SECTION 07812

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:

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 07840.

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 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.

1. Cementitious fireproofing shall contain a minimum 17-percent post consumer and 3-percent post industrial recycled content.

2. Cementitious fireproofing shall contain zero VOC content g/L.

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.

2.02 EXPOSED HIGH-DENSITY FIREPROOFING MATERIALS

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

1. High-density cementitious fireproofing shall contain a minimum 2-percent post consumer and 1.4-percent post industrial recycled content.

2. Cementitious fireproofing shall contain zero VOC content g/L.

3. 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.

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

5. 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.

6. 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.

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

8. 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.

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

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

Flame Spread	0
Smoke Development	0

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

12. 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.

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 indicated or 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 Owner.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing firestopping.

1.02 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide firestopping systems capable of closing or filling through-penetrations created by the burning or melting of combustible pipes, cable jacketing, or pipe insulation materials, or by the deflection of sheet metal due to thermal expansion.

B. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

C. For firestopping exposed to view, provide products when flame-spread values of less than 25 and smoke-developed values of less than 450, when tested in accordance with ASTM E84.

1.03 REFERENCE STANDARDS

A. Leadership in Energy and Environmental Design (LEED), www.usgbc.org/LEED (United States Green Building Council (USGBC).

1. LEED – NC v2.2 Reference Guide, first edition, dated December 2006.

1.04 SUBMITTALS

A. Refer to Section 01352 – LEED Requirements for LEED related submittal requirements.

B. Product Data: Manufacturer's descriptive, technical data and illustrations. Include manufacturer's Material Data Safety Sheets and installation instructions.

C. Certification:

1. Manufacturer's certification that products comply with local regulations controlling use of volatile organic compounds (VOC's) and are nontoxic to building occupants.

2. Manufacturer's certification that firestopping materials comply with ASTM E814 and UL 147.

D. UL Design Numbers: Furnish UL Design No. from the "Fire Resistance Directory - Volume II" for each required penetration type and configuration. Indicate which materials will be used in firestopping the penetration.

1.05 QUALITY ASSURANCE

A. Firestopping materials and systems shall be listed and labeled in accordance with requirements of Underwriters Laboratories, Inc. (UL) Building Materials Directory.

B. Firestopping materials shall conform to California Building Code for fire resistance standards and requirements for penetrations in walls, partitions, and floor/ceiling and floor/roof assemblies.

C. Firestopping materials shall comply with ASTM E814 and UL 1479.

D. Firestopping sealants shall comply with ASTM C719 and ASTM C920.

E. Form materials to remain in place in the completed work and sealant used for firestopping work shall be UL listed and labeled.

F. Firestopping materials shall be rated as required when tested in accordance with ASTM E119.

G. Firestopping materials shall be asbestos free and shall not incorporate nor require the use of hazardous solvents.

H. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surface.

I. Installer shall have a minimum of 3-years experience installing UL listed firestop systems in similar type construction.

1.06 ENVIRONMENTAL QUALITY ASSURANCE

A. Applicable LEED Credits: Refer to Section 01352.

1. Credit EQc4.1 – Adhesives and Sealants.

1.07 JOB CONDITIONS

A. Follow manufacturer's instructions for temperature, ventilation, and other conditions for mixing and installing foam seals.

B. Observe and follow manufacturer's precautions when using materials considered toxic and hazardous.

C. Maintain current copy of UL "Fire Resistance Directory" on Project site.

D. Installation of firestopping shall precede finishing of gypsum board.

1.08 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the manufacturer's unopened containers and packages with manufacturer's name, labels, product identification, lot numbers, and mixing and installation instructions, as applicable.

B. Store materials in unopened containers and packages, and under conditions recommended by manufacturer.

C. Store and handle firestopping materials in accordance with manufacturer's Material Safety Data Sheets.

1.09 PROJECT CONDITIONS

A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilation: Ventilate firestopping in accordance with manufacturers' instructions by natural means or forced air circulation.

1.10 SEQUENCING AND SCHEDULING

A. Perform work of this and other Sections in proper sequence to prevent damage to the firestopping materials and to ensure that their installation will occur prior to enclosing or concealing work.

B. Do not cover firestopping materials until they have been properly inspected and accepted by the authority having jurisdiction.

PART 2 - PRODUCTS

2.01 FIRESTOPPING, GENERAL

A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the penetrating items.

B. Accessories: Provide components of each firestopping system required to install fill materials. Use only components specified by firestopping manufacturer and which are approved by UL for the designated fire-resistance-rated system.

C. Manufacturers or systems not listed in UL "Fire Resistance Directory" but who can furnish certification of UL approval may be used in the work.

2.02 THROUGH-PENETRATION FIRESTOPPING MATERIALS

A. General: Listed manufacturers of through-penetration firestopping are intended as guidelines only; manufacturer and material type shall be as required by the UL Design No. for each penetration to receive firestopping.

B. Approved Manufacturers: Hilti Construction Chemicals, Inc., International Protective Coatings Corp., Specified Technologies, Inc., The RectorSeal Corporation, Tremco, Inc., 3M Fire Protection Products or approved equal.

C. Provide mortar, sealants and caulk, putty, wrap strips, pillows, bags, and other types required for UL Design No. for each penetration to receive firestopping.

2.03 MINERAL FIBER FIRESTOPPING MATERIALS

A. Material: Semirigid mineral fiber insulation, minimum 4-pcf density; USG Interiors "Thermafiber Safing", Johns Manville "Insul-Shield", Thermal Ceramics Inc. "Cerablanket F.S" or approved equal.

B. Support Clips: Manufacturer's standard impaling clips or custom designed to suit installation conditions, fabricated from galvanized sheet steel.

2.04 FIRESTOPPING AT ELECTRICAL BOXES AND UTILITY OUTLETS

A. Utility penetrations in walls, ceilings, or floors requiring protected openings shall be firestopped and sealed with an approved material securely installed, capable of maintaining its integrity when subjected to test temperatures specified in ASTM E814.

B. Steel electrical outlet boxes on opposite sides of walls requiring protected openings shall be separated by a horizontal distance of 24-inches.

C. Steel electrical outlet boxes which occur in combination with outlet boxes of any size such that the aggregate area of unprotected outlet boxes exceeds 100-square inches in any 100-square feet of wall area shall be protected by an approved material or detail to decrease the aggregate area of unprotected utility boxes to less than 100-square inches in any 100-square feet of wall.

D. Steel electrical outlet boxes which exceed 16-square inches in area shall be protected by 3M "Moldable Putty Pads", Specified Technologies, Inc. "SpecSeal Series SSP Putty Pads" or approved equal.

E. Utility and electrical outlets or boxes shall be securely fastened to the stud or framing of the wall or ceiling assembly. The opening in the gypsum board shall be cut so that the clearance between the box and the gypsum board does not exceed 1/8-inch.

1. In smoke partitions, fill the 1/8-inch gap with an approved fire-rated sealant.

2.05 MIXING

A. For those products requiring mixing prior to application, comply with manufacturer's instructions.

2.06 IN-FILL AT TOP OF FULL HEIGHT PARTITIONS ABUTTING UNDERSIDE OF FRAMING

A. Rigid Insulation Board: Minimum 6-pcf density fiberglass or mineral wool boards, thickness as required to fill spaces between joists without sagging.

B. Sprayed Firestopping: Specified Technologies Inc. (STI) "SpecSeal Series AS200 Elastomeric Fire Stop Spray" or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect openings and voids to be sealed to determine if conditions are satisfactory for the proper installation of firestopping. Do not commence work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer.

1. Remove foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping.

3. Remove laitance and form release agents from concrete.

B. Priming: Prime substrates where recommended by manufacturer using manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of the work. Remove tape as soon as possible.

3.03 EXTENT OF FIRESTOPPING WORK

A. General: Provide solid continuous firestopping wherever the penetration or addition of a construction element through or adjacent to a fire-rated floor, wall or partition, or roof creates a discontinuity of such a rated separation. Application limited in size and configuration to tested systems. Do not install insulation types specified in other Sections in lieu of specified firestopping materials.

B. Penetrations:

1. Penetrations include conduit, cable, wire, pipe, duct, and other elements which pass through one or both outer surfaces of a fire-rated floor, roof, wall, or partition.

2. Fill penetrations as indicated in applicable UL Design No.

3. Verify that annular space around sprinkler pipes through fire-rated walls and floors is provided as required by NFPA 13.

C. Fire Rated Partitions:

1. Fire-rated or smoke-rated partitions shall be firestopped with a firestop sealant as listed in UL "Fire Resistance Directory" and as specified. Apply minimum 3/8-inch bead at intersection of finish material and adjacent surface, both sides and along entire perimeter.

2. Intersections at fire-rated or smoke-rated partitions and steel deck type floor-ceiling or roof-ceiling assemblies shall be firestopped as indicated.

D. Provide firestopping to fill miscellaneous voids or openings at fire-rated construction as specified.

3.04 INSTALLATION

A. Do not install firestopping until:

1. Building is sufficiently enclosed or protected against adverse weather conditions.

2. Supporting framing and surrounding construction is in a dry condition.

B. Prepare and install firestopping in accordance with manufacturer's instructions.

C. Mineral Fiber:

1. Provide in thickness for compressing into voids for a tight friction fit when installed.

2. Provide in width sufficient to fill the depth of the void space using single width pieces.

3. Install with ends tight against terminal end construction, and with intermediate joints well compressed together and tight.

4. For vertical void spaces, provide support clips near each end, spaced not over 24-inches on center.

D. Foam:

1. Provide form materials to retain foam when placed.

2. Prime contact surfaces as recommended by foam manufacturer.

3. Inject foam into void spaces so foam develops full and complete contact with adjoining surfaces, and the space is free from air pockets.

4. Cure foam 24-hours, remove form materials not required to remain, and inspect.

5. Provide additional foam or sealant to fill insufficient depth and remaining voids.

E. Sealants:

1. Prepare penetrations in vertical and horizontal surfaces as required to receive finish products.

2. Install damming materials as required.

3. Apply caulk or putty in accordance with manufacturer's recommendations.

F. Finish surfaces of exposed to view firestopping to a uniform and level condition.

G. In-fill at Top of Partitions Abutting Underside of Framing:

1. Install rigid board to fit tightly between joists. Provide supplementary framing as required for attachment of rigid boards.

2. Spray-apply elastomeric firestopping spray over rigid boards in accordance with manufacturer's instructions. Spray-apply to a minimum thickness of 1/8-inch.

3.05 FIELD QUALITY CONTROL

A. Identify firestop systems after installation. Identify the firestop system that has been installed and include the appropriate UL Design Number.

3.06 CLEANING

A. Remove spilled and excess materials without damaging adjacent surfaces.

B. Leave finished work in neat, clean condition with no evidence of spill-overs or damage to adjacent surfaces.

END OF SECTION