

Note to specifier: This specification section covers only "Through-Penetration Firestop Systems." Most projects require protection of "Fire-resistive construction joints" as well; a companion section 07842 "Fire-resistive Construction Joints" should be issued in addition.

### SECTION 07841 THROUGH-PENETRATION FIRESTOP SYSTEMS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

##### 1.02 DEFINITIONS

- A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

##### 1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

- A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- B. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- C. Openings and penetrations in fire-rated partitions or walls containing fire doors.
- D. Openings around structural members which penetrate floors or walls.

##### 1.04 RELATED WORK OF OTHER SECTIONS

- A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:
  - 1. Section 03300 - Cast-In-Place Concrete
  - 2. Section 04200 - Masonry Work
  - 3. Section 07842 – Fire-resistive joint systems
  - 4. Section 07900 - Joint Sealers
  - 5. Section 09200 - Lath and Plaster
  - 6. Section 09250 - Gypsum Drywall Systems
  - 7. Section 13080 - Sound, Vibration and Seismic Control
  - 8. Section 13900 - Fire Suppression and Supervisory Systems
  - 9. Section 15050 - Basic Mechanical Materials and Methods
  - 10. Section 15250 - Mechanical Insulation
  - 11. Section 15300 - Fire Protection
  - 12. Section 15400 - Plumbing
  - 13. Section 16050 - Basic Electrical Materials and Methods

## 1.05 **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. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their “FIRE RESISTANCE DIRECTORY” that 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)
- D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments
- E. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops.”
- G. All major building codes: ICBO, SBCCI, BOCA, and IBC.  
*(Note to specifier: Retain or delete building codes listed above as applicable)*
- H. NFPA 101 - Life Safety Code
- I. NFPA 70 - National Electric Code

## 1.06 **QUALITY ASSURANCE**

- A. A manufacturer’s direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer’s written recommendations published in their literature and drawing details.
- B. Firestop System installation must meet requirements of ASTM E 814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
- D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
- E. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.

## 1.07 **SUBMITTALS**

- A. Submit Product Data: Manufacturer’s specifications and technical data for each material including the composition and limitations, documentation of UL firestop systems to be used and manufacturer’s installation instructions to comply with Section 1300.
- B. Manufacturer’s engineering judgment identification number and drawing details when no UL system is available for an application. Engineering judgment must include both project name and contractor’s name

who will install firestop system as described in drawing.

- C. Submit material safety data sheets provided with product delivered to job-site.

#### **1.08 INSTALLER QUALIFICATIONS**

- A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
- B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
- C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
- D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
- E. Do not use damaged or expired materials.

#### **1.10 PROJECT CONDITIONS**

- A. Do not use materials that contain flammable solvents.
- B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
- C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
- D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.
- E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

### **PART 2 - PRODUCTS**

#### **2.01 FIRESTOPPING, GENERAL**

- A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post installed." Provide cast-in-place firestop devices prior to concrete placement.

## 2.02 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
1. Hilti, Inc., Tulsa, Oklahoma  
Telephone 800-879-8000. Web Site: [www.us.hilti.com](http://www.us.hilti.com)
  2. Provide products from the above acceptable manufacturer; *no substitutions will be accepted.*

## 2.03 MATERIALS

- A. Use only firestop products that have been UL 1479 or ASTM E 814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
- B. Cast-in place firestop devices for use with combustible and non-combustible pipes (closed and open piping systems) and cable bundles penetrating concrete floors, the following products are acceptable:
1. Hilti CP 680 Cast-In Place Firestop Device
    - a. Add Aerator adaptor when used in conjunction with aerator (“sovent”) system.
  2. Hilti CP 681 Tub Box Kit for use with tub installations.
  3. Hilti CP 682 Cast-In Place Firestop Device for use with noncombustible penetrants
- C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
  2. Hilti CP 604 Self-leveling Firestop Sealant
  3. Hilti CP 620 Fire Foam
  4. Hilti CP606 Flexible Firestop Sealant
  5. Hilti CP 601s Elastomeric Firestop Sealant
- D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
1. Hilti CP 601s Elastomeric Firestop Sealant
  2. Hilti CP 606 Flexible Firestop Sealant
  3. Hilti FS-ONE Intumescent Firestop Sealant
- E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
- F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti FS-ONE Intumescent Firestop Sealant
  2. Hilti CP 620 Fire Foam
  3. Hilti CP 601s Elastomeric Firestop Sealant
  4. Hilti CP 606 Flexible Firestop Sealant
- G. Non curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
1. Hilti CP 618 Firestop Putty Stick
  2. Hilti CP 658T Firestop Plug
- H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the

following products are acceptable:

1. Hilti CP 617 Firestop Putty Pad
- I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
1. Hilti CP 643N Firestop Collar
  2. Hilti CP 644 Firestop Collar
  3. Hilti CP 645/648 Wrap Strips
- J. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti CP 637 Firestop Mortar
  2. Hilti FS 657 FIRE BLOCK
  3. Hilti CP 620 Fire Foam
  4. Hilti CP 675T Firestop Board
- K. Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
  2. Hilti CP 675T Firestop Board
- L. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
  2. Hilti CP 658T Firestop Plug
- M. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
1. Verify penetrations are properly sized and in suitable condition for application of materials.
  2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
  3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
  4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
  5. Do not proceed until unsatisfactory conditions have been corrected.

### **3.02 COORDINATION**

- A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

- B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

### **3.03 INSTALLATION**

- A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.
- B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.
  - 1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
  - 2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
  - 3. Protect materials from damage on surfaces subjected to traffic.

### **3.04 FIELD QUALITY CONTROL**

- A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B. Keep areas of work accessible until inspection by applicable code authorities.
- C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.
- D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

### **3.05 ADJUSTING AND CLEANING**

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

**END OF SECTION**