SECTION 07 81 16

CEMENTITIOUS FIREPROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and applying the following types of cementitious sprayed-on fireproofing as required by Code and as follows:

1. Concealed fireproofing.

2. Provide exposed high-density fireproofing where required by manufacturer' s ICC ESR Report.

B. Related Sections:

1. Firestopping is specified in Section 07 84 00.

1.02 SUBMITTALS

A. Certificates:

1. Furnish manufacturer's certificate stating materials provided comply with specified standards.

2. Furnish applicator's certificate stating that material has been applied in accordance with manufacturer's instructions, and meets fire-resistance ratings, thickness requirements, and application requirements of regulatory agency having jurisdiction.

B. Test Reports: Furnish certified test reports from a listed laboratory that fireproofing materials can be applied to substrate materials required and conform to specified fire-resistance and fire-resistive characteristics requirements, including thickness and dry density requirements of the fireproofing in accordance with ASTM E605.

1.03 QUALITY ASSURANCE

A. Materials and application procedures shall be tested and listed by UL and be acceptable to governing agencies for assemblies to be fireproofed.

B. Applicator: Approved by the manufacturer of the fireproofing materials.

C. Fireproofing shall provide fire-resistive rating as required by California Building Code (CBC).

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver fireproofing material in manufacturer's original, unopened packaging, identified with manufacturer's name, brand, and UL label.

B. Store under cover, above ground and in a manner to keep dry until ready to use. Discard material that has been exposed to moisture prior to mixing for use.

C. Remove from storage and discard fireproofing material that has not been used prior to its expiration date.

1.05 JOB CONDITIONS

A. Scheduling:

1. Ensure that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are placed before installing fireproofing systems.

2. Schedule installation of ducts, piping equipment, conduit, and other suspended items after the installation of fireproofing materials.

3. Schedule application of fireproofing system to underside of metal roof deck assemblies after roofing work is completed. Upon commencement of fireproofing application, roof traffic will be prohibited until the fireproofing material is cured and fully dried.

B. Environmental Requirements:

1. Temperature of substrate and ambient air shall be a minimum of 40-deg. F. for a minimum of 24-hours before, during, and after application of fireproofing. If required for job progress, provide enclosures with heat to maintain required temperatures.

2. Ventilate areas to receive fireproofing; introduce fresh air and exhaust air continuously during and after application. Provide forced air circulation in poorly ventilated areas to achieve a total air exchange rate of 4 times per hour until the material is substantially dry.

C. Protection:

1. Provide temporary enclosures, as necessary, to prevent spray from contaminating air.

2. Protect adjacent surfaces and equipment from damage by over spray, fallout, and dusting off of sprayed fireproofing.

3. Where concrete, masonry, or other surfaces subject to overspray are to remain exposed to view in the completed work, provide protective masks, drop cloths, or other satisfactory coverings to prohibit contact with sprayed fireproofing materials.

PART 2 - PRODUCTS

2.01 CONCEALED FIREPROOFING MATERIALS

A. Type: Cementitious composition; Grace Construction Products "Monokote" Type MK-6, Isolatek International " Cafco 300" , Mandoval " Mandolite CP-2" or approved equal. Fireproofing shall contain no amounts of mineral wool or regulated fibers including asbestos.

B. Physical Properties:

1. Bond Strength: 200-psf in accordance with ASTM E736.

2. Compressive Strength: Fireproofing shall not deform more than 10-percent when subjected to 1000-psf compressive force in accordance with ASTM E761.

3. Corrosion Resistance: No evidence of corrosion in accordance with ASTM E937.

4. Deflection: No cracking, spalling, delamination or the like in accordance with ASTM E759.

5. Bond Impact: No cracking, spalling, delamination or the like in accordance with ASTM E760.

6. Air Erosion: Maximum weight loss of 0.005-grams per sq. ft. in accordance with ASTM E859.

7. Dry Density: Values for average and individual densities required for fire-resistive ratings specified, in accordance with ASTM E605, but not less than 15-pcf.

8. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 0 and 0 when tested in accordance with ASTM E84.

9. Compatibility: Material shall have a maximum total heat release of 20 MJ per sq. meter 600-seconds after insertion into a radiant heat flux of 75 KW per sq. meter when tested in accordance with ASTM E1354.

10. Resistance to Mold: The fireproofing material shall be formulated at time of manufacture with a mold inhibitor.

11. VOC Content: 0 g/L.

2.02 EXPOSED HIGH-DENSITY FIREPROOFING MATERIALS

A. Type: Portland cement based cementitious fireproofing; Grace Construction Products " Monokote Z-146" or approved equal.

1. Dry Density: The field density shall be measured in accordance with ASTM E605. Minimum average density shall be that listed in the UL Fire Resistance Directory, ICBO Evaluation Report or as required by the authority having jurisdiction.

2. Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.

3. Bond Impact: Material subject to to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.

4. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have a minimum average bond strength of 10,000-psf and a minimum individual bond strength of 8,000-psf.

5. Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.005-gm/sq. ft. when tested in accordance with ASTM E859.

6. Compressive Strength: The fireproofing shall not deform more than 10-percent when subjected to compressive forces of 80,000-psi when tested in accordance with modified ASTM E761.

7. Corrosion Resistance: Steel with applied fireproofing shall be tested in accordance with ASTM E937 and shall not promote corrosion of steel.

8. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84:

Flame Spread	0
Smoke Development	0

9. Durometer Hardness: The fireproofing shall have a minimum Durometer Hardness of 35 when tested in accordance with ASTM D2240.

10. Resistance to Mold: The fireproofing material shall be formulated at the time of manufacturing with a mold inhibitor. Fireproofing material shall be tested in accordance with ASTM G21 and shall show resistance to mold growth for a period of 28-days of general use.

11. VOC Content: 0 g/L.

B. Provide high density fireproofing at exterior locations, on structural steel members less than 8-feet above the floor, landing or occupied space, columns to a height of 8-feet unless protected with furred gypsum board, concrete or cement plaster, and where required by fireproofing manufacturer' s ICC ESR Report.

2.03 MISCELLANEOUS FIREPROOFING MATERIALS

A. The sprayed fireproofing material shall have been tested and reported by UL in accordance with the procedures of ASTM E119 and shall be listed in the UL Fire Resistance Directory.

B. Sprayed fireproofing material and application shall meet requirements of OSHA regulation 29 CFR 1926.58 which regulates the use of asbestos in construction.

C. Mixing water shall be clean, fresh and suitable for domestic consumption and free from such amounts of mineral or organic substances as would affect the set of the fireproofing material.

D. Primers: Approved by fireproofing manufacturer for substrate and exposure conditions.

E. Adhesives: As recommended by fireproofing manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine surfaces to receive fireproofing and verify the following:

1. That surfaces to receive fireproofing are free of loose mill scale, dirt, paint/primers, grease, oil, and other material that would impair bond of fireproofing materials.

2. That shop-primed surfaces designated to receive fireproofing are compatible with fireproofing bond requirements and materials. If surfaces are painted or primed, verify that bonding requirements established in the UL "Fire Resistance Directory" latest edition for sprayed fireproofing material are met.

3. Objects that will penetrate fireproofing have been attached.

4. Substrates are not obstructed by construction that could inhibit application of fireproofing.

3.02 PREPARATION

A. Clean substrates of loose mill scale, dirt, grease, oil, rolling compounds, incompatible paints/primers, and other substances that would affect the bond of fireproofing. Sandblast surfaces if normal cleaning methods fail to remove adhering substances.

B. Prime substrates where recommended by fireproofing manufacturer.

C. Cover other work which might be damaged by fall-out or over-spray. Provide temporary enclosure to confine spraying operations and ensure adequate ambient conditions.

3.03 APPLICATION

A. Apply fireproofing materials in accordance with manufacturer's recommendations as required to achieve thickness and densities required by UL Fire Resistance Directory, ICC Evaluation Report, or as required by authority having jurisdiction.

B. Coat substrates with adhesive where recommended by manufacturer.

C. Extend fireproofing full thickness over entire area of each substrate.

D. Apply materials by sprayed-on method.

E. Angles, channels, rods and miscellaneous shapes shall be fireproofed as a beam.

F. Splice plates and bolts shall be fireproofed to the thickness required for the column or beam to which they are attached.

3.04 FIELD QUALITY CONTROL

A. Testing Laboratory or its agent will perform laboratory tests and inspections as specified in CBC Section 1704.10.

B. Tests will include material thickness in accordance with requirements of CBC Section 1704.10.2.

C. Correct unacceptable work and pay for further testing required to provide acceptable installations.

D. Patch areas from which fireproofing materials have been taken for test and inspection purposes to restore required fire-resistive ratings, at no additional increase in Contract Sum.

3.05 CLEANING, REPAIR, AND PROTECTION

A. Cleaning: Remove over-spray and fall-out of materials from adjacent surfaces and clean exposed surfaces to remove evidence of soiling, and unless otherwise specified, leave exposed surfaces in a scraped clean condition.

B. Protect fireproofing from damage resulting from construction operations and other causes.

C. Repair or replace work that has not been adequately protected. Patching and repairing of sprayed fireproofing, due to damage by other work, shall be performed under this Section at no additional cost to the County.

END OF SECTION