## SECTION 07 81 16
## FIREPROOFING

### PART 1 - GENERAL

**1.1 SCOPE:**

A. Provide all of the labor, materials, equipment, and services required to furnish and install the fireproofing.

**1.2 QUALITY ASSURANCE:**

A. The applied fireproofing shall, in all cases, match the requirements of the designated UL Design No. See Drawings. Any discrepancies or conflicts shall be brought to the attention of the Architect immediately.

B. The Architect may select, and the Owner will pay an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with the following:
   1. ASTM E605-77(82), "Standard Test Method for Thickness and Density of Sprayed Fire Resistive Material Applied to Structural Members".
   2. Uniform Building Code Standard No. 7-6, "Thickness and Density Determination for Spray-Applied Fireproofing."
   3. Inspection Procedure for Field Applied Sprayed Fire Protection Materials as published by the International Association of Wall and Ceiling Contractors/Gypsum Drywall Contractors International.
   4. National Evaluation Service Committee Report No. NER-332 Published by Council of American Building Officials (ICBO, BOCA, SBCCI) Underwriters' Laboratories, Inc. Fire Resistance Directory.

C. Work shall be performed by a firm with expertise in the installation of fire protection or similar materials. This firm shall be licensed or otherwise approved by the spray-applied fire resistive material manufacturer.

D. Before proceeding with the fire protection work, approval of the proposed material thicknesses and densities shall be obtained from the Architect and the authorities having jurisdiction.

**1.3 REFERENCE STANDARDS:**

A. Test standards:
   1. ASTM E84 - Surface Burning Characteristics of Building Materials.
   2. ASTM E119 - Fire Tests of Building Construction and Materials.
   3. ASTM E136 - (Noncombustibility) Behavior of Materials in a Vertical Tube Furnace at 750-degree C.
   4. ASTM E605 - Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
   5. ASTM E736 - Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
   6. ASTM E759 - Effect of Deflection of Sprayed Fire-Resistive Materials Applied to Structural Members.

7. ASTM E760- Effect of Impact on the Bonding of Sprayed Fire-Resistive Materials Applied to Structural Members.
8. ASTM E761 - Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members.
9. ASTM E859 - Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.
10. ASTM E937 - Corrosion of Steel by Sprayed Fire-Resistive Materials Applied to Structural Members.

B. Underwriters Laboratories, Inc. (UL) Fire ResistanceDirectory.

C. Uniform Building Code Standard No. 7-6 (current edition): Thickness and Density Determination for Spray-Applied Fire Protection.

D. AWCI Publication: Inspection Procedure for Field Applied Sprayed Fire-Resistive Materials.

**1.3 SUBMITTALS:**

A. Prior to installation, submit to the Architect for review the following:
1. Complete and fully descriptive manufacturer's literature.
2. Fireproofing schedule for use as a standard for work on the Project that shall give the following information:
   a. Name each item to be fireproofed and its location within the building.
   b. Color coded framing plan showing each member to which the fireproofing shall be applied, what type fireproofing to be used and to what thickness.
   c. Certification that the thickness to be applied will give the hourly fire rating required.
3. Physical sample of the fireproofing proposed for use.
4. Test data: Independent laboratory test results for specified performance criteria.

**1.4 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. Packaging shall bear the UL labels for fire hazard and fire- resistance classifications.

B. Store materials above ground, in a dry location, protected from the weather. Damaged packages found unsuitable for use shall be rejected and removed from the project.

**1.5 PROJECT CONDITIONS:**

A. When the prevailing outdoor temperature at the building is less than 40 degrees F, a minimum substrate and ambient temperature of 40 degrees F shall be maintained prior to, during and a minimum of 24 hours after application of the spray-applied fire resistive material. If necessary for job progress, Contractor shall provide enclosures with heat to maintain temperatures.

B. Provide ventilation to allow proper drying of the spray-applied fire resistive material during and subsequent to its application.

C. In enclosed areas, ventilation shall not be less than 4 complete air changes per hour.

**1.6 SEQUENCING/SCHEDULING:**

A. All fire protection work on a floor shall be competed before proceeding to the next floor.

B. The Contractor shall cooperate in the coordination and scheduling of the fire protection work to avoid delays in job progress.

## PART 2 - PRODUCTS

### 2.1 CEMENTITIOUS SPRAY FIREPROOFING:

A. Product/manufacturer:
1. Monokote MK-6/HY, MK-6s, RG as manufactured by Grace Construction Products
2. An approved equal.

B. The fireproofing shall be a factory mixed cementitious material. The material shall be applied to provide compliance with the performance criteria.

C. Performance criteria:
1. Dry density: Minimum of 15 pcf with an average minimum density of 17 pcf when tested in accordance with ASTM E605-77.
2. Material shall not crack or delaminate when the backing to which it is applied is subjected to a downward deflection of 1/120 of the span in accordance with ASTM E-759.
3. The fireproofing subject to impact tests in accordance with ASTM E-760 or a sample of the completed floor assembly shall not crack or delaminate from the surface to which it was applied. The test shall consist of a 60 lb. sand bag dropped from a height of 4'-0" onto the test specimen.
4. Bond: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum individual bond strength of 150 psf.
5. Air errosion: Maximum allowable weight loss of the fireproofing material shall be 0.025 gm./ft sq. when tested in accordance with ASTM E-859.
6. Compressive strength: The fireproofing shall not deform more than 10% when subjected to compressive forces of 500 psf when tested in accordance with ASTM E761.
7. Abrasion resistance: The fireproofing material shall have been subjected to abrading forces in accordance with test methods developed by the City of San Francisco, Bureau of Building Inspection, and required by the U. S. Navy (NAVFAC). The abrasion when tested in accordance with this method shall be not more than 1.22".
8. The fireproofing material shall have been subjected to impact penetration tests in accordance with test procedures per ASTM Proposed Test Methods for Sprayed Fire Resistive Material. Samples of the material when subjected to impact forces shall not show an impact loss of greater than .31".

## PART 3 - EXECUTION

### 3.1 PREPARATION, DELIVERY, ANDINSPECTION:

A. All material to be used for fireproofing shall be delivered in original unopened packages bearing the name of the manufacturer, the brand and proper Underwriters Laboratories, Inc. labels for fire hazard and fire resistance classifications.

B. The material shall be kept dry until ready for use. The packages of material shall be kept off the ground under cover and away from sweating walls and other damp surfaces. All bags that have been exposed to water before use shall be discarded. Stock of material is to be rotated and used before its expiration date.

C. Prior to application of fireproofing material, an inspection shall be made to see that all steel

is acceptable to receive fireproofing. Steel shall be free of oil, grease, loose mill scale, paint and any other substance that may impair proper adhesion. Do not apply to surfaces that have received prime coating or paint.

D. All clips, hangers, supports, sleeves and other attachments to the fireproofing bases, as covered under other Sections of the Specifications, are to be placed by others, prior to the application of the fireproofing material, where these attachments can be anticipated in advance.

E. Ducts, piping, conduit or other suspended equipment that interfere with the uniform application of the fireproofing material shall be positioned after the application of the sprayed fireproofing.

**3.2 APPLICATION:**

A. Application of fireproofing shall be in accordance with the printed instructions of the material manufacturer and shall be installed byexperienced craftsmen.

B. Fireproofing to the underside of roof deck assemblies shall be done only after:
1. Roofing application is complete, penthouses are complete, and all mechanical units have been placed, and roof traffic has ceased.
2. Completion of concrete work on steeldecking.
3. Until certification has been received by the Contractor that surfaces to receive sprayed fire protection have been inspected by the applicator and are acceptable to receive sprayed fire protection.
4. All unsuitable substrates have been identified and corrected.

C. Temperature and enclosure conditions shall be as required by the fireproofing manufacturer.

E. An air and substrate temperature of minimum 40 degrees F shall be maintained for 24 hours before and after application of the fireproofing.

F. Provisions shall be made for ventilation to properly dry the fireproofing after application. In enclosed areas lacking natural ventilation, air circulation and ventilation is to be provided.

G. Patching and repairing of sprayed fireproofing damaged by other trades shall be performed under this Section and paid for by the trade(s) causing the damage.

H. Provide masking, drop cloths or other suitable coverings to prevent overspray from coming in contract with surfaces not intended to be sprayed.

I. Bonding materials (adhesives, catch coats, metal lath, mesh, stud pins, etc.) Shall be applied as per the UL fire resistance design and manufacturer's writtenrecommendations.

J. Topcoat materials shall be the type recommended and proved by the manufacturer of each spray- applied fire resistive material required for the applications indicated.

**3.3 CLEAN-UP:**

A. After completion of the fireproofing work, equipment shall be removed and all exposed wall and floor areas shall be left in a broom-clean condition.

**- END OF SECTION -**