



NFCA 400 – Field Quality Assurance Procedure for Application of Mastic and Thin-Film Intumescent Fire Resistive Coatings

1 Scope

The application of mastic and thin-film intumescent fire resistive coatings 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 mastic and thin-film intumescent fire-resistive coating application.

2 Reference Documents

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

- 2.1.1. AWC Technical Manual 12-B, "Standard Practice for the Testing and Inspection of Field Applied Thin-Film Intumescent Fire-Resistive Materials; an Annotated Guide," Second Edition.
- 2.1.2. ULI, 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 mastic and thin-film intumescent fire-resistive coatings. 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 mastic and thin-film intumescent fire-resistive coatings.

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 fire resistive materials require specialized equipment for application. Consult the coating 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 coating. Assure that the substrate is prepared to receive the primer in accordance with the recommendation of the intumescent coating or primer manufacturer.
- 3.3.2 Compatible Primer: All steel to receive mastic and thin-film intumescent fire resistive coatings must be primed with a compatible primer in accordance with the mastic and thin-film intumescent coating manufacturer's or primer manufacturer's recommendations and fire test design information.

3.4 Environmental Considerations

- 3.4.1 Follow good painting practices. Measure the temperature and humidity of the application site before beginning the coating application. Enclosure, heat and dehumidification of the workspace may be required to comply with the mastic and thin-film intumescent fire resistive coatings 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, mastic and thin-film intumescent fire resistive coatings must be applied in indoor conditions and shall be protected from exposure to water and other elements that may effect 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 Mastic and thin-film intumescent fire resistive coatings 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 Mastic and thin-film intumescent fire resistive coatings must dry between coats and before top coating. Consult and abide by the coating 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 coating being used.

- 3.5.4 Mastic and thin film fire resistive coatings 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 coating manufacturer, the pump manufacturer, or supplier.

4 Delivery, Storage and Handling

- 4.1 Deliver mastic and thin-film intumescent fire resistive coatings 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 mastic and thin-film intumescent coatings is directly related to the thickness of the applied coating. 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; an Annotated Guide," latest edition.
- 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 mastic and thin-film intumescent fire resistive coatings, and must be subtracted from final thickness measurements for accurate determination of thickness of the fire-resistive coating.

- 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 coating thickness to bring the thickness into compliance. The additional coating application shall comply with coating manufacturers application instructions.

6 Inspection

- 6.1 Inspection of mastic and thin-film intumescent fire resistive coatings 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 mastic and thin-film intumescent fire resistive coatings by a third party or the local authority having jurisdiction shall be scheduled to coincide with adequate drying of final application of intumescent coat and prior to application of top coat.