

SECTION 078400 FIRESTOPPING

PART 1- GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Firestop devices and systems tested in accordance with ASTM E814 (ANSI/UL 1479) and listed in UL Fire Resistance Directory.
 - 2. Fire-resistant construction joints.
 - 3. Dynamic partition head, wall, and barrier details.
 - 4. Fire safing at the edge of slab and curtain wall conditions.
 - 5. Penetrations through fire-rated floors, walls, and shafts.
 - 6. Duct and damper firestops.
 - 7. Intumescent wraps and pads at receptacle boxes and recessed items within fire-rated walls.
- B. Select adhesives, primers, and sealants meeting Cal-GREEN requirements.
- C. Related Sections:
 - 1. Section 000113 – Finish and Materials Legend, Designation
 - 2. Section 016116 - Volatile Organic Compound (VOC) Restrictions
 - 3. Section 018113 – Sustainable Design Requirements
 - 4. Section 017329 - Cutting and Patching; Repair of openings with original materials.
 - 5. Section 072100 – Thermal Insulation: Batt, mineral wool continuous, and EXP insulation types.
 - 6. Section 072700 – Air Barriers
 - 7. Section 075419 – Polyvinyl Chloride Roofing: Roof Insulation.
 - 8. Section 078100 – Spray Applied Fireproofing.
 - 9. Section 078123 - Intumescent Fireproofing.
 - 10. Section 092900 – Gypsum Board: Acoustical Insulation, Mineral wool fire rated.
 - 11. Section 092900 - Gypsum Board
 - 12. Division 08 - Openings
 - 13. Division 14 - Conveying Equipment
 - 14. Division 21 – Fire Suppression.
 - 15. Division 22 – Plumbing.
 - 16. Division 23 – Heating, Ventilating, and Air Conditioning.
 - 17. Division 25 - Integrated Automation
 - 18. Division 26 – Electrical.
 - 19. Division 27 – Communications
 - 20. Division 28 - Electronic Safety and Security

1.2 REFERENCES

- A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"

- B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops"
- C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems"
- D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" which is updated annually.
 - 1. UL Fire Resistance Directory:
 - a. Firestop Devices (XHJI)
 - b. Fire Resistance Ratings (BXRH)
 - c. Through-Penetration Firestop Systems (XHEZ)
 - d. Fill, Voids, or Cavity Material (XHHW)
 - e. Forming Materials (XHKU)
 - f. Joint Systems (XHBN)
 - g. Perimeter Fire Containment Systems (XHDG)
 - 2. Alternate Systems: "Omega Point Laboratories Directory" (updated annually).
- E. Test Requirements: ASTM E 1966, "Standard Test Method for Fire Resistive Joint Systems"
- F. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus"
- G. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops"
- H. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"
- I. ASTM D6904, "Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings Applied on Masonry"
- J. ASTM C 679, "Standard Test Method for Tack-Free Time of Elastomeric Sealants"
- K. ASTM G21, "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi"
- L. California Building Code
- M. NFPA 101 - Life Safety Code
- N. NFPA 70 - National Electric Code
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives
- P. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives

1.3 **SYSTEM DESCRIPTION**

- A. General: Make firestop and smoke seal assembly selections that comply with UL Fire Resistance Directory, the Authority Having Jurisdiction, and applicable codes for:
 - 1. Materials, fabrication, and installation of firestops and smoke seals.
 - 2. Fire containment.
 - 3. Fire-resistant construction joints.
 - 4. Dynamic partition head details.
 - 5. Edge of slab and curtain wall conditions.
 - 6. Penetrations through fire-rated floors, walls, and shafts.
 - 7. Duct and damper firestops.
 - 8. Intumescent wraps and pads at receptacle boxes and recessed items within fire-rated walls.
 - 9. Coordinate with mechanical, electrical, and drywaller to provide a single manufacturer for all firestopping materials.
- B. Firestop Voids and Openings in Following Locations:
 - 1. Duct, cable, cable tray, conduit, piping, and other penetrations through floor slabs (except on-grade slabs) and through fire-rated walls and partitions.
 - 2. Penetrations of vertical shafts, pipe chases, elevator shafts, and utility shafts.
 - 3. Openings between floor slab edges and exterior walls, including glass and aluminum curtain walls.
 - 4. Openings, gaps, and cracks at abutting fire-rated assemblies and components, such as wall-to-wall and wall-to-floor including overhead floor and roof decks.
 - 5. Blank openings into or through fire-rated floors and walls.
 - 6. Other locations indicated or scheduled.
- C. Design Requirements:
 - 1. Insulated Piping and Duct Penetrations: Install firestop systems intended for use with the type of insulation on the penetrating item.
 - a. Install firestop systems intended for use with the type of insulation on the penetrating item.
 - b. If a compatible firestop system is unavailable, remove the insulation at the contact area with firestop material
 - c. Coordinate with trades who installed insulation to ensure proper re-sealing of cut edges of insulation.
 - 2. Provide Products that Do Not Deteriorate when Exposed to Following Conditions:
 - a. Plumbing and Wet-Pipe Sprinkler Systems: Moisture-resistant through-penetration firestop.
 - b. Exposed to View:
 - 1) Flame-spread value of less than 25 and smoke-developed value of less than 450, ASTM E84.
 - 2) Compatible with applied finishes.
- D. F and T Rating Requirements: Conform to F and T ratings, ASTM E 814 (ANSI/UL 1479).
 - 1. Comply with applicable codes and authority having jurisdiction.
 - 2. F Ratings: Equal to fire resistance rating of assembly being penetrated but not less than one hour.
 - 3. T Ratings: Equal to F ratings, except where a T rating for the firestop condition is specifically exempted by the applicable code.
- E. Provide a W-rated fire/smoke stop system (Class 1) for wet areas and Telecom, IT, and

Electrical Rooms.

- F. Testing Requirements:
 - 1. Utilize systems and materials tested and approved by UL or other nationally recognized independent testing agencies acceptable to the Authorities Having Jurisdiction.
 - 2. Determine fire ratings in accordance with ASTM E814 (ANSI/UL 1479), ASTM E 1966 (ANSI/UL 2079), and ASTM E 2307 for through penetration and joint firestops, ASTM E119 (UL263) for fire-rated assemblies, and as required by applicable codes and authority having jurisdiction. Testing laboratories approved by the Office of State Fire Marshal (OSFM):
<https://osfm.fire.ca.gov/media/rtlf4auu/approved-testing-laboratories.pdf>
- G. Large openings may be closed with the same type of construction as the adjacent floor, roof, and wall assembly.
- H. Sealing around penetrations of fire-rated assemblies without an approved firestop system is not permitted. Methods and materials not permitted include but are not limited to:
 - 1. Joint compound at gypsum board assemblies.
 - 2. Mortar at masonry and concrete assemblies.
 - 3. Use of joint sealants.
- I. Whenever finished firestop materials are scheduled to receive finish paint or other coatings, test the compatibility of firestop materials with coatings to be applied.

1.4 SUBMITTALS

- A. General: Submit in accordance with Section 013300.
- B. Submit manufacturer's certification stating:
 - 1. Each penetration of fire-rated walls and floor, partition heads, and the edge of slabs will be firestopped with a firestopping system tested by UL or other recognized testing agency for substrate and the penetrating item.
 - 2. Authorities having jurisdiction have approved firestopping systems for this project.
 - 3. Products and Classifications Schedule:
 - a. Provide tabular form schedule for firestops, fire containment, and fire-resistant construction joints.
 - b. Schedule to identify:
 - 1) Construction penetrated including fire resistance rating.
 - 2) Penetrating item.
 - 3) Products and manufacturers included in each system.
 - 4) Form material used.
 - 5) Firestop classification and description from UL or other nationally recognized independent testing agencies acceptable to the Authority Having Jurisdiction.
 - 6) Fire containment and fire-resistant construction joint description.
 - 7) F, T, and W ratings where applicable
 - c. Update the schedule periodically to include addition and changes.
- C. Informational Submittals: Submit the following:

1. Test Reports: Copy of UL or other acceptable testing agency report illustrating each system and device as tested and approved.
2. List of generic descriptions and product names and manufacturers included in each system including form material, containment system, gang assemblies, means of controlling size of annular space, and sealer, topcoat, or intumescent materials.
3. Certifications specified in this section.
4. Qualification Data: Manufacturer's and installer's qualification data.
5. Manufacturer's field reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section with a minimum of five years' experience.
- B. Firestop Manufacturer: Do not use firestop material produced by any manufacturer who will not agree to send a direct employee as a qualified technical representative to the project site, during the initial installation and when requested, for the purpose of training appropriate installer personnel in proper selection and installation procedures and for rendering advice concerning the proper installation of materials.
- C. All Firestopping Products shall be manufactured by one company to ensure compatibility with tested and listed assemblies and systems. Firestopping products made by multiple companies shall not be permitted to be installed.
- D. Engineering Analysis: Engineering Analysis or Engineering Judgments/EJs are not encouraged for tenant improvement projects and will not be accepted for new construction projects. If Engineering Analysis are submitted they may not be approved. The first course of action is to provide a listed or prescriptive code design. Engineering Analysis shall not be permitted without the Office of the State Fire Marshal or Deputy State Fire Marshal's approval, prior to permit issuance for the scope of work. An Alternate Materials and Methods Request (AMMR) will be required if a listed design is not available for a specific condition.
- E. Installer Qualifications:
 1. The General Contractor/Construction Manager shall coordinate with mechanical, plumbing, electrical, low-voltage, and rated assemblies to provide a single company for the installation of all firestopping materials
 2. Company specializing in the installation of firestopping specified with experience on at least five projects of similar nature in the past three years.
 3. Trained and approved by the manufacturer of firestop materials.
 4. The installer shall be certified, licensed, FM Approved in accordance with FM 4991, or Certified by UL as a Qualified Contractor, or approved by Cal Poly and the AHJ, in addition to being certified by the firestopping manufacturer (not by distributor) as having been provided the necessary training to install firestop products per specified requirements.
 5. The certified installer shall have in such person's possession their certification cards available at all times during installation and inspection. Any new certified installer shall be submitted for review and approval.
 6. The firestopping installation shall be performed by one company, multiple

companies installing firestopping shall not be permitted.

- F. Installer Responsibility: Select firestop, fire containment, and fire-resistant construction joint products from those indicated for each penetration.
 - 1. Obtain approval of authorities having jurisdiction for selected methods.
 - 2. Submit proposed methods along with proof of acceptance by the Authority Having Jurisdiction.
- G. Regulatory Requirements: Ensure firestop, fire containment, and construction joint components comply with applicable portions of local, state, and federal codes, laws, and ordinances for flame spread and smoke-developed indices.
- H. Certifications:
 - 1. Contractor's and installer's certification that products are installed in accordance with Contract Documents, based on inspection and testing specified as part of Field Quality Control.
 - 2. Manufacturer certification ensuring firestopping interface compatibility with other firestopping and systems
 - 3. Certificates of compliance from the Authority Having Jurisdiction indicating approval of firestops, fire containments, and construction joints.
 - 4. Certificate of inspection and acceptance by the Authority Having Jurisdiction of firestops, fire containments, and construction joints.

1.6 PRE-INSTALLATION CONFERENCE

- A. Conduct a pre-installation conference in accordance with Section 013119.
- B. Agenda: Include discussion and agreement upon acceptable:
 - 1. Product and classification schedule.
 - 2. Test firestop materials to confirm compatibility with adjacent materials and chemicals and solvents with which they may come into contact during construction.
 - 3. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
 - 4. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
 - 5. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.
 - 6. Coordinate with the firestop manufacturer during the pre-installation conference to ensure installation is completed per the required design.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 016000.
 - 1. Packing, Shipping, Handling, and Unloading: Deliver materials in the manufacturer's unopened containers with the manufacturer's name, product identification, lot number, UL labels or labels of other nationally recognized independent testing agencies, and mixing and installation instructions.

2. Storage and Protection: Store materials to prevent deterioration and damage due to moisture, temperature change, and contamination.

1.8 PROJECT CONDITIONS

- A. Environmental Requirements:
 1. Comply with the manufacturer's temperature and humidity limitations before, during, and after installation.
 2. Do not install firestopping products when ambient or substrate temperatures are outside the limitations recommended by the manufacturer.
 3. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
 4. Comply with ventilation requirements.

2.0 SEQUENCING

- B. Sequence Work properly with adjacent work to allow unobstructed access to all areas needing firestops and smoke seals.
 1. Identify penetrations and openings requiring firestops, smoke seals, fire containments, and construction joints.
 2. Schedule installation of firestopping after completion of work involving penetrating items, but prior to covering, concealing, and eliminating access to penetrations.
 3. Coordinate with work of other trades
- C. Inspection: Request inspection of firestops by the Authority Having Jurisdiction and testing consultant before concealment.
 1. Sequence work to permit installation to be inspected and approved prior to being concealed.
 2. Ensure that subsequent openings and penetrations are reported, properly firestopped, and inspected.
 3. Required State Fire Marshal Inspection Milestones:
 - a. Material Verification
 - b. Substrate Inspection
 - c. Assembly installation inspection (each layer)
 - d. Final Inspection
 - e. Other Inspection as required TBD (e.g. firestopping through penetrations) as applicable.

PART 2- PRODUCTS

2.1 FIRESTOPPING DEVICE AND SYSTEM MANUFACTURERS

- A. Acceptable Manufacturers:
 1. **Basis of Design: Hilti Corp., Tulsa, OK.**
 2. Approved Equal
- B. Substitutions: Product substitutions must comply with Section 012500. Approval must be obtained by the Design Team, Cal Poly Facilities Planning and Capital Projects department, and the Authority Having Jurisdiction for approved equivalent prior to installation.

2.2 PRODUCT DESCRIPTION

A.

1. Intumescent sealants: intumescent, water-based sealants. Fast drying, paintable, red in color. Sealant materials for use with non-combustible and combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles, and plastic pipe. Provides a W-rating once cured
2. Acrylic-Based Firestop Sealants: Single-part, water-based. Paintable, low shrinkage, low VOC sealant. Use firestop pipe penetrations (not for use with CPVC) and joints. Available in red, white, and grey colors.
3. Silicone Sealants: Flexible, Smoke, fume water, and UV resistant sealant. Halogen and solvent free. Meets Class 1 W-rating requirements. Use in mechanical, electrical, and plumbing applications to firestop through a fire-rated wall and floor assemblies
4. Self-Leveling Sealants: Products: Single part, self-leveling firestop silicone sealant. Gray in color. Meets Class 1 W-rating requirements. For use with floor penetrations UL Water leakage test.
5. Intumescent Composite Sheets: Intumescent sheet that fastens directly to the surface, #304 stainless steel, and nonmagnetic. For use with large wall and floor fire-rated assemblies.
6. Intumescent Collar: Factory-assembled steel collars lined with intumescent material sized to fit the specific outside diameter of the penetrating item, latch mechanism for closing, BS and UL compliant, and FM-approved firestop collar.
7. Intumescent Wrap Strips: Firestop wrap device that attaches to assembly around the combustible plastic pipe (closed and open piping systems) and can be continuously wrapped.
8. Intumescent Firestop Blocks: Intumescent, re-usable, Re-enterable non-hardening blocks with an embedded fiberglass mesh used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways. To be installed with the manufacturer's label intact on the block for ease of installation.
9. Intumescent Moldable Putty: Remains pliable, flexible, and easily re-enterable, non-toxic putty. Versatile putty for pipes, cables, cable trays, blank openings, and other penetrations.
10. Cast-In Place Device: A one-step cast-in firestop device for sealing combustible and non-combustible penetrations, ready-to-use out of the package, integrated

moisture, and smoke seal. Available in red or black.

- a. Metal Deck Device: Cast-in firestop device that can work in composite W3 and W2 floor decks, does not require steel deck reinforcement or additional shoring, and tested in accordance with UL 1479, ASTM E 814, and ASTM G21.
11. Plugs: For blank openings made in a fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected.
12. Cable pathway devices: whenever single and/or bundled low-voltage cables penetrate fire-rated concrete, masonry, and drywall walls and floors, where frequent cable additions and changes may occur. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The device shall be capable of being easily ganged together. The fire-rated cable management device shall consist of a bare metal housing and frame(s) to enable grounding for electrical continuity. The device shall provide airflow containment sufficient to achieve the L-Rating requirements of the barrier type.
 - a. Round fire-rated cable management device: The device shall consist of a corrugated steel tube with zinc coating, contain an inner plastic housing, intumescent material rings, and an inner fabric smoke seal membrane. The device shall contain a smoke seal fabric membrane or intumescent firestop sufficient to achieve the L-Rating. Install the device per the manufacturer's published installation instructions.
 - b. Rectangular fire-rated cable management device: The device shall consist of a rectangular galvanized steel sleeve with a symmetrical half-shell design for retrofit capabilities. The device shall consist of an inner and outer layer of brushes on both ends of the device sufficient to achieve the L-Rating. The device shall be capable of being easily ganged together using gang plates or floor grid systems with ganging clips. Install the device per the manufacturer's published installation instructions.
13. Pre-formed Head of Wall Device: One-piece, pre-formed, polyurethane foam-based, firestop seal for use with standard head-joint top tracks and slip-type head joints in fire-rated construction at top of partition to maintain continuity of the fire-resistance-rated assembly indicated. Provide in width and configuration required to accommodate depth and installation of studs and designed to saddle over the top track.
14. Firestop Joint Spray: Tested in accordance with ASTM D6904, both sprayable and brushable, contains no halogens, solvents, or asbestos, mold, and mildew resistance rating of 1. For use of sealing wall and top-of-wall openings and joints, building perimeter gaps between floor slabs and exterior façades.

15. Edge of Slab Device: Pre-formed polyurethane foam-based material for use as part of a perimeter fire barrier between fire-resistance-rated floors and exterior wall assemblies.
- B. Performance Criteria:
1. Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water, or other forms of moisture characteristic during and after construction.
 2. Pipe insulation shall not be removed, cut away, or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
 3. Fire-rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons, and changes will occur.
 4. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data, and video cabling shall be provided with re-enterable products specifically designed for retrofit. Systems: Comply with the code for firestopping systems for each condition encountered.
- C. **INS-07** Safing Insulation, Foil Faced:
1. General: Mineral fiber composition, foil faced.
 2. Classification:
 - a. ASTM C612, Class 1 or 2.
 - b. ASTM C665: Type III, Class A.
 3. Density and Thickness: Manufacturers recommended to achieve the indicated fire rating.
 4. Combustion Characteristics: ASTM E136, noncombustible.
 5. Fire rating: ASTM E84, flame spread 25 or less, and smoke development 10 or less.
 6. Acceptable Products:
 - a. Owens Corning Thermafiber: Thermafiber Safing Insulation.
 - b. ROXUL SAFE, Rockwool.
 - c. Or equal.
- D. Accessories: Provide accessories required by the manufacturer, UL, or other testing agency, and classification for the specific application.
1. Sealant Primers: As instructed by the manufacturer.
 2. Sealant Damming Materials:
 - a. Non-combustible.
 - b. Chemically compatible with sealant.
 - c. Mineral fiberboard, mineral fiber matting, or fibrous fire safing.
 3. Cleaning Solvents: As instructed by the manufacturer.
 4. Labels:
 - a. Provide a label for each firestop condition.
 - b. Type information in non-fading ink on 20-pound (minimum) paper.
 - c. Include the following information on each label:
 - 1) Manufacturer's name.

- 2) Product name.
 - 3) Product type (sealant, putty, mortar, or other generic material description).
 - 4) F-Rating.
 - 5) W Rating.
 - 6) T-Rating. State when not required for the condition.
 - 7) Testing and listing agency filing numbers, such as UL System number.
- E. Select adhesives, primers, and sealants meeting Cal-GREEN requirements.
1. Adhesives shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit requirements.
 2. Sealants and Sealant Primers shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

2.3 CURTAIN WALL FIRE-STOPPING SYSTEMS

- A. Deferred Submittals for Curtain Wall Fire Stopping Systems shall not be permitted.
1. Fire Retardant Sealants and Insulation:
 - a. Insulation: Approved semi-rigid curtain wall insulation and firesafing materials; coordinate with Section 072100 for materials to create a fire-rated assembly.

PART 3- EXECUTION

3.1 EXAMINATION

- A. Examine conditions and proceed with work when substrate conditions are acceptable.
- B. Verify that permanent penetration items have been installed and that temporary penetrating items have been removed.
- C. Verify that supports have been installed on both sides of penetrated construction as required by UL classifications.
- D. Inspect and verify that surfaces and condition of openings have no defects that could interfere with the installation and performance of firestop materials.
- E. Verify sleeves installed under plumbing, mechanical, and electrical work are properly installed.

3.2 PREPARATION

- A. Clean surfaces of opening substrates free of dirt, oil, grease, debris, items not explicitly included in the listed assembly, and loose and harmful materials which may adversely affect the bond of materials to surfaces in accordance with manufacturer's recommendations.
- B. Test surfaces which have been previously painted, sealed, and treated with other coatings and compounds to ensure compatibility with materials and proper bond capability.
- C. Remove incompatible coatings and materials which may affect the firestop bond with surrounding surfaces.

- D. Mask and protect adjacent surfaces from damage.
- E. Prime surfaces as instructed by the manufacturer.

3.3 FIRESTOPPING INSTALLATION

- A. General: Install in accordance with manufacturer's details, applicable codes, UL or other testing agency classification requirements, and approved schedule and shop drawings.
 - 1. Fire-resistant systems without UL or other testing agency classification requirements shall be approved by authorities having jurisdiction before installation.
 - 2. Install firestopping material in the manner required to achieve the F rating, W rating, and T rating required by UL classification, applicable codes, and authorities having jurisdiction.
 - 3. Install firestopping material with sufficient pressure to ensure uniform density and texture, and to ensure proper filling and sealing of openings to create a smoke seal.
 - 4. Install forms and supports to arrest liquid and flowable material leakage and retain materials in openings.
 - 5. Remove form materials after firestopping material has cured unless materials used are permitted or required to remain according to test classifications.
- B. Through Penetration Firestopping Systems: Comply with classification design requirements. Separate cables not in conduit and maintain the required separation of penetrating items from edges of openings and from each other.
 - 1. Tool and trowel exposed surfaces to smooth finish, flush with surrounding surfaces unless otherwise required by test classification.
 - 2. Remove excess firestop material promptly as work progresses.
- C. Through Penetration Firestopping:
 - 1. Securely attach device frames to supporting construction.
 - 2. Assembly component parts to ensure proper contact and sealing of gaps and openings around penetrating items.
- D. Curtain Wall Fire Containment, Foil-Faced Siding Insulation:
 - 1. Fill voids between the curtain wall and edge of slabs at floors and roofs in accordance with the manufacturer's instructions. Do not leave voids in siding.
 - 2. Tape and seal tears and cuts in siding.
 - 3. Seal joints with the manufacturer's recommended sealant.
 - 4. Provide flexible fire-rated smoke seal tested and approved for dynamic movement.
 - 5. Create a fire-rated assembly with a listed design number.
- E. Fire Resistant Construction Joints:
 - 1. Provide fire-resistant systems to match the fire rating of the adjacent construction.
 - 2. Provide fire-resistant systems at the following locations:
 - a. Voids and gaps in fire-rated construction, including control joints and gaps at the top of fire-rated CMU walls.
 - b. Fire-rated partition and metal deck flutes.
 - c. Changes in partition material.
 - d. Floor joints not requiring expansion joints.

- e. Other locations indicated and required by applicable codes.

3.4 FIELD QUALITY CONTROL

- A. Site Inspections: Comply with Division 01 requirements.
- B. Inspection: The owner may engage and pay for the services of an independent testing consultant to perform a quality control inspection.
- C. Do not conceal firestops, fire containments, and fire-resistant construction joints prior to required inspection by the Inspector of Record (IOR) and Authority Having Jurisdiction (AHJ)
- D. Notify the Authority of Having Jurisdiction and designated inspectors of work released for inspection.
- E. Manufacturer's Field Service: At the start of the installation, periodically as the Work progresses, and after completion, utilize the firestop material manufacturers' representative at the job site as necessary to advise on every phase of the Work.
- F. The listed assembly and the manufacturer installation instructions shall be onsite and available during the installation to ensure and verify proper installation. Listed documentation and the manufacturer's installation instructions shall be provided by the Contractor or Subcontractor during inspections in accordance with 014100. Listed documentation provided shall be by the listing agency, not the manufacturer.
- G. All firestopping installations must be performed in compliance with a tested and listed firestop system design. The tested and listed system specifically states the manufacturer and the exact products that may be used. There is NO substitution, as each product has different properties and these specific combinations and applications are what have passed testing.
- H. Labels:
 - 1. Provide a label for each firestop/smoke seal condition.
 - 2. Securely fasten the label immediately adjacent to the firestopping condition to allow authorities having jurisdiction and the owner's inspection agency to readily identify and confirm the system.
 - 3. Wall partitions are required to have protected openings or penetrations permanently identified with signs or stenciling. Such identification shall be located in accessible concealed floor, floor-ceiling, or *attic* spaces:
 - a. Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall partition and
 - b. Include lettering not less than 3 inches in height with a minimum 3/4-inch stroke in a contrasting color incorporating the suggested wording. **"Fire and/or smoke barrier-protect all openings"** or similar wording.
- I. Inspection Requirements:
 - 1. Visually examine firestopping, fire containments, and fire-resistant construction joints to verify compliance with Contract Documents.
 - 2. Examine firestopping, fire containments, and fire-resistant construction joints for proper installation, adhesion, and curing appropriate for each material.
 - 3. Submit a written inspection report including the following information:
 - a. Identify construction penetrated including fire resistance rating.

- b. Identify penetrating items.
 - c. Identify products and manufacturers included in each system.
 - d. Identify the form material used.
 - e. Firestop classification and description from UL, FM, Warnock Hersey, or other independent testing agencies.
 - f. Fire containment and fire-resistant construction joint description.
 - g. F, T, and W ratings.
 - h. State whether firestop, fire containment, and fire-resistant construction joint is or is not in full compliance with testing agency classification, description, and manufacturer's requirements. If variations occur confirm acceptance of variation by the manufacturer and authority having jurisdiction.
- J. Re-examine firestopping, fire containments, and fire-resistant construction joints immediately prior to concealment by other construction to ensure no damage has occurred since the initial inspection.
- K. Correct unacceptable firestopping, fire containments, and fire-resistant construction joints, and provide additional inspection, to verify compliance with this Section, at no additional cost to the Owner.

3.5 REPAIRS AND MODIFICATIONS

- A. Identify damaged and re-entered seals requiring repair and modification.
- B. Remove loose and damaged materials.
- C. If penetrating items are to be added, remove enough material to permit penetration by new elements, being careful not to damage the balance of the seal.
- D. Repair holes, cracks, and damage in accordance with the manufacturer's instructions to ensure a complete smoke seal.
- E. Use only materials approved by the manufacturer of the original seal as suitable for repair.

3.6 CLEANING

- A. General:
 - 1. Clean as instructed by the manufacturer. Do not use materials or methods which may damage the firestop or surrounding construction.
 - 2. Remove stains and correct damage to adjacent surfaces.

3.7 PROTECTION

- A. Protect material subject to traffic from damage.

END OF SECTION