



NFCA 300 Standard Practice for the Application of Intumescent Fire-Resistive Material (IFRM)

1. Scope

- 1.1. This standard covers guidelines for applications of Intumescent Fire-Resistive Material.
- 1.2. This standard covers safety as it applies to Intumescent Fire-Resistive Material.
- 1.3. This standard covers patching of Intumescent Fire-Resistive Material.
- 1.4. This standard covers specific exclusions, qualifications and or clarifications to be used for owners, construction managers, general contractors, architects and specifiers.

2. Reference Documents

- 2.1. ASTM E119 (UL263) Standard Test Methods for Fire Tests of Building Construction and Materials
- 2.2. AWCI Technical Manual 12-B Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials
- 2.3. ICBO ES Reports
- 2.4. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
- 2.5. UL 1709 Standard for Rapid Rise Fire Tests of Protection Materials for Structural Steel
- 2.6. ASTM D2240 “Test Method for Rubber Property -Durometer Hardness” (Shore D scale only)
- 2.7. ASTM D2794 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
- 2.8. ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

3. Terminology

- 3.1. Application: an act of applying Intumescent Fire-Resistive Materials.
- 3.2. Intumescent Fire-Resistive Material: intumescent coatings that are mixed at the factory and are applied directly to building structures by means of pumping equipment specifically designed for that purpose or by hand with paint brush, roller, or trowel.
- 3.3. Fire Resistive Materials: materials that are applied onto substrates to provide fire-resistive protection of the substrates.

4. Summary of Practice

- 4.1. This standard describes the intent of the NFCA for the purpose of aiding others to specify, apply and test IFRMs.

5. Significance & Use

- 5.1. This practice is the intent of the NFCA for use by the material specifier, general contractor, construction manager, NFCA applicator or any individual group requiring information regarding the application of IFRMs.
- 5.2. This practice is not intended to replace the manufactures' specific application instructions.

6. Safety

- 6.1. Current OSHA, applicable local ordinances, or code regulations shall be followed at all times. Note: The OSHA regulation for solvent-based intumescent coatings is specific to the volatile nature of the product.
- 6.1.1. Equipment shall have safety guards that meet applicable OSHA regulations in place. Grounded electrical connections shall be used.
- 6.1.2. Protective Equipment: All persons in the application area shall wear protective equipment as required. Examples of equipment that may be needed are respirators, dust masks, coveralls, goggles or safety glasses and hard hats.
- 6.1.3. Workmen shall not wear loose fitting clothing that could become caught in the machinery. Note, however, that personnel actually spraying product may wear loose, long sleeve clothing for protection and comfort reasons.
- 6.1.4. Floors: The floors in the work area shall be kept free of obstructions, excessive moisture, waste material or other unsafe conditions.
- 6.1.5. Explosion Hazard: In areas where explosion hazards exist, workman should be required to use non-ferrous tools and extinguish all open flame sources.

7. Materials

- 7.1. The IFRM shall be intumescent type. The IFRM shall be manufactured in accordance with the manufacturer's specifications and procedures required by product approval agencies. The material shall be free of any contamination that could impair its application or performance.

8. Storage & Handling

- 8.1. All materials shall be delivered to the job site in clearly labeled, unopened containers. Labels shall include the manufacturer, product name, surface-burning characteristics of the product, product code, and certification agency or mark.
- 8.2. Materials with a shelf life shall be used within that period. Materials that have gone beyond their shelf life shall be removed from the job site, or manufacturer shall provide documentation attesting that the product is still usable for its original intended purpose.

- 8.3. Materials shall be kept dry and stored off the ground under cover until used.
- 8.4. Materials shall be transported, delivered, stored, and used in accordance with manufactures' instructions concerning temperature limitations. Protect water-based products from freezing.

9. Equipment and Utilities

- 9.1. Equipment used for application shall be of a type recommended by the IFRM manufacturer. Equipment shall include, but is not limited to the following:
 - 9.1.1. Pumping equipment: manufactures recommended pumping equipment should be used for materials specified. i.e. Proper Pump Ratio and PSI.
 - 9.1.2. Mixer: use recommended mixing paddle or wand to avoid air entrapment.
 - 9.1.3. Accessories: use only those types of hoses, spray guns, spray tips, etc. that are recommended by product manufacturer.
 - 9.1.4. Measuring Devices: use only recommended wet film and dry film thickness measuring devices to ensure proper interim and final coating thicknesses.

10. Application Environment

- 10.1. A minimum ambient and substrate temperature of 50 F (10 C) shall be maintained for 72 hours before, during and a minimum of 72 hours after the application of the IFRM unless otherwise recommended by the material manufacturer. If necessary for job progress, enclosures, heat and/or dehumidification shall be provided to maintain recommended conditions and shall be the responsibility of the general contractor and or construction manager.
- 10.2. Relative humidity in the work area shall not exceed 75 percent during the application and drying/curing period required for the IFRM except as otherwise recommended by the IFRM manufacturer. If dehumidification is required, the IFRM manufacturer shall be consulted for specific recommendations. Precautions must be taken to avoid condensation from forming on the steel during application. Do not apply any intumescent coating if condensation is present.
- 10.3. To allow proper drying of the IFRM during and after application, adequate ventilation must be provided and shall be the responsibility of the general contractor and or the construction manager (reference 13.2). In enclosed areas, ventilation shall not be less than 4 complete air exchanges per hour, until the IFRM is dry.
- 10.4. Within the building, free and clear ingress/egress for movable scaffolds, from the floor line to the area to be fireproofed, is required. No installation that would restrict movement of scaffolds, equipment, personnel, or limit the uninterrupted application of fireproofing materials shall be permitted. Clutter, debris and/or items stored on the floor must be located where they will not interfere with application. Protection of stored items is not the responsibility of the IFRM contractor.
- 10.5. Suitable room and space required for pump stations and material storage shall be provided.
- 10.6. Sufficient egress for material trailers will be required, i.e. crushed stone or gravel.
- 10.7. Dedicated sources of sufficient electricity and water in close proximity to the work area will be required and will be the responsibility of the general contractor and or the construction manager.

10.8. Protection and covering will be limited to structural walls and floors. Other covering and protection will be the responsibility of the designated trade or the General Contractor and or Construction Manager.

11. Application

- 11.1. IFRMs shall be applied by an experienced manufacturer licensed or certified contractor.
- 11.2. Equipment, mixing, and applications shall be in accordance with IFRM manufacturers' written specifications and application instructions.
- 11.3. The substrates to receive application of IFRMs shall be satisfactory for direct spray application. Structural steel shall be free of paint (other than those primers tested and found acceptable to, or required by, the IFRM manufacturer), oils, grease, loose mill scale, rust, dirt, or other foreign substances that may impair proper adhesion.
- 11.4. Steel surface temperature shall be a minimum of 4 degrees fahrenheit above the dew point.
- 11.5. Areas to be fireproofed should be protected from rain and high humidity and in accordance with manufactures recommendations.
- 11.6. Prior to application of IFRMs, clips, hangers, supports, and other attachments required to penetrate the fireproofing shall be in place.
- 11.7. Ducts, piping, equipment, metal stud framing, non-load bearing CMU or other suspended material shall not be positioned until the fireproofing work is complete.
- 11.8. Primers shall be used when required and as recommended by IFRM manufacturer.

12. Proper Spraying Techniques

- 12.1. Trained Sprayers: sprayers must follow the manufacturers recommended application procedures and also follow field quality assurance procedures for IFRMs to ensure the following:
 - 12.1.1. All required flutes, both long bay and short bay flutes, are treated to meet UL/ULC design listings.
 - 12.1.2. Apply each coat in accordance with manufacturers' maximum loading recommendations.
 - 12.1.3. All products are sprayed to obtain complete and consistent texture.
 - 12.1.4. Correct tolerances and thickness control is obtained through spot checks during application and confirmed by a third party independent inspection agency. (Note: wet film thickness gauges must be used during application).

13. Protection During Curing

- 13.1. IFRMs are susceptible to damage while they are curing. Precautions shall be taken to allow the materials to cure without physical abuse or damage during the cure period. Precautions shall be the sole responsibility of the damaging contractor and or the general contractor and/or the construction manager.
- 13.2. Heating and ventilation shall be provided when needed for curing and/fume removal and will be the responsibility of the General Contractor and or Construction Manager.

- 13.3. Care shall be taken so that deflection or impact greater than the IFRM manufacturers' recommended limits do not occur.

14. Patching

- 14.1. Patching: in areas where the IFRM has been removed, the area shall be resprayed or patched with the same material except as otherwise recommended by the manufacturer or in accordance with the fire resistance design criteria.
- 14.2. The responsible party for damage shall be determined before the patching takes place.
- 14.3. All patching and repair of IFRM due to damage (intentional or unintentional) by others shall be completed by manufacturer certified or licensed contractor at the expense of the responsible party.

15. Specific Exclusions, Qualifications & Clarifications

The general contractor and/or construction manager shall provide the following conditions for application of the IFRM:

- 15.1. Power and water to the staging area;
- 15.2. Heat, ventilation, and weather protection as applicable during application and during curing of the IFRM;
- 15.3. Protection of any surfaces other than structural walls and floors;
- 15.4. Method of payment for performing patching services prior to commencement of patching;
- 15.5. Showing IFRM on the construction progress schedule (this is mandatory);
- 15.6. Clear and unobstructed access to areas and steel to receive IFRM is mandatory;
- 15.7. Coordinate and communicate test results from inspection of IFRMs to fireproofing contractor at completion of each floor or distinct work area. Note: tests shall be in accordance with AWCI Technical Manual 12-B.
- 15.8. Removal of equipment and stored materials from work area and all exposed floor areas shall be provided in scraped-clean condition.
- 15.9. Proper construction site space to facilitate the delivery of materials to proximity of the work.

