SECTION 07 84 00
FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish and install fireproof firestopping, firesafing materials, smoke seals and related accessories required for this Project for all penetrations through fire resistance rated construction, including, but not limited to, penetrations for plumbing, fire suppression, heating, ventilating and air conditioning, electrical systems, and specialized equipment.

1. Fire resistance rated construction requiring firestopping includes, but is not limited to: floors, rated partitions, smoke barriers, smoke partitions, partitions in rated corridors, passageways and stairs, shaft partitions, shaft wall (vertical and horizontal), area separation fire walls, party wall systems, and temporary fire resistant rated partitions and barriers.
2. Provide removable temporary firestopping (pillows) as required to maintain fire integrity prior to Owner's final acceptance, to permit installation of electrical, telephone, data and sound system wiring. Replace temporary firestopping with permanent, after wiring systems are completed.

B. Furnish and install firestopping/smoke seals at construction joints occurring at tops of fire resistance rated partitions, smoke partitions, and temporary partitions between top of partition and underside of deck above.

C. Furnish and install all firestopping, firesafing, and smoke seals at perimeter of floor/roof construction and exterior wall systems, as indicated and where required by applicable codes.

D. Furnish and install all firestopping, firesafing, and smoke seals at expansion joints in chase walls where expansion joints are not exposed to view.

E. Furnish and install all firestopping, firesafing, and smoke seals where required by applicable codes and as additionally required by authorities having jurisdiction at no additional cost to the Owner.

1.2 RELATED REQUIREMENTS

A. Section 01 73 29 - CUTTING AND PATCHING: Procedural and administrative requirements for cutting and patching.

B. Section 09 29 00 - GYPSUM BOARD: Gypsum wallboard fireproofing.

C. Division 21 - FIRE SUPPRESSION: Fire protection system penetrations through fire resistance rated construction.

D. Division 22 - PLUMBING: Plumbing system penetrations through fire resistance rated construction.

E. Division 23 - HEATING, VENTILATING AND AIR CONDITIONING: Heating, ventilating and air conditioning system penetrations through fire resistance rated construction.

F. Division 26 - ELECTRICAL: Electrical penetrations through fire resistance rated construction.

1.3 REFERENCES

A. Referenced Standards: Comply with applicable requirements of the following standards and those others referenced in this Section, under the provisions of Section 01 42 00 - REFERENCES. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. ASTM E-84 - Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E-119 - Method for Fire Tests of Building Construction and Materials.
3. ASTM E-814 - Test Method of Fire Tests of Through-Penetration Firestops.
4. NFPA 70 - National Electrical Code.
5. UL - Fire Resistance Directory.
6. UL 1479 - Fire Tests of Through Penetration Firestops.

1.4 PERFORMANCE REQUIREMENTS

A. Provide materials and work to conform to Building Code Requirements in fire resistant wall and floor assemblies.

B. Manufacturer’s certified product test requirements:

1. All firestop/smokeseal material shall be tested by a recognized, independent testing agency and shall conform to both Flame (F-rating) and Temperature (T-rating) requirements of ASTM E-814.
2. All firestop/smokeseal material shall be tested by a recognized, independent testing agency and shall conform to and be listed as compliant with Factory Mutual requirements with an FM Leakage Rating (L-rating) of not more than 7 cu.ft./min./sq.ft.
3. Conform to UL Fire Hazard Classification Requirements.
4. Tested and classified non-combustible per ASTM E-84.

C. Firestops in place shall be of sufficient thickness, width, and density to provide a fire resistance rating at least equal to the floor, wall, or partition construction into which it is installed.

D. Non-combustible dams shall be constructed:

1. As necessary to achieve fire rating as tested and rated.
2. In conformance with installation requirements for type of floor, wall, and partition construction.
3. As recommended by firestop/smokeseal manufacturer.

E. Combustible damming materials, if used, must be removed after proper curing.

1.5 SUBMITTALS

A. Information and Review Submittals: Submit the following under provisions of Section 01 33 00 - SUBMITTAL PROCEDURES:

1. Product Data: Manufacturer's product data sheets, specifications, performance data, and physical properties.
    a. Indicate requirements for manufacturer’s descriptive data for products and

related materials with FM, UL or Warnock-Hersey illustrations showing systems and approval of materials in systems.

2. Certificates: Manufacturer's written certification stating that firestopping materials, meet or exceed the requirements specified under this Section and that all fire-resistive

requirements for the indicated combustibility, Flame (F-rating) and Temperature (T- rating) Ratings have been met.

3. Manufacturer’s installation instructions.
4. Test reports: Submit fire test reports from recognized, independent testing agent(s) indicating the following:
   a. Fire test report of firestop material applied to substrate and penetration materials similar to project conditions. Tests to indicate both Flame (F-rating) and Temperature (T-rating) Ratings.
   b. Test reports of products to be used shall indicate conformance to ASTM E-814.
5. On-site sample installation to be included in Work: Minimum thirty days prior to application in any area, provide samples of firestop and smokeseal materials and installation in accordance with the following requirements.
   a. Apply one sample of appropriate firestop and smokeseal material for each different penetration and fire rating required for the work.
   b. Sample areas will comply with thickness, fire resistance ratings, and finished appearance of the project and applicable fire code.
   c. Acceptance samples will constitute standard of acceptance for method of application, thickness, and finished appearance for firestop and smokeseal application. The sample(s) shall remain visible during completion of the work and shall remain as part of the completed work.
6. Shop drawings indicating requirements for penetrations in wall/deck intersections, change of planes, control joints, expansion joints and blank openings.

1.6 QUALITY ASSURANCE

A. General: Notify the Architect where conflicts apply between referenced standards and existing materials, and existing methods of construction.

B. Sole Source: Obtain firestop and smokeseal products from a single manufacturer, except as otherwise approved by Architect.

C. Environmental Requirements for Volatile Chemicals: Use firestopping caulks that comply with the following limits for VOC content:
   1. Firestopping caulks: VOC not more than 250 g/L.

D. Special Inspections: Allow for 3 percent of each type of firestopping system to be removed and inspected for conformance with approved submittals.
   1. All firestopping shall be inspected prior to installation of suspended ceilings or concealed by other materials.

E. Qualifications:
   1. Installer: a specialized subcontractor having not less than 3 years documented experience demonstrating previously successful work of the type specified herein.
      a. The manufacturer of the firestop material shall submit written certification that the firm to be used for the firestop products has been trained in the

application of the products by the manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver and store firestopping materials in original, sealed, packages showing manufacturer's identification and date of packaging.

B. Store and handle materials following manufacturer's recommended procedures, and in accordance with material safety data sheets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering similar products include the following:

1. Bio Fireshield (A Division of Rectroseal), Houston TX.
2. Dow Corning Corporation, Midland MI.
3. Hilti, Inc. Tulsa OK.
4. 3M Company, Saint Paul MN.
5. Specified Technologies, Inc., Somerville NJ.
6. Metacaulk, (A Division of Rectroseal), Houston TX.
7. Tremco, Inc., Beachwood OH.

2.2 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire resistance ratings and surface burning characteristics.

B. Obtain certificate of compliance from authority having jurisdiction indicating approval of combustibility.

C. All firestoppping products shall be listed as FM Approved and where applicable comply with an FM Leakage Rating (L-rating) of not more than 7 cu.ft./min./sq.ft.

2.3 MATERIALS

A. Firestop mortar: asbestos free, cementitious mortar, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM/UL1479.

1. Acceptable products, or approved equal:
   a. Bio Fireshield, product "Bio K-10+ Fire Rated Mortar".
   b. Specified Technologies, Inc., product "Spec Seal Mortar".
   c. Tremco Inc., product "Tremstop M".

B. Silicone Firestop sealant: Single component, non-combustible silicone elastomer firestop sealant, U.L. classified as a "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

1. Acceptable products, or approved equal:
   a. Bio Fireshield, product product "Biotherm 100" (Gun Grade) or "Biotherm 200" (Self Leveling).
   b. Specified Technologies, Inc., product "Spec Seal Pensil 300 Sealant (gun grade)" or "Spec Seal Pensil 300SL" (Self Leveling).

c. 3M Company, product “Fire Barrier Silicone Sealants”.

d. Tremco Inc., product product “Tremsil" (Gun Grade) or “Tremsil S/L" (Self Leveling).

2. Sealants will not dissolve in water.

C. Intumescent firestop sealant and caulks: Acrylic based, water resistant sealant, which will not re-emulsify after drying.

1. Acceptable products, or approved equal:

a. Bio Fireshield, product “Biostop 500".

b. Specified Technologies, Inc., product “Spec Seal Triple-S Sealant".

c. 3M Company, product “Fire Barrier Caulk CP25WB+".

d. Tremco Inc., product “Tremstop 1A".

D. Firestop putty: sticks or pads.

1. Acceptable products, or approved equal:

a. Bio Fireshield, product “Moldable Putty”.

b. Specified Technologies, Inc., product “Spec Seal Putty Bars and Pads”.

c. 3M Company, product “Fire Barrier Moldable Putty”.

d. Tremco Inc., product “Flowable Putty”.

E. Firestop collars: Pre-manufactured fire protective pipe sleeve, UL classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

1. Provide separated (two piece) firestop collar for application when plastic pipe system is already in place. Provide non-separated firestop collar for application prior to installation of plastic pipe system.

2. Acceptable products, or approved equal:

a. 3M Company, Inc., product “Fireshield Firestop Sleeve”.

b. Specified Technologies, Inc., product “Spec Seal Collars”.

c. 3M Company, product “Fire Barrier PPD’s”.

d. Tremco Inc., product “Fyrecan sleeve”.

F. Firestop pillows: UL Classified as "fill, void, or cavity material" for through penetration firestop system when tested in accordance with ASTM E-814/UL1479.

1. Acceptable products, or approved equal:

a. Bio Fireshield, product “Fireshield Firestop Pillows”.

b. Specified Technologies, Inc., product “Spec Seal Pillows”.

c. Tremco Inc., product “Tremstop P.S”.

G. Wrap strips:

1. Acceptable products, or approved equal:

a. Bio Fireshield, product “FS-195”.

b. Specified Technologies, Inc., product “Spec Seal Wrap Strip”.

c. 3M Company, product “Fire Barrier FS195 Wrap Strip”.

d. Tremco Inc., product “Tremco W.S”.

H. Mineral wool fiber / ceramic wool non-combustible insulation (fire safing): Conforming to ASTM C665, Type 1, ASTM C612, and ASTM C553 with a minimum density of 4 pounds per cubic foot.

1. Flame Spread Classification: Material shall be classified non-combustible per ASTM E-814.
2. Recycled content of slag: Use maximum available percentage of material (slag). Mineral wool insulation products incorporated into the work shall contain not less than 75 percent of recycled material (slag) by weight.
3. Acceptable products include:
   a. Fibrex Insulations Inc. Sarnia Ontario, Canada, product: “Fibrex FBX” Industrial board.
   b. Rock Wool Manufacturing Company, Leeds, AL, product: “Delta Safing Mineral Wool”.
   c. Roxul, Inc., product “Roxul Safe”.
   d. Thermafiber, Inc. product “Safing 4.0 pcf”.
4. Accessories: Provide galvanized steel safing clips as required for installation of insulation.

I. Elastomeric Firestopping: Non halogenated latex based elastomeric coating applied by airless spray.

1. Acceptable products, or approved equal:
   a. Specified Technologies, Inc., product “Spec Seal Elastomeric Firestop Spray”.
   b. Bio Fireshield (A Division of Rectroseal), product “Flamesafe FS900+”
   c. Hilti, Inc., product “CP 601S.”

2.4 ACCESSORIES

A. Forming and damming materials: Mineral fiberboard or other type as recommended by firestopping manufacturer.

B. Primer, sealant and solvents: As recommended by manufacturer.

C. Woven wire mesh: Galvanized 20 gage woven wire mesh “chicken wire” or “poultry fencing”, 1 inch spacing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Inspect areas and conditions where firestops are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Beginning of installation means acceptance of existing substrate and project conditions.

3.2 PREPARATION

A. Surface to receive firestops shall be free of dirt, dust, grease, oil, form release agents, or other matter that would impair the bond of the firestop material to the substrate or penetrating item(s).

B. Voids and cracks in substrate shall be filled and unnecessary projection removed prior to installation of firestops.

C. All penetrating items shall be permanently installed prior to firestop installation.

D. Substrate shall be frost, free and, when applicable, dry.

3.3 INSTALLATION

A. General

1. Installation of firestops shall be performed by applicators/installers qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
2. Apply firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations. Meet building code requirements.
3. Coordinate with plumbing, mechanical, electrical, and other trades to assure that all pipe, conduit, cable, and other items which penetrate fire rated construction have been permanently installed prior to installation of firestops. Schedule and sequence the work to assure that partitions and other construction which would conceal penetrations are not erected prior to the installation of firestops.
    a. Ensure that all firestopping is inspected prior to installation of suspended ceilings or concealed by other finished materials.

B. Dam construction

1. Install dams when required to properly contain firestopping materials within openings and as required to achieve required fire resistance rating. Combustible damming material must be removed after appropriate curing. Incombustible damming material may be left as a permanent component of the firestop system.
2. Placement of dams shall not interfere with function or adversely affect the appearance of adjacent construction.

C. Installation of single component silicone firestop

1. Apply with manual or powered caulking gun.
2. Apply minimum 1/2 inch thickness for 2 hour rating. Apply 1/2 inch to both sides of wall penetrations; one side only in floor penetrations.
3. Use incombustible insulation as required to achieve fire resistance rating.
4. Surface of gun grade silicone firestop may be tooled using clean, potable water.
5. Clean excess material off of adjacent surfaces and tools within 10 minutes using either water or Xylol where the use of such would not be hazardous.

D. Installation of cementitious firestop mortar.

1. Add dry powder to water and mix with mechanical mixer or hand mixing tools as recommended by firestop mortar manufacturer. Allow a average mixing time is 3 minutes and provide a average wet density of 70 pounds per cubic foot, plus or minus 5 PCF.
2. Do not apply if ambient or substrate temperature is less than 35 degrees Fahrenheit during 24 hours after application.
3. Wet all surfaces prior to application of firestop mortar.
4. Mortar may be hand applied or pumped into the opening.
5. Exposed surfaces shall be finished using conventional plastering tools prior to

curing.

6. When installation around layered cables, it is recommended to increase the fluidity of the firestop mortar to provide a better fill around the cables. Vibrate or move the cables slightly to prevent voids from forming between the cables.
7. Allow 48 hours for initial cure prior to form removal. For full cure allow 27 days.
8. Wet material may be cleaned with water. Dry material may require scraping or chipping.

E. Installation of firestop collars (plastic pipe only)

1. Firestop collars may be surface mounted to a slab or wall or imbedded in Firestop Mortar to a maximum depth of 2 inches.
2. For wall penetrations with ABS pipe firestop collars must be installed on both sides of the penetration to provide a 2 hour F and T Rating. All other applications required installation on one side only to provide a 2 hour F and T Rating.

F. Firesafing insulation: Install firestopping safing insulation on safing clips spaced as needed between each stud and floor slab, leaving no voids. Secure safing clips to slab using fasteners recommended by insulation manufacturer. Install sealant over mineral wool in accordance with test requirements.

3.4 LABELING

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems.

1. Include the following information on labels:

WARNING: THROUGH-PENETRATION FIRESTOP SYSTEM-DO NOT DISTURB. NOTIFY FACILITY MANAGER OF ANY DAMAGE.

- *Contractor's name, address, and phone number.*
- *Through-penetration firestop systems designation of applicable testing and inspecting agency.*
- *Date of installation.*
- *Through-penetration firestop systems manufacturer's name.*
- *Installer's name.*

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.

1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.

B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.

C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.6 SCHEDULE

A. General: Typical penetrations are indicated below with list of standard firestopping/smokeseal approaches. Actual firestopping materials and combination of materials will vary with size of penetration and with individual firestopping manufacturer's approved UL Design System Requirements. Use only UL Design System materials for each penetration that best matches the wall and floor construction.

1. Where penetrations occur for which no listed UL or WH Design System test exists, obtain from the firestop system manufacturer an engineered system acceptable to the authorities having jurisdiction for firestopping such penetrations. Engineered system

   from manufacturer shall include a detail drawing showing the engineered system and shall contain no disclaimers.

B. Single metal pipe (non-insulated) and conduit penetrations through floors:

1. Firestop mortar.
2. Silicone Firestop sealant.
3. Intumescent firestop sealant.
4. Firestop putty, sticks or pads.
5. Mineral fiber / ceramic wool non-combustible insulation (fire safing) in conjunction with a firestop sealant.

C. Single metal pipe (non-insulated) and conduit penetrations through walls:

1. (masonry and concrete walls only) Firestop mortar and putty.
2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
3. Intumescent firestop sealant with wrap strips.

D. Multiple metal pipe and conduit penetrations through floors:

1. Firestop mortar and wrap strips.
2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).

E. Multiple metal pipe and conduit penetrations through walls:

1. Firestop mortar and putty.
2. (through masonry walls only) Firestop pillows with woven wire mesh.
3. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).

F. Insulated metal pipe penetrations through floors:

1. Firestop mortar and wrap strips.
2. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
3. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
4. Silicone Firestop sealant over wrap strip.
5. Mineral fiber / ceramic wool non-combustible insulation (fire safing) in conjunction with a firestop sealant.

G. Insulated metal pipe penetrations (single and multiple) through walls:

1. Firestop mortar with wrap strips.
2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
3. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing) and Wrap strips.
4. (multiple penetrations through masonry walls only) Firestop pillows with woven wire mesh.

H. Duct penetrations through floors or walls:

1. Rectangular and square ducts: Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing), and steel flanges provided under Division 15.
2. Round ducts: Intumescent firestop sealant over mineral fiber / ceramic wool non- combustible insulation (fire safing).

I. Combustible plastic pipe and conduit penetrations through floors:

1. Firestop mortar with wrap strips.
2. Firestop mortar with firestop putty and firestop collars.
3. Silicone firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
4. Silicone firestop sealant and firestop collars.
5. Intumescent firestop sealant and firestop collars.
6. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing) with firestop collars.
7. (maximum pipe size 2 inches) Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing) with wrap strips.

J. Combustible plastic pipe and conduit penetrations through walls:

1. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
2. Intumescent firestop sealant with firestop collars.

K. Cable penetrations through floors:

1. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).

L. Cable penetrations through walls:

1. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).
3. (single penetrations only) Firestop putty.
4. (electrical boxes) Firestop pads.
5. Firestop putty over mineral fiber / ceramic wool non-combustible insulation (fire safing).

M. Cable tray penetrations:
   1. (floors only) Firestop mortar.
   2. Firestop pillows with woven wire mesh containment, and Firestop putty, sticks or pads for filling voids.
   3. Firestop pillows with woven wire mesh containment, and Firestop mortar at perimeter and firestop putty, sticks or pads for filling voids.

N. Bus ducts through floors:
   1. Firestop mortar and wrap strips.
   2. Intumescent firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing) and 28 gage (minimum) steel cover plate.

O. Blank openings:
   1. Firestop mortar.
   2. Silicone Firestop sealant over mineral fiber / ceramic wool non-combustible insulation (fire safing).

P. Fire rated joints:
   1. Silicone Firestop sealant over backer rod or bond breaker.

Q. Construction joints at head of wall/floor assemblies:
   1. Silicone Firestop sealant/mastic over mineral fiber / ceramic wool non-combustible insulation (fire safing).
   2. Elastomeric spray over mineral fiber / ceramic wool non-combustible insulation (fire safing).

R. Smoke barrier sealant for dampers, fire door frames:
   1. Silicone Firestop sealant.

S. Temporary sealing of openings and penetrations:
   1. Firestop putty, sticks or pads.
   2. Firestop pillows.

END OF SECTION