



National Fireproofing  
Contractors Association

## **NFCA 400 Field Quality Assurance Procedure for the Application of Intumescent Fire-Resistive Material (IFRM)**

### **1**     Scope

The application of intumescent fire-resistive material requires the contractor to ensure that the product is installed in accordance with product approval agencies', manufacturers' and project criteria. This document defines the type of quality assurance procedures that should be followed by the contractor during intumescent fire-resistive material application.

### **2**     Reference Documents

2.1     Following are documents referenced in this document or that reference this document.

- 2.1.1.   AWCI Technical Manual 12-B Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials
- 2.1.2.   UL Fire-Resistance Directory – Volume 1, latest edition.
- 2.1.3.   ULC List of Equipment and Materials, Fire-Resistance, latest edition.
- 2.1.4.   Factory Mutual, Approvals Guide, latest edition.
- 2.1.5.   ITS, Directory of Listed Building Products, latest edition.

### **3**     Determining Acceptable Substrate Surface Conditions

3.1     General: The surface of the structural substrate must be of acceptable quality and primed with a compatible primer to ensure adequate adhesion of intumescent materials. Criteria for acceptable substrate surfaces include adequate substrate surface temperature, surface free of any de-bonding materials, rigidity of the substrate, application of a compatible primer and surface preparation. All listed criteria must be met before application of intumescent materials.

#### 3.2     Substrate Surface Temperature

3.2.1   Frequency of Temperature Determination: The substrate surface temperature must be measured at the beginning of each day. The temperature must be monitored during the day to ensure compliance with temperature criteria. Substrate surface temperature must be measured with a surface-measuring thermometer with a minimum range of 0°F to 100°F (-18 to 38°C).

3.2.2 The following substrate surface conditions should be considered for the type of product being used. All surfaces should be free of frost and meet all conditions per manufacturer's specifications. The ambient temperature should be at least 5° F (3°C) above the dew point and rising prior to commencing application. Relative humidity should not exceed 80%.

3.2.2.1 Water Based Materials: Do not allow ambient temperature to drop below 50°F (10°C) during the application and the temperature shall be maintained at or above 50°F (10°C) for a minimum of 24 hours after application, except as permitted by the manufacturer's application instructions. Should the substrate temperature drop below 50°F (10°C), the application area must be heated to maintain the acceptable temperature.

The material Shore D should reach a minimum level as determined by the manufacturer to indicate a full cure has been reached and conditioning is no longer required.

3.2.2.2 Solvent Based Materials: Do not allow ambient temperatures to drop below 40°F (4°C) during the application and the temperature shall be maintained at or above 40°F (4°C) for a minimum of 24 hours after application, except as permitted by the manufacturer's application instructions. Should the substrate temperature drop below 40°F (4°C), the application area must be heated to maintain the acceptable temperature.

The material Shore D should reach a minimum level as determined by the manufacturer to indicate a full cure has been reached and conditioning is no longer required.

3.2.2.3 Epoxy Based Materials: These intumescent fire-resistive materials (IFRM's) require specialized equipment for application. Consult the IFRM manufacturer's detailed application instructions for application temperature. Do not allow temperatures to drop below 50°F (10°C) during the application and maintain the temperature at or above 50°F (10°C) for a minimum of 24 hours after application, except as permitted by the manufacturer's application instructions. Should the ambient or substrate temperature drop below 50°F (10°C), the application area must be heated to maintain the acceptable temperature.

### 3.3 Clean Substrates

3.3.1 Substrate Condition: All substrates must be free of any dust, grease, mill scale, surface contaminants or other foreign matter prior to application of compatible primer and intumescent material. Assure that the substrate is prepared to receive the primer in accordance with the recommendation of the intumescent material or primer manufacturer.

- 3.3.2 Compatible Primer: All steel to receive intumescent fire-resistive materials must be primed with a compatible primer in accordance with the intumescent material manufacturer's or primer manufacturer's recommendations and fire test design information.

### 3.4 Environmental Considerations

- 3.4.1 Follow good application practices. Measure the temperature and humidity of the application site before beginning the IFRM application. Enclosure, heat and dehumidification of the workspace may be required to comply with the intumescent fire-resistive materials recommendations. Refer to the intumescent manufacturer's application procedures for specific instructions.
- 3.4.2 Unless specifically formulated for exposure to weather and exterior conditions, intumescent fire-resistive materials must be applied in indoor conditions and shall be protected from exposure to water and other elements that may affect the drying process as well as long-term adhesion.

### 3.5 Application

- 3.5.1 The contractor shall be trained and qualified in the proper application procedures by the intumescent manufacturer before starting the first application.
- 3.5.2 Intumescent fire-resistive materials are typically built up with a number of thinner coats. To avoid solvent entrapment, do not exceed the manufacturer's recommended thickness per coat.
- 3.5.3 Intumescent fire-resistive materials must dry between coats and before top coating. Consult and abide by the IFRM manufacturer's application instructions for minimum time and method to determine dryness or cure. Vent area where the application is occurring and consult the manufacturer's instructions for specific recommendations relating to the IFRM being used.
- 3.5.4 Intumescent fire-resistive materials are typically applied by airless equipment. This equipment operates at high pressures and can be dangerous. Make sure that all contractor personnel using this equipment have been trained by the IFRM manufacturer, the pump manufacturer, or supplier.

## 4 Delivery, Storage and Handling

- 4.1 Deliver intumescent fire-resistive materials to the project in manufacturer's unopened packages. Product shall be fully identified as to trade name, type and other identifying data. Packaging shall bear the certification agency's labels or listing mark as evidence that the product has been tested for the required fire resistance ratings.
- 4.2 Store materials at a temperature above 50°F (10°C) (water based) or 40° F (4°C) (solvent based) in a dry location, protected from the weather, except as otherwise indicated by the

manufacturer's instructions. Water-based and solvent based intumescent must be protected from freezing.

- 4.3 Damaged packages found unsuitable for use and any materials that have come into contact with contaminants prior to use shall be rejected and removed from the project.

## 5 Thickness Measurement

- 5.1 General: The performance of intumescent fire-resistive materials is directly related to the thickness of the applied IFRM. The thickness required by the specific fire-resistive design determines the hourly rating.
- 5.2 Frequent thickness measurements with a wet-film gauge are required during the application of each coat to ensure uniform thickness.
- 5.3 Final thickness must be measured with a dry film thickness gauge in accordance with AWCI Technical Manual 12-B Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials.
- 5.4 Final thickness must be measured and recorded prior to application of any topcoat since removal of topcoat to correct a thickness deficiency may be difficult.
- 5.5 Thickness of primer or other existing coating on surface of the substrate must be measured and recorded prior to application of intumescent fire-resistive materials, and must be subtracted from final thickness measurements for accurate determination of thickness of the fire-resistive material.
- 5.6 Corrective Action: Should the final thickness measurement in section 5.4 above fall below the minimum thickness required for the application, the contractor shall apply additional IFRM thickness to bring the thickness into compliance. The additional IFRM application shall comply with IFRM and primer manufacturers application instructions.

## 6 Inspection

- 6.1 Inspection of mastic and intumescent fire resistive materials by a third party or the local authority having jurisdiction, shall be in accordance with 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.
- 6.2 Inspection of intumescent fire resistive materials by a third party or the local authority having jurisdiction shall be scheduled to coincide with adequate drying of final application of IFRM and prior to application of top coat.

