 mil)

The samples were tested for durometer hardness (ASTM D2240-05 Modified) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

This report is subject to the following terms and conditions: 1. This report relates only to the specimen provided and there is no representation or warranty that it applies to similar substances or materials or the bulk of which the specimen is a part. 2. The content of this report is for the information of the customer identified above only and it shall not be reprinted, published or disclosed to any other party except in full. Prior written consent from Cambridge Materials Testing Limited is required. 3. The name Cambridge Materials Testing Limited shall not be used in connection with the specimen reported on or any substance or materials similar to that specimen without the prior written consent of Cambridge Materials Testing Limited. 4. Neither Cambridge Materials Testing Limited nor any of its employees shall be responsible or held liable for any claims, loss or damages arising in consequence of reliance on this report or any default, error or omission in its preparation or the tests conducted. 5. Specimens are retained 6 months, test reports and test data are retained 7 years from date of final test report and then disposed of, unless instructed otherwise in writing.

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AD Fire Protection Systems Inc.
Laboratory #403264A-05 REVISED

RESULTS OF TESTING

ASTM D2240-05: Durometer Hardness, Shore D

	Durometer Hardness Shore D	Average
Sample #1 – AD Firefilm III (65 mil)	71, 73, 72, 72, 70	72
Sample #2 – AD Firefilm III (100 mil)	72, 75, 71, 71, 72	72

NOTE: The Type "D" Durometer (Model #307L, Serial #12246) was manufactured by PTC Instruments, calibrated on February 16th, 2005 and verified prior to measurements on December 5th, 2005.

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Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5 SCARBOROUGH, Ontario M1B 1Y4 Phone: (416) 292-2361 Fax: (416) 298-5887	**Laboratory #:** **Report Date:** **Received Date:** **Customer P.O.#:**	**403264C-05** **REVISED** December 8th, 2005 November 11th, 2005 6630
Attention:	Ted Rozum		
Specimen:	Water Based Coatings		

TEST REPORT

RE: TESTING OF WATER BASED THIN-FILM INTUMESCENT COATINGS FOR COMPRESSIVE PROPERTIES

On November 11th, 2005, CMTL received two (2) samples of AD Firefilm III water based thin-film intumescent coating for determination of various physical characteristics.

The submitted samples were identified as:

Sample #1 - AD Firefilm III (65 mil)
Sample #2 - AD Firefilm III (100 mil)

The samples were tested for compressive properties (ASTM E761-92 (Reapproved 2005)) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

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AD Fire Protection Systems Inc.
Laboratory #403264C-05 REVISED

RESULTS OF TESTING

ASTM E761-92 (Reapproved 2005): Compressive Strength of SFRM Applied to Structural Members

Sample #1 – AD Firefilm III (65 mil)

		Replicate #1	Replicate #2	Average
Thickness	(inches)	0.058	0.058	0.058
Compressive Strength	(lbs/in^2)	889	624	757
Load @ 10% Deformation	(lbs)	2,667	1,872	2,270
Mode of Failure		None	None	None

Sample #2 – AD Firefilm III (100 mil)

		Replicate #1	Replicate #2	Average
Thickness	(inches)	0.092	0.092	0.092
Compressive Strength	(lbs/in^2)	665	621	643
Load @ 10% Deformation	(lbs)	1,996	1,864	1,930
Mode of Failure		None	None	None

The calculated density of the AD Firefilm III water based intumescent coating was 112 lbs/ft^3.

05-10

Underwriters' Laboratories of Canada

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NC8982
06CA03332

April 10, 2006

Mr. Stevo Miljatovich
A/D Fire Protection Systems
420 Tapscott Road, Unit 5
Scarborough, ON M1B 1Y4

Subject: Surface Burning Characteristics of A/D FIREFILM® III

Dear Mr. Miljatovich:

On March 31, 2006, fire tests were conducted at Underwriter's Laboratories in Northbrook, IL in accordance with the Standard ASTM E-84, Standard Method of Test for Surface Burning Characteristics of Building Materials, 2004 Edition and UL 723, Test for Surface Burning Characteristics of Building Materials, 9th Edition, on two intumescent coating systems applied to nominal 12.7 mm thick cement board. The coating systems were designated by the client as "A/D FIREFILM® III" and "A/D FIREFILM® III with Topcoat". The client specified a coating thickness of 120 mil.

The test specimens used in this investigation were submitted to ULC in ready to test form. The test specimens were not produced under the observation of a representative of ULC. Three pieces measuring 2440 mm (8 ft.) long by 535 mm (21 in.) wide were butted end-to-end to form the 7315 mm (24 ft.) test specimen. The overall thickness of the test specimen coated with A/D FIREFILM® III measured 15.53 mm (0.611 in.) thick on average. The overall thickness of the test specimen coated with A/D FIREFILM® III and a topcoat measured 15.81 mm (0.622 in.) thick on average. The test specimens were conditioned to constant mass at 23 ± 3°C and 50 ± 5% relative humidity.

Due to the rigidity of the test samples, supplementary means of support was not required. The test specimens were installed on the ceiling of the tunnel furnace. A 356 mm (14 in.) long by 1.52 mm (0.060 in.) thick, uncoated, steel plate was placed on the specimen mounting ledge in front of and under the specimen at the fire end of the tunnel furnace "upstream" from the gas burners to complete the 7620 mm (25 ft.) chamber length. An airtight water seal was maintained around the furnace lid during the test.

Data on the flame spread and smoke developed appear in the following tabulations. Graphical plots of flame spread and light transmission data are also provided.

... /2

Test results relate only to the items tested and are as follows:

	Calculated		Index	
Sample Description	Flame Spread	Smoke Developed	Flame Spread	Smoke Developed
A/D FIREFILM® III	8.96	50.4	10	50
A/D FIREFILM® III with Topcoat	17.08	22.6	15	25

ULC Disclaimer:

The issuance of this Report in no way implies Listing, Classification, or Recognition by ULC and does not authorize the use of ULC Listing, Classification, or Recognition Marks or any other reference to ULC on or in connection with coating systems with respect to surface burning characteristics. Information conveyed by this Report applies only to the specimens actually involved in this test. A representative of ULC did not witness the manufacture of the test specimens used. ULC has not established a factory follow-up service program to determine the conformance of subsequently produced coating system assemblies, nor has any provision been established to apply any registered mark of ULC to such coating system assemblies with respect to surface burning characteristics.

In no event shall ULC be responsible to anyone for whatever use or nonuse is made of the information contained in this Report and in no event shall ULC, its employees, or its agents incur any obligation or liability for damages including, but not limited to, consequential damage arising out of or in connection with the use or information contained in this report.

If you have any questions on the foregoing, please do not hesitate to contact us.

Sincerely,

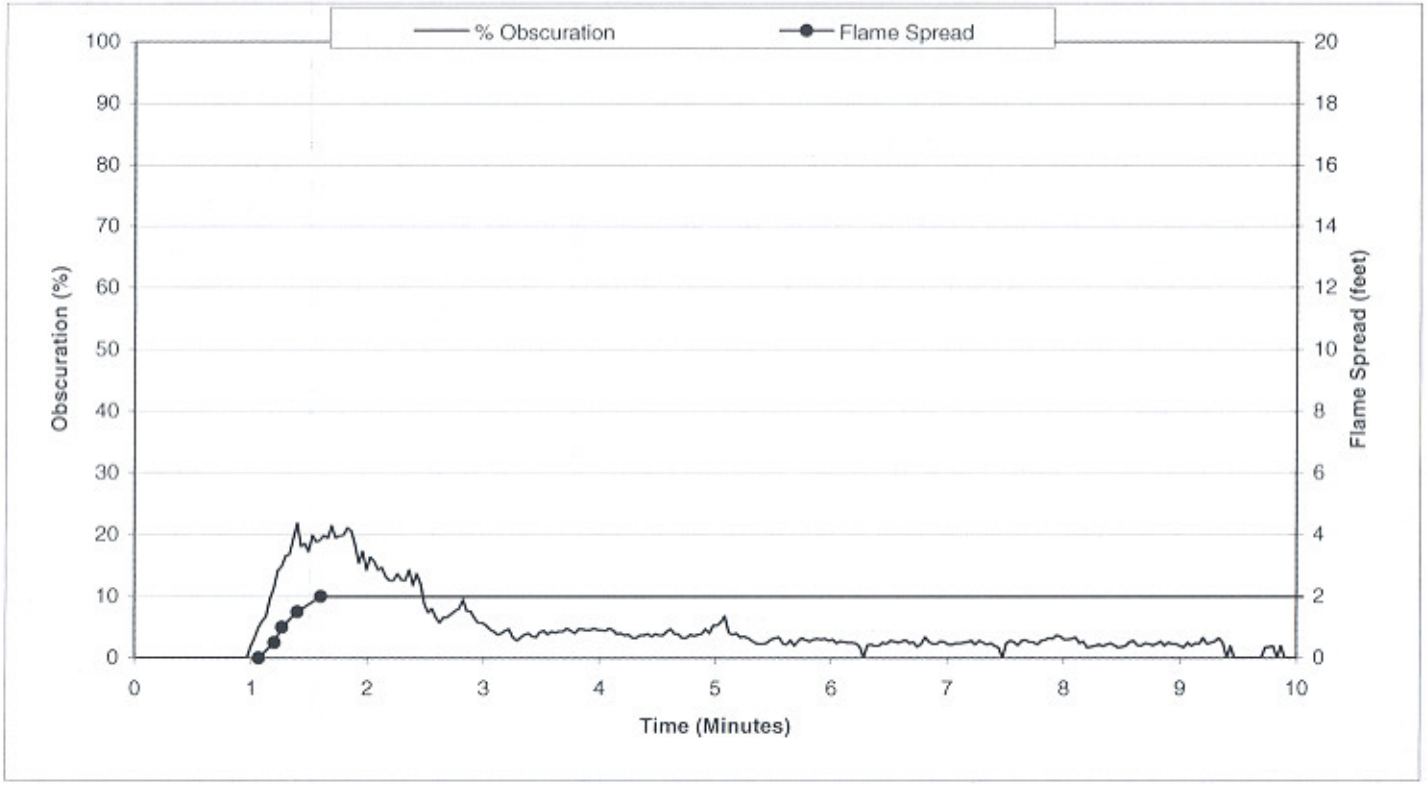
Stanis Yu
Project Handler
Fire Protection Division

Reviewed by:

G. Abbas Nanji, P.Eng.
Engineering Group Leader
Fire Protection Division

Flame Spread / Smoke Results

A/D Fire Protection Systems
A/D FIREFILM® III

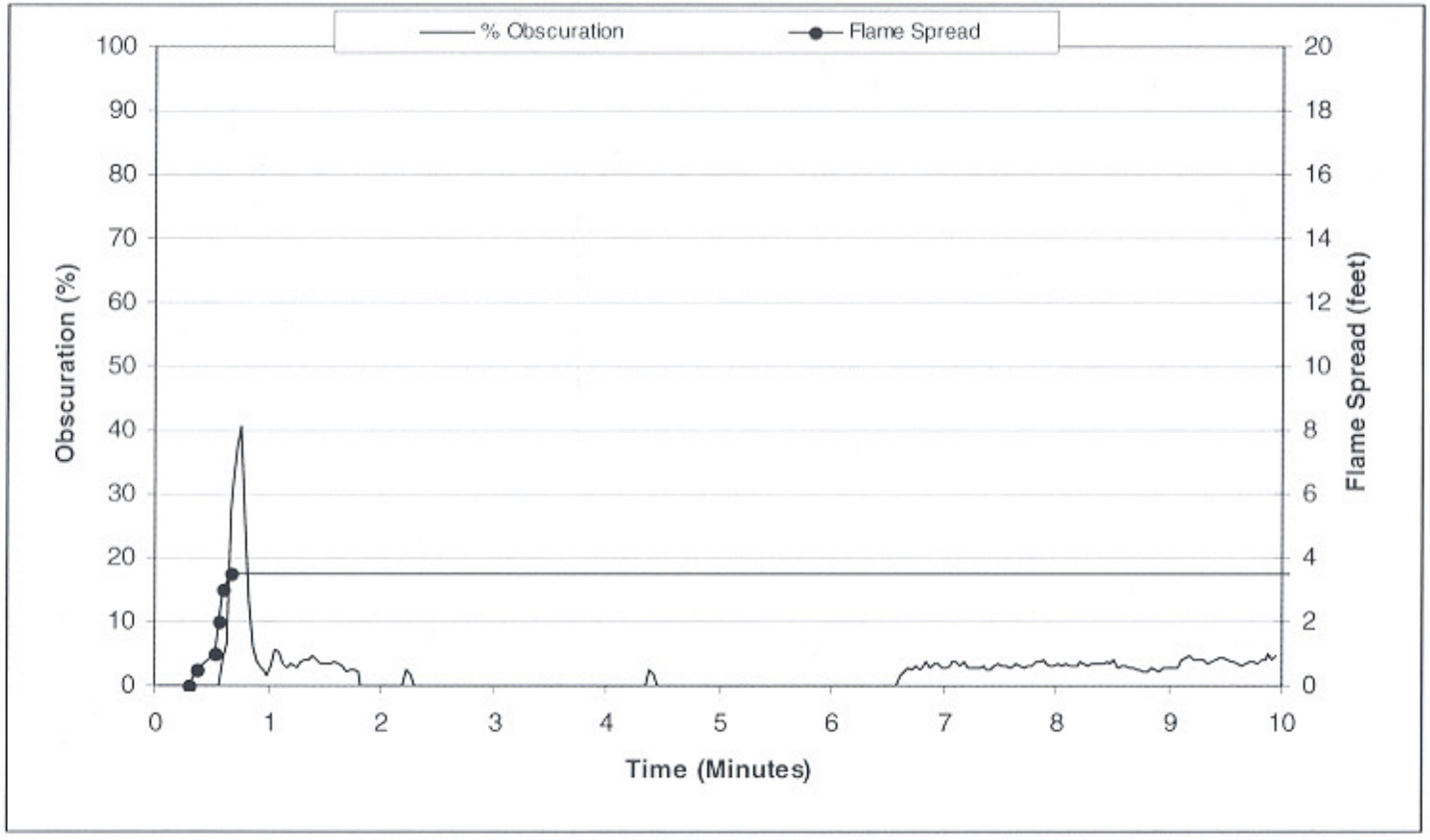


Test Num.: 1
06CA03332 / NC8982
03310608

Flame Spread Index: 10
Smoke Developed Index: 50
Max. Flame Spread: 2.0

Flame Spread / Smoke Results

A/D Fire Protection Systems
A/D FIREFILM® III with topcoat



Test Num.: 2
06CA03332 / NC8982
03310610

Flame Spread Index: 15
Smoke Developed Index: 25
Max. Flame Spread: 3.5

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Product Development
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Report For:	AD Fire Protection Systems 420 Tapscott Road, Unit #5 SCARBOROUGH, Ontario M1B 1Y4	**Laboratory #:**	**403264D-05** **REVISION 3**
		Report Date:	December 15th, 2005
		Received Date:	November 11, 2005
	Phone: (416) 292-2361 Fax: (416) 298-5887	**Customer P.O.#:**	6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III		

TEST REPORT

DEC 2 2 2005

RE: TESTING OF WATER BASED THIN-FILM INTUMESCENT COATINGS FOR PULL-OFF STRENGTH

On November 11th, 2005, CMTL received one (1) sample of AD Firefilm III water based thin-film intumescent coating for determination of various physical characteristics.

The submitted sample was identified as:

Sample #1 - AD Firefilm III (65 mil)

The sample was tested for pull-off strength (ASTM D4541-02 (Modified)) in accordance with applicable ASTM standards.

The results of testing are attached hereto.

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AD Fire Protection Systems Inc.
Laboratory #403264D-05 REVISION 3

RESULTS OF TESTING

ASTM D4541-02 (Modified): Pull-Off Strength of Coating Using Portable Adhesion Testers

The sample was conditioned for a minimum of 24 hours at 23±2°C and 50±5% relative humidity prior to testing.

Three (3) two-inch diameter loading fixtures were bonded by CMTL to the surface with a two-component rapid curing epoxy adhesive.

The three loading fixtures were secured to the crosshead of the testing machine and pulled off at a rate of 150 psi/s.

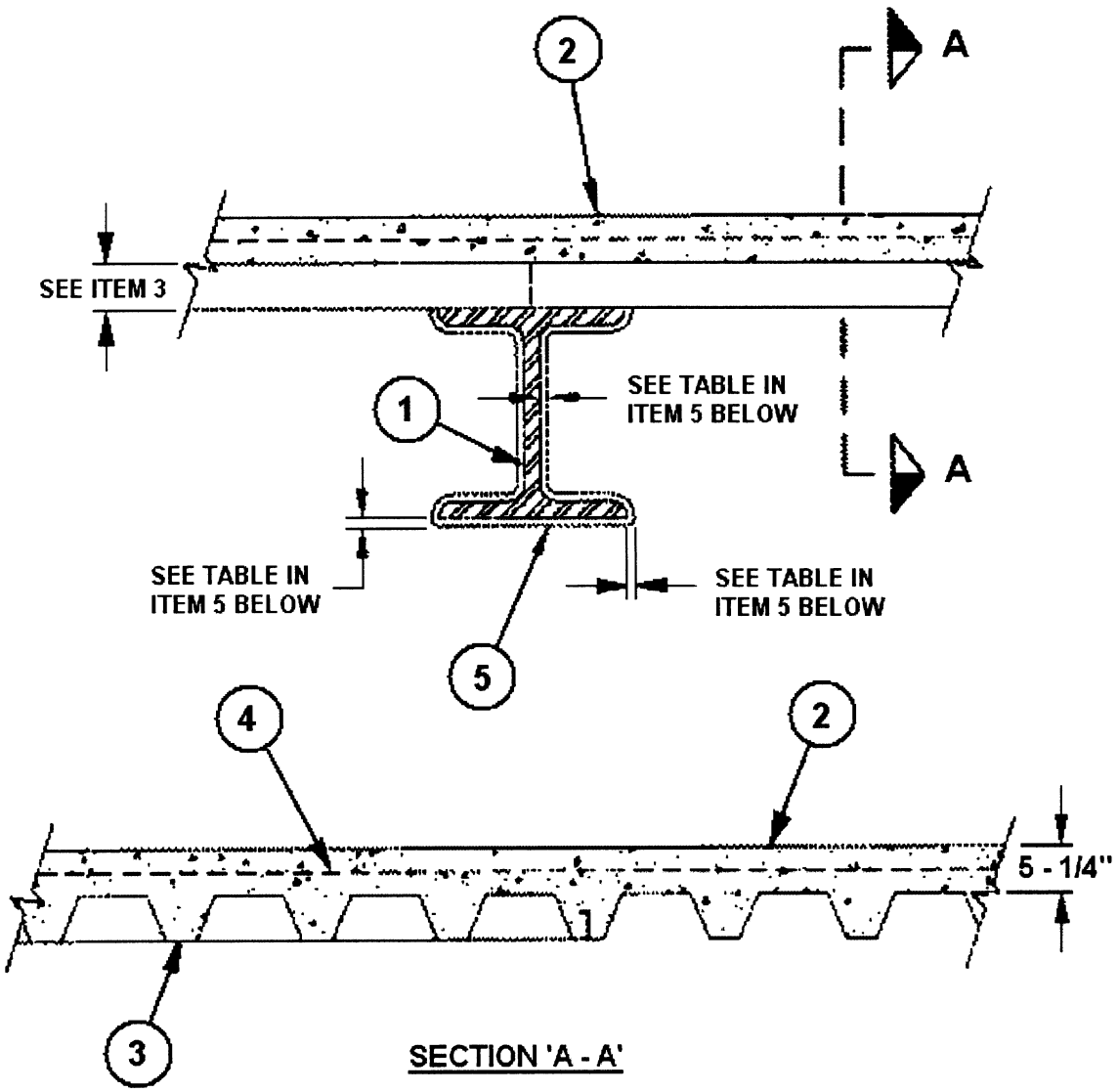
To ensure the pull was perpendicular to the adhered surface a long chain and pivot was used.

Sample #1 – AD Firefilm III (65 mil)

	Force (lbs)	Cohesive / Adhesive Force (lbs/in^2)	Type of Failure
Replicate #1	328	104	100% failure to first coating
Replicate #2	442	141	100% failure to first coating
Replicate #3	408	130	100% failure to first coating
Average ± Std. Dev.	***393 ± 59***	***125 ± 19***	

FLOOR/CEILING DESIGN No. 31

Restrained Assembly Rating – 2 hr.
Unrestrained Assembly Rating – 0 hr.
Unrestrained Beam Rating – 2, 1-1/2 hr.



SECTION 'A - A'

1. STEEL BEAMS — Wide flange steel beam with the minimum sizes shown in the table in item 5. Beam shall be primed with metal Alkyd Primer.

2. NORMAL WEIGHT CONCRETE — Normal–density concrete, carbonate aggregate, 150 pcf (2400kg/m^3) density, 3600 psi (25 MPa) compressive strength.

3. STEEL FLOOR AND FORM UNITS — Composite or noncomposite, 3 in. (76.2 mm) deep, 20 MSG fluted or 20/20 MSG cellular, galvanized units. All fluted or alternating one 36 in.(914 mm) or 24 in. (610 mm) wide fluted to one 24 in. (610 mm) wide max cellular section. Welded to supports not over 12 in. (305 mm) o.c. Adjacent units welded or crimped together along side laps 16 in. (406 mm) o.c. When the maximum clear span of the Steel Floor and Form Units I less than or equal to the tested span of 5 ft. 9 in. (1.75 m), the unrestrained assembly rating is increased to 1-1/2 hr. or 2 hr. to match the unrestrained beam rating.

4. WELDED WIRE FABRIC — 6 x 6 in. – W1.4 x W1.4 (152 x 152 mm MW9.1 x MW9.1) wire mesh.

5. MASTIC COATING — Mastic coating spray or brush applied in accordance with manufacture's instructions to the minimum dry film thickness shown below:

Min Beam Size, in. (W/D)	Min Beam Size, m (M/D)	Restrained Assembly Rating, Hr.	Unrestrained Assembly Rating, Hr.	Unrestrained Beam Rating, Hr.	Required Min Dry Film Thickness, in. (mm)
W8x31 (0.80)	W200x46 (46)	2	0 (See Item 3)	1-1/2	0.089 (2.26)
W6x25 (0.84)	W150x37 (48)	2	0 (See Item 3)	2	0.100 (2.54)

A/D Fire Protection Systems Inc., 420 Tapscott Road Unit 5, Scarborough Ontario, M1B 1Y4

A/D FIREFILM® II or A/D FIREFILM® III.

6. SHEAR CONNECTORS — (Optional, Not shown) — Studs ¾ in. (19 mm) diameter by 6 in. (152 mm) long, headed type, or equivalent per A.I.S.C. specifications. Welded to top flange of the beam through the deck

7. TOP COAT — (Not shown) Finishing topcoat, (silicone alkyd paint) applied at an approximate 0.002 in. (0.05 mm) dry film thickness.

A/D Fire Protection Systems Inc., 420 Tapscott Road Unit 5, Scarborough Ontario, M1B 1Y4

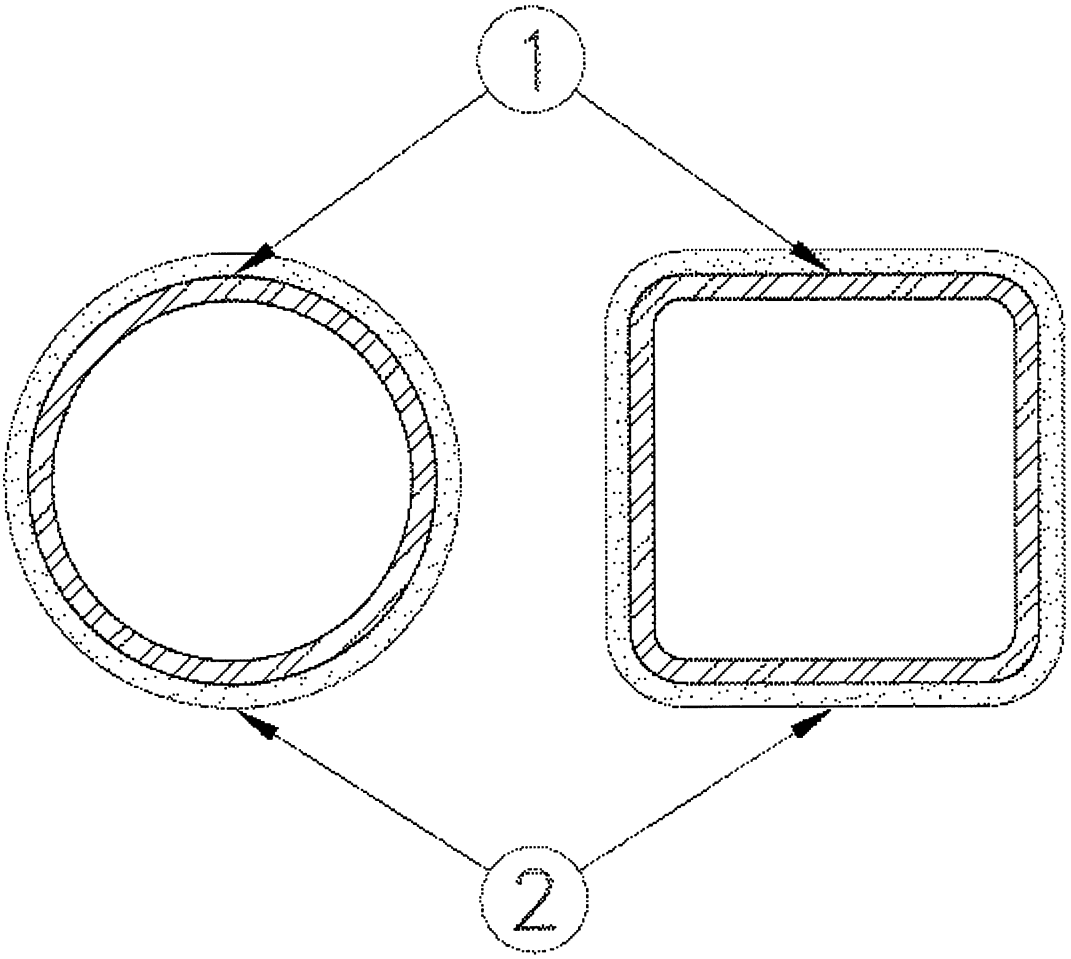
A/D COLORCOAT.

FM APPROVALS
Project ID: 3026158

Appendix E

¾ or 1 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 10



FM APPROVALS
Project ID: 3026158

Appendix E

¾ or 1 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 10

1. Steel Column — Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below, or square, rectangular or circular hollow structural sections (HSS) with M/D as specified below. All columns should be free of dirt, loose scale and oily deposits.

2. Mastic Coating — Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below. Column surfaces should be primed as per manufacturer's instructions.

Ratings, hr	Min Column Size, in.	Column A/P	Min Column Size, mm	Min M/D	Required Min Film Thickness, in. (mm)
3/4	ST 5 x 3 x 1/4	0.22	HSS127 x 76 x 6.4	44	0.130 (3.30)
3/4	SP 8.625 dia x 1/4	0.24	HSS 219 dia x 6.4	48	0.102 (2.60)
1	ST 5 x 3 x 1/4	0.22	HSS127 x 76 x 6.4	44	0.134 (3.40)
1	SP 8.625 dia x 1/4	0.24	HSS 219 dia x 6.4	48	0.148 (3.76)

M = Mass of column section, kg/m.

D = Heated perimeter of column section, m.

A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D FIREFILM III.

3. Top Coat — (Not shown) — Finishing topcoat, (silicone alkyd paint) applied at an approximate 0.002 in. (0.05 mm) dry film thickness.

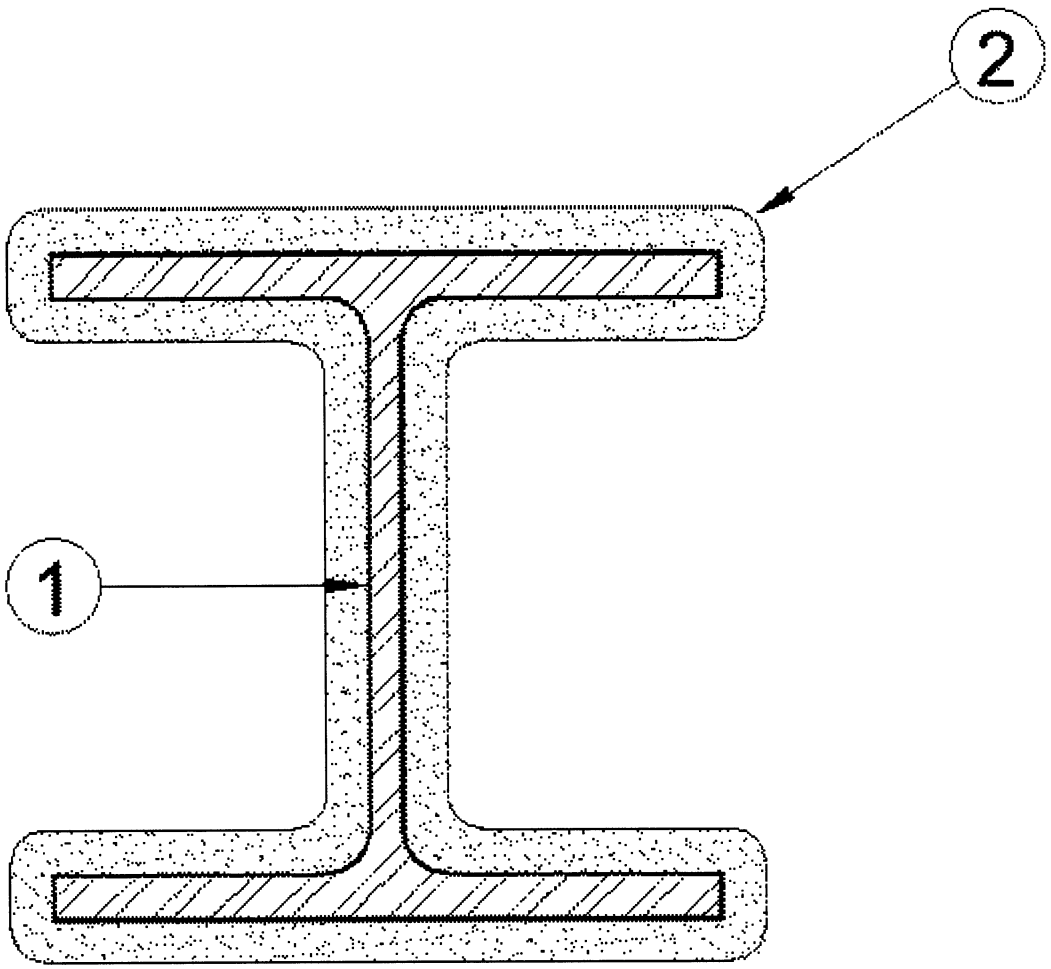
A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D COLORCOAT.

FM APPROVALS
Project ID: 3026158

Appendix A

¾ or 1 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 6



FM APPROVALS
Project ID: 3026158

Appendix A

¾ or 1 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 6

1. Steel Column — Wide flange steel columns with the minimum sizes shown in the table below, or W-Shaped column with M/D as specified below. All columns should be free of dirt, loose scale and oily deposits.

2. Mastic Coating — Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below. Column surfaces should be primed as per manufacturer's instructions.

Ratings, hr	Min Column Size, in.	W-Shaped only Min Column W/D	Min Column Size, mm	Min M/D	Required Min Film Thickness, in. (mm)
3/4	W10x49	0.84	W250 x 73	49.0	0.042 (1.07)
1	W10x49	0.84	W250 x 73	49.0	0.045 (1.14)

M = Mass of column section, kg/m.

D = Heated perimeter of column section, m.

A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D FIREFILM III.

3. Top Coat — (Not shown) — Finishing topcoat, (silicone alkyd paint) applied at an approximate 0.002 in. (0.05 mm) dry film thickness.

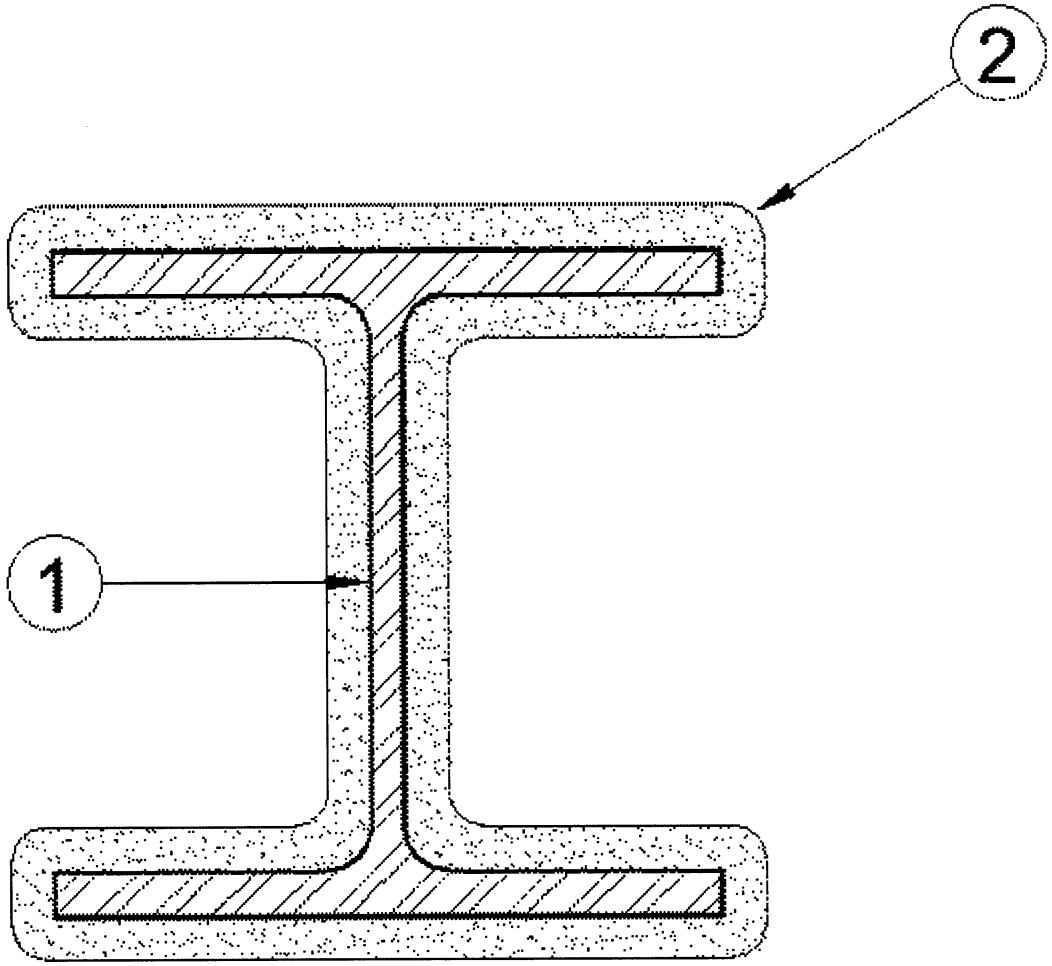
A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D COLORCOAT.

FM APPROVALS
Project ID: 3026158

Appendix B

3 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 7



Appendix B

3 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 7

1. Steel Column — Wide flange steel columns with the minimum sizes shown in the table below, or W-Shaped column with M/D as specified below. All columns should be free of dirt, loose scale and oily deposits.

2. Mastic Coating — Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below. Column surfaces should be primed as per manufacturer's instructions.

Rating, hr	Min Column Size, in	W-Shaped only Min Column W/D	Min Column Size, mm	Min M/D	Required Min Film Thickness, in. (mm)
3	W10x77	1.28	W250X115	≥ 74	0.0269 (0.68)

M = Mass of column section, kg/m.

D = Heated perimeter of column section, m.

A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D FIREFILM III.

3. Top Coat — (Not shown) — Finishing topcoat, (silicone alkyd paint) applied at an approximate 0.002 in. (0.05 mm) dry film thickness.

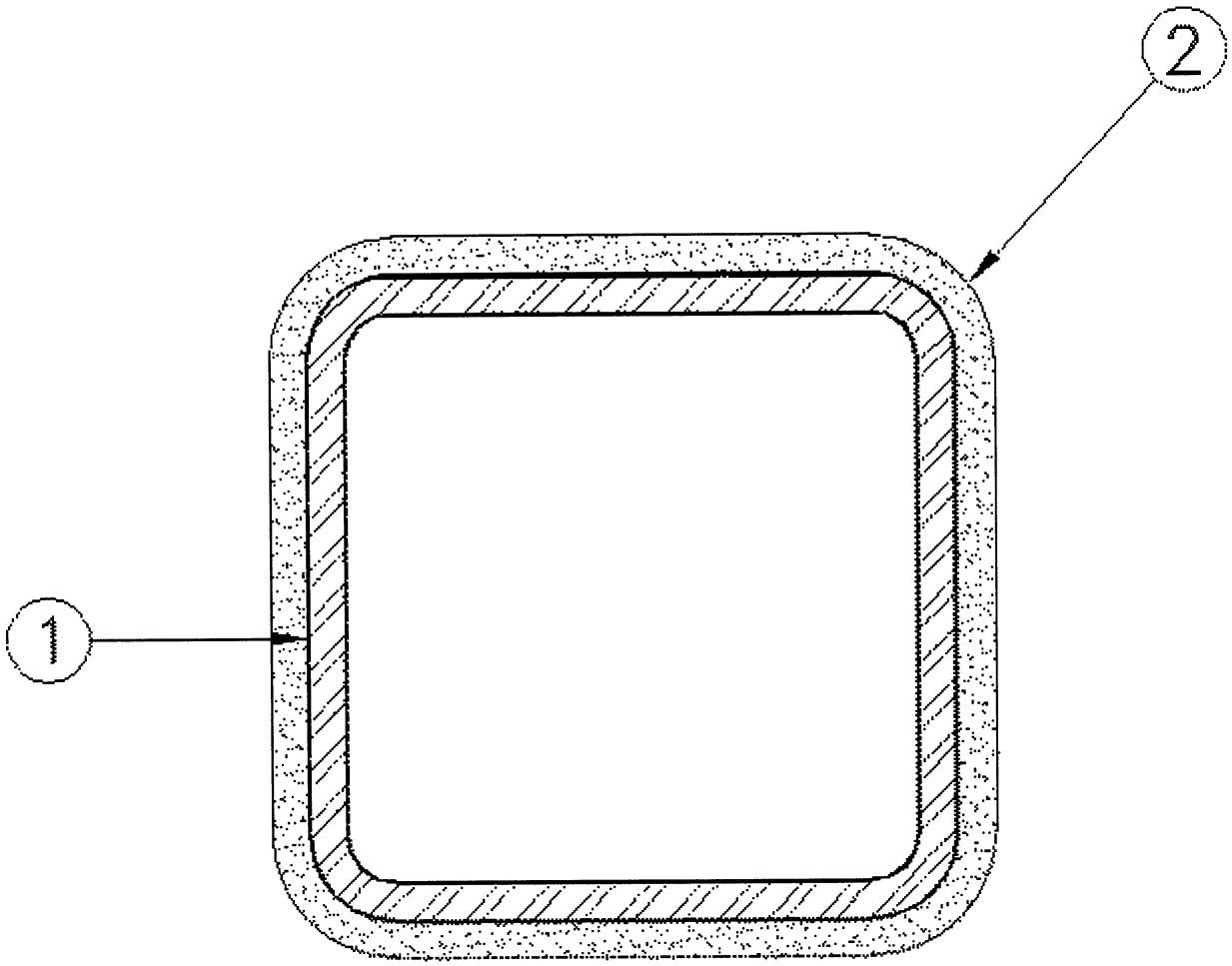
A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D COLORCOAT.

FM APPROVALS
Project ID: 3026158

Appendix D

¾, 1, 1-1/2, 2 or 3 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 9



FM APPROVALS
Project ID: 3026158

Appendix D

¾, 1, 1-1/2, 2 or 3 Hour Fire Resistant Column

COLUMN PROTECTION METHOD 9

1. Steel Column — Square steel tube columns with the minimum sizes shown in the table below, or square, hollow structural section (HSS) with M/D as specified below. All columns should be free of dirt, loose scale and oily deposits.

2. Mastic Coating — Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below. Column surfaces should be primed as per manufacturer's instructions.

Ratings, hr	Min Column Size, in.	Column A/P	Min Column Size, mm	Min M/D	Required Min Film Thickness, in. (mm)
3/4	ST 10 x 10 x 1/2	0.46	HSS 203 x 203 x 13	90	0.035 (0.89)
1	ST 10 x 10 x 1/2	0.46	HSS 203 x 203 x 13	90	0.045 (1.14)
1-1/2	ST 10 x 10 x 1/2	0.46	HSS 203 x 203 x 13	90	0.094 (2.40)
2	ST 10 x 10 x 1/2	0.46	HSS 203 x 203 x 13	90	0.186 (4.72)
3	ST 10 x 10 x 1/2	0.46	HSS 203 x 203 x 13	90	0.324 (8.22)

M = Mass of column section, kg/m.

D = Heated perimeter of column section, m.

A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D FIREFILM III.

3. Top Coat — (Not shown) — Finishing topcoat, (silicone alkyd paint) applied at an approximate 0.002 in. (0.05 mm) dry film thickness.

A/D Fire Protection Systems Inc 420 Tapscott Road Unit 5 Scarborough Ontario M1B 1Y4
A/D COLORCOAT.

AD/IMF 120-01
(Formerly AD/FCA 120-01)
LOADED RESTRAINED OR UNRESTRAINED COMPOSITE BEAM
A/D Fire Protection Systems, Inc.
A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3
Intumescent Coatings
ASTM E 119 (2000)
See Table For Ratings

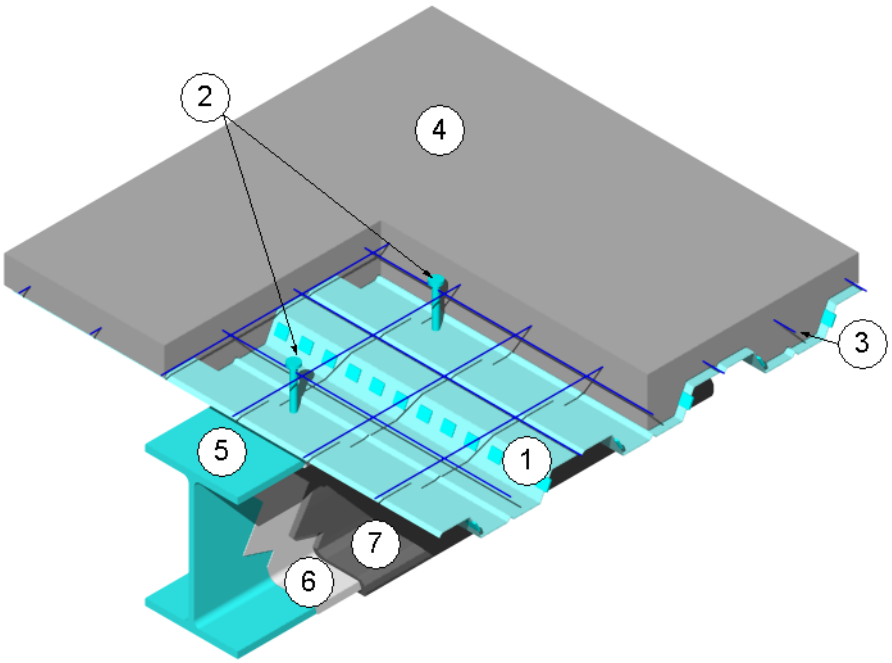


Table 1

			Minimum Concrete Cover Thickness		Min. Dry Thickness of A/D FIREFILM II, A/D FIREFILM IIIC, A/D FIREFILM III and A/D FIREFILM A3 on Beam of minimum size indicated	
Restrained Assembly Rating (Hour)	**Unrestrained Assembly Rating (Hour)**	**Unrestrained Beam Rating (Hour)**	**Normal Density**	**Low Density**	**W6X12 W/D=0.51**	**W6X25 W/D=0.82**
2	0, see item 1	1	4-1/2"	3-1/4"	0.065"	0.045"
2	0, see item 1	2	4-1/2"	3-1/4"	---	0.101"
1-1/2	0, see item 1	1	4'	2-3/4"	0.065"	0.045"
1	0, see item 1	1	3-1/4"	2-1/2"	0.065"	0.045"
3/4	0, see item 1	3/4	2-1/2"	2-1/2"	0.045"	0.045"

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1. FLOOR UNITS – Fluted composite or non-composite floor deck made from sheet steel conforming to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa), or select other acceptable structural sheet steels or high strength low alloy steels from the North American Specification for the Design of Cold-Formed Steel Structural Members. Install minimum 0.030 in. fluted sections or 0.040/0.040 in. thick cellular sections, welded to top of structural steel beam (Item 5) and covered with minimum concrete (Item 4) requirements as required herein. When maximum clear span of floor units is less than or equal to 9 ft, 6 in., unrestrained assembly rating is increased to 2, 1 or ¾ hour to match the unrestrained beam rating.

2. SHEAR STUD CONNECTORS: OPTIONAL – When used puddle weld steel studs, headed type or equivalent per AISC specifications, to composite steel floor deck (Item 1) and structural steel beam (Item 5) providing a nominal concrete cover over the steel stud heads as required. Install shear stud connectors per AISC guidelines to provide composite action between the beam and the concrete deck assembly as required.

3. CONCRETE REINFORCEMENT: Non-structural applications – Use minimum 6 in. x 6 in. 9 GA wire mesh installed mid depth of concrete (Item 4) topping.

4. CONCRETE: Use minimum compressive strength of 3500 psi. Place concrete topping (as measured from top of floor units (Item 1) to wearing surface of concrete) as required by rated floor construction.

5. SOLID STRUCTURAL STEEL BEAM: Use steel sections, I-beam or W-beam, having nominal W/D section factors based on three sided exposure with one surface in contact with composite steel floor deck (Item 1). Intumescent mastic fireproofing (Item 7) thickness for nominal W/D section factors based on one side in contact with composite steel floor units (Item 1). Refer to table 1 above for specific application thickness of intumescent mastic fireproofing (Item 7).

6. PRIMER COATING: Apply an approximate 2 mil dry film thickness of primer recommended by the certified intumescent mastic fireproofing manufacturer, which is compatible with the intumescent mastic fireproofing (Item7), to the solid structural steel beam (Item 5).

7. CERTIFIED MANUFACTURER: A/D Fire Protection Systems, Inc.

   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

   MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3.

   Install intumescent mastic fireproofing in accordance with Table 1 above. Apply only to clean and dry surfaces free of loose scale and oil. Apply in one or more coats to achieve minimum thickness of intumescent mastic fireproofing to three exposed sides of solid structural steel beam (Item 5) as noted in Table 1. Allow each coat to set before applying next coat. Voids (flutes) between floor units (Item 1) and top of solid structural steel beam (Item 5) shall have the same thickness of fireproofing, or flute spaces above structural steel beam (Item 5) shall be completely filled with mineral wool insulation (not shown) having a minimum density of 6.0 pcf.

8. FINISH COATING (Not Shown) – Apply an optional Silicone Alkyd paint designated A/D COLORCOAT per the manufacturer's published specification

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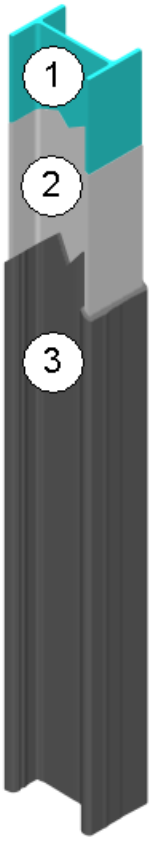
AD/IMF 120-02
(Formerly AD/CA 120-03)
Column Assemblies
A/D Fire Protection Systems, Inc.
A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3
Intumescent Coatings
ASTM E 119 (2000)
See Table For Ratings



1. SOLID STRUCTURAL STEEL COLUMN: Use solid steel sections, I-shape or W-shape, having nominal W/D section factor based on four sided exposure. Refer to Table 1 for specific application thickness of intumescent mastic fireproofing (Item 3) based on minimum W/D section factors.
2. PRIMER COATING: Apply an approximate 2 mil dry film thickness of primer recommended by the certified intumescent mastic fireproofing manufacturer, which is compatible with the intumescent mastic fireproofing (Item3), to the solid structural steel column (Item 1).
3. CERTIFIED MANUFACTURER: A/D Fire Protection Systems, Inc.

   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

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MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3

Apply Intumescent Mastic Fireproofing per the manufacturer's installation instructions at the minimum dry film thickness specified in the Table 1 below:

Table 1

Rating (Hours)	Minimum W/D	Minimum Dry Film Thickness	
		A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3 Intumescent Coatings	
		Mils	mm
3/4	0.41	76	1.94
3/4	0.70	50	1.27
3/4	0.83	42	1.07
1	0.41	118	3.00
1	0.65	91	2.30
1	0.83	87	2.21
1	0.91	80	2.02
1	1.62	30	0.76
1	2.96	16	0.40
1-1/2	0.91	118	3.00
1-1/2	1.34	73	1.85
1-1/2	2.96	36	1.00
2	1.60	118	3.00
2	1.60	95	2.40
2	2.96	55	1.40

4. FINISH COATING (Not Shown) – Apply an optional Silicone Alkyd paint designated A/D COLORCOAT per the manufacturer's published specifications.

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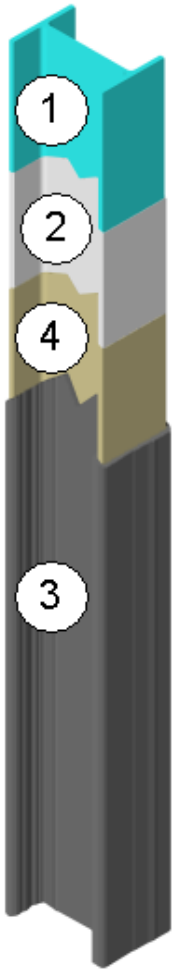
AD/IMF 120-03
(Formerly AD/CA 120-04)
Column Assemblies
A/D Fire Protection Systems, Inc.
A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3 Intumescent Coatings
ASTM E 119 (2000)
Rating: 2 Hours



1. SOLID STRUCTURAL STEEL COLUMN: Use solid steel sections, I-shape or W-shape, having a minimum W/D section factor of 1.26 (M/D: 74) based on four sided exposure.
2. PRIMER COATING: Apply an approximate 2 mil dry film thickness of primer recommended by the certified intumescent mastic fireproofing manufacturer, which is compatible with the intumescent mastic fireproofing (Item 3), to the solid structural steel column (Item 1).
3. CERTIFIED MANUFACTURER: A/D Fire Protection Systems, Inc.

   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

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MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3

Apply Intumescent Mastic Fireproofing per the manufacturer's installation instructions at the minimum dry film thickness of 138 mil (3.5 mm).

4. GLASS CLOTH REINFORCEMENT: Apply self adhesive, alkali resistant glass mesh cloth 152 g/m^2, applied over first coat of Intumescent Mastic Fireproofing (Item 3).

5. FINISH COATING (Not Shown) – Apply an optional Silicone Alkyd paint designated A/D COLORCOAT per the manufacturer's published specifications.

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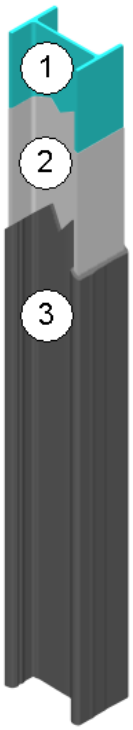
AD/IMF 180-01
(Formerly AD/CA 180-01)
Column Assemblies
A/D Fire Protection Systems, Inc.
A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3 Intumescent Coatings
ASTM E 119 (2000)
Rating: 3 Hours



1. STEEL COLUMN: Use solid steel sections, I-shape or W-shape, having nominal W/D section factor of 2.22 (M/D:130) based on four sided exposure.
2. PRIMER COATING: Apply an approximate 2 mil dry film thickness of primer recommended by the certified intumescent mastic fireproofing manufacturer, which is compatible with the intumescent mastic fireproofing (Item3), to the solid structural steel column (Item 1).
3. CERTIFIED MANUFACTURER: A/D Fire Protection Systems, Inc.

   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

   MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III, and A/D FIREFILM® A3.

   Apply a minimum 130 mil (nominal 3.3 mm) dry film thickness layer of Intumescent Mastic Fireproofing to steel column (Item 1).
4. FINISH COATING – Apply an optional Silicone Alkyd paint designated A/D

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COLORCOAT over the Intumescent Mastic Fireproofing (Item 3) per the manufacturer's specifications.

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AD/IMF 90-01
(Formerly AD/CA 90-02)
Column Assemblies
A/D Fire Protection Systems, Inc.
A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3 Intumescent Coatings
ASTM E 119 (2000)
See Table For Ratings

1. HOLLOW RECTANGULAR, SQUARE OR CIRCULAR HSS STRUCTURAL STEEL COLUMN: Use hollow steel sections, rectangular-shape, having nominal W/D section factors based on four sided exposure. Refer to the table below for specific application thicknesses of intumescent mastic fireproofing (Item 3) based on nominal W/D section factors.

2. PRIMER COATING: Apply an approximate 2 mil dry film thickness of primer recommended by the certified intumescent mastic fireproofing

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manufacturer, which is compatible with the intumescent mastic fireproofing (Item3), to the hollow rectangular structural steel column (Item 1).

3. CERTIFIED MANUFACTURER: A/D Fire Protection Systems, Inc.

   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

   MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III, and A/D FIREFILM® A3

   Apply Intumescent Mastic Fireproofing per the manufacturer's installation instructions at the minimum dry film thickness specified in the table below.

Rating (Hours)	Column Designation	W/D	Minimum Dry Film Thickness	
			A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3 Intumescent Coatings	
			mils	mm
3/4	4" ∅ x 0.188"	0.61	102	2.60
3/4	5" x 3" x 0.25"	0.76	130	3.30
3/4	8" x 6" x 0.313"	0.97	65	1.65
3/4	10" x 6" x 0.25"	0.80	45	1.15
3/4	10.75" ∅ x 0.25"	0.83	45	1.15
1	5" x 3" x 0.313"	0.93	130	3.30
1	8" x 6" x 0.334"	1.14	62	1.57
1	12" x 8" x 0.425"	1.46	35	0.90
1	10.75" ∅ x 0.51"	1.62	35	0.90
1	12" x 12" x 0.5"	1.58	45	1.14
1	10.75" ∅ x 0.313"	1.03	111	2.81
1-1/2	10.75" ∅ x 0.313"	1.03	130	3.30
1-1/2	12" x 12" x 0.50	1.58	95	2.41

4. FINISH COATING (Not Shown) – Apply an optional Silicone Alkyd paint designated A/D COLORCOAT per the manufacturer's published specifications.

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CITY OF LOS ANGELES
CALIFORNIA

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

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DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK M. BUSH
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

OSAMA YOUNAN, P.E.
EXECUTIVE OFFICER

A/D Fire Protection Systems, Inc.
420 Tapscott Road #5
Scarborough, ON M1B1Y4
CANADA

Attn: Stevo Miljatovich
(416) 292-2361

RESEARCH REPORT: RR 25440
(CSI #07840)

Expires: February 1, 2019
Issued Date: February 1, 2017
Code: 2014 LABC

GENERAL APPROVAL - Renewal - A/D Firefilm III ® and A/D Colorcoat ® Intumescent Fire Resistive Coating for Structural Steel.

DETAILS

A/D Firefilm III Intumescent fire resisting coating consists of a topcoat designated as A/D Colorcoat® and a primer designated as A/D Firefilm III® approved by A/D Fire Protection Systems Inc.

A/D Firefilm III is intended for interior use only.

A/D Firefilm III can provide a maximum 3 hour fire resistance rating for floor/ceiling assemblies and a 3 hour fire resistance rating for steel columns.

The fire rating and the maximum design is provided in the attached listed designs summary and UL and ULC listings.

The approval is subject to the following conditions:

1. Fire-resistive materials shall be delivered to the job site in sealed containers identified by the products name and by the Underwriters Laboratories classification marking.

2. All surfaces to which the product will be applied shall be free of dust, dirt, oil, scale, grease or paint.

G-5 (Rev.3/13)
AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER
Page 1 of 2

3. Special inspection is required.

4. The applied thickness of the fire-resistive material shall be verified as outlined in the manufacturer's "Application Guide".

5. A/D Firefilm III must be protected from direct and indirect contact with moisture. Ambient air and steel temperatures shall be not less than 50° F and relative humidity in the work area must be 40 to 60 percent.

6. Application of the fire-resistive material shall be in accordance with the manufacturer's instructions, a copy of which shall be available at the job site.

DISCUSSION

The report is in compliance with the 2014 City of Los Angeles Building Code.

The approval is based on fire and environmental tests in accordance with standard UL 263.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this approval have been met in the project in which it is to be used.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

_____

QUAN NGHIEM, Chief
Engineering Research Section
201 N. Figueroa St., Room 880
Los Angeles, CA 90012
Phone - 213-202-9816
Fax - 213-202-9942

QN
RR25440
R02/07/17
TLB1700015
714

Attachment: A/D Firefilm III Design Summary and listed designs per UL and ULC Listings (21 pages)

NYC BUILDINGS

NYC Department of Buildings
280 Broadway, New York, NY 10007
Patricia Lancaster, FAIA, Commissioner
(212) 566-5000, TTY: (212) 566-4769

Siun Derkhidam, Engineer
Materials and Equipment Acceptance
Phone: (212) 566-3271
Fax: (212) 566-3840
E-mail: siund@buildings.nyc.gov

Sander Trestain
A/D Fire Protection Systems
420 Tapscott Road
Scarborough, ON M1B 1Y4

DATE: June 30, 2006

Dear Applicant:

Enclosed is a final official signed copy of MEA acceptance of your products, **MEA 108-94-S-4**, which you may use as proof of your product acceptance in New York City.

This document together with proper labeling and installation in accordance with New York City Building Code will enable the inspector to know that the product installed is legal.

All shipments and deliveries of accepted materials to the job site are required to be labeled or tagged in accordance with the format below:

Accepted For Use
City of New York
Department of Buildings
MEA 108-94-S-4

Company Name

Very truly yours,

Siun Derkhidam

Siun Derkhidam
Assistant Mechanical Engineer
Materials and Equipment Acceptance

c: Deborah F. Taylor, AIA, LEED AP
Executive Director, Special Projects and MEA

NYC BUILDINGS

NYC Department of Buildings
280 Broadway, New York, NY 10007
Patricia Lancaster, FAIA, Commissioner
(212) 566-5000, TTY: (212) 566-4769

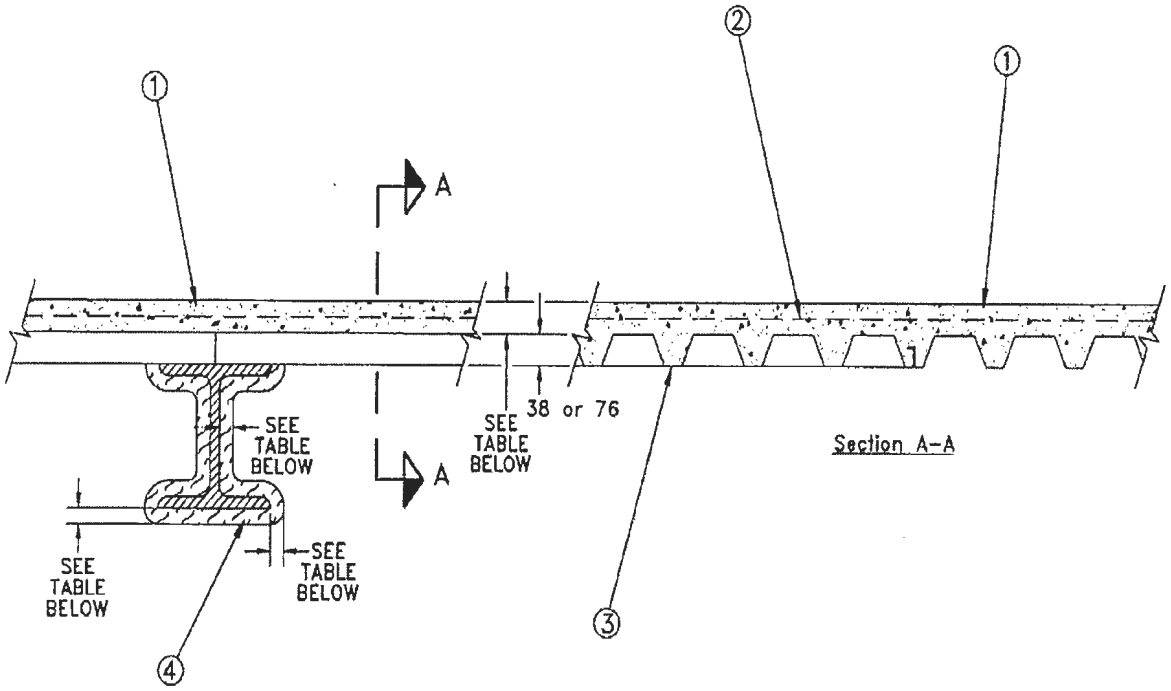
Report of Materials and Equipment Acceptance Division

Pursuant to Administrative Code Section 27-131, the following equipment or material has been found acceptable for use subject to the terms and conditions contained herein.

MEA 108-94-S-4

Manufacturer:	A/D FIRE PROTECTION SYSTEMS
Trade Name(s):	A/D FIREFILM® III and A/D COLORCOAT®
Product:	Thin-film Intumescent sprayed fire resistive system for protection of floor assemblies
Pertinent Code Section(s):	27-323, 27-324, 27-133
Prescribed Test(s):	RS 5-2 (ASTM E119)
Laboratory:	Underwriters Laboratories of Canada
Test Report(s):	August 26, 1993, CR1698, February 12, 1998, CR1698, 21822 and May 4, 1999, CR1698, 26103, April 30, 2002 CR1698, R20543, 29171, 02NK08232, and January 31, 2006, CR1698, R20543.

Description – Floor protection assemblies, as per Fire Resistive Designs listed below utilizing A/D FIREFILM III Intumescent fire protection material, applied to the required thicknesses following the manufacturer's instructions, for the fire resistance ratings of 3/4, 1, 1-1/2, or 2 hours and in accordance with Underwriter's Laboratories of Canada and Underwriters Laboratories, Inc. Design Numbers listed below:



ULC Design Numbers:
F906 for Fire Resistance Ratings of 3/4, 1, 1-1/2, 2 and 3 hours.
F910 for Fire Resistance Ratings of 1, 1-1/2 and 2 hours.

F912 for Fire Resistance Ratings of 1-1/2 and 2 hours.
ULI Design Numbers:
D941 for Fire Resistance Ratings of 1-1/2 and 2 hours.

Terms and Conditions: That the above described floor protection assemblies be accepted for Class I and Class II Buildings only, as having the fire resistance ratings given above, when members supporting floors have at least the same fire resistance rating, provided the following requirements for application and protection of the Intumescent coating fireproofing be adhered to:

1. Where used in Class I Buildings, subject material shall be used for fireproofing of selected structural members and be limited to 20% of all structural members on any one floor and a maximum of 20% of the gross area of all structural members in the entire building.

2. Where used for protection of floor, ceiling and/or assemblies in roof/ceiling Class I in fireproofing buildings each such beam shall bear an identifying tag. Subject tag shall be of metal construction mechanically attached to such beams and shall state the following: this beam has been fireproofed with MEA approved A/D FIREFILM III finish and such finish shall not be removed nor any subsequent coating shall be applied other than A/D FIREFILM III.

3. Surfaces to receive Intumescent coating shall be cleaned off prior to the application of the fireproofing.

4. The finished fireproofing shall be applied to a uniform thickness, which shall not be less than the minimum thickness specified.

5. The general contractor and the owner shall provide qualified personnel to supervise the application of the sprayed fire resistive material. They shall certify to the Department of Buildings that the finished fireproofing of the completed building is in full compliance with the acceptance requirements and drawings approved by the Department of Buildings.

6. The installation of the sprayed fire resistive materials shall be subject to the controlled inspection requirements of Section 27-132.

7. The use of this material shall be subject to all pertinent regulations of the Department of Air Resources and the Department of Health.

8. All installation shall comply with 118-68 GR, the New York City Building Code, the Fire Department Directives, the manufacturer's instructions and laboratory recommendation.

9. All shipments and deliveries of the materials comprising this assembly shall be accompanied by a certificate or label certifying that the materials shipped or delivered are equivalent to those tested and acceptable for use, as provided for in Section 27-131 of the Building Code.

NOTE: In accordance with section 27-131(d), all materials tested and accepted for use shall be subject to periodic retesting as determined by the commissioner; and any material which upon retesting is found not to comply with code requirements or the requirements set forth in the approval of the commissioner shall cease to be acceptable for the use intended. During the period for such retesting, the commissioner may require the use of such material to be restricted or discontinued if necessary to secure safety.

Final Acceptance June 30, 2006

Examined By Sian Dorphuson

NYC BUILDINGS

NYC Department of Buildings
280 Broadway, New York, NY 10007
Patricia Lancaster, FAIA, Commissioner
(212) 566-5000, TTY: (212) 566-4769

Siun Derkhidam, Engineer
Materials and Equipment Acceptance
Phone: (212) 566-3271
Fax: (212) 566-3840
E-mail: siund@buildings.nyc.gov

Sander Trestain
A/D Fire Protection Systems
420 Tapscott Road
Scarborough, ON M1B 1Y4

DATE: June 30, 2006

Dear Applicant:

Enclosed is a final official signed copy of MEA acceptance of your products, **MEA 242-92-S-7**, which you may use as proof of your product acceptance in New York City.

This document together with proper labeling and installation in accordance with New York City Building Code will enable the inspector to know that the product installed is legal.

All shipments and deliveries of accepted materials to the job site are required to be labeled or tagged in accordance with the format below:

Accepted For Use
City of New York
Department of Buildings
MEA 242-92-S-7

Company Name

Very truly yours,

Siun Derkhidam

Siun Derkhidam
Assistant Mechanical Engineer
Materials and Equipment Acceptance

c: Deborah F. Taylor, AIA, LEED AP
Executive Director, Special Projects and MEA

NYC BUILDINGS

NYC Department of Buildings
280 Broadway, New York, NY 10007
Patricia Lancaster, FAIA, Commissioner
(212) 566-5000, TTY: (212) 566-4769

Report of Materials and Equipment Acceptance Division

Pursuant to Administrative Code Section 27-131, the following equipment or material has been found acceptable for use subject to the terms and conditions contained herein.

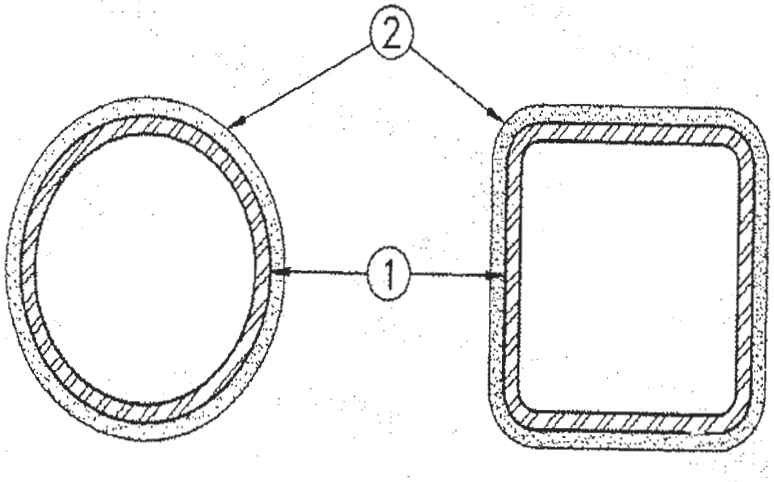
MEA 242-92-S Vol.7

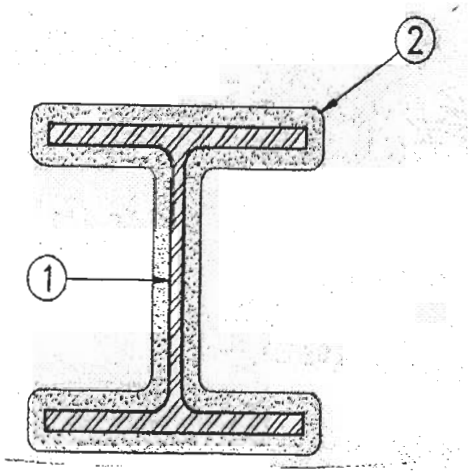
Manufacturer:	A/D FIRE PROTECTION SYSTEMS
Trade Name(s):	A/D FIREFILM® III and A/D COLORCOAT®
Product:	Thin-film Intumescent sprayed fire resistive system for protection of column assemblies.
Pertinent Code Section(s):	27-323, 27-324, 27-133
Prescribed Test(s):	RS 5-2 (ASTM E119)
Laboratory:	Underwriters Laboratories Inc.
Test Report(s):	January 31, 2006, CR1698, R20543 (ULC Designs Z626, Z627, Z628, Z629 and Z630; UL Designs X669, 670, X671, X672 and X673), July 14, 1999, CR1698, 29166-A, January 12, 1998, CR1698, dated August 7, 1997 and June 12, 2000, March 29, 2001, R20543, 00NK49658 (ULI Designs X629, X641, X642, X643 and X645) and November 10, 2003, R20543, 03CA14402 (modifies ULC Design Z611 and ULI Design X642).

Description – Column protection assemblies, as per Fire Resistive Designs listed below utilizing A/D FIREFILM III Intumescent fire protection material, applied to the required thicknesses following the manufacturer's instructions, for the fire resistance ratings of 3/4, 1, 1-1/2, 2 or 3 hours and in accordance with Underwriter's Laboratories of Canada and Underwriters Laboratories, Inc. Design Numbers listed below:

ULC Column Design Numbers:
Z608 for Fire Resistance Ratings of 3 hours.
Z610 for Fire Resistance Ratings of 3/4, 1, 1-1/2 and 2 hours.
Z611 for Fire Resistance Ratings of 3/4, 1, 1-1/2 and 2 hours.
Z612 for Fire Resistance Ratings of 1-1/2 and 2 hours.
Z617 for Fire Resistance Ratings of 2 hours.
Z626 for Fire Resistance Ratings of 3/4 and 1 hours.
Z627 for Fire Resistance Ratings of 3 hours.
Z628 for Fire Resistance Ratings of 1-1/2 and 2 hours.
Z629 for Fire Resistance Ratings of 3/4, 1, 1-1/2, 2 and 3 hours.
Z630 for Fire Resistance Ratings of 3/4 and 1 hours.

ULI Column Design Numbers:
X639 for Fire Resistance Ratings of 3 hours.
X641 for Fire Resistance Ratings of 3/4, 1, 1-1/2 and 2 hours.
X642 for Fire Resistance Ratings of 3/4, 1, 1-1/2 and 2 hours.
X643 for Fire Resistance Ratings of 1-1/2 and 2 hours.
X645 for Fire Resistance Ratings of 2 hours.
X669 for Fire Resistance Ratings of 3/4 and 1 hours.
X670 for Fire Resistance Ratings of 3 hours.
X671 for Fire Resistance Ratings of 1-1/2 and 2 hours.
X672 for Fire Resistance Ratings of 3/4, 1, 1-1/2, 2 and 3 hours.
X673 for Fire Resistance Ratings of 3/4 and 1 hours.





Terms and Conditions: That the above described column protection assemblies be accepted for Class I and Class II Buildings only, as having the fire resistance ratings given above, when members framing into the columns have at least the same fire resistance rating, provided the following requirements for application and protection of the Intumescent coating fireproofing be adhered to:

1. Where used in Class I Buildings, subject material shall be used for fireproofing of selected structural members and be limited to 20% of all structural members on any one floor and a maximum of 20% of the gross area of all structural members in the entire building.

2. Where used for protection of column(s) in fireproofing buildings each such column(s) shall bear an identifying tag installed at 7' above finished floor. Subject tag shall be of metal construction mechanically attached to such column(s) and shall state the following: this column has been fireproofed with MEA approved A/D FIREFILM III finish and such finish shall not be removed nor any subsequent coating shall be applied other than A/D FIREFILM III.

3. Surfaces to receive Intumescent coating shall be cleaned off prior to the application of the fireproofing.

4. The finished fireproofing shall be applied to a uniform thickness, which shall not be less than the minimum thickness specified.

5. The general contractor and the owner shall provide qualified personnel to supervise the application of the sprayed fire resistive material. They shall certify to the Department of Buildings that the finished fireproofing of the completed building is in full compliance with the acceptance requirements and drawings approved by the Department of Buildings.

6. The installation of the sprayed fire resistive materials shall be subject to the controlled inspection requirements of Section 27-132.

7. The use of this material shall be subject to all pertinent regulations of the Department of Air Resources and the Department of Health.

8. All installation shall comply with 118-68 GR, the New York City Building Code, the Fire Department Directives, the manufacturer's instructions and laboratory recommendation.

9. All shipments and deliveries of the materials comprising this assembly shall be accompanied by a certificate or label certifying that the materials shipped or delivered are equivalent to those tested and acceptable for use, as provided for in Section 27-131 of the Building Code.

Final Acceptance June 30, 2006

Examined By Sian Derbhridan

Carboline Company
Executive Offices
350 Hanley Industrial Court
St. Louis, MO 63144
314/644-1000
FAX: 314/644-4617

CARBOLINE A/D FIREFILM III – PATCH AND REPAIR GUIDE

READ THESE INSTRUCTIONS CAREFULLY BEFORE PATCHING, REPAIRING, CONNECTING, WELDING, OR BOLTING STEEL THAT HAS BEEN PROTECTED WITH CARBOLINE A/D FIREFILM III.

For A/D Firefilm III application information, please refer to the most recent Firefilm III Application Instructions.

PATCHING SMALL DAMAGED AREA

1. Completely remove Firefilm III slightly beyond the damaged are, using a grinder, utility knife, chisel or sandblasting.

2. Using sand paper, remove an additional ¼ inch of topcoat.

3. Clean steel surface of any dust, dirt, grease or any other material that may impair bond and reapply primer if the existing primer is damaged.

4. If a different approved primer is used over an existing primer, ensure that they are compatible.

5. Apply either A/D Firefilm III or A/D Firefilm Putty to the thickness specified for the required hourly protection.

CLAMP ON CONNECTIONS INSTALLED AFTER APPLICATION OF A/D FIREFILM III

Examples of clamp on connections include pipe, sprinkler pipe and utilities support brackets. Small to medium size clamps and clips are usually left unprotected. Large clamps and clip supports are usually protected with the same thickness as the structural member, due to the possibility of heat transfer. These connection details are not usually addressed in the fire test design information. It is recommended that the Authorities Having Jurisdiction be consulted for approval.
Where support clamps are required to be protected, the coating should be applied where the clamps are in contact with the structural member, and for four inches beyond the structural member. Refer to the A/D Firefilm III Application Instructions for information including product limitations, required surface preparation, humidity, temperature, application rates, cure times, and topcoat application.
If A/D Firefilm III is damaged when the clamped connections are removed, the affected area should be touched up in accordance with “PATCHING SMALL DAMAGED AREAS” above.

WELDED CONNECTIONS INSTALLED AFTER APPLICATION OF A/D FIREFILM III

Welded items such as plates and wide bracket supports are usually protected with the same A/D Firefilm III thickness as the supporting member due to the possibility of heat transfer. These details are usually not addressed in the fire test design information. We recommend the Authorities Having Jurisdiction be consulted for approval and confirmation of their requirements.
Prior to welding connections, remove the A/D Firefilm III a minimum of three inches beyond the area to be welded by using a grinder, utility knife, chisel or sandblasting. Remove an additional ¼ inch of topcoat by using a medium grit sandpaper.

After welding is complete, clean the steel surface to remove all dust, grease, dirt, etc…that would affect the bond, and reapply the specified primer. Apply the A/D Firefilm III or A/D Firefilm III Putty to the areas in need of repair and to the connecting items if required. Refer to the A/D Firefilm III Application Instructions for required surface prep, product limitations, humidity, temperature, application rates, cure times, and topcoat application.

BOLTED STEEL CONNECTIONS INSTALLED AFTER THE APPLICATION OF A/D FIREFILM III

Bolts of threaded rods of ¾ inch diameter or less are usually left unprotected. Bolts or threaded rods greater than ¾ inch diameter are usually protected with the same thickness of A/D Firefilm III as the supporting member, due to the possibility of heat transfer. These connection details are usually not addressed in the fire test design information. We recommend the Authorities Having Jurisdiction be consulted for approval and confirmation of their requirements.
If drill oil is used, oil should be cleaned as soon as possible
If A/D Firefilm III is damaged after drilling, the damaged area should be touched up in accordance with "PATCHING SMALL DAMAGED AREAS" above.
If there is no damage to the A/D Firefilm III system after drilling, no additional treatment is required.

BXUV.D941 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. D941

December 04, 2015

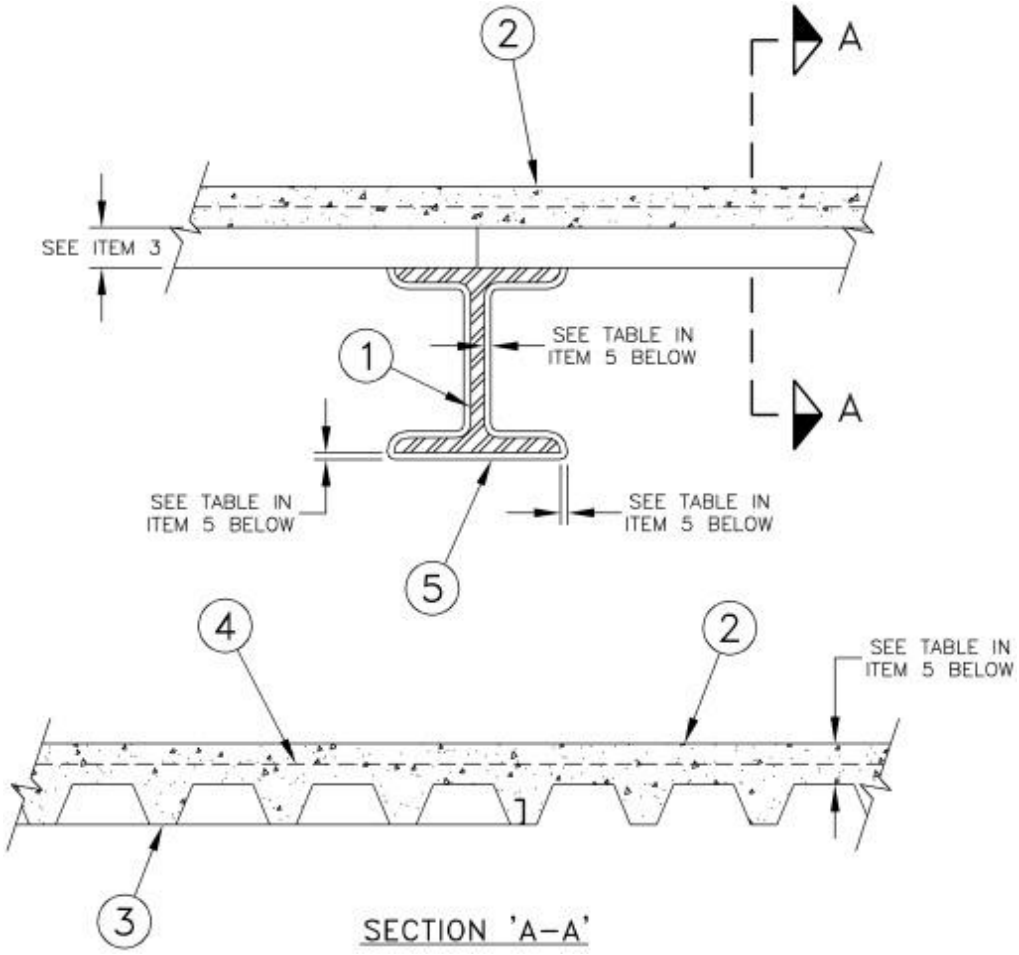
Restrained Assembly Ratings - 2 Hr. (See Item 5)

Unrestrained Assembly Ratings - 0 Hr. (See Item 3)

Unrestrained Beam Ratings - 2, 1-1/2 Hr. (See Item 5)

Loading Determined by Allowable Stress Design Method or Load and Resistance Factor Design Method published by the American Institute of Steel Construction, or in accordance with the relevant Limit State Design provisions of Part 4 of the National Building Code of Canada

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



1. **Steel beam —** Any wide flange steel size shown in table in Item 5. Beam shall be primed with metal Alkyd Primer.

2. **Normal Weight Concrete —** Normal-density concrete, carbonate aggregate, 150 pcf unit weight 3600 psi compressive strength.

3. **Steel Floor and Form Units* —** Composite or noncomposite, 3 in. deep, 20 MSG fluted or 20/20 MSG cellular, galv units. All fluted or alternating one 36 in. or 24 in. wide fluted to one 24 in. wide max cellular section. Welded to supports not over 12 in. OC. Adjacent units welded or crimped together along side laps 16 in. OC. When the maximum clear span of the Steel Floor and Form Units is less than or equal to the tested span of 5 ft. 9 in., the unrestrained assembly rating is increased to 1-1/2 Hr. or 2 Hr. to match the unrestrained beam rating.

CANAM STEEL CORP — 24 in. wide Type P-2436 and P-2404 noncomposite.

DECK WEST INC — 36 in. wide Type 3-DW.

H H ROBERTSON — Type QL-99, QL-WKX

VULCRAFT, DIV OF NUCOR CORP — 24 or 36 in. wide Types 3VLI and 3VLP. Phos/ptd Type 3VLI units.

4. **Welded Wire Fabric —** 6 x 6 - W1.4 x W1.4.

5. **Mastic and Intumescent Coating* —** Mastic coating spray or brush applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

Minimum Beam Size, (W/D)	Restrained Assembly Rating, Hr.	Unrestrained Assembly Rating, Hr.	Unrestrained Beam Rating, Hr.	Minimum Concrete Cover thickness, in.	Min Dry Thickness of A/D Firefilm on Beam, in.
W8 x 31 (0.80)	2	0 (see Item 3)	1-1/2	4.5	0.089
W6 x 25 (0.84)	2	0 (see Item 3)	2	4.5	0.100

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Conditioned Interior Space Purpose and Interior General Purpose

6. **Shear Connectors —** (optional) (not shown)— Studs 3/4 in. diam by 6 in. long, headed type, or equivalent per A.I.S.C specifications. Welded to top flange of the beam through the deck. Shear studs shall not be permitted for concrete cover thickness less than 5.25 in.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2015-12-04

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

UL permits the reproduction of the material contained in the Online Certification Directory subject to the following conditions: 1. The Guide Information, Assemblies, Constructions, Designs, Systems, and/or Certifications (files) must be presented in their entirety and in a non-misleading manner, without any manipulation of the data (or drawings). 2. The statement "Reprinted from the Online Certifications Directory with permission from UL" must appear adjacent to the extracted material. In addition, the reprinted material must include a copyright notice in the following format: "© 2019 UL LLC"

BXUV.D948 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. D948

November 08, 2012

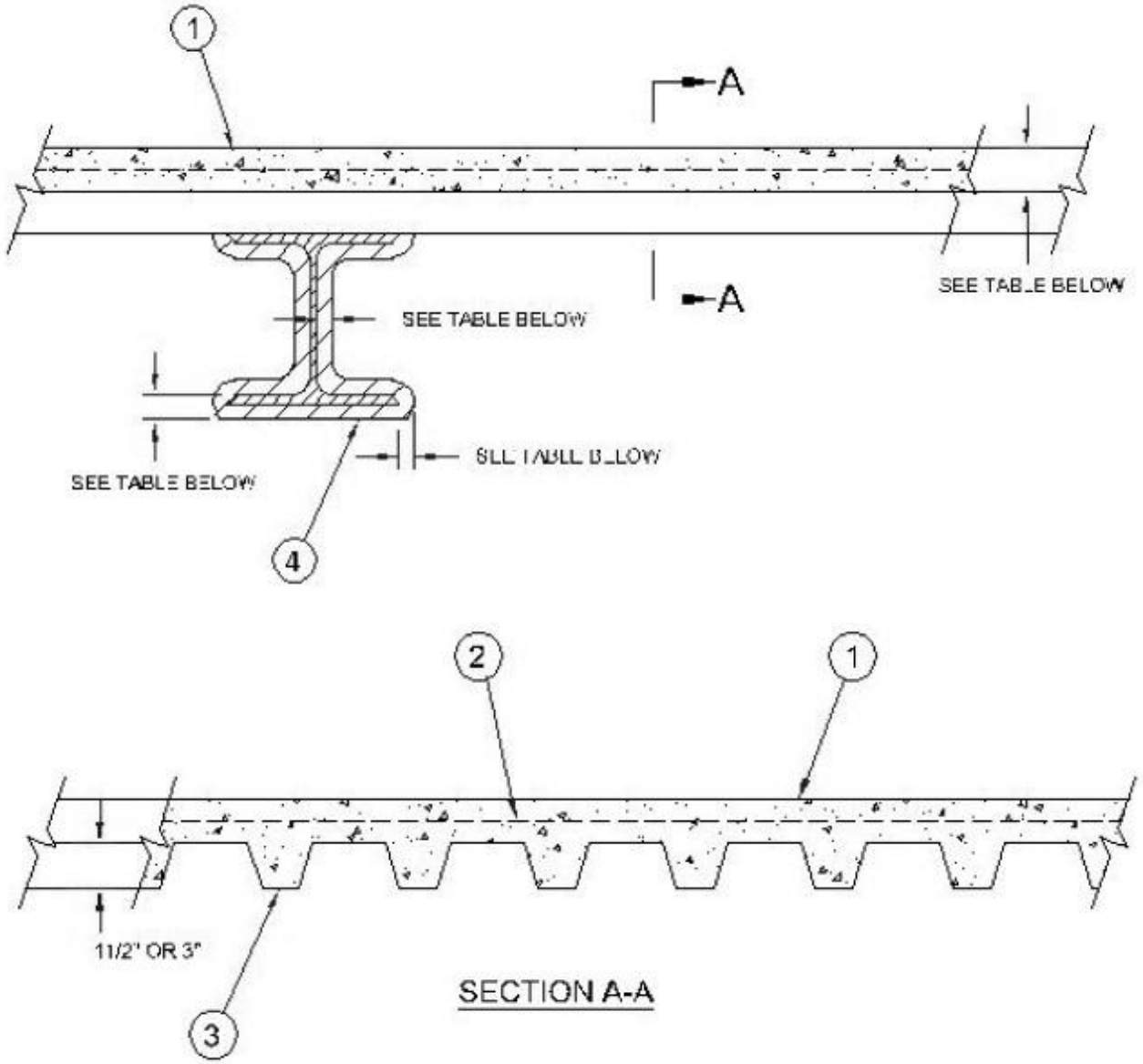
Restrained Assembly Ratings — 1, 1-1/2, 2 and 3 Hr (See Item 4)

Unrestrained Assembly Ratings — 0 Hr (See Item 3)

Unrestrained Beam Ratings — 1 and 1-1/2 Hr (See Item 4)

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



Beam — W6x25, minimum size.

1. **Normal-Weight or Lightweight Concrete —** Normal-weight concrete, carbonate or siliceous aggregate, 3500 psi nominal compressive strength. Low-density concrete, expanded shale, clay or slate aggregate by rotary kiln method, 110±3 lb/ft^3 density, 3500 psi nominal compressive strength.

2. **Wire Wire Fabric —** 6 x 6- W1.4 x W1.4.

3. **Steel Floor Units* —** Composite or noncomposite floor units. 22 MSG thick fluted sections, welded to supports with 3/4 in. puddle welds spaced 12 in. OC. Adjacent units button punched or welded 12 in. OC along side joints. When the maximum clear span of the steel floor units is less than or equal to the tested span of 9 ft- 6 in., the unrestrained assembly rating is increased to 1 Hr and 1-1/2 Hr to match the unrestrained beam rating.
DECK WEST INC — 36 in. wide Type 3-DW.

H H ROBERTSON — Type QL-99, QL-WKX

VULCRAFT, DIV OF NUCOR CORP — 24 or 36 in. wide Types 3VLI and 3VLP. Phos/ptd Type 3VLI units.

4. **Mastic and Intumescent Coating* —** Mastic coating spray or brush applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

Restrained Assembly Rating, Hr.	Unrestrained Assembly Rating, Hr.	Unrestrained Beam Rating, Hr.	Min Concrete Cover Thickness, in		Min Dry Thickness of A/D FIREFILM on Beam, mils
			Normal-Weight Concrete	Lightweight Concrete	
1	0 (see Item 3)	1	3-1/4	2-1/2	45
1-1/2	0 (see Item 3)	1	4	2-3/4	45
2	0 (see Item 3)	1	4-1/2	3-1/4	45
3	0 (see Item 3)	1-1/2	4-1/2	Not permitted	82

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Conditioned Interior Space Purpose and Interior General Purpose

5. **Shear Connectors —** (optional) (not shown)— Studs 1/2 in. diam. by 4 in. long, headed type, or equivalent per A.I.S.C specifications. Welded to top flange of the beam tHrough the deck for a maximum composite action of 40 percent between Steel Beam and Concrete. Shear studs are not permitted for Restarined Assembly Rating greater than 2 hour.

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Last Updated on 2012-11-08

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BXUV.N641 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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BXUV - Fire-resistance Ratings - ANSI/UL 263

See General Information for Fire-resistance Ratings - ANSI/UL 263

Design No. N641

December 21, 2016

Restrained Beam Ratings - 2, 1-1/2 Hr. (See Item 5)

Unrestrained Beam Ratings - 2, 1-1/2 Hr. (See Item 5)

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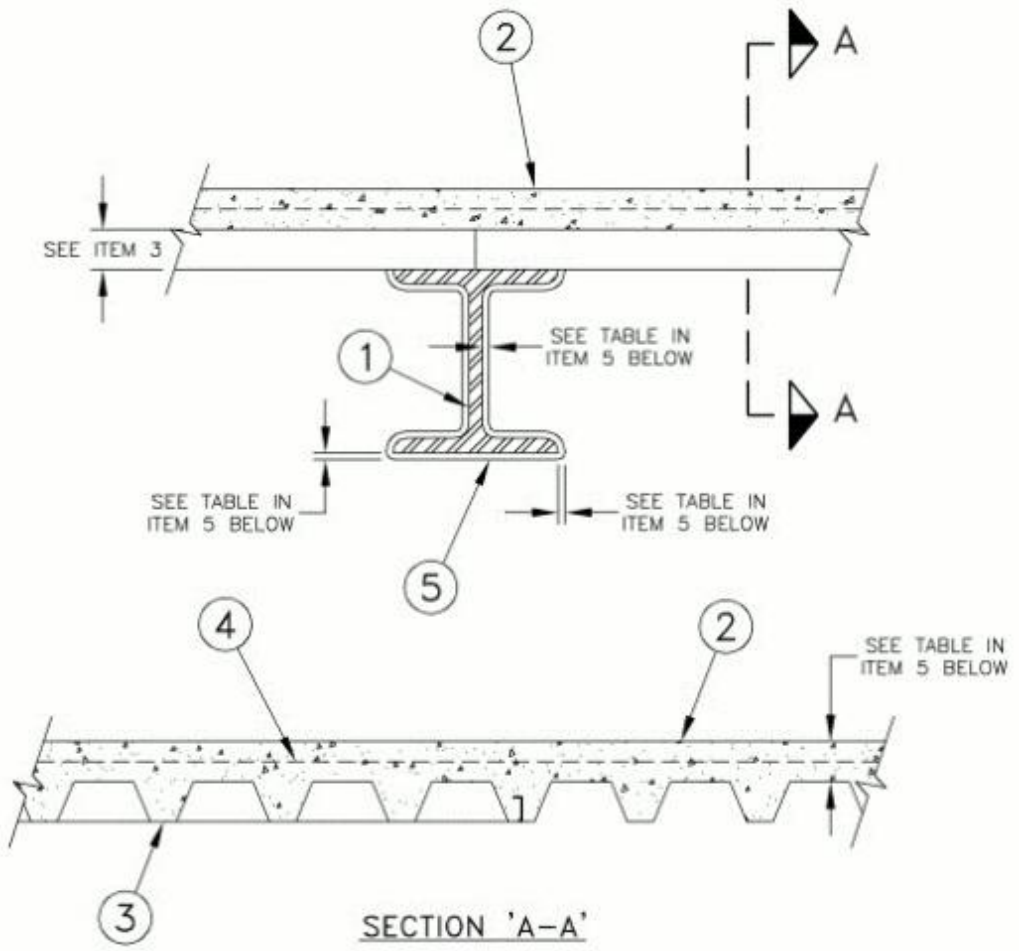

1. **Steel beam —** Any wide flange steel size shown in table in Item 5. Beam shall be primed with metal Alkyd Primer.

2. **Normal Weight Concrete —** Normal-density concrete, carbonate aggregate, 150 pcf unit weight 3600 psi compressive strength.

3. **Steel Floor and Form Units* —** Composite or noncomposite, 3 in. deep, 20 MSG fluted or 20/20 MSG cellular, galv units. All fluted or alternating one 36 in. or 24 in. wide fluted to one 24 in. wide max cellular section. Welded to supports not over 12 in. OC. Adjacent units welded or crimped together along side laps 16 in. OC. When the maximum clear span of the Steel Floor and Form Units is less than or equal to the tested span of 5 ft. 9 in., the unrestrained assembly rating is increased to 1-1/2 Hr. or 2 Hr. to match the unrestrained beam rating.

CANAM STEEL CORP — 24 in. wide Type P-2436 and P-2404 noncomposite.

DECK WEST INC — 36 in. wide Type 3-DW.

H H ROBERTSON — Type QL-99, QL-WKX

VULCRAFT, DIV OF NUCOR CORP — 24 or 36 in. wide Types 3VLI and 3VLP. Phos/ptd Type 3VLI units.

4. **Welded Wire Fabric —** 6 x 6 - W1.4 x W1.4.

5. **Mastic and Intumescent Coating* —** Mastic coating spray or brush applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

Minimum Beam Size, (W/D)	Restrained Beam Rating, Hr.	Unrestrained Beam Rating, Hr.	Minimum Concrete Cover thickness, in.	Min Dry Thickness of A/D Firefilm on Beam, in.
W8 x 31 (0.80)	1-1/2	1-1/2	4.5	0.089
W6 x 25 (0.84)	2	2	4.5	0.100

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Conditioned Interior Space Purpose and Interior General Purpose

6. **Shear Connectors —** (optional) (not shown)— Studs 3/4 in. diam by 6 in. long, headed type, or equivalent per A.I.S.C specifications. Welded to top flange of the beam through the deck. Shear studs shall not be permitted for concrete cover thickness less than 5.25 in.

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Last Updated on 2016-12-21

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BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X639

October 29, 2010

Rating - 3 Hr

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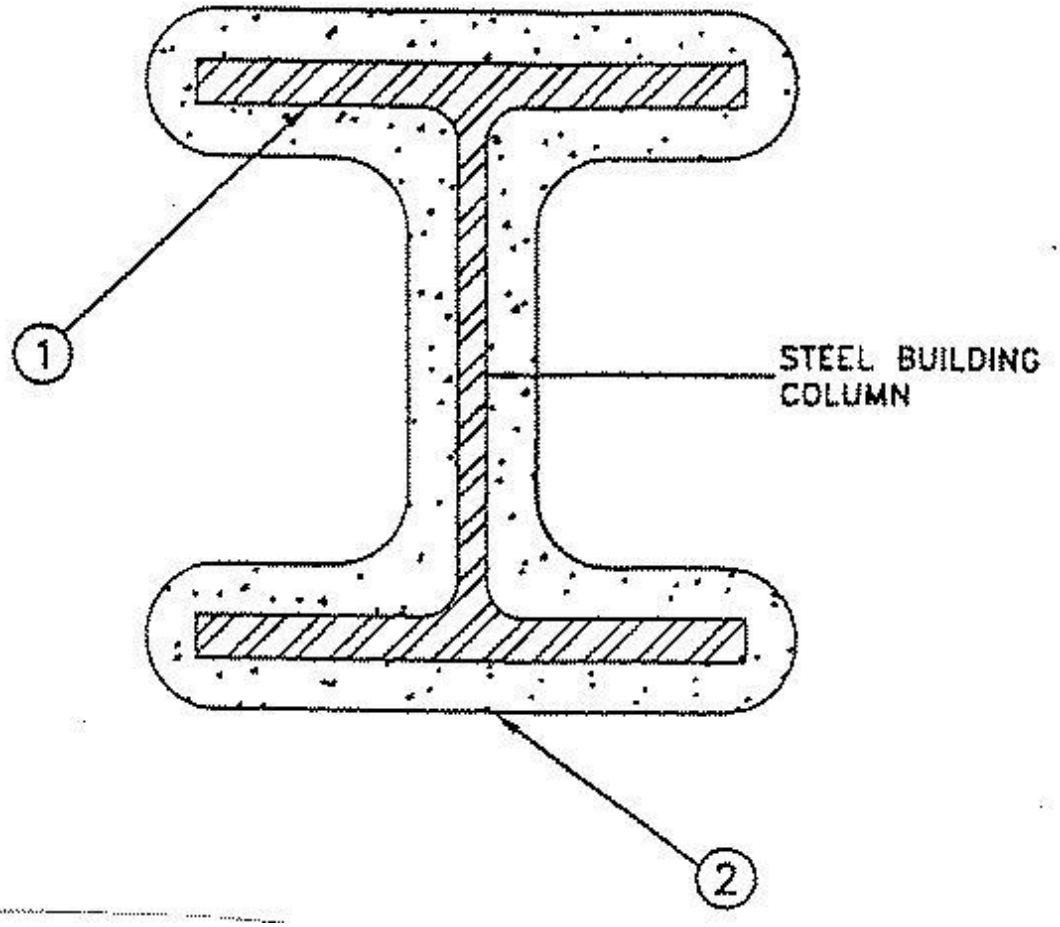

1. **Steel Column —** Minimum size column W12 x 170 with W/D≥2.26. The column surfaces shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness of 0.130 in.

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C". Investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

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Design Criteria and Allowable Variances

Design No. X640

October 29, 2010

Ratings - 2 and 3 Hr (See Item 3)

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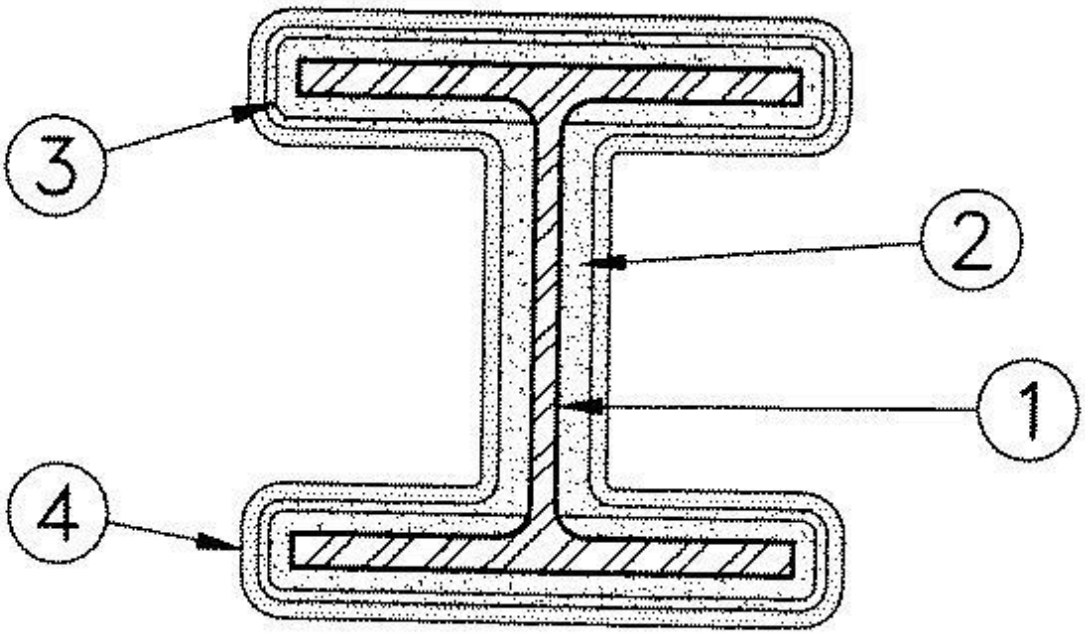

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied as a mastic basecoat in accordance with manufacturer's instructions to the minimum dry film thickness shown below.
A/D FIRE PROTECTION SYSTEMS INC — Type "A/D BASECOAT".

3. **Glass Fiber Mesh —** (for 3 hr rating only) — Self adhesive, alkali resistant glass fiber mesh, weighing 4.5 oz per sq yd (152 g/m^2) applied over second to last coat of "A/D BASECOAT" around the column flanges.

4. **Mastic and Intumescent Coating* —** Coating applied over "A/D BASECOAT" in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Steel Column Size	Column, W/D	Required Min "A/D BASECOAT" Thickness, in.	Required Min "A/D FIREFILM" Thickness, in.
2	W10x68	1.14	0.311	0.105
3	W10x77	1.28	0.300@)	0.120

(@) Thickness includes glass fiber mesh.

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C". Investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X641

October 29, 2010

Ratings - 3/4, 1, 1-1/2 and 2 Hr (See Item 2)

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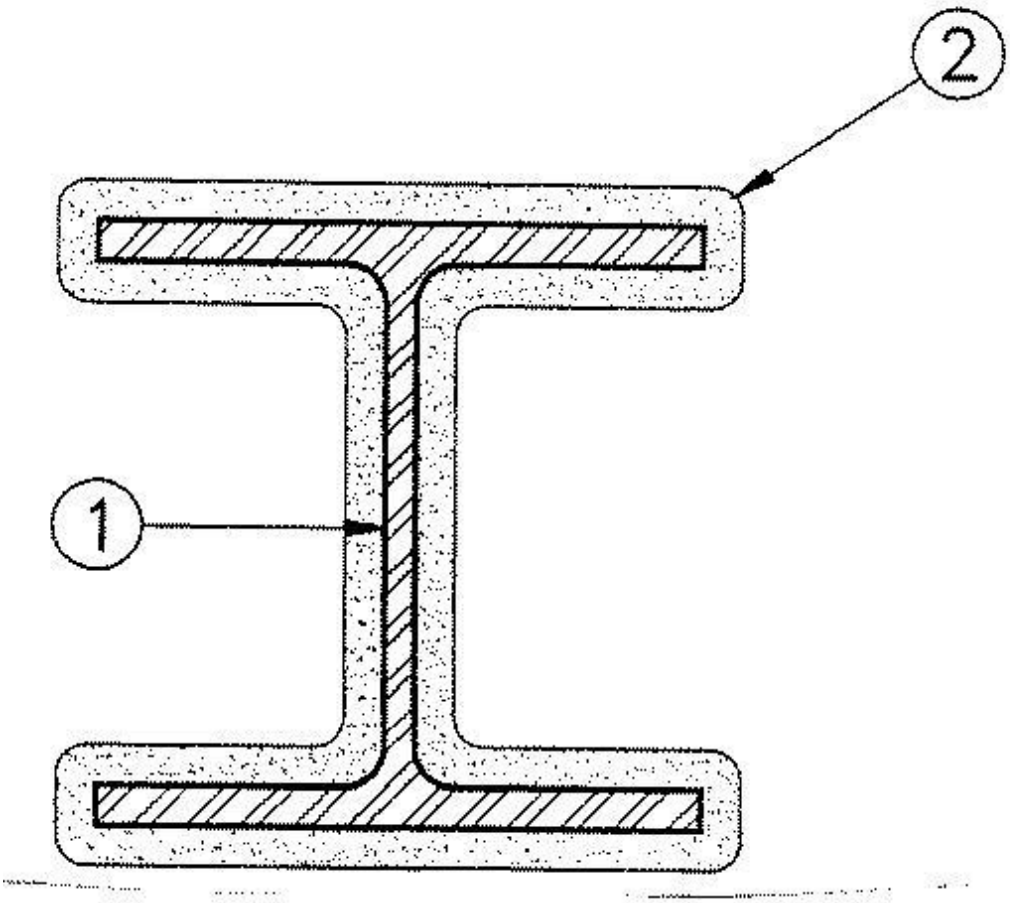

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

Steel Column Size		Minimum Thickness, in.			
Size	**W/D**	**3/4 hr**	**1 hr**	**1-1/2 hr**	**2 hr**
W6x15	0.43	0.076	0.118	NR	NR
W8x31	0.66	0.076	0.091	NR	NR
W14x38	0.70	0.050	0.091	NR	NR
W10x49	0.84	0.042	0.055	NR	NR
W12x65	0.92	0.042	0.055	0.118	NR
W8x67	1.36	0.042	0.055	0.073	NR
W10x100	1.63	0.026	0.055	0.073	0.110
W12x120	1.64	0.026	0.03	0.073	0.110
W14x283	3.00	0.016	0.016	0.039	0.055

As an alternate to the above table, the required dry film thickness of coating (in inches) to be applied to all surfaces of wide flange steel columns, in the W/D range of 0.43 to 3.00 and for 3/4, 1, 1-1/2 and 2 hour rating periods, may be determined from the following equation:

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

Where t = minimum dry film thickness of coating in inches, T = Fire resistance period in minutes, for 45, 60, 90 and 120 minutes, W = Weight of steel column in pounds per linear foot, D = Heated perimeter of steel column section in inches.

Thicknesses generated from the equation shall fall between 0.016 in. and 0.118 in. If a calculated thickness falls outside of this range, a rating cannot be determined.

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X642

October 29, 2010

Ratings - 3/4, 1, 1-1/2 and 2 Hr (See Item 2)

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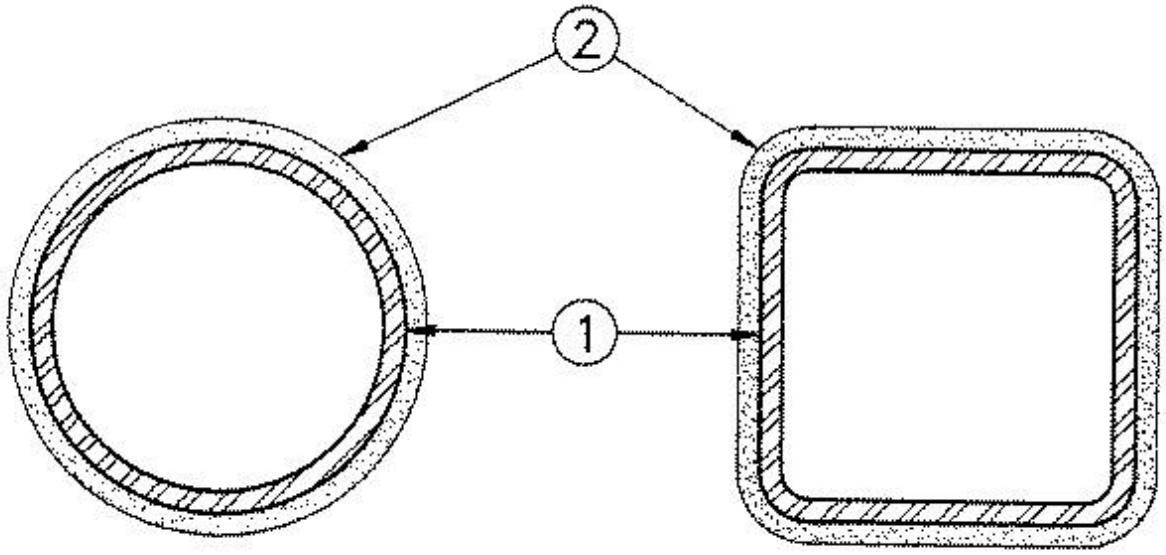

1. **Steel Column —** Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Steel Column Size	Column A/P	Required Min Thickness, In.
3/4	SP 4 diam x 3/16 in.	0.18	0.102
3/4	ST 5 x 3 x 1/4 in.	0.22	0.130
3/4	ST 8 x 6 x 5/16 in.	0.29	0.065
3/4	ST 10 x 10 x 1/2 in.	0.46	0.035
1	ST 5 x 3 x 5/16 in.	0.27	0.130
1	ST 12 x 12 x 1/2 in.	0.47	0.045
1	SP 10 in. diam x 5/16 in.	0.30	0.111
1-1/2	SP 10 in. diam x 5/16 in.	0.30	0.130
1-1/2	ST 12 x 12 x 1/2 in.	0.47	0.095
2	SP 8 in. diam x 1/2 in.	0.47	0.191
2	ST 8 x 8 x 1/2 in.	0.47	0.186

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Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X643

October 29, 2010

Ratings- 1-1/2, 2 Hr (See Item 2)

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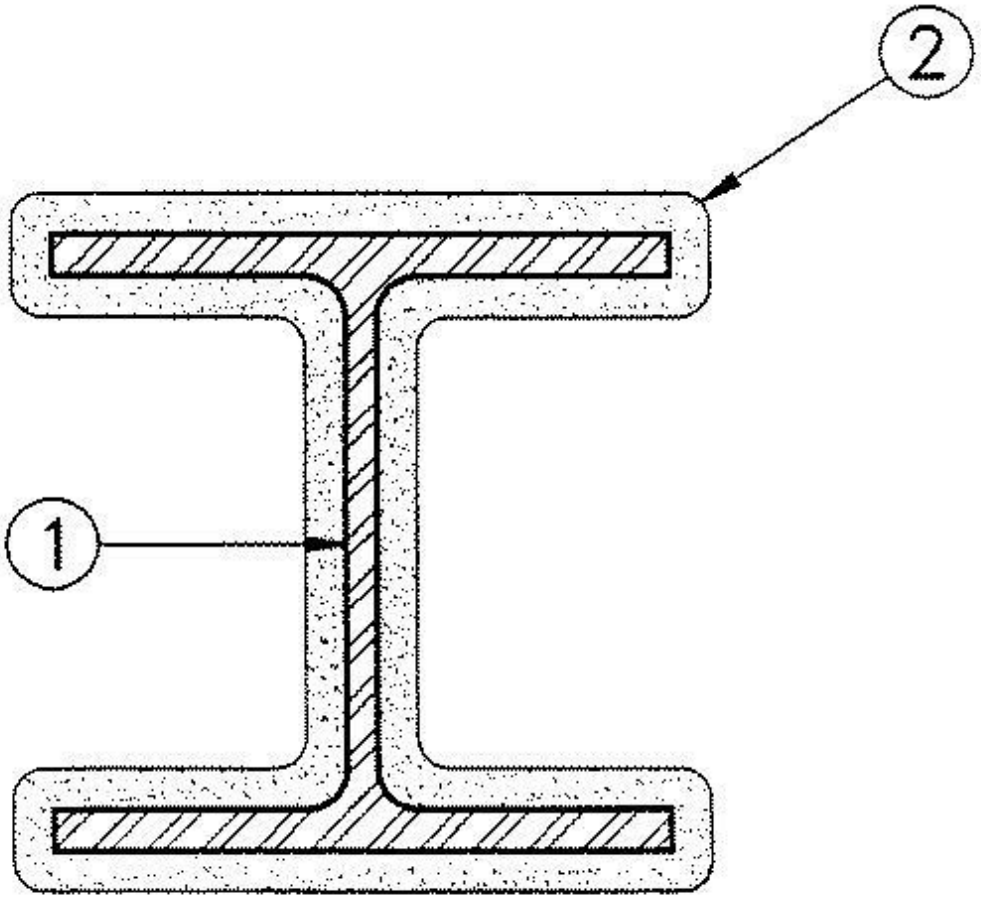

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Column Description, In.	Column W/D	Required Min Thickness, In.
1-1/2	W8x31	0.66	0.213
2	W12x120	1.64	0.095

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Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X644

October 29, 2010

Rating - 2 Hr

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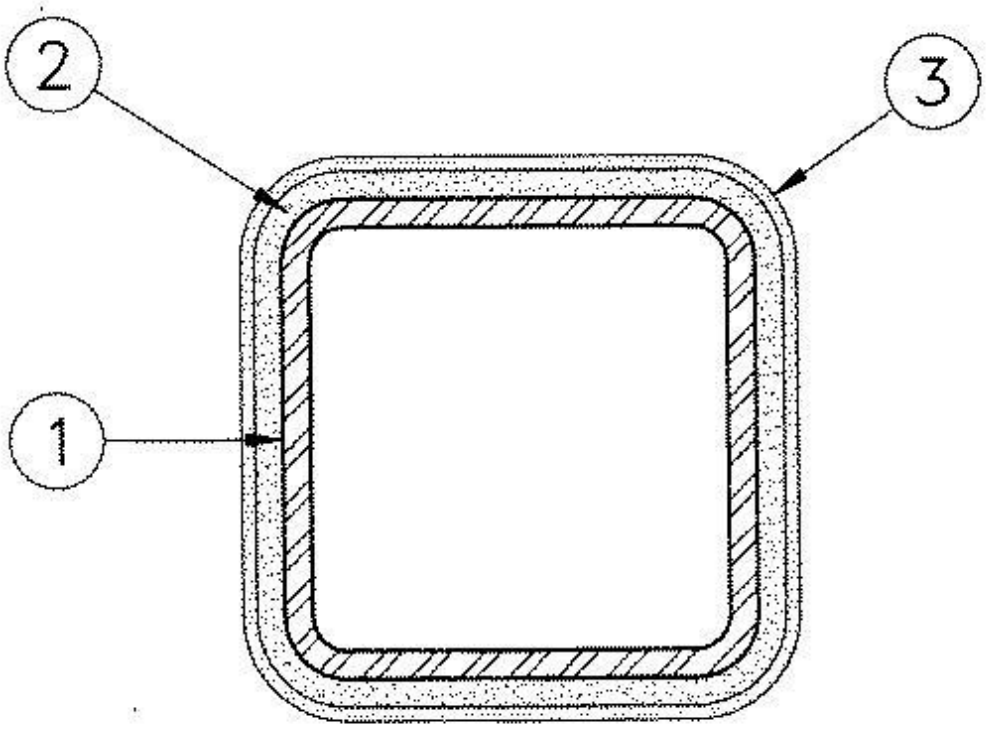

1. **Steel Column —** Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied as a mastic basecoat in accordance with manufacturer's instructions to the minimum dry film thickness shown below.

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D BASECOAT".

3. **Mastic and Intumescent Coating* —** Coating applied over "A/D BASECOAT" in accordance with manufacturers instructions to the minimum dry film thickness shown below:

Rating, hr	Column Size	Column, A/P	"A/D BASECOAT" Thickness, In.	"A/D FIREFILM" Thickness, In.
2	ST 10 x 10 x 3/8 in.	0.35	0.210	0.105

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2010-10-29

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BXUV.X645 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

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- Authorities Having Jurisdiction should be consulted before construction.
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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

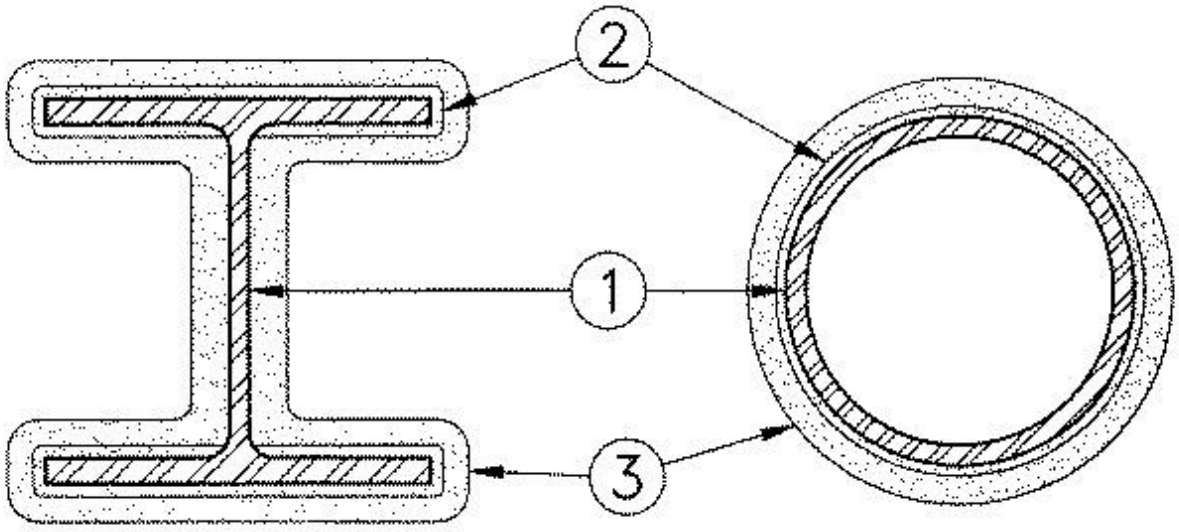
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X645

October 29, 2010

Rating - 2 Hr

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**



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. 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/m^2) applied over first coat of mastic and intumescent coating around the W shaped column flanges or wrapped around tubular steel pipe column.

3. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Column Size, In.	Min "A/D FIREFILM" Column	Thickness, In. (@)
2	W10 x 77	1.28 (W/D)	0.138
2	SP 4 in diam .673 wall thickness	0.57 (A/P)	0.174

(@) Thickness includes glass fiber mesh.

A/D FIRE PROTECTION SYSTEMS INC — Types "A/D FIREFILM II" or "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2010-10-29

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BXUV.X669 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

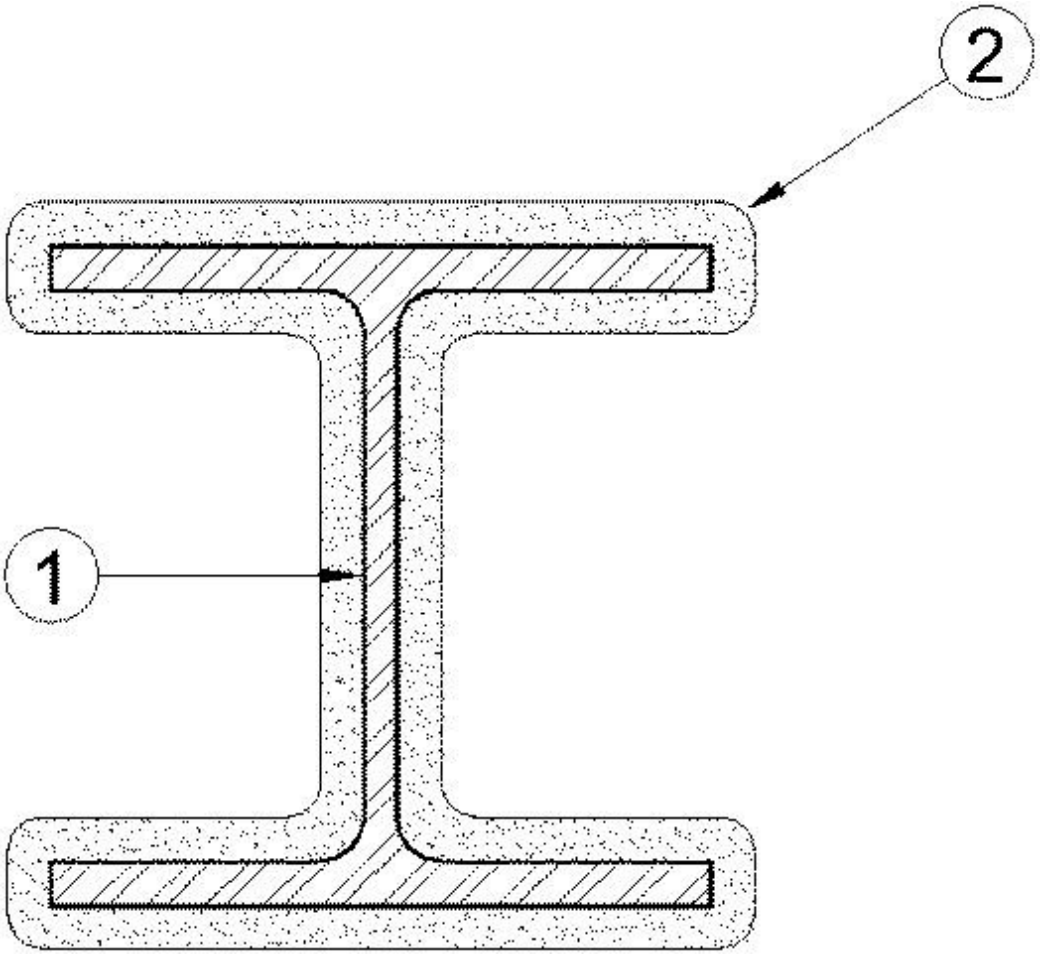
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X669

October 29, 2010

Ratings - 3/4 and 1 Hr (See Item 2)

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



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. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:
A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

Ratings, hr	Steel Column Size	W-Shaped only Min Column W/D	Required Min Film Thickness, In.
3/4	W10x49	0.84	0.042
1	W8x24	0.59	0.107
1	W10x49	0.84	0.045

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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BXUV.X670 - FIRE-RESISTANCE RATINGS - ANSI/UL 263

Design/System/Construction/Assembly Usage Disclaimer

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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X670

October 29, 2010

Ratings- 3 Hr (See Item 2)

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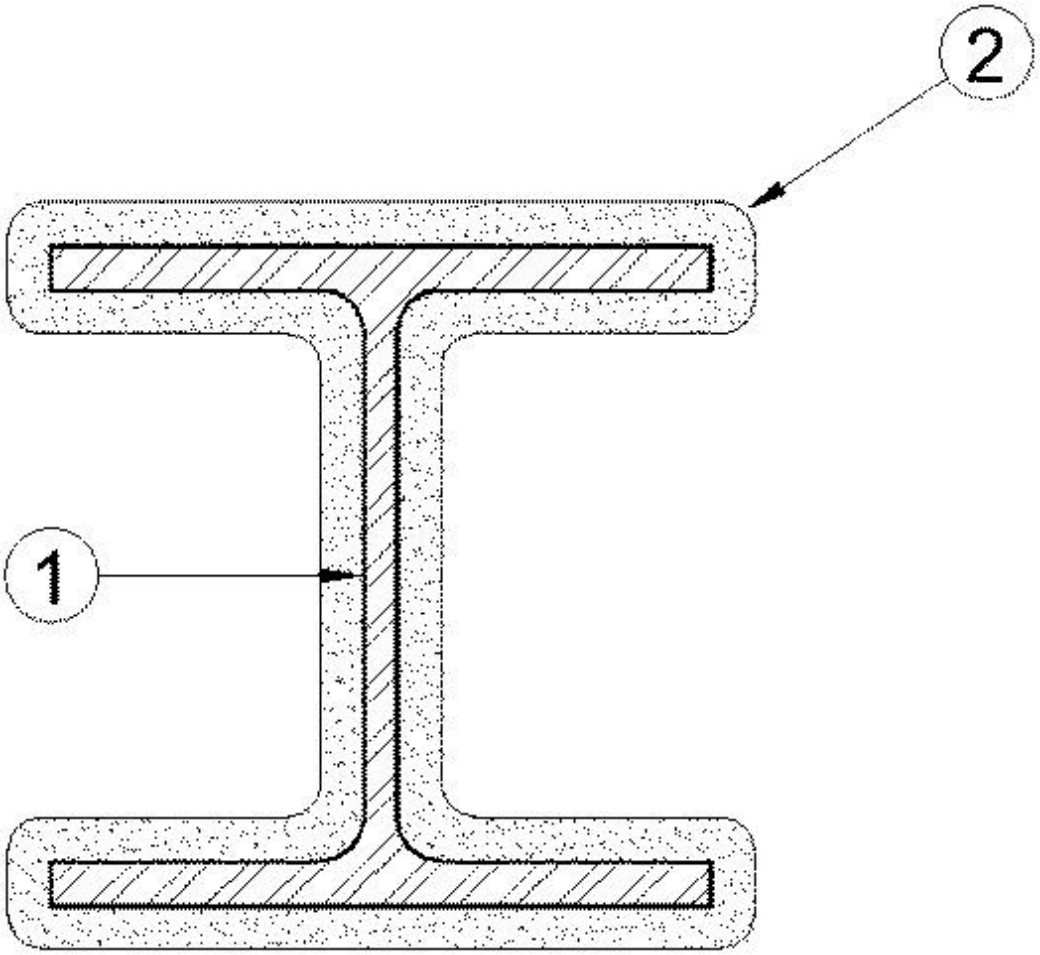

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Column Description, In.	Column W/D	Required Min Thickness, In.
3	W10x77	1.28	0.269

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States

BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X671

October 29, 2010

Ratings - 1-1/2 and 2 Hr (See Item 2)

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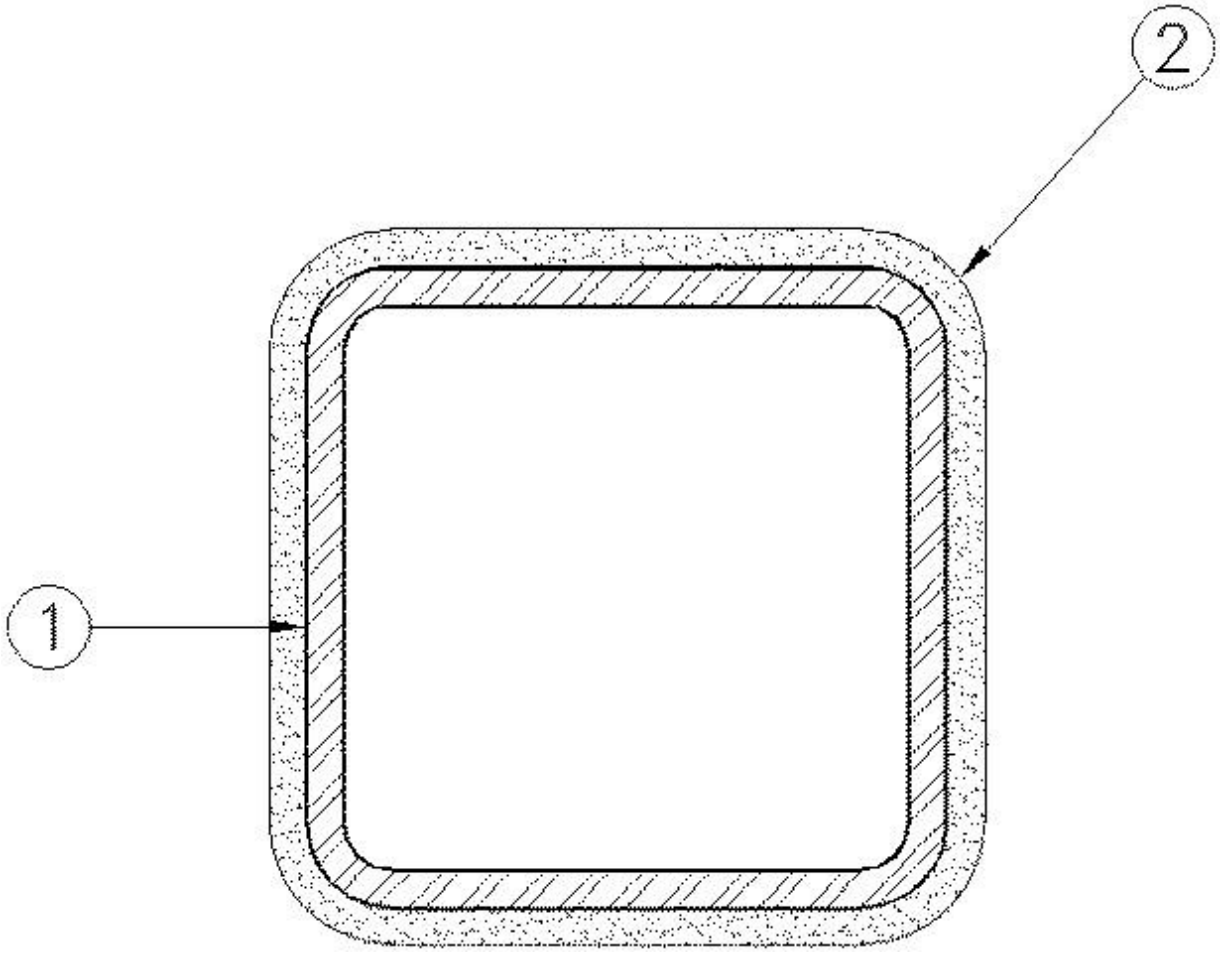

1. **Steel Column —** Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturers instructions to the minimum dry film thickness shown below:

Rating, hr	Column Size	Column, A/P	Required Min Thickness, In.
1-1/2	ST 10 x 10 x 5/16 in.	0.30	0.188
2	ST 10 x 10 x 5/16 in	0.30	0.257

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X672

October 29, 2010

Ratings - 3/4, 1, 1-1/2, 2 and 3 Hr (see Item 2)

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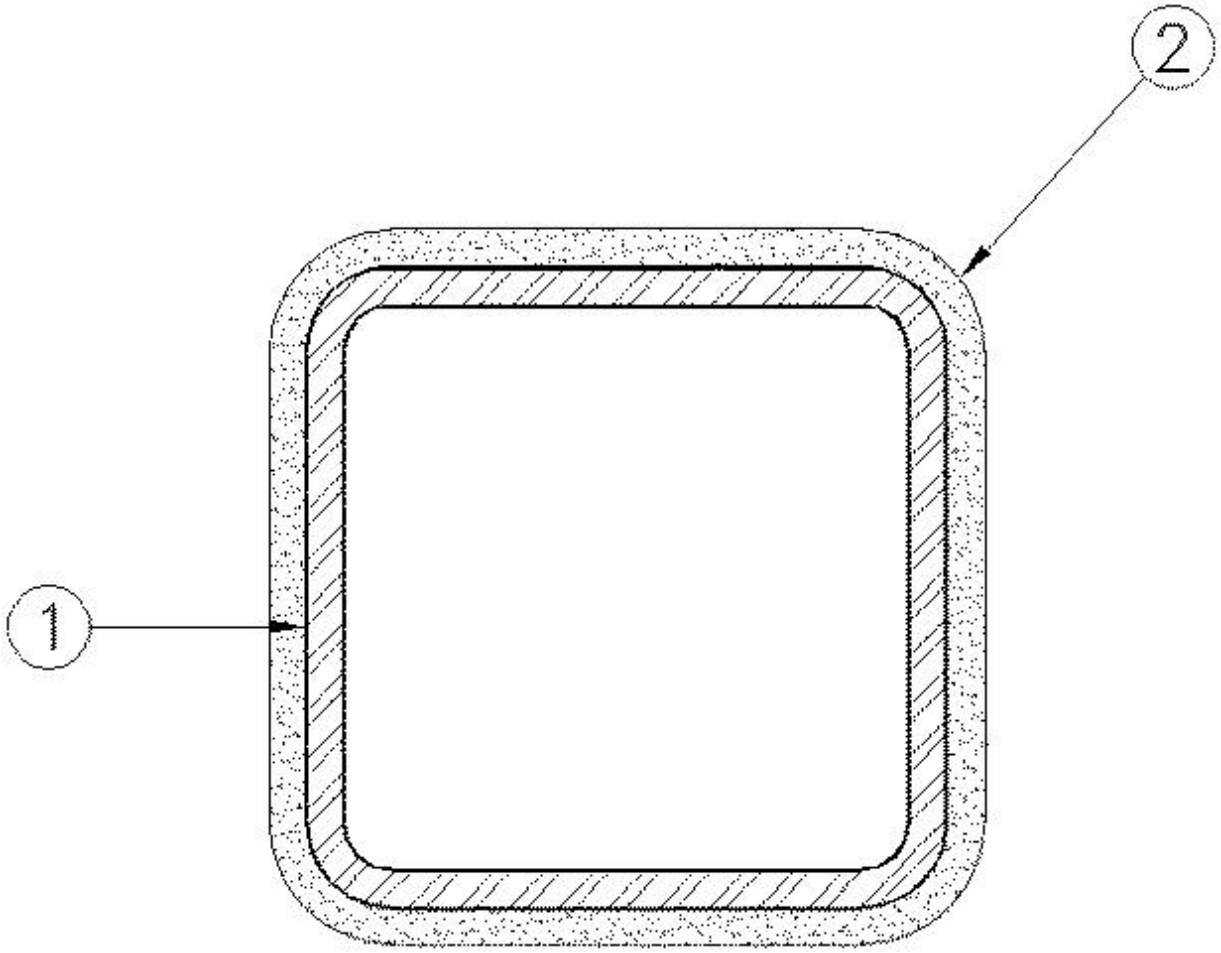

1. **Steel Column —** Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturers instructions to the minimum dry film thickness shown below:

Column Size	Column A/P	3/4 Hr Min Thickness	1Hr Min Thickness	1-1/2 Hr Min Thickness	2 Hr Min Thickness	3 Hr Min Thickness
		In.	In.	In.	In.	In.
ST 10 x 10 x 1/2 in.	0.46	0.035	0.045	0.094	0.186	0.324

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada

See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States
Design Criteria and Allowable Variances

See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X673

October 29, 2010

Ratings - 3/4, and 1 Hr (See Item 2)

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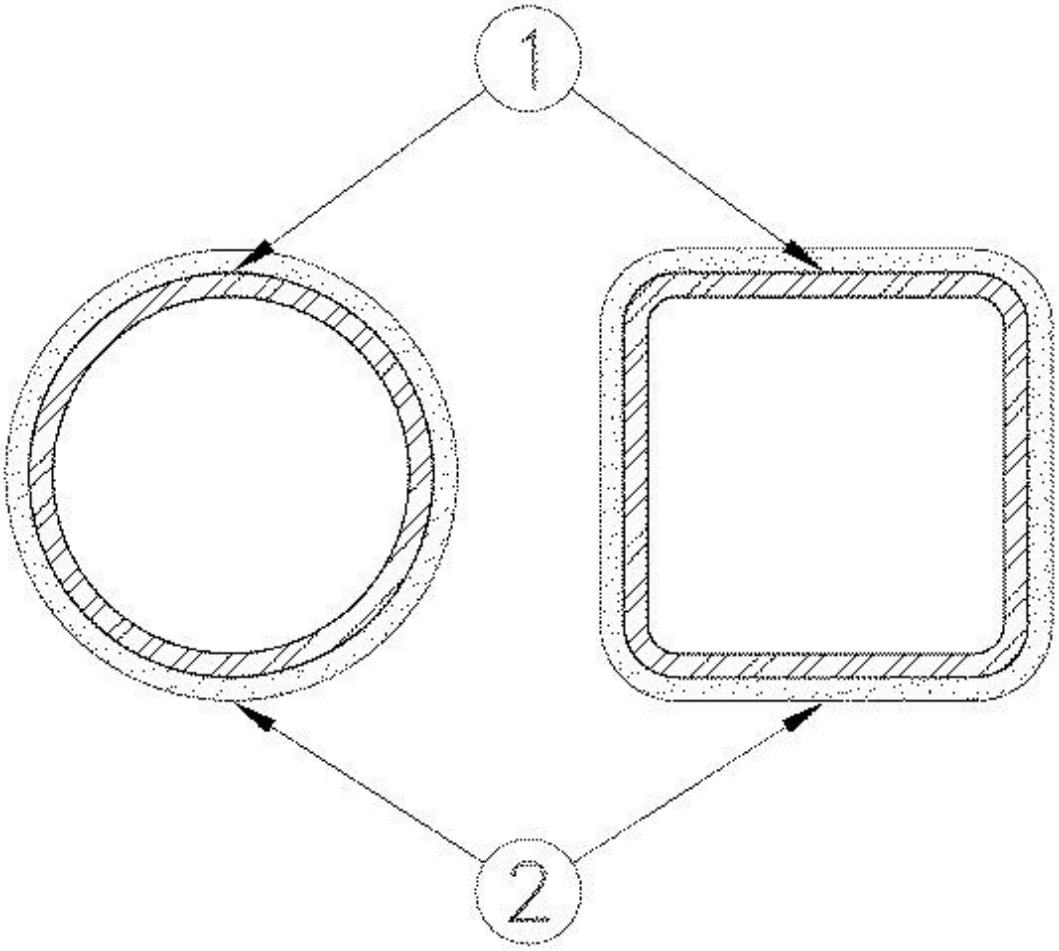

1. **Steel Column —** Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

2. **Mastic and Intumescent Coating* —** Coating applied in accordance with manufacturer's instructions to the minimum dry film thickness shown below:

Rating, hr	Steel Column Size	Column A/P	Required Min Thickness, In.
3/4	ST 5 x 3 x 1/4 in.	0.22	0.130
1	ST 5 x 3 x 1/4 in.	0.22	0.134
1	SP 8.625 in. diam x 1/4 in.	0.24	0.135

A/D FIRE PROTECTION SYSTEMS INC — Type "A/D FIREFILM III" or "A/D FIREFILM III C" investigated for Interior Conditioned Space Purpose and Interior General Purpose.

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COMPLIANCE TESTED by berkeley analytical

VOC Emission Test Certificate

Product Name: A/D Firefilm III

Product Sample Information		**Certificate Information**	
Manufacturer:	Carboline	Certificate No:	170120-01
Manf. Website:	www.carboline.com	Certified By:	Raja S. Tannous, Laboratory Director
CSI Category & No.:	Fireproofing (Division 7)		
Date Produced:	12/29/2016	Date:	January 20, 2017

Reference Standard: California Department of Public Health CDPH/EHLB/Standard Method Version 1.1, 2010 (Emission testing method for CA Specification 01350)

Acceptance Criteria and Results Demonstrating Compliance of Product Sample to Referenced Standard:

Exposure Scenario[1]	**Individual VOCs of Concern**[2]		**Formaldehyde**[3]		**TVOC**[4]
	Criterion	**Compliant?**	**Criterion**	**Compliant?**	**Range**
School Classroom	≤½ Chronic REL	YES	≤9.0 µg/m^3	YES	≤ 5.0 mg/m^3
Private Office	≤½ Chronic REL	YES	≤9.0 µg/m^3	YES	≤ 5.0 mg/m^3

Product Coverage[5]: Not applicable

1. Exposure scenarios & product quantities for classroom & office are defined in Tables 4-2 – 4-5 (CDPH Std. Mtd. V1.1-2010)
2. Maximum allowable concentrations of individual target VOCs are specified in Table 4-1 (*ibid.*)
3. Maximum allowable formaldehyde concentration is ≤9 µg/m^3, effective Jan 1, 2012; previous limit was ≤16.5 µg/m^3 (ibid.)
4. Informative only; predicted TVOC Range in three categories, i.e., ≤0.5 mg/m^3, >0.5 – 4.9 mg/m^3, and ≥5.0 mg/m^3
5. Informative and applicable only to tests of wet-applied products; grams of sample applied per square meter of substrate

Standards & Codes Recognizing CDPH Standard Method V1.1 (partial list)

- ANSI/ASHRAE/USGBC/IES Standard 189.1-2011
- USGBC LEED for Schools, 2009
- Collaborative for High Performance Schools (CHPS), National Core Criteria, 2013
- USGBC LEED Version 4, BD&C, ID&C, 2013
- ANSI/GBI 01-2010, Green Building Assessment Protocol

Narrative: Carboline selected a sample representative of its A/D Firefilm III - product and submitted it on 12/30/2016 for testing. Berkeley Analytical measured and evaluated the emissions of VOCs from this sample following CDPH/EHLB/Standard Method V1.1-2010. The results of the test are presented in Berkeley Analytical report, 904-001-01A-Jan1917.

Berkeley Analytical is an independent, third-party laboratory specializing in the analysis of organic chemicals emitted by and contained in building products, finishes, furniture, and consumer products. We are an ISO/IEC 17025 accredited laboratory (IAS, TL-383); all standards used in performing this test are in Berkeley Analytical's scope of accreditation.

DISCLAIMER: THIS CERTIFICATE OF COMPLIANCE AFFIRMS THAT: 1) A SAMPLE OF THE LISTED PRODUCT WAS TESTED ACCORDING TO THE REFERENCED STANDARD; 2) THE MEASURED VOC EMISSIONS FROM THE SAMPLE WERE EVALUATED FOR THE DEFINED EXPOSURE SCENARIO(S); AND 3) THE RESULTS MEET THE ACCEPTANCE CRITERIA OF THE REFERENCED STANDARD(S). BERKELEY ANALYTICAL IS NOT RESPONSIBLE FOR ANY CLAIMS REGARDING A PRODUCT OR PRODUCTS ENTERED INTO COMMERCE THAT MAY BE BASED ON THIS TEST. BERKELEY ANALYTICAL PROVIDES THIS CERTIFICATE OF COMPLIANCE "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE.

LEED® v4 Technical Bulletin
Building Design + Construction

Background
This document outlines Carboline's contributions towards available LEED v4 credits. Carboline is committed to developing and manufacturing environmentally compliant coatings and fire protection products. Carboline fireproofing products can contribute towards points under the LEED Green Building Rating System. The LEED Green Building Rating System does not certify construction products and materials. Instead, entire projects are certified on the basis of the environmental impact of the building materials employed and the overall building design.

What is LEED?
Leadership in Energy and Environmental Design (LEED) is the most widely used green building rating system in the world. LEED was developed by the United States Green Building Council (USGBC) to evaluate the environmental performance of buildings and promote sustainable design methods. LEED certification provides independent verification of environmental features which allow for efficient, high performance, cost-effective building design and construction. There are four levels of certification that can be reached for LEED v4 which are awarded based on achieving a minimum number of points (Certified, Silver, Gold and Platinum).

Carboline products can contribute toward the following LEED v4 credit categories:

Energy & Atmosphere
- ✓ EA Prerequisite – Minimum Energy Performance
- ✓ EA Credit – Optimize Energy Performance

Materials and Resources
Materials and Resources
- ✓ MR Prerequisite: Construction and Demolition Waste Management Planning
- ✓ MR Credit: Building Life Cycle Impact Reduction
- ✓ MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials
- ✓ MR Credit: Building Product Disclosure and Optimization – Material Ingredients

Indoor Environmental Quality
- ✓ EQ Credit: Low-Emitting Materials

Energy and Atmosphere

EA Prerequisite: Minimum Energy Performance

Intent: To reduce the environmental and economic harm of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

Requirements: Follow the criteria in the LEED New Construction Energy Design Guide as specified in LEED v4 (page 66).

Carboline Contributions: Carboline wet mix materials provide thermal resistance and noise reduction coefficient values. This will reduce the amount of energy needed for climate control and any added materials needed for soundproofing. This credit only applies to Carboline materials when used within the building envelope.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

EA Credit: Optimize Energy Performance (1-18 points)

Note: This credit requires that an energy analysis be done that includes all energy costs within and associated with the building project. Points for this credit are assigned from 1-18 based on the percentage of energy cost savings the building materials or systems will provide.

Intent: Achieve increasing levels of energy performance above the baseline in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements: Follow the criteria in EA Prerequisite Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to Table 1 in LEED v4 (page 75). Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building.

Carboline Contributions: Carboline wet mix materials provide thermal resistance and noise reduction coefficient values. This will reduce the amount of energy needed for climate control and reduce any added materials needed for soundproofing. This credit only applies to Carboline materials when used within the building envelope.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

Materials and Resources

MR Prerequisite: Construction and Demolition Waste Management Planning

Intent: To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements:
Option 1 (page 106) Diversion (1–2 points)
Path1: Divert 50% and Three Material Streams (1 point)
Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

Path 2: Divert 75% and Four Material Streams (2 points)
Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows: 50%: 1 point, 75%: 2 points

Carboline Contributions: Carboline products are supplied in paper bags, plastic pails or metal pails which can be recycled. The pallets used for shipment are also recyclable.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Building Life-Cycle Impact Reduction (2-5 points)

Intent: To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements: Reuse or salvage building materials from offsite or onsite as a percentage of the surface area as listed in Table 1 (page 91). Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems). Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Materials contributing toward this credit may not contribute toward MR Credit Material Disclosure and Optimization.

Percentage of completed project surface area reused	Points BD&C	Points BD&C (Core and Shell)
25%	2	2
50%	3	3
75%	4	5

Carboline Contributions: Carboline wet mix and intumescent materials are utilized for retrofit and rehab construction. These materials provide fire resistance ratings to unprotected structural members which will bring the existing building up to code. This will eliminate the need to replace the structural elements that were not code compliant.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1 XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Building Product Disclosure and Optimization-Sourcing of Raw Materials (1-2 points)

Intent: To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements:
Option 1 (page 95) Raw Material Source and Extraction Reporting (1 point)
Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria

Carboline Contributions: Carboline has publicly released reports from their raw material suppliers which include raw material supplier extraction locations for our wet mix and intumescent materials fire resistive materials.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Option 2 (page 95). Leadership Extraction Practices (1 point)
Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.

Recycled content: Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost. Products meeting recycled content criteria are valued at 100% of their cost for the purposes of credit achievement calculation.

Carboline Contributions: Carboline wet-mix products are manufactured with post-consumer recycled materials.

Carboline Products That Contribute: Southwest™ Type 5GP (10% recycled content), Southwest™ Type 5MD (10% recycled content), Southwest™ Type 5EF (10% recycled content).

MR Credit: Building Product Disclosure and Optimization-Material Ingredients (1-2 points)

Intent: To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements:
Option 1 (Page 97) Material Ingredient Reporting (1 point)
Use at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product.

Carboline Contributions: Carboline wet mix and intumescent products have complete Declare Health Product Declaration: The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open standard.

Carboline Products That Contribute: Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 241, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

MR Credit: Construction and Demolition Waste Management (1-2 points)

Intent: To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements:
Option 1 (page 106) Diversion (1–2 points)
Path 1: Divert 50% and Three Material Streams (1 point)
Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

Path 2: Divert 75% and Four Material Streams (2 points)
Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows: 50%: 1 point, 75%: 2 points

Carboline Contributions: Carboline products are supplied in paper bags, plastic pails or metal pails which can be recycled. The pallets used for shipment are also recyclable.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Indoor Environmental Quality

EQ Credit: Low Emitting Materials (1-3 points)

Intent: To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

Requirements: This credit includes requirements for product manufacturing as well as project teams. It covers volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials as well as the testing methods by which indoor VOC emissions are determined. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in seven categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system such as waterproofing membranes and air- and water-resistive barrier materials.

Option 1 (Page 118) Product Category Calculations (1-3 points)

Achieve the threshold level of compliance with emissions and content standards for the number of product categories listed in Table 2 (page 118).

Category	Threshold	Emission & Content Requirements
Interior paints and coatings applied onsite	At least 90% by volume for emissions, 100% for VOC content	• General Emissions Evaluation for paints and coatings applied to walls, floors and ceilings • VOC content requirements for wet applied products
Interior adhesives and sealants applied onsite	At least 90% by volume, for emissions 100% for VOC content	• General Emissions Evaluation • VOC content requirements for wet applied products
Ceilings, walls, thermal and acoustic insulation	100%	• General Emissions Evaluation • Healthcare, schools only
Healthcare and schools projects only: Exterior applied products	At least 90% by volume	• General Emissions Evaluation • Exterior applied products

Emissions and Content Requirements

To demonstrate compliance, a product or layer must meet all of the following requirements, as applicable.

Inherently non-emitting sources: Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.

General emissions evaluation: Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario. The default scenario is the private office scenario. The manufacturer's or third-party certification must state the exposure scenario used to determine compliance. Claims of compliance for wet-applied products must state the amount applied in mass per surface area.

Manufacturers' claims of compliance with the above requirements must also state the range of total VOCs after 14 days (336 hours), measured as specified in the CDPH Standard Method v1.1:

- 0.5 mg/m3 or less;
- between 0.5 and 5.0 mg/m3; or
- 5.0 mg/m3 or more.

Additional VOC content requirements for wet-applied products: In addition to meeting the general requirements for VOC emissions (above), on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other trade workers who are exposed to these products. To demonstrate compliance, a product or layer must meet the following requirements, as applicable. Disclosure of VOC content must be made by the manufacturer. Any testing must follow the test method specified in the applicable regulation.

- All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.
- All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications as analyzed by the methods specified in Rule 1168. The provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.
- For projects outside the U.S., all paints, coatings, adhesives, and sealants wet-applied on site must either meet the technical requirements of the above regulations or comply with applicable national VOC control regulations such as the European Decopaint Directive (2004/42/EC), the Canadian VOC Concentration Limits for Architectural Coatings, or the Hong Kong Air Pollution Control (VOC) Regulation.

As there is no fireproofing category in the LEED v4, the SCAQMD regulations are commonly used to designate specialty coatings classifications for LEED applications. The SCAQMD (Rule #1113) outlines the current VOC limits as of January 1, 2014 for several categories of specialty coatings as follows:

Specialty Coating Type	Current VOC Limit (g/l)
Concrete surface retarders	50
Driveway Sealers	50
Faux finishing coatings	200
Fireproofing coatings	**150**
Graphic art coatings	150
Mastic coatings	100
Metallic pigmented coatings	150
Anti-graffiti coatings	50

The following Carboline products meet current VOC requirements:

Carboline Compliant Fireproofing Products	VOC Limit (EPA Method 24) (g/l)
A/D Firefilm® III	20 g/l
A/D Firefilm® III C	20 g/l
Firefilm® IV	4 g/l
Thermo-Sorb® VOC	142 g/l
Thermo-Sorb® E	147 g/l
Thermo-Sorb® 263	148 g/l
Thermo-Lag® E100	13 g/l
Thermo-Lag® E100 S	64 g/l
Thermo-Lag® 3000 A	13 g/l
Thermo-Lag® 3000 SA	64 g/l
A/D Type TC-55	0 g/l
Pyroprime® 775 WB	81 g/l
Southwest™ Series	0 g/l
Pyrolite® Series	0 g/l
Pyrocrete® Series	0 g/l

Carboline Contributions: Carboline has wet mix and intumescent materials that meet the required VOC limits and VOC emissions requirements for this credit.

Carboline Products That Contribute: Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, A/D Type TC-55, Pyroprime® 775 WB, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500, A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Manufacturing Locations

Products manufactured in Louisa, VA:
Pyrolite® 15, Pyrolite® 22, Southwest™ Type 5GP, Southwest™ Type 5MD, Southwest™ Type 5EF, Southwest™ Type 1XR, Southwest™ Type 7GP, Southwest™ Type 7HD, Southwest™ Type 7TB, Southwest™ Type DK 3 Spattercoat, Pyrocrete® 239, Pyrocrete® 40, Pyrocrete® 240 HY, Pyrocrete® 241, Pyrocrete® 241 HD, Hardcoat 4500

Products manufactured in Green Bay, WI:
Pyroprime® 775, Thermo-Sorb® E, Thermo-Sorb® 263,

Products manufactured in Dayton, NV:
Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Products manufactured in Lake Charles, LA:
A/D Firefilm® III, A/D Firefilm® III C, Firefilm® IV, A/D Type TC-55, Thermo-Sorb®, Thermo-Sorb® VOC, Thermo-Sorb® E, Thermo-Sorb® 263, Thermo-Lag® 3000, Thermo-Lag® E100, Thermo-Lag® E100 S

Raw Material Extraction Locations

NOTE: For raw material extraction locations and distance to manufacturing plants, please contact your local Carboline technical sales representative or Carboline fireproofing technical service.

Declare.℠

Firefilm III
Carboline Company

Final Assembly: Lake Charles, Louisiana, USA
Life Expectancy: Life of Structure
End of Life Options: Landfill (100%)

Ingredients:

Ammonium Polyphosphate, Water, Titanium Dioxide, 1,3-Propanediol, 2,2-bis(Hydroxymethyl)-, Acrylics; Acrylic Resins, Chlorinated Paraffins (CPs), Melamine, Butyl Benzyl Phthalate (BBP), Palygorskite Fibers (> 5mm in length), Methanol, Quartz

Living Building Challenge Criteria:

CRB-1009
VOC Content: 20 g/L
Declaration Status

EXP. 01 NOV 2020
VOC Emissions: CDPH Compliant
☐ LBC Red List Free
☐ LBC Compliant
■ Declared

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