

## SECTION 07 81 16

### CEMENTITIOUS FIREPROOFING

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Cementitious direct spray-applied fireproofing

##### 1.02 MEASUREMENT AND PAYMENT

- A. General: Sprayed-on cementitious fireproofing will not be measured separately for payment but will be paid for as part of the Contract lump sum price for Architectural Work.

##### 1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM):

1. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials
2. ASTM E119 Test Method for Fire Tests of Building Construction and Materials
3. ASTM E605 Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
4. ASTM E736 Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
5. ASTM E759 Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members
6. ASTM E760 Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members
7. ASTM E761 Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members
8. ASTM E859 Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members
9. ASTM E937 Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
10. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

- B. International Conference of Building Officials, Uniform Building Code (UBC):

1. UBC Standard 7-6, Thickness and Density Determination for Spray-Applied Fireproofing

C. Underwriters Laboratories Inc. (UL):

1. UL Fire Resistance Directory; applicable UL Design Numbers for application of spray-applied fireproofing and conditions as indicated.

**1.04 SYSTEM DESCRIPTION**

System includes one-hour, two-hour, and three-hour fire-rated protection for structural steel members and for underside of steel decking as indicated

**1.05 REGULATORY REQUIREMENTS**

- A. In addition to the foregoing referenced standards, the regulatory requirements that govern the work of this Section include the following governing code:

1. California Code of Regulations (CCR), Title 24, Part 2, California Building Code, Chapter 7, "Fire-Resistant Materials and Construction."

**1.06 SUBMITTALS**

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Product Data: Submit manufacturer's product data of the cementitious fireproofing material proposed for this work.
- C. Certificates: Submit certificates from a testing laboratory acceptable to the Engineer, attesting that fire protection material and installation methods meet specified fire hazard classifications and fire resistance ratings. Certificates shall also list thicknesses and density of material proposed for use.

**1.07 QUALITY ASSURANCE**

- A. Regulatory Requirements: Spray-applied fireproofing shall meet or exceed the applicable requirements of the California Building Code, Chapter 7, "Fire-Resistant Materials and Construction," and the applicable UL Design Numbers and code approvals for the application of the one-hour, two-hour, and three-hour fire protections indicated.
- B. Qualifications: Application of the spray-applied fireproofing material shall be by a skilled and experienced applicator specializing in the application of spray-applied fireproofing. Fireproofing applicator shall be approved by the manufacturer who furnishes the materials. Submit proof of this in writing to the Engineer before starting the fireproofing application.
- C. Manufacturer's Field Services:
1. The Contractor shall make necessary arrangements with the manufacturer of the materials to be applied to provide on-site consultation and inspection services to ensure the proper application of the cementitious fireproofing material.
  2. At completion of the work, the manufacturer shall submit written certification that

fireproofing material was applied over inspected and approved base steel components and that fireproofing material was applied correctly in accordance with these Specifications and the manufacturer's specifications and recommendations.

## **1.08 DELIVERY AND STORAGE**

- A. Materials shall be delivered to the site in sealed packages properly marked and labeled to show manufacturer's name, brand, and certification of compliance with requirements for fire hazard and fire-resistance classifications. Damaged packages found unsuitable for use in the work will be rejected and shall be removed from the site. Store materials under cover in a dry location.

## **1.09 PROJECT CONDITIONS**

- A. Surfaces that fire protection material is to be applied, as well as the ambient temperature during application and for 24 hours after application, shall not fall below 45 degrees F. Relative humidity shall be low enough to assure proper drying of the applied material.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Fireproofing Material: Factory-blended, cementitious direct spray-applied, non-flaking and non-dusting, type fireproofing material, with mold and fungi inhibitor added by the manufacturer. Fireproofing material shall be labeled by the Underwriters Laboratories, Inc., for fire hazard classification, and evidence of the UL Classification Marking shall appear on the packages of all fireproofing material. Material containing asbestos will not be acceptable. Material shall contain the following properties and characteristics:
1. Fire-Retardant Requirements: Fireproofing material shall have been tested, classified, and listed by the Underwriters Laboratories Inc. in accordance with the provisions of ASTM E119.
    - a. Surface Burning Characteristics: Fireproofing material shall have a flamed-spread rating of 10 or less and a smoke-developed contribution of 0 when tested in accordance with ASTM E84.
  2. Applied Dry Density: Provide for minimum dry density in place, when tested in accordance with ASTM E605, as required by applicable UL Design Number and UBC Standard 7-6 for the indicated application.
  3. Bond Strength: Minimum bond strength between fireproofing material and steel members shall be 200 pounds per square foot when tested in accordance with ASTM E736.
  4. Deflection: Material shall not crack or delaminate from the surface that it is applied when tested in accordance with ASTM E759.
  5. Bond Impact: Material shall not crack or delaminate from the surface that it is applied when tested in accordance with ASTM E760.

6. Compressive Strength: Material shall not deform more than 10 percent when subjected to compressive forces of 500 pounds per square foot in accordance with test requirements of ASTM E761.
  7. Air Erosion: Maximum allowable weight loss of the material shall be 0.025 grams per square foot when tested in accordance with ASTM E859.
  8. Corrosion Resistance: Applied material shall not promote corrosion of steel when tested in accordance with ASTM E937.
  9. Fungi Growth Resistance: Applied material shall not support mold growth when tested in accordance with ASTM G21.
- B. Water: Fresh, clean and potable, and free from such amounts of mineral and organic substances as would adversely affect the strength, cohesion, and adhesion of the fireproofing material.

## **2.02 MIXING**

- A. Mixing of fireproofing materials shall be in accordance with the manufacturer's instructions and recommendations. Material and water ratio shall be mechanically controlled.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that items that will penetrate fireproofing, including clips and hangers for suspended ceilings, piping, and conduits are properly located and installed.
- B. Verify that interfacing installations are complete as indicated.

### **3.02 PREPARATION OF SURFACES**

- A. Surfaces that spray-on fireproofing will be applied shall be cleaned of oil, grease, dirt, loose paint, mill scale, or any other matter that may impair bond of fireproofing material to steel. Galvanized decking material with lubricant shall be solvent washed and dried before application of fireproofing.
- B. Provide suitable templates, masking, or coverings to stop fireproofing material and overspray at exposed finished surfaces in sharp and neat straight lines. Provide for protection of floors and equipment from spillage, overspray, and rebound.

### **3.03 APPLICATION**

- A. Application of fireproofing materials shall be in accordance with the application instructions and recommendations of the materials' manufacturer and the fire test reports' information. Adhesive and sealer, when not an integral part of the material, shall be applied in accordance with manufacturer's recommendations.
- B. Fireproofing material shall be applied in minimum thicknesses as required to meet UL Design requirements and code approvals for one-hour and two-hour fire protections as indicated.

- C. When test reports require tamping of sprayed-on material, provide such tamping in accordance with the manufacturer's instructions and recommendations.

**3.04 PATCHING AND REPAIRING**

- A. Perform patching and repairing of fireproofing material as required to provide the one-hour, two-hour, and three-hour fire protection and related thicknesses. Include all patching and repairing of fireproofing material required after the work of other trades has been installed, such as piping and conduits, ductwork, metal stud partitions, ceiling suspension systems, and similar work. Re-apply fireproofing material as required to maintain fire-resistive continuity.

**3.05 FIELD QUALITY CONTROL**

- A. Corrective measures, when necessary, shall be performed as required. The Contractor shall require that the manufacturer of the fireproofing material submit recommendations for corrective measures to the Engineer for approval.
- B. The Contractor shall take frequent, random probe measurements, as witnessed by the Engineer, of applied material to verify compliance with thickness requirements.
- C. The Contractor shall take field samples of fireproofing material, randomly selected, for laboratory tests to verify compliance with specified density and compressive-strength requirements. Submit such laboratory reports to the Engineer for record purposes.

**END OF SECTION 07 81 16**