

## **SECTION 07 84 00**

### **FIRESTOPPING PENETRATIONS, JOINTS AND PERIMETER FIRE CONTAINMENT**

#### **PART 1 GENERAL**

##### **1.00 RELATED DOCUMENTS**

- A. The BIDDING REQUIREMENTS, CONTRACTING REQUIREMENTS, and applicable parts of DIVISION 1 - GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

##### **1.01 DESCRIPTION SUMMARY**

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code for this project.
- B. Firestop systems shall be used in locations including, but not limited to, the following:
  - 1. Penetrations through fire-resistance-rated floor and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.
  - 2. Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.
  - 3. Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.
  - 4. Joints in fire-resistance-rated assemblies to allow independent movement.
  - 5. Perimeter Fire Barrier System between a rated floor/roof and an exterior wall assembly.
  - 6. Joints, through penetrations and membrane penetrations in Smoke Barriers and Smoke Partitions.
- C. Documentation of non-conforming penetrations or systems, repairs made to existing conditions, new construction and detailed barrier report shall include the following unless otherwise provided in the solicitation.
  - 1. Identify non-conforming items. Take a photo of each non-conforming item and issue a unique number for reference in final report unless provided by the VA in the Statement of Work.
  - 2. Label each installed system with numbered label, the name of the installer, system installed, materials used, and date installed.
  - 3. Label substrate (fire and smoke walls only, not floor separations) to identify rated designation i.e. 1 hour, 2 hour etc.

4. Take an 'after' photo of non-conforming items that receive corrective action and issue a unique number. The photo and unique number are to be included in the final report.
5. Develop and provide to the VA a "rated barrier" compliance report detailing the nonconforming items to include barrier type, location, item type, size, quantity, current issue and reason for being non-compliant. If corrective action is taken, identify the system installed, label number, and photo. If no corrective action is taken, provide colored photos and note the action required on the report. Separate the report into corrected items and items remaining to be corrected. Further, break down the report by building, floor and rated barrier.
6. Provide a quote for non-conforming items identified during remediation/assessment work that are not corrected.
7. Develop a summary of all work performed to include linear feet of rated walls impacted by remediation/assessment work and recommendations for next steps based on Statement of Conditions PFI timelines.
8. Establish a tracking system for the manufacturer lot numbers of the products used on the job and/or use in each system.

## **1.02 RELATED WORK**

- A. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that relate directly to Work of this Section include, but are not limited to:
  1. Division 3 - CAST-IN-PLACE CONCRETE; Concrete work
  2. Division 4 - UNIT MASONRY
  3. Division 5 - EXPANSION, CONTROL, and SEISMIC JOINTS
  4. Division 7 - THERMAL AND MOISTURE PROTECTION
  5. Division 8 - GLASS, GLAZING AND METAL CURTAIN WALL SYSTEMS
  6. Division 9 - GYPSUM WALLBOARD
  7. Division 15 - MECHANICAL
  8. Division 16 - ELECTRICAL, LIGHTING, POWER, ALARMS and COMMUNICATIONS

## **1.03 REFERENCES**

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
  1. American Society for Testing and Materials (ASTM).
    - a) E 84 Test Method for Surface Burning Characteristics of Building Materials
    - b) E 119 Test Method for Fire Tests of Building Construction and Materials

- c) E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
  - d) E 814 Fire Tests of Through-Penetration Fire Stops
  - e) E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths
  - f) E 1966 Test Method for Resistance of Building Joint
  - g) E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops
  - h) E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems
  - i) E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA)
- 2. Firestop Contractors International Association (FCIA):
    - a) M.O.P. Manual of Practice
  - 3. International Firestop Council (IFC):
    - a) Ref. 1 Recommended IFC Guidelines for Evaluating Firestop Engineering Judgments (April 2001)
    - b) Ref. 2 Inspectors Field Pocket Guide
  - 4. National Fire Protection Association (NFPA):
    - a) NFPA 70 - National Electric Code
    - b) NFPA 101 - Life Safety Code
    - c) NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
    - d) NFPA 251 - Fire Tests of Building Construction and Materials
  - 5. Underwriters Laboratories, Inc. (UL):
    - a) UL Qualified Firestop Contractor Program
    - b) UL 263 Fire Tests of Building Construction and Materials
    - c) UL 723 Surface Burning Characteristics of Building Materials
    - d) UL 1479 Fire-Tests of Through-Penetration Fire Stops
    - e) UL 2079 Tests for Fire Resistance of Building Joint Systems

#### **1.04 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Penetrations: Provide and install firestopping systems that are produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:
  - 1. Firestop all penetrations passing through fire resistance rated wall and floor assemblies and other locations as indicated on the drawings.
  - 2. Provide and install complete penetration firestopping systems that have been tested and approved by third party testing agency.

3. F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than one hour or the fire-resistance rating of the construction being penetrated.
  4. T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated by Code.
  5. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.
  6. W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined per UL 1479, where indicated.
- B. Perimeter Fire Containment Systems: Provide interior perimeter joint systems with fire-resistance ratings indicated, as determined per ASTM E 2307, but not less than the fire-resistance rating of the floor construction.
  - C. Fire-Resistive Joints: Provide joint systems with fire-resistance ratings indicated, as determined per UL 2079, but not less than the fire-resistance rating of the construction in which the joint occurs.
  - D. For firestopping exposed to view, traffic, moisture, and physical damage, provides appropriate firestop systems for these conditions.
  - E. Where there is no specific third party tested and classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFFRA) for submittal.

## **1.05 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, shop drawings, product data, and samples.
- B. Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material shall be asbestos free and complies with local regulations.
  1. Certification by firestopping manufacturer, that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's) and are nontoxic to building occupants.
- C. Submit system design listings, including illustrations from a qualified testing and inspection agency that is applicable to each firestop configuration

## **1.06 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: Provide firestopping System Design Listing by a testing and inspection agency in accordance with the appropriate ASTM Standard(s) per article 1.04. A qualified testing and inspection agency may be UL, FM Research, Intertek Testing Services, Omega Point Laboratories (OPL) or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the authority having jurisdiction.
- B. Contractor Qualifications: Acceptable installer firms shall be:
  - 1. FM Approved in accordance with FM Standard 4991 – Approval of Firestop Contractors
  - 2. Underwriter Laboratories (UL) Qualified Firestop Contractor
  - 3. Licensed by the State or local authority, where applicable.
  - 4. Shown to have successfully completed not less than 5 comparable scale projects.
  - 5. Evidence of a Quality Management System or equivalent system based on ISO 9000 principles
    - a. Must have approved QMS by UL or approved FM Certification Process
    - b. Shall demonstrate latest audit findings if completed prior to award by UL, FM or Representatives of accrediting, qualifying or certifying entities (Current is within established timelines set by UL or FM)
- C. Manufacturer Source Requirements: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer unless otherwise permitted by the organization.
  - 1. The organization reserves the right to approve and limit the manufactures and types of manufacturer's products. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
  - 2. Tested and listed firestop systems are to be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRR) is installed.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver firestopping products to project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer.
- B. Ensure that manufacturers products are not diluted mixed or otherwise altered unless permitted by the manufactures directions.
- C. Store and handle firestopping materials in accordance with manufacturers written instructions. Product and equipment staging and storage must be approved by the COTR.

#### **1.08 PROJECT CONDITIONS**

- A. Environmental Conditions: Install firestopping in accordance with manufacturers written instructions.
- B. Ventilation: Ventilate per firestopping manufacturers' instructions or Material Safety Data Sheet (MSDS)

## **1.09 SEQUENCING AND SCHEDULING**

- A. Project coordination is essential to inform and educate all the parties involved with the firestopping process of their role and how they can affect firestopping on the project. A pre-construction meeting shall be scheduled and required for all parties involved prior to the start of construction.
- B. Do not cover up firestopping installations until Owner's inspection agency or the Authorities Having Jurisdiction have examined each installation.

## **1.10 ENVIRONMENTAL REGULATIONS**

- A. All materials shall be asbestos free and comply with local VOC Regulations.
- B. If required, hazardous disposal of firestop materials shall be strictly observed as noted on the individual MSDS.
- C. Bulk storage shall be preapproved and in locations as to not present a hazard to the environment or risk to occupants.

## **PART 2 PRODUCTS**

### **2.01 FIRESTOPPING, GENERAL**

- A. Systems listed by approved testing agencies, as identified in part 1 above, may be used, providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance.
- B. Manufacturer of firestop products shall have been successfully producing and supplying these products for a period of not less than 3 years, and be able to show evidence of at least 10 projects where similar products have been installed and accepted.
- C. Allowable firestop products produced by FCIA Manufacturer Members in good standing.
  - 1. 3M Fire Protection Products
  - 2. HILTI, Inc.
  - 3. Specified Technologies, Inc.
  - 4. Thermafiber, LLC

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Notify the responsible party or parties of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

- B. Identifying any unique conditions that may create unusual construction dust, noise or other impacts to infection control or life safety that may be outside of established and approved methods by the organization.

### **3.02 PREPARATION**

- A. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond. Do not allow spillage and migration onto exposed surfaces.
- B. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing the firestopping seal with substrates.
- C. Verify that system components are clean, dry, and ready for installation.
- D. Verify that field dimensions are as shown on the Drawings and as recommended by the manufacturer.

### **3.03 INSTALLING PENETRATION FIRESTOPS**

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
  - 1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
  - 2. Schedule the work to assure that partitions and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- B. Install forming/damming materials and other accessories in accordance with manufacturers written instructions.
- C. Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:
  - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
  - 2. Install materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces.

### **3.04 INSTALLING FIRESTOP JOINT SYSTEMS**

- A. General: Comply with the "System Performance Requirements" article in Part 1 and with the firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

1. Install joint fillers to provide support of firestop materials during application and at the position required to produce the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- B. Install systems by proven techniques that result in firestop materials:
  1. Directly contacting and fully wetting joint substrates.
  2. Completely filling recesses provided for each joint configuration,
  3. Providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.
- C. Tool non-sag firestop materials immediately after their application and prior to the time skinning or begins. Form smooth, uniform beads of configuration indicated or required to:
  1. Produce fire-resistance rating
  2. To eliminate air pockets
  3. To ensure contact and adhesion with sides of joint.

### **3.05 INSTALLING PERIMETER FIRE BARRIER SYSTEMS**

- A. General: Comply with “System Performance Requirements” article in Part 1 and with the firestop manufacture’s installation and drawings pertaining to products and applications indicated.
- B. Install metal framing, curtain wall insulation, mechanical attachments and firestop materials as applicable within the system design.

### **3.06 FIELD QUALITY CONTROL**

- A. Inspection – The VA organization may require an independent inspection agency employed and paid by the VA to examine penetration firestopping in accordance with ASTM E – 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems. Inspection agency to examine firestopping and will determine, in general, that firestopping has been installed in compliance with requirements of tested and listed firestop system, and installation process conforms to FM 4991 – Standard for Approval of Firestop Contractors or UL Qualified Firestop Contractor Program.
- B. The inspector shall advise the contractor of any deficiencies noted within one (1) working day.
- C. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.
- D. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed system design.

### **3.07 CLEAN-UP AND SPECIAL WORKING CONDITIONS**



- A. Firestop Material: Clean off excess fill materials and sealants adjacent to openings and joints as work progresses. Use methods and cleaning materials approved by manufacturers of firestopping products and or assemblies in which openings and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances. If damage caused by others, owner and general contractor to instruct firestop contractor to make appropriate repairs and charge to appropriate trades.
- C. Debris: Removal of litter and debris shall be in closed or covered containers at the end of each shift or more often as necessary to prevent unsafe fire conditions and reduce construction dusts. The organization may require additional measures in areas where compromised patients are housed or treated.
  - 1. Areas may include special procedure areas, operating rooms, special ventilation rooms and other spaces deemed critical.
  - 2. Such areas may require specialized local barriers to be erected prior to commencing work. Special consideration to scheduling and potentially working in off tour hours may be necessary.
- D. Surfaces: Ceiling grids shall be replaced at the end of each shift unless prior approval by the Contracting Officer Technical Representative. Floors and other surfaces that may become contaminated by construction dust and debris as a result of the work shall be cleaned following completion of each repair location in a manner acceptable to the organization.
- E. Mitigation Measures: Where work may temporary eliminate or restrict life safety features as determined by the organization. Special Interim Life Safety Measures (ILSMs) may be required as mitigating measures.

### **3.08 WARRANTY**

- A. Firestopping work subject to the terms of the Article “Warranty of Construction”, FAR clause 52.246-21, except extend the warranty period to five years.

**END OF SECTION 07 84 00**