PENETRATION FIRESTOPPING – SECTION 078413

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**EDITING NOTE**

All bracketed blanks, words, phrases, sentences, and paragraphs in this specification require the editor to either include or delete the bracketed section, or provide required information.

**PENETRATION FIRESTOPPING – SECTION 078413**

1. GENERAL
   * + 1. RELATED DOCUMENTS
          1. Drawings and General Provision of Contract, including General and Special Conditions and Division 1 Specification Section, apply to work of this section.
       2. SUMMARY
          1. Firestopping is defined as furnishing and installing tested and listed firestopping systems, combinations of materials, or devices to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, partitions, floors, and ceiling-floor assemblies, including through-penetrations and construction joints and gaps.
       3. ALLOWANCES

[List Allowances, if included as part of the contract. Confirm with OSHEM and COTR]

* + - 1. UNIT PRICES

[List Unit Prices, if included as part of the contract. Confirm with OSHEM and COTR]

* + - 1. DEFINITIONS
  1. COTR: Contracting Officer Technical Representative
  2. FM: FM Global (Factory Mutual)
  3. FPE: Fire Protection Engineer
  4. Furnish: To supply the stated equipment or materials
  5. Install: To set in position and connect or adjust for use
  6. NFPA: National Fire Protection Association
  7. NICET: National Institute for Certification in Engineering Technologies
  8. OSHEM: Office of Safety Health and Environmental Management
  9. Provide: To furnish and install the stated equipment or materials
  10. UL: Underwriters Laboratories
      + 1. SYSTEM DESCRIPTION
           1. Firestopping shall be provided in the following locations:

Construction Joints: includes those used to accommodate expansion, contraction, wind, or seismic displacement. The firestopping material shall be a dynamic system and shall not detract from the intended movement of the joint.

Penetrations through floor slabs, fire-rated partitions, fire walls, and exterior walls where rated. Firestopping shall be provided for all new penetrations; penetrations left open by demolition/removal of duct, cable, conduit, and pipe; damaged firestopping, and existing abandoned penetrations in the contract area. Unless otherwise specified or shown on the drawings, the Contractor shall assume that all floor slabs are two-hour, fire-rated. Locations of fire walls or partitions shall be indicated on the drawings.

Penetrations of vertical shafts: assume a two-hour fire barrier unless noted otherwise.

Around openings and penetrations through fire-rated floor/ceiling and roof/ceiling assemblies.

Joint systems for floor-to-floor, wall-to-wall, floor-to-wall, and head of wall applications.

* + - * 1. Other locations shown specifically on the drawings or where called for in other sections of the specifications.
      1. PERFORMANCE REQUIREMENTS
         1. Materials or combinations of materials used for firestopping shall be noncombustible and comply with the following as a minimum:

Flame Spread Index: 25 or less, as measured by ASTM E-84

Flame Spread Index (FSI) is a relative indication of the flammability of the material of interest with respect to a red oak standard. For example, an FSI of 25 indicates that a material has approximately 25% of the standard material’s flame spread characteristics.

Smoke Developed Index: 100 or less, as measured by ASTM E-84

Smoke Developed Index (SDI) is a relative indication of the amount of smoke produced by a material when exposed to a certain heat source with respect to a red oak standard. The numbers carry the same meaning as the FSI values (25 indicates 25%).

* + - * 1. Firestopping shall be asbestos free and shall be non-toxic to humans during installation and fire conditions
        2. Examination Of Work By The Contractor

It shall be the responsibility of the prime contractor to provide firestopping for the entire project. The Contractor shall examine the area to receive firestopping prior to beginning work or to submitting the data required under 1.08, Submittals.

Data to be submitted shall be based on the findings of the Contractor's examination.

* + - 1. SUBMITTALS:
         1. Submit the following for approval by the COTR and the OSHEM Fire Protection Engineer. Submit applicable data for each condition specified.

Certificates of conformance or compliance, accompanied by classification by a nationally recognized testing lab or by other supporting evidence satisfactory to the COTR and the OSHEM Fire Protection Engineer, that the material or combination of materials used meet the requirements specified for flame spread, smoke developed, and fire resistance.

Manufacturer's catalog data for all materials and prefabricated devices, including descriptions sufficient to identify them on the job, and instructions for installation. This data shall also include the Flame Spread Index and the Smoke Developed Index for the materials of interest.

Completed construction details (as-builts) showing material, reinforcement, anchorage, fastenings and method of installation. Catalog data with installation diagrams shall also be included. Clearly show which product will be used for each application. Firestopping materials of different manufacturers shall not be intermixed. Do not submit multiple products for the same application. Details for firestopping of penetrations and joint systems shall show compliance with the appropriate UL Design Number. Drawings shall accurately reflect job conditions pursuant to paragraph 1.07 C, Examination of the Work by Contractor.

Provide as-built drawings showing all penetration locations on floor plans. An identification key shall provide the rating and construction of the assembly penetrated, and the firestopping assembly used at each location.

* + - 1. QUALITY ASSURANCE
         1. Manufacturers Qualifications: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM) Publications:

E84 Standard Test Method for Surface Burning Characteristics of Building Materials

E119 Standard Test Method For Fire Tests of Building Construction and Materials

E814 Test Method of Fire Tests of Through-Penetration Fire stops

E1966 Fire Resistive Joint Systems

E1399 Cyclic Movement And Measuring The Min & Max Joint Widths of Arch Joint Systems

Underwriters Laboratories (UL) Publications:

UL-1479 Fire Tests of Through-Penetration Fire Stops

UL-2079 Tests for Fire Resistance of Building Joint Systems

FRD Fire Resistance Directory

* + - * 1. Installer’s Qualifications. Provide data to show that the firm has at least two years of experience in the installation or application of systems similar in complexity to those required for this project. In addition, provide data to show that the firm is qualified by providing at least 5 comparable scale projects using the manufacturer’s systems.
        2. Pre-Installation Conference

Conduct a pre-installation conference with all sub-contractor representatives to verify project requirements, substrate conditions, manufacturer’s installation instructions, and manufacturer’s warranty requirements.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver products to project site in original, unopened packages with intact and legible manufacturers’ labels identifying product and manufacturer, date of manufacture, and shelf life if applicable.
         2. Store materials indoors, under cover, above ground, away from moisture, and protected from physical damage until ready for use. Remove from site and discard wet or damaged materials.
      2. PROJECT CONDITIONS

[List any special project conditions and/or environmental limitations on system installation, such as temperature, humidity, ventilation, etc.]

* + - 1. COORDINATION
         1. Coordinate installation of all penetration firestopping systems with mechanical, electrical, fire protection, and other trades so that installation is complete and to minimize rework due to the addition of penetrants or other modifications.
      2. WARRANTY
         1. Provide a written warranty by the manufacturer against defects in manufacturing and materials and by the installer against defects in workmanship.
      3. SERVICE AGREEMENT

[List requirements, if part of the contract. Confirm with OSHEM and COTR].

* + - 1. EXTRA MATERIALS

[List special requirements for spare parts, if part of the contract. Confirm with OSHEM and COTR].

1. PRODUCTS
   * + 1. GENERAL
          1. All firestopping used throughout the project shall be the products of a single manufacturer.
       2. MANUFACTURERS
          1. Hilti
          2. 3M
          3. Specified Technologies, Inc.
          4. Nelson
          5. Any manufacturer approved by OSHEM and the COTR
       3. FIRE RESISTANCE RATING
          1. Firestop systems shall be UL Fire Resistance listed or FM P7825a approved with an “F” rating at least equal to the fire-rating of the fire wall or floor in which penetrated openings are to be protected. The “F” rating is permitted to be 3 hours in through-penetrations of 4 hour fire rated walls or floors. Firestop systems shall also have “T” rating where required by any applicable code.

F Rating: a rating usually expressed in hours indicating a specific length of time that a fire resistive barrier can withstand fire before being consumed or permits the passage of flame through an opening in an assembly.

T Rating: a rating usually expressed in hours indicating the length of time that the temperature on the non-fire side of a fire-rated assembly exceeds 325 degrees above its ambient temperature.

* + - 1. THROUGH-PENETRATIONS
         1. Firestopping materials for through-penetrations shall provide “F” and “T” fire resistance ratings in accordance with ASTM E 814 or UL 1479.
      2. CONSTRUCTION JOINTS AND GAPS
         1. Construction joints and gaps shall be provided with firestopping materials and systems that have been tested per ASTM E 119, ASTM E 1966 or UL 2079 to meet the required fire resistance rating. Systems installed at construction joints shall meet the cycling requirements of ASTM E 1399 or UL 2079.

1. EXECUTION
   * + 1. SURFACE PREPARATION:
          1. Prior to application, remove from surfaces all dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting or required fire resistance of the firestopping material for cast-in-place firestop devices. Formwork or metal deck to receive device prior to concrete placement and shall be sound and capable of supporting the device. Prepare surface as recommended by the manufacturer.
       2. INSTALLATION:
          1. Install in accordance with approved construction drawings (shop drawings), approved manufacturer's literature, installation instructions, UL Design Number or UL Report, and the following requirements:
          2. Firestopping caulks must be installed in a neat and workmanlike manner. The finished installation shall have neat edge lines and a smoothed surface without excess masses of rough caulk on the surface of the wall.
          3. Firestopping materials shall completely fill the void space regardless of geometric configuration, subject to tolerances established by the manufacturer when intumescent materials are used.
          4. Apply firestopping materials at penetrations of insulated pipes and ducts, prior to application of the insulation. If insulation is already in place, remove it at the penetration prior to application of the firestopping materials, except where intumescent materials are used and removal is not necessary per manufacturer's instructions. Removed insulation shall be replaced with a material having equal thermal insulation characteristics and equal firestopping characteristics.
          5. Firestopping for filling voids in floors, in which the smallest dimension is 101 mm (4 inches) or more, shall support the same load as the floor is designed or shall be protected by a permanent barrier to prevent loading or traffic on the fire stopped area.
          6. Cable tray penetrations shall be protected by either UL-listed through penetration fire stop devices or through penetration fire stop systems that are re-enterable. Where penetrating cables in a cable tray are removed, replaced, or added, restoration shall be accomplished in an approved manner; the allowable number of penetrating items shall not be exceeded; only permitted penetrations shall be installed; and adequate clearances shall be maintained among penetrations, between penetrations, and the sides of the opening.
          7. Damaged, disrupted, or removed firestopping shall be replaced with new.
          8. Firestopping shall not be applied in conjunction with fire dampers, smoke dampers, or combination fire/smoke dampers unless specifically required by the damper manufacturer installation instructions.
       3. INSPECTION
          1. Approved installation instructions shall be present at each work area prior to the beginning of work and a test installation shall be produced for quality check by the COTR and OSHEM Fire Protection Engineer. The test installation shall be subject to inspection and/or test for conformance with contract requirements. Periodic quality checks shall be performed at the discretion of the COTR, and should installation prove to be substandard, all firestopping installed up to that time, not meeting approved standards, shall be replaced at no additional cost to the Government.
          2. Area of work shall remain available for inspection by the COTR or his designated representative before and after application of firestopping.
          3. Notification: Notify the COTR or his designated representative at least 24 hours prior to installation of firestopping in each area to allow opportunity for inspection.
          4. The contractor shall submit written reports indicating locations of and types of penetrations and types of firestopping used at each location; type shall be recorded by UL listed printed numbers. Contractor records shall be maintained on site and provided to the COTR upon arrival for inspections.
       4. ACCEPTANCE OF WORK
          1. Acceptance of Work: As work is completed, remove materials, litter, and debris. All work shall be inspected and accepted by the Contracting Officer and OSHEM Fire Protection Engineer before materials and equipment are moved to the next scheduled work area. Insulation work and/or ceiling and wall close-in shall not occur before OSHEM acceptance has been obtained.
          2. Labeling: Upon completion of unfinished areas only, affix label to or adjacent to each fire stopped penetration or joint assembly in fire-rated assemblies indicating material and proper replacement, if later disturbed. Suggested label is as follows:

**ATTENTION**

This is a **FIRE-RATED ASSEMBLY**

before breaching

contact building manager and project cotr

Hr Rating: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Installed by:

Install Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Company: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

UL Design #: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Employee: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

END OF SECTION 078143