

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetrations in fire-resistance-rated walls.
- B. Related Sections:
 - 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency and product being used for the system.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

- A. Installer shall meet one of the following qualification requirements:
 - 1. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training by the manufacturer for the products specified. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:
 - 1. Penetration firestopping tests are performed in accordance with Section 014000 "Quality Requirements" for Special Inspections.
 - 2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
 - b. Classification markings on penetration firestopping correspond to designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

1.6 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Approximately 2 weeks before scheduled commencement of installation of joint systems and through-penetration firestopping, meet at Project site with Installer, installer of each component of associated work, Architect, Owner, joint/through-penetration firestop system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) test agencies, and governing authorities.
 - 1. Review foreseeable methods and procedures related to fire-resistive joint systems and through-penetration firestop systems work, including but not necessarily limited to the following:
 - a. Tour representative areas of building, inspect and discuss condition of substrate, joints, and penetrations.
 - b. Review fire-resistive joint and through-penetrations firestop system requirements (Drawings, Specifications, and manufacturer's written instructions.)
 - c. Review required submittals, both completed and yet to be completed
 - d. Review and finalize construction schedule related to work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - e. Review required inspection, testing, certifying, and material usage accounting procedures.
 - 2. Contractor shall record discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.
- C. Notify Architect at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by the Architect and building inspector, if required by authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Grace Construction Products.
 - 2. Hilti, Inc.
 - 3. Nelson Firestop Products.
 - 4. Specified Technologies Inc.
 - 5. 3M Fire Protection Products.
 - 6. Tremco, Inc.; Tremco Fire Protection Systems Group.

2.2 PENETRATION FIRESTOPPING

- A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. Fire-resistance-rated walls include fire walls fire-barrier walls smoke-barrier walls and fire partitions.
 - 2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- D. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-wool-fiber or rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Acrylic Sealants: Single-component acrylic formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant

additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.
- K. Intumescent Sealants: Intumescent acrylic or silicone-based sealants.

2.4 MIXING

- A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 EXECUTION

3.1 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 the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

- A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.
- C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Wall Identification: All fire and/or smoke barriers or walls shall be effectively and permanently identified with signs or stenciling above a decorative ceiling and/or in concealed spaces with letters a minimum of 2 inches (50.8 mm) high on a contrasting background spaced a maximum of 12 feet (365.76 cm) on center with a minimum of one per wall or barrier. The hourly rating shall be included on all rated barriers or walls. Wording shall be similar to the following: '() Hour Fire and Smoke Barrier-Protect All Openings. Where signs are utilized, they shall be designed and installed to resist peeling or detaching from the barrier.
 1. Existing stenciling, acceptable to the authority having jurisdiction, shall be permitted to remain in use. Existing signs that are not peeling or detaching from the barrier shall be permitted to remain in use, subject to the approval of the authority having jurisdiction.

3.5 FIELD QUALITY CONTROL

- A. Where deficiencies are found or penetration firestopping is damaged or removed, repair or replace penetration firestopping to comply with requirements.
- B. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Firestopping with No Penetrating Items FS-1:
 1. UL-Classified Systems: C-AJ- 0001-0999.
- C. Firestopping for Metallic Pipes, Conduit, or Tubing FS-2:
 1. UL-Classified Systems: C-AJ- 1001-1999.
- D. Firestopping for Metallic Pipes, Conduit, or Tubing FS-3:
 1. UL-Classified Systems: C-BK- 1001-1999.
- E. Firestopping for Metallic Pipes, Conduit, or Tubing FS-4:
 1. UL-Classified Systems: W-L- 1001-1999.
- F. Firestopping for Nonmetallic Pipe, Conduit, or Tubing FS-5:
 1. UL-Classified Systems: C-AJ- 2001-2999.
- G. Firestopping for Nonmetallic Pipe, Conduit, or Tubing FS-6:
 1. UL-Classified Systems: C-BK- 2001-2999.
- H. Firestopping for Nonmetallic Pipe, Conduit, or Tubing FS-7:

1. UL-Classified Systems: W-L- 2001-2999.
- I. Firestopping for Electrical Cables FS-8:
 1. UL-Classified Systems: C-AJ- 3001-3999.
- J. Firestopping for Electrical Cables FS-9:
 1. UL-Classified Systems: C-BK- 3001-3999.
- K. Firestopping for Electrical Cables FS-10:
 1. UL-Classified Systems: W-L- 3001-3999.
- L. Firestopping for Cable Trays with Electric Cables FS-11:
 1. UL-Classified Systems: W-J- 4000 Series System using intumescent pillows.
- M. Firestopping for Cable Trays with Electric Cables FS-12:
 1. UL-Classified Systems: W-K- 4000 Series System using intumescent pillows.
- N. Firestopping for Cable Trays with Electric Cables FS-13:
 1. UL-Classified Systems: W-L- 4000 Series System using intumescent pillows.
- O. Firestopping for Insulated Pipes FS-14:
 1. UL-Classified Systems: C-AJ- 5001-5999.
- P. Firestopping for Insulated Pipes FS-15:
 1. UL-Classified Systems: C-BK- 5001-5999.
- Q. Firestopping for Insulated Pipes FS-16:
 1. UL-Classified Systems: W-L- 5001-5999.
- R. Firestopping for Miscellaneous Electrical Penetrants FS-17:
 1. UL-Classified Systems: C-AJ- 6001-6999.
- S. Firestopping for Miscellaneous Electrical Penetrants FS-18:
 1. UL-Classified Systems: C-BJ- 6001-6999.
- T. Firestopping for Miscellaneous Electrical Penetrants FS-19:
 1. UL-Classified Systems: W-L- 6001-6999.
- U. Firestopping for Miscellaneous Electrical Penetrants FS-20:
 1. UL-Classified Systems: C-AJ- 7001-7999.
- V. Firestopping for Miscellaneous Mechanical Penetrants FS-21:
 1. UL-Classified Systems: C-BJ- 7001-7999.
- W. Firestopping for Miscellaneous Mechanical Penetrants FS-22:
 1. UL-Classified Systems: W-L- 7001-7999.
- X. Firestopping for Groupings of Penetrants FS-23:
 1. UL-Classified Systems: C-AJ- 8001-8999.
- Y. Firestopping for Groupings of Penetrants FS-24:
 1. UL-Classified Systems: C-BJ- 8001-8999.
- Z. Firestopping for Groupings of Penetrants FS-25:
 1. UL-Classified Systems: W-L- 8001-8999.

END OF SECTION 078413