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A/D Firefilm® III C

Water Based Intumescent

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A/D Firefilm® III C

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 C 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 in clean room and sterile environments.
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. • Very low out-gassing.
Color	White Contact your Carboline Representative for availability.
Finish	Smooth
Primer	A/D Firefilm® III C 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 C. Contact Carboline Technical Service for a complete list of approved primers for clean room applications.
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 *A/D Firefilm® III C 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 C must be applied to the specified DFT and be dry before applying a topcoat. Contact Carboline Technical Service for a complete list of approved topcoats for clean room applications.

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 C to the substrate. The general requirement for interior steel is SSPC-SP2 or SP3. Contact Carboline Technical Service for recommendations and specific primer requirements.
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
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 C 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 30 mesh inline filter installed. 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)

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.

Fan Size	6-10" (152-254 mm) depending on section being sprayed
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 C 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.

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 C. The coating shall then be built back to the original thickness, allowed to dry, then overcoated with the specified topcoat or system.

TESTING / CERTIFICATION / LISTING

Underwriters Laboratories, Inc.	A/D Firefilm® III C has been tested in accordance with ASTM E-119 (UL 263) at Underwriter's Laboratories, Inc. A/D Firefilm® III C 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:** D941, D948, F906, F910, F912 *The product should be applied in accordance with the appropriate design.
Intertek	A/D Firefilm® III C has been tested in accordance with ASTM E-119 at Intertek Laboratories. A/D Firefilm® III C 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

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 50-100°F (10-38°C). Protect from freezing.

PACKAGING, HANDLING & STORAGE

Shipping Weight (Approximate)	12 lb. (5.4 kg) per gallon (3.7 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 Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. 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.

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 48ADS1NL

Product Name: A/D FIREFILM III C

Revision Date: 11/28/2018

Supercedes Date: 03/16/2017

1.2 Relevant identified uses of the substance or mixture and uses advised against Fireproofing Material

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: Schlereth, Ken - 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
TRADE SECRET	TRADE SECRET	<0.1

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
TRADE SECRET	GHS06-GHS09	H300-332-400-410	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: Wash off with soap and plenty of water. 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 respiratory system.

4.3 Indication of any immediate medical attention and special treatment needed

No Information

5. Fire-fighting Measures

5.1 Extinguishing Media:

Alcohol Foam, 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

Cool containers / tanks with water spray. Evacuate personnel to safe areas. The product is not flammable. Use NIOSH approved respiratory protection. Use water spray to cool unopened containers.

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Evacuate personnel to safe areas. Wear personal protective equipment.

6.2 Environmental precautions

No Information

6.3 Methods and material for containment and cleaning up

No Information

6.4 Reference to other sections

No 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. Do not breathe vapours or spray mist. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation/personal protection. 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 container closed when not in use.

7.3 Specific end use(s)

No Information

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
TRADE SECRET	TRADE SECRET	0.5 MG/M3	N/E	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	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	
TRADE SECRET	TRADE SECRET	NE	

FURTHER INFORMATION: No Information

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: Use with adequate ventilation.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Viscous Liquid, White
Physical State	Liquid
Odor	Ammonia
Odor threshold	Not Determined
pH	Not Determined
Melting point / freezing point (°C)	Not Determined
Boiling point/range	149 F (65 C) - 471 F (244 C)
Flash Point	213 F (100 C)
Evaporation rate	Slower Than Ether

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

9.2 Other information

VOC Content g/l:	17
Specific Gravity (g/cm3)	1.46

10. Stability and Reactivity

10.1 Reactivity
No Information

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
No Information

10.6 Hazardous decomposition products
None known.

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: 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		
TRADE SECRET	TRADE SECRET	>1,000 MG/ KG		> 3.5 MG/L		

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
TRADE SECRET	TRADE SECRET	No information	No information	No information

13. Disposal Considerations

13.1 WASTE TREATMENT METHODS: Dispose of in accordance with local regulations.

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.: N/A

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:

No Information

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. E119Fire 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 33° F (1° C) and 100° F (38° 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 50° F (10° C), a minimum substrate and ambient temperature of 50° F (10° 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

Cambridge
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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 REVISED** July 11, 2011 November 11, 2005 6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III C		

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 C water based thin-film intumescent coating for determination of various physical characteristics.

The submitted sample was identified as:

Sample #1 - AD Firefilm III C (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.

Cambridge Materials Testing Limited

Per Steve Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild
DEREK WILD, TECHNICIAN

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AD Fire Protection Systems Inc.
REVISED
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 C (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

R&D PROJECT: A/D FIREFILM III C **DATE: 23 July 2010**

REPORT #: D 3960

REQUESTED BY: Fireproofing Department

TITLE: Determination of Volatile Organic Content (VOC)

PURPOSE: To determine the Volatile Organic Content of A/D FIREFILM III C

REFERENCES: Test Procedure ASTM D 3960, EPA Method 24

CONCLUSIONS: Volatile Organic Content 20 grams per Liter

Ted Rozum
Lab Coordinator

Cc: Sean Younger, Ed Taylor

R&D PROJECT: A/D FIREFILM III C **DATE: 12 September 2011**

REPORT #: D 2240-05

REQUESTED BY: Fireproofing Department

TITLE: Determination of the Shore D Hardness

PURPOSE: To determine the Shore D Hardness of A/D FIREFILM III C

REFERENCES: Test Procedure ASTM D 2240-05

CONCLUSIONS: The Durometer Shore D hardness was determined to be in the range of 75 to 82

Ted Rozum
Lab Coordinator

Cc: Sean Younger, Ed Taylor

R&D PROJECT: A/D FIREFILM III C **DATE: 17 November 2005**

REPORT #: **D 605**

REQUESTED BY: Fireproofing Department

TITLE: Dry Density

PURPOSE: To determine the dry density of A/D FIREFILM III C

REFERENCES: Test Procedure ASTM D 605

PROCEDURE: The A/D FIREFILM III C was applied at 65-mils wet film thickness and allowed to dry for 7-Days.

CONCLUSIONS: Based on the % Solids the Dry density was determined to be: 108.6 lbs/ft^3

Ted Rozum
Lab Coordinator

Cc: Sean Younger, Ed Taylor

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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. #:**	**403264D-05** **REVISION 5** July 11, 2011 November 11, 2005 6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III C		

TEST REPORT

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 C water based thin-film intumescent coating for determination of various physical characteristics.

The submitted sample was identified as:

Sample #1 - AD Firefilm III C (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.

Cambridge Materials Testing Limited

Per Steve Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild
DEREK WILD, TECHNICIAN

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AD Fire Protection Systems Inc.
Laboratory #403264D-05 REVISION 5

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 C (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***	

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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** **REVISION 2** July 11, 2011 November 11, 2005 6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III C		

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 C water based thin-film intumescent coating for determination of various physical characteristics.

The submitted samples were identified as:

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

Cambridge Materials Testing Limited

Per Steve Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild
DEREK WILD, TECHNICIAN

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AD Fire Protection Systems Inc.
Laboratory #403264C-05 REVISION 2

RESULTS OF TESTING

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

Sample #1 – AD Firefilm III C (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 C (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 C water based intumescent coating was 112 lbs/ft^3.

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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. #:**	**403264D-05** **REVISION 5** July 11, 2011 November 11, 2005 6630
Attention:	Ted Rozum		
Specimen:	AD Firefilm III C		

TEST REPORT

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 C water based thin-film intumescent coating for determination of various physical characteristics.

The submitted sample was identified as:

Sample #1 - AD Firefilm III C (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.

Cambridge Materials Testing Limited

Per Steve Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild
DEREK WILD, TECHNICIAN

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AD Fire Protection Systems Inc.
Laboratory #403264D-05 REVISION 5

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 C (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***	

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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** REVISED July 13, 2011 February 1st, 2006 6638
Attention:	Ted Rozum		
Specimen:	AD Firefilm III C		

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 C water based thin-film intumescent coating for determination of various physical characteristics.

The submitted samples were identified as:

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

Cambridge Materials Testing Limited

Per Steve Brown
STEPHEN BROWN, QUALITY ASSURANCE

Per Derek Wild
DEREK WILD, TECHNICIAN

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AD Fire Protection Systems Inc.
Laboratory #410160-06
REVISED

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 C (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 C (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.

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

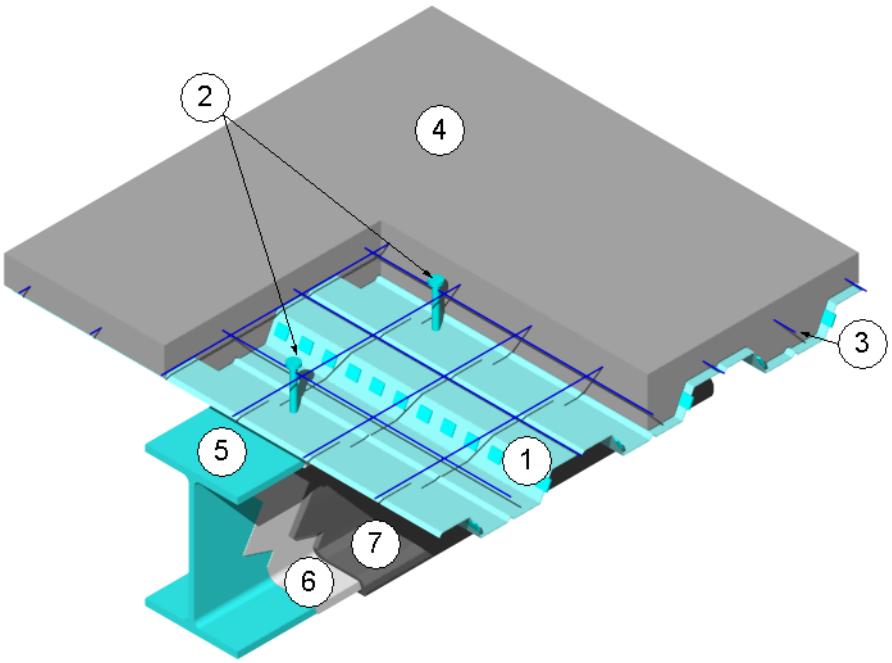


Table 1

			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"

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.

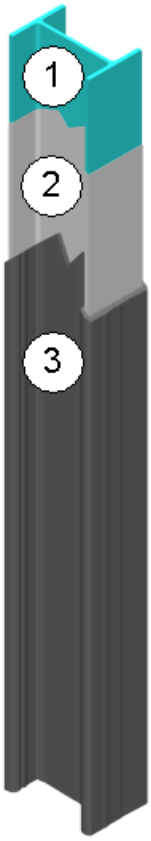
   CERTIFIED PRODUCT: Intumescent Mastic Fireproofing

   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

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

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

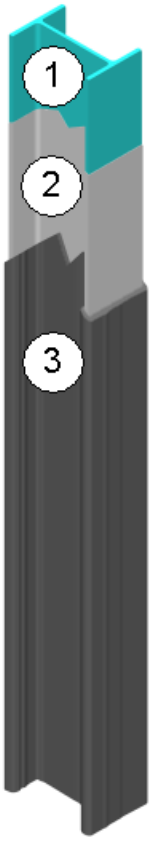
Apply Intumescent Mastic Fireproofing per the manufacturer's installation instructions at the minimum dry film thickness specified in the Table 1 below:

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.

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

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

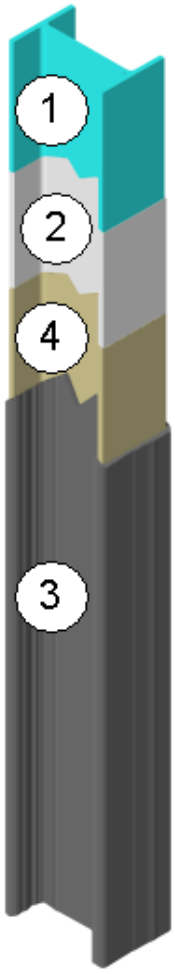
Apply Intumescent Mastic Fireproofing per the manufacturer's installation instructions at the minimum dry film thickness specified in the Table 1 below:

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.

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

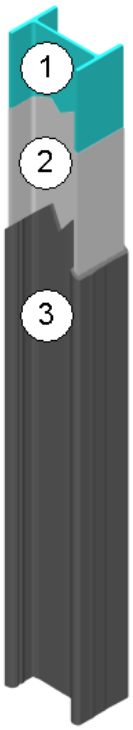
MODEL: A/D FIREFILM® II, A/D FIREFILM® IIIC, A/D FIREFILM® III and A/D FIREFILM® A3

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.

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

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

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

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.

FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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

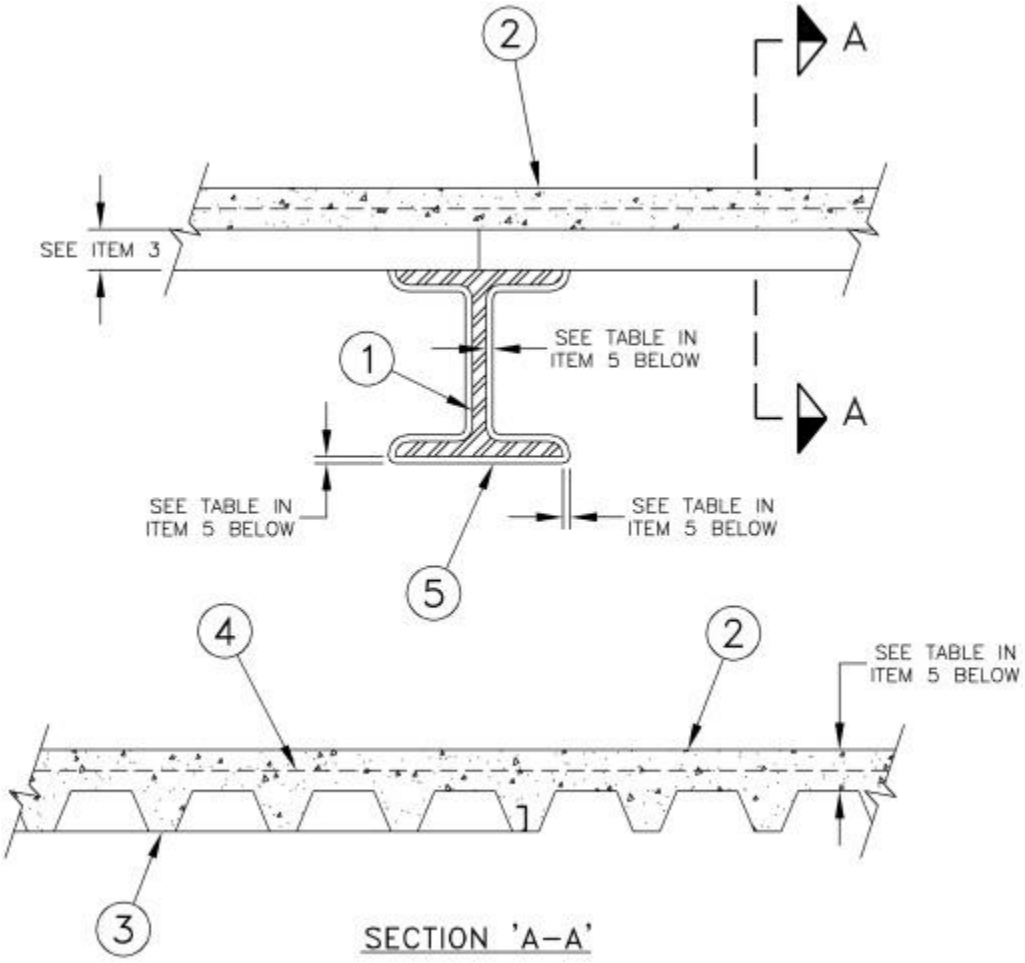
Restrained Assembly Ratings - 2 Hr. (See Item 5)

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

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.

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should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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

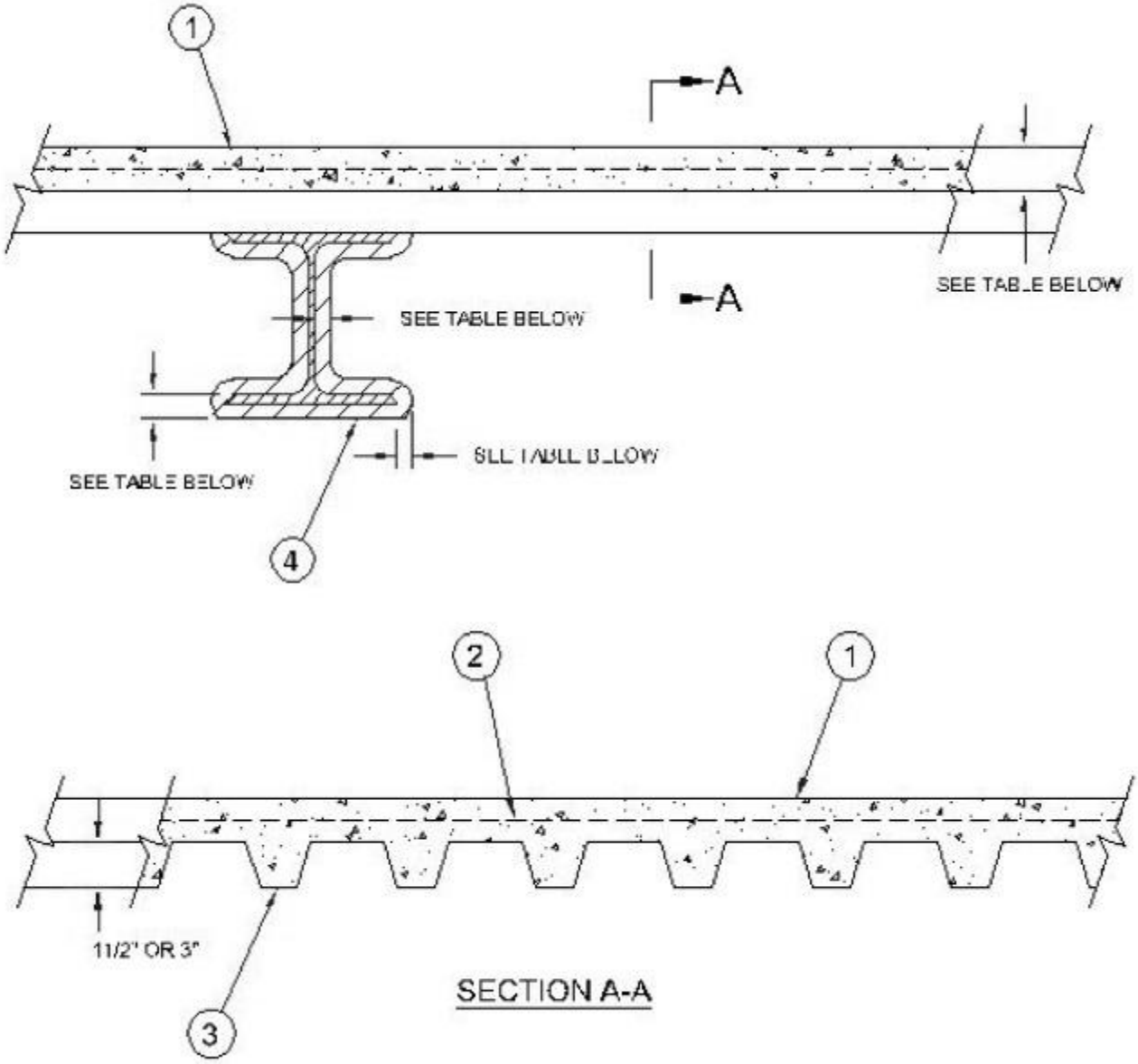
Restrained Assembly Ratings — 1, 1-1/2, 2 and 3 Hr (See Item 4)

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.

*** 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 2012-11-08

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.

FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

BXUV - Fire-resistance Ratings - ANSI/UL 263

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

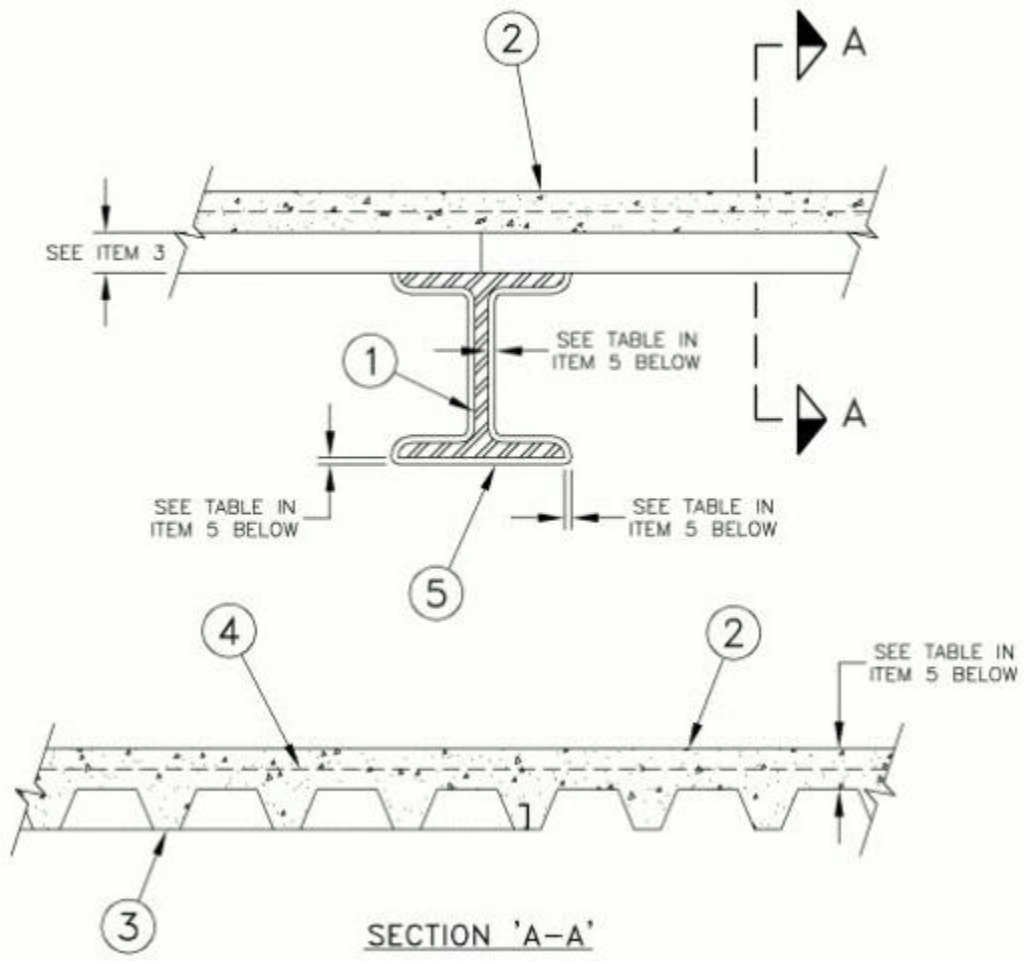
Design No. N641

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)

*** 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 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.

*** 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 2016-12-21

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.

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.

FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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

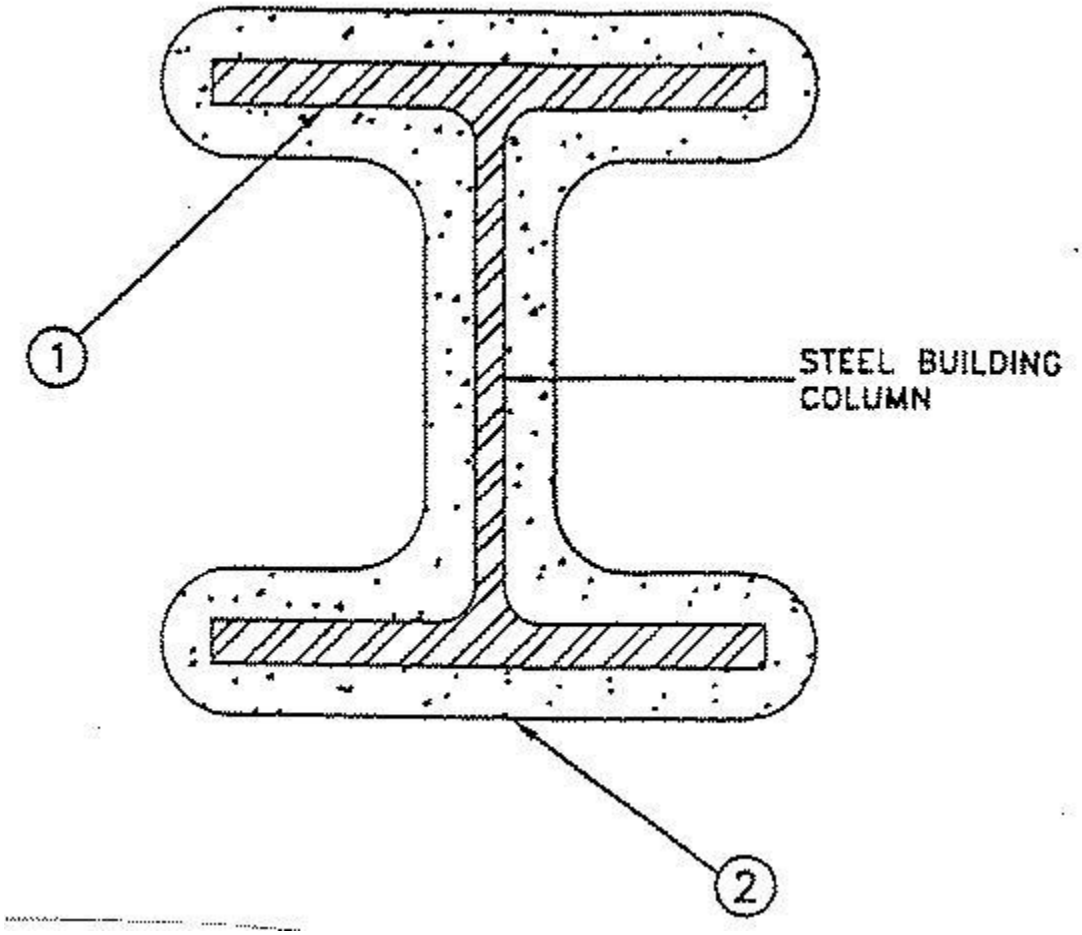
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X639

October 29, 2010

Rating - 3 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 —** 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.

*** 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

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.

FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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

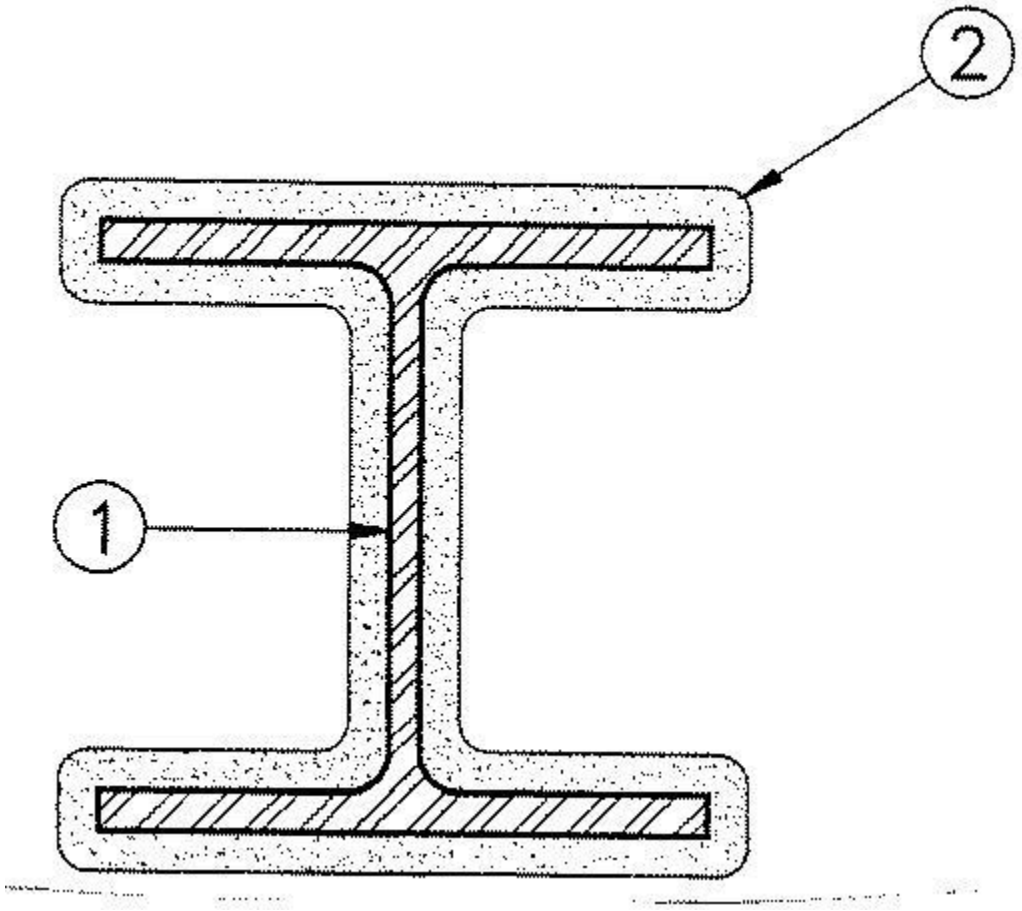
See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada
Design Criteria and Allowable Variances

Design No. X641

October 29, 2010

Ratings - 3/4, 1, 1-1/2 and 2 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:

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.

*** 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

Design/System/Construction/Assembly Usage Disclaimer

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- Authorities Having Jurisdiction should be consulted before construction.
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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".

FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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. X642

October 29, 2010

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

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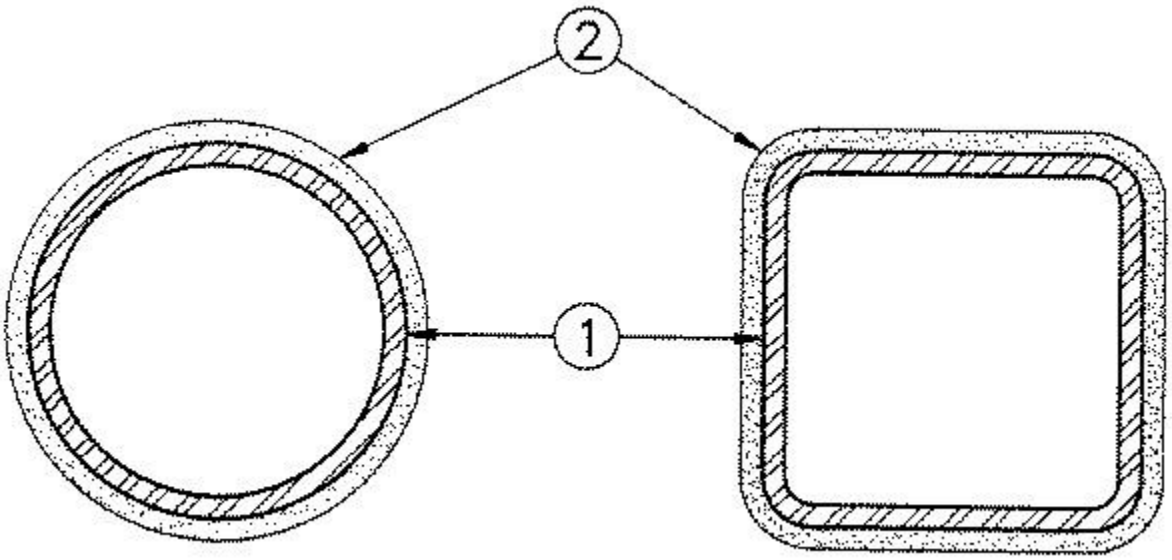

1. **Steel Column —** Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

		Column	Required Min
Rating, hr	Steel Column Size	A/P	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

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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Last Updated on 2010-10-29

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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. X643

October 29, 2010

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

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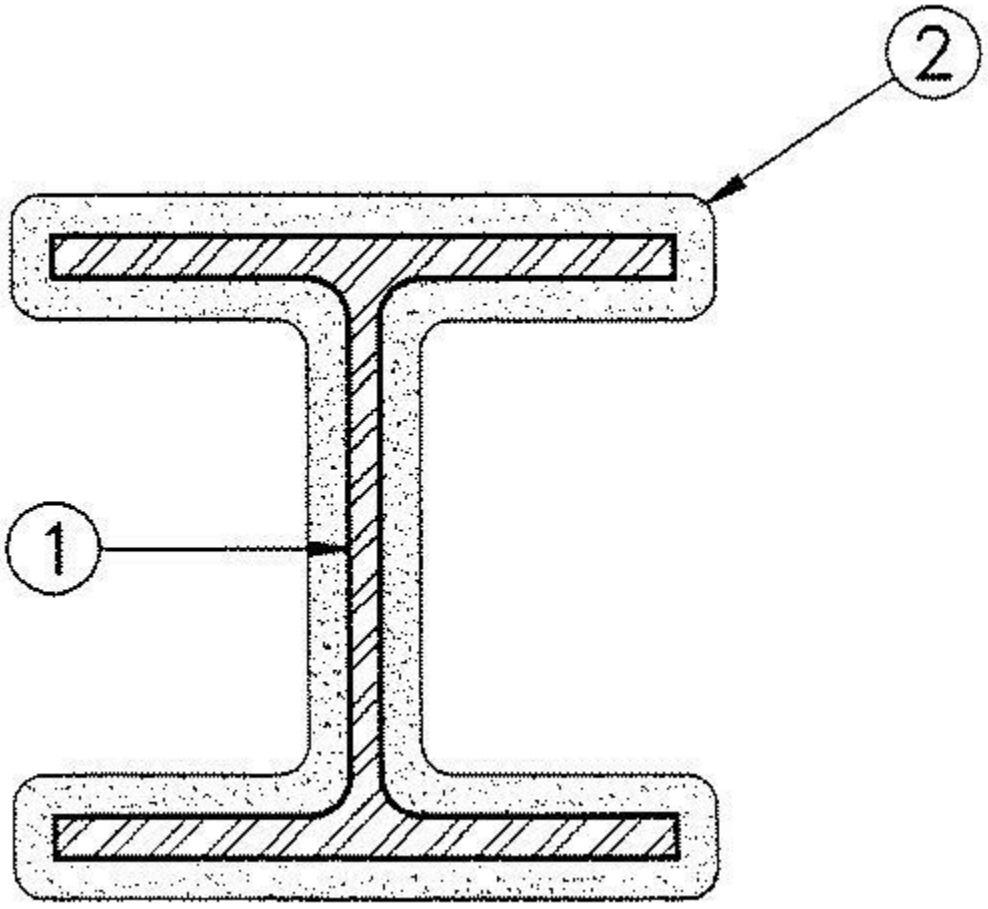

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

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

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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Last Updated on 2010-10-29

Design/System/Construction/Assembly Usage Disclaimer

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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)

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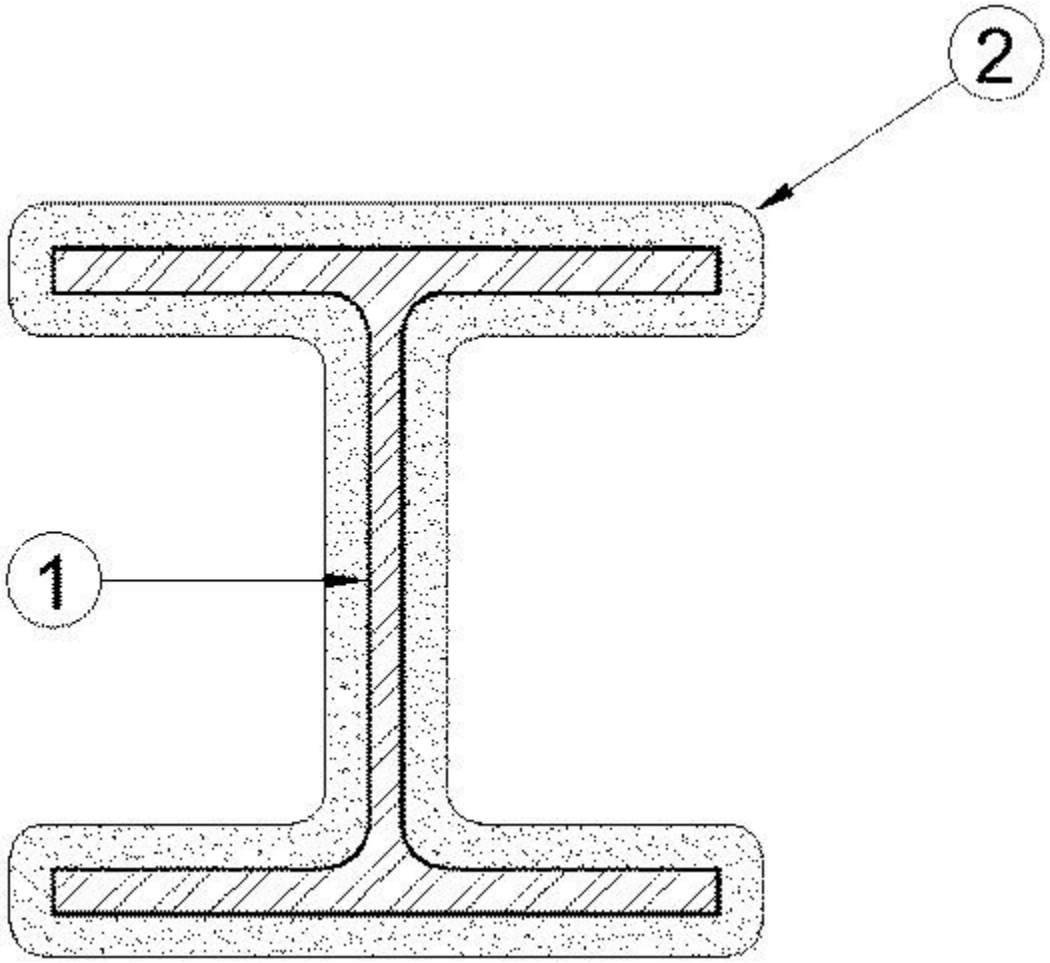

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

Last Updated on 2010-10-29

Design/System/Construction/Assembly Usage Disclaimer

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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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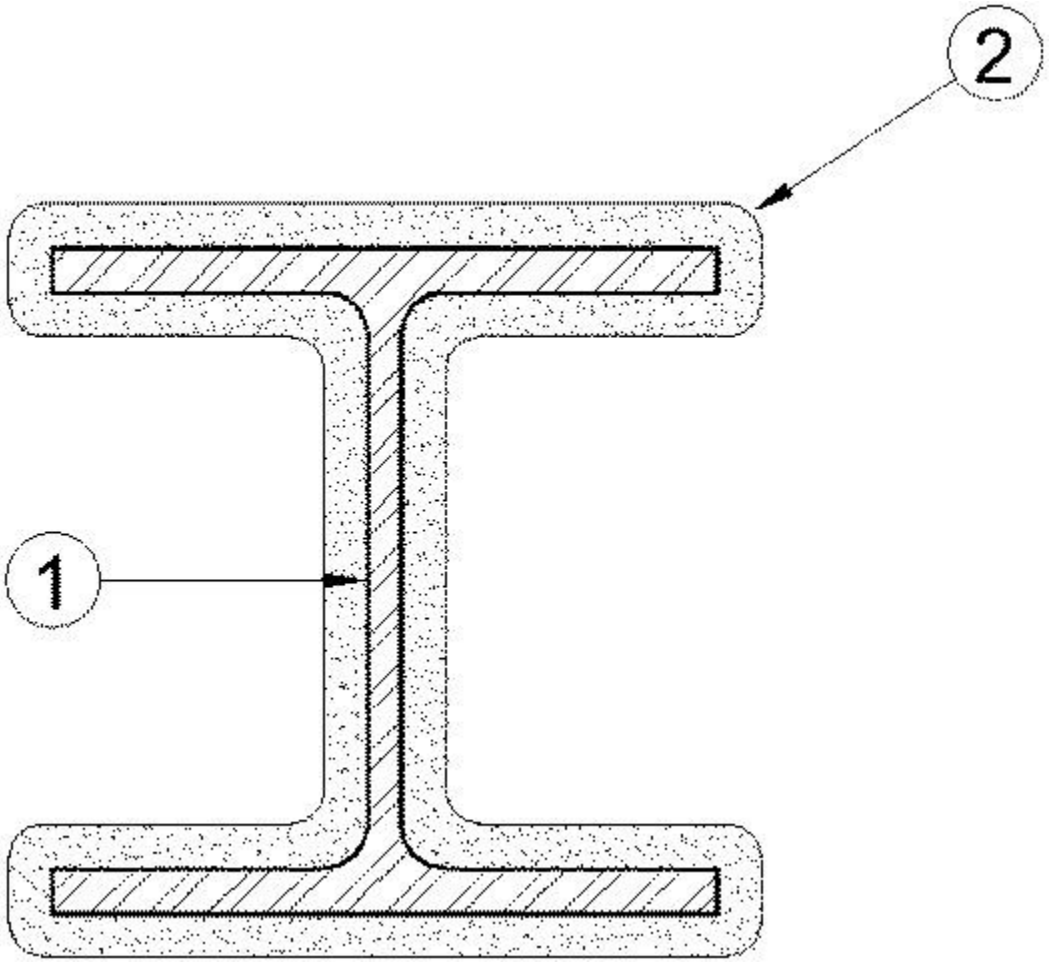

1. **Steel Column —** Wide flange steel columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

	Column	Column	Required Min	
Rating, hr	Description, In.	W/D	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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Last Updated on 2010-10-29

Design/System/Construction/Assembly Usage Disclaimer

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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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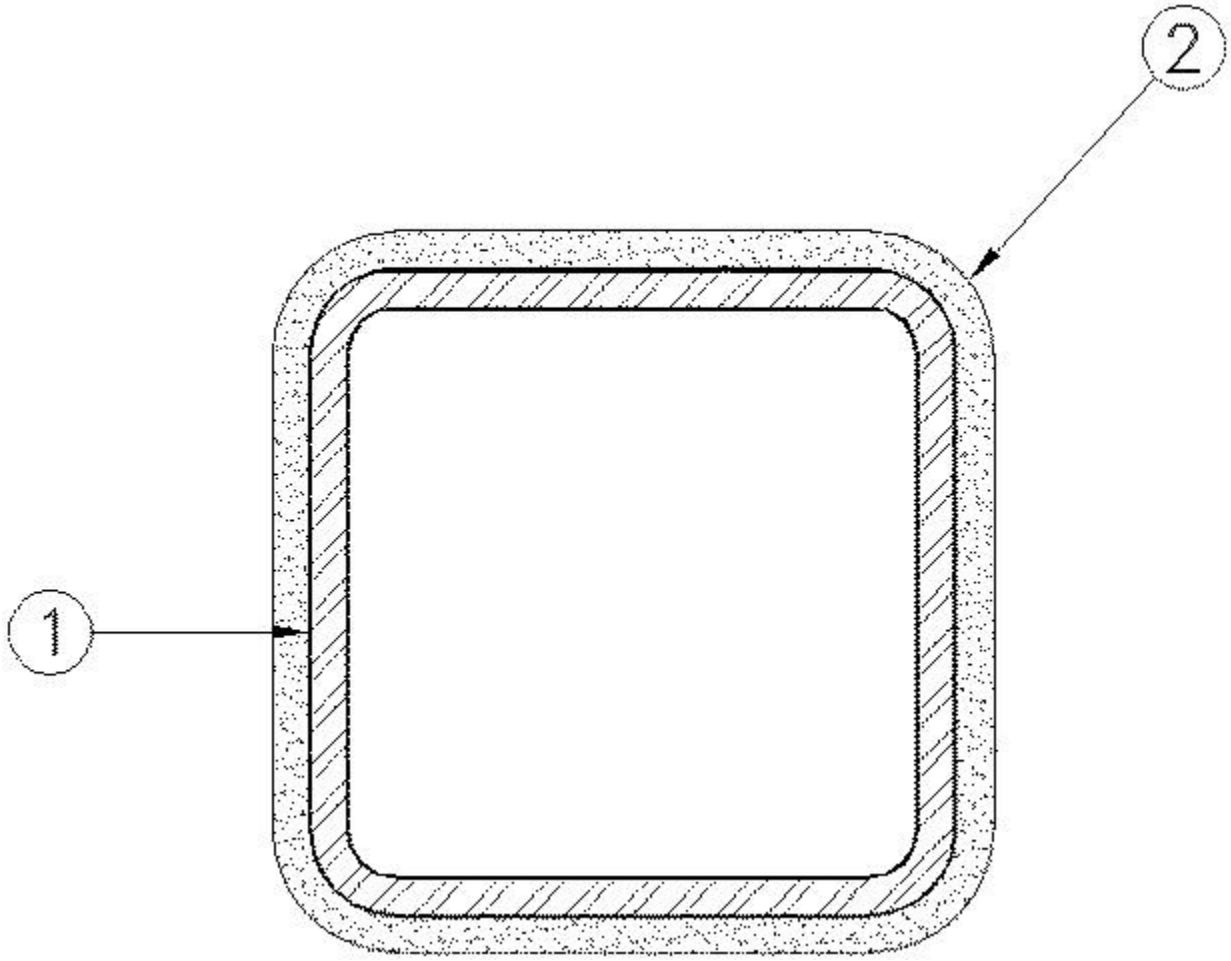

1. **Steel Column —** Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

			Required Min	
Rating, hr	**Column Size**	**Column, A/P**	**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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Last Updated on 2010-10-29

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FIRE-RESISTANCE DESIGN

Assembly Usage Disclaimer

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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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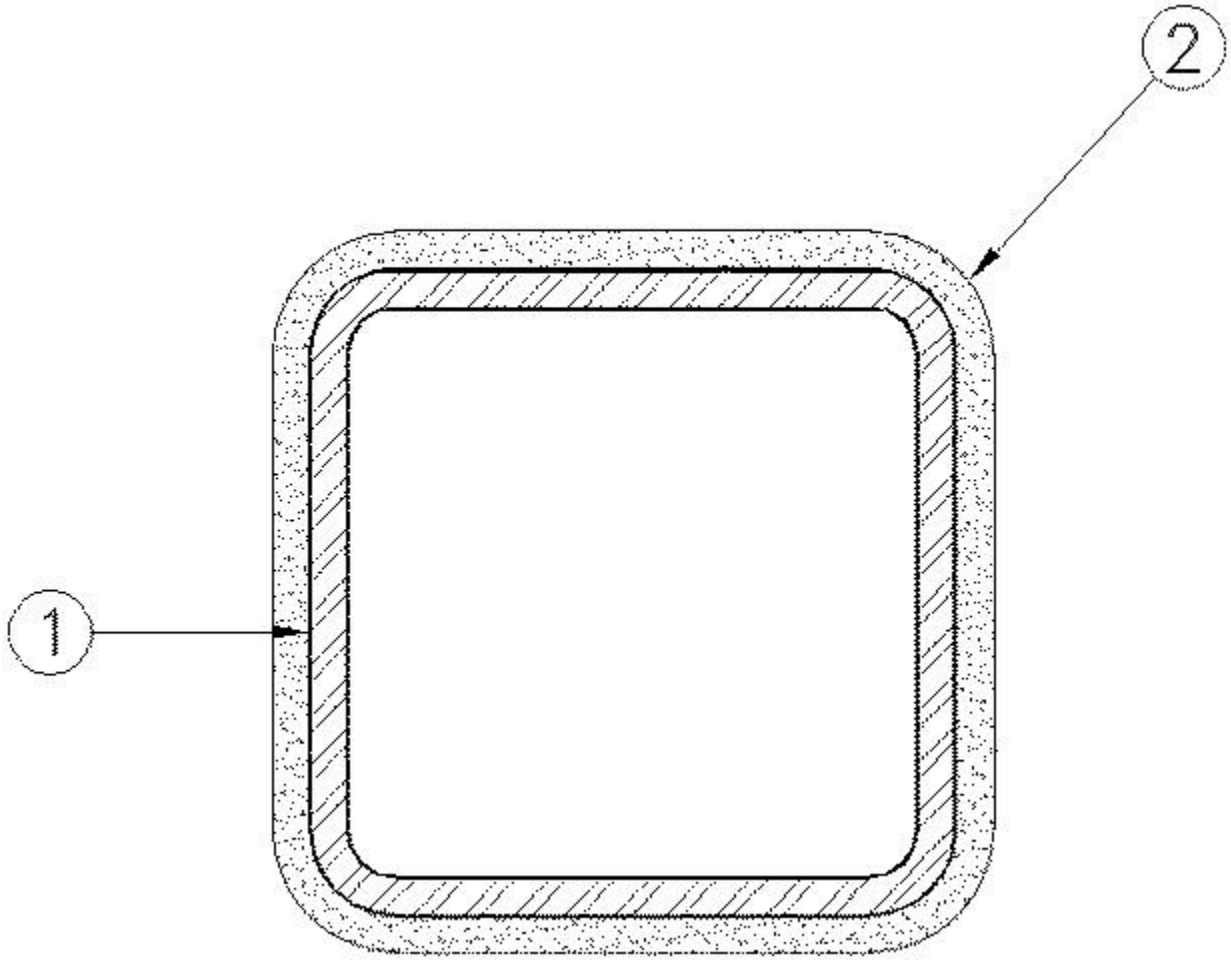

1. **Steel Column —** Square steel tube columns with the minimum sizes shown in the table below. Columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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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FIRE-RESISTANCE DESIGN

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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. X673

October 29, 2010

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

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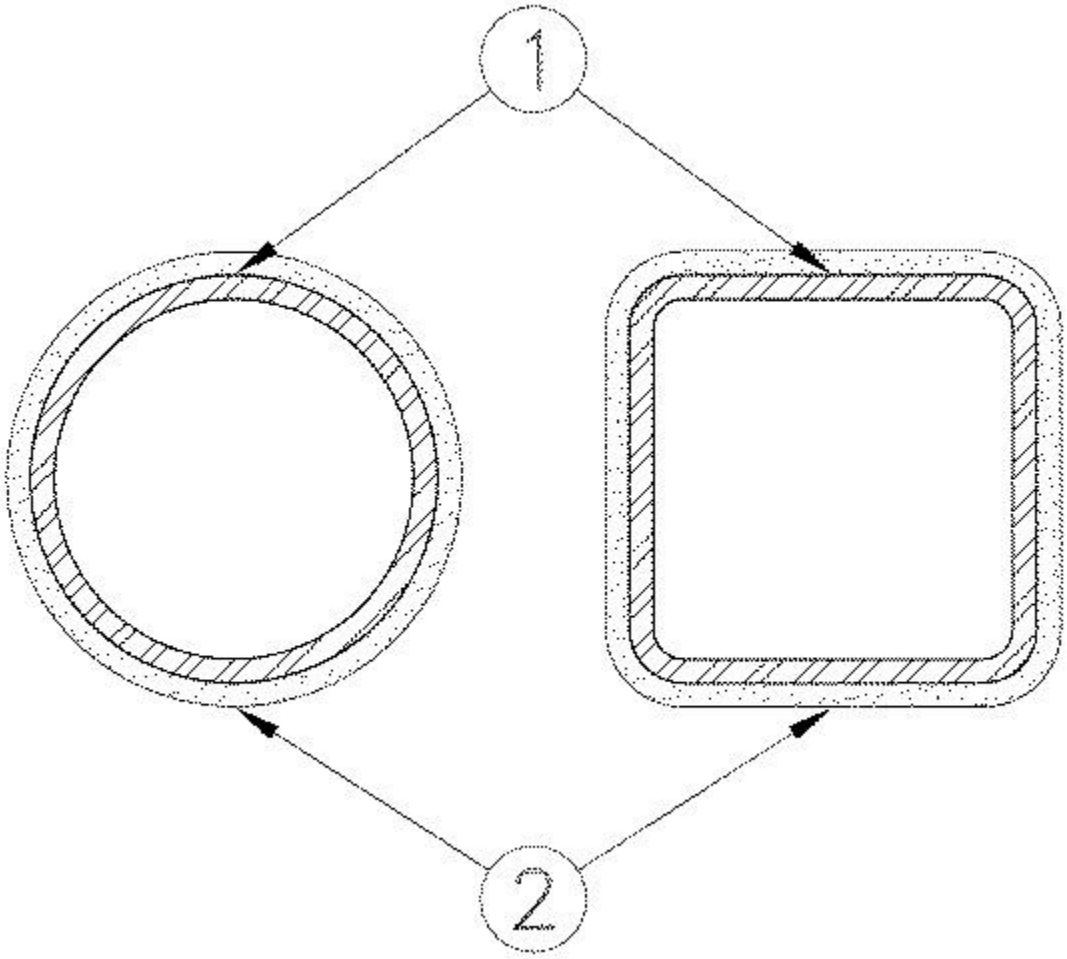

1. **Steel Column —** Square, rectangular or circular tubular steel columns with the minimum sizes shown in the table below. Steel columns shall be free of dirt, loose scale and oil. Column shall be primed with metal alkyd primer.

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

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Declare℠

Firefilm III C
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)-, Chlorinated Paraffins (CPs), Melamine, Vinyl Acrylic Resin, Guanidine, Cyano-, Aluminum Hydroxide, Aluminum Oxide, Boric Acid (HBO2), Barium Salt, Butyl Benzyl Phthalate (BBP), Palygorskite Fibers (> 5mm in Length), Propanoic Acid, 2-Methyl-, Monoester with 2,2,4-Trimethyl-1,3-Pentanediol, Cellulose, 2-Hydroxyethyl Ether, Methanol, Quartz

Living Building Challenge Criteria:

CRB-0010
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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