

## **SECTION 07 84 00 - FIRESTOPPING**

### **PART 1 - GENERAL**

#### 1.01 SUMMARY

- A. Work Included: Provide products in accordance with the Contract Documents. The Contract Documents are as defined in the "Agreement". The "General Conditions Governing All Contracts" shall apply to all work under the Contract. The Work of this Section shall include but not be limited to the following:

1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
4. Joints and terminations in fire-resistance-rated walls, partitions, smoke barriers and construction enclosing compartmentalized areas, including both same plane, changes in plane, edge of slab and other joint conditions.
5. Sealant joints in fire-resistance-rated construction.
6. Furnishing of dams, clips and closures for support and containment of fire stopping materials and installation of dams, clips and closures where possible to install after completion of floors, walls or other construction.
7. Coordinate with all trades and construction which affects or is affected by the Work of this Section.

#### 1.02 SYSTEM PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide firestop systems that are 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 assembly penetrated.
1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
  2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
  3. Fire-resistance-rated floor assemblies, including slab perimeter and floor edge conditions.
  4. Fire-resistance-rated roof assemblies.

- B. Systems shall be capable of preventing passage of smoke, flame and hot gases sufficient to ignite cotton waste, when tested in accordance with ASTM E 814 and ANSI/UL 1479 for firestop systems and ASTM E 119 and ANSI/UL 2079 for joint systems and fire containment, including perimeter conditions.
- C. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- D. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupied floor areas:
  - 1. Penetrations located outside wall cavities.
  - 2. Penetrations located outside fire-resistive shaft enclosures.
  - 3. Penetrations located in construction containing fire-protection-rated openings.
  - 4. Penetrating items larger than 4-inch-diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- E. Jointed Systems: Provide joint firestop systems indicated, as determined per ASTM E 1399, but not less than that equaling or exceeding fire-resistance rating of adjoining construction.
- F. For firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- G. For firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.
- H. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies or support live loads and traffic. Installer shall consult the Resident Engineer prior to penetrating any load bearing assembly.
- I. Where subject to movement, firestopping materials used shall remain flexible and allow for normal movement of building structure, substrates, penetrating items and related surfaces and items without affecting integrity and performance of firestopping materials and systems.

### 1.03 SUBMITTALS

- A. Product data for each type of product specified.
  - 1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.
  - 2. In addition to the above requirements, provide MEA certificates indicating the proposed product/system (including all system components), MEA approval numbers and other data illustrating acceptance of such products as required by the NYC Department of Buildings.
- B. Shop Drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.
  - 1. List of Conditions: Shop Drawings shall list all firestopping categories indicated or expected for the project. For each type of construction element and assembly indicated, list the UL Design Number to be complied with, include coordinated specified product data for each product incorporated into firestopping assemblies. Attach a copy of each UL Design Number listed.
    - a. In addition to the above requirements, provide MEA certificates indicating the proposed product/system (including all system components), MEA approval numbers and other data illustrating acceptance of such products and conditions as required by the NYC Department of Buildings.
  - 2. For unusual penetrations which have no formal tested assembly and which require modification of qualified testing and inspecting agency's illustration to suit the particular unusual through-penetration firestop condition, submit Drawings and product data and associated illustrations prepared by qualified firestopping Manufacturer's Fire Protection Engineer including required modifications clearly illustrated.
    - a. Manufacturer's engineering judgment shall be derived from similar UL system designs or other applicable tests. Engineer judgment Drawings must follow requirements set forth by the International Firestop Council.
      - (1) The Manufacturer issuing the engineering judgment shall be responsible for issued engineering judgments without any adjustment to the responsibilities of the entities involved.
- C. Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.
- D. Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.
- E. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Architects and Owners, and other information specified.
- F. Submit product specifications and material data (MSD)safety sheets for each product.

#### 1.04 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those specified under the "System Performance Requirements" article:
1. All firestopping systems shall be U.L. listed and shall be installed as a completed U.L. listed assembly. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated
  2. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.
  3. Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified testing and inspecting agency.
    - a. Joint sealants, including backing materials, bear classification marking of qualified testing and inspection agency.
  4. Proposed firestopping materials and methods shall conform to State and Local Codes and other authorities having jurisdiction.
- B. Information on Drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Resident Engineer's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.
- C. Installer Qualifications: Engage an experienced firm that has recently completed Firestopping projects similar in cost, material, design and extent to that indicated by this section and whose work has resulted in construction with a record of successful in-service performance.
1. The Contractor performing the Work of this Section may demonstrate compliance with the above qualification requirements by demonstrating that it is certified or authorized as an installer by a manufacturer designated as acceptable in these Specifications or by a manufacturer determined by Owner to be an approved equal.
    - a. A copy of such manufacturer certification or authorizations must be submitted, or verified in writing by the manufacturer.
- D. Single-Source Responsibility: Obtain all firestopping systems for each kind of penetration, joint and construction condition indicated from a single manufacturer.

- E. Field-Constructed Mockup: Prior to installing firestopping, erect mockups for each different through-penetration firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
  - 1. Locate mockups on site in locations indicated or, if not indicated, as directed by Resident Engineer.
  - 2. Notify Resident Engineer 1 week in advance of the dates and times when mockups will be erected.
  - 3. Obtain Resident Engineers acceptance of mockups before start of final unit of Work.
  - 4. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
    - a. Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.
- F. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- G. Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated through-penetration firestop systems are installed per specified requirements.
- H. The Contractor will employ and pay a qualified inspection agency to check installed firestopping systems for compliance with requirements.
  - 1. Tests for thickness and density of applied material may be performed by an independent testing agency retained by and paid by the Contractor. Where test results are unsatisfactory in sample areas, additional tests in other areas may be made. Such further testing, if required, shall be by the same testing agency and shall be paid for by the Contractor.
- I. Firestopping system manufacturer's direct representative (not distributor or agent) shall 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.

#### 1.05 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; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

#### 1.06 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

#### 1.07 SEQUENCING AND SCHEDULING

- A. Notify the City's inspection agency at least 1 week in advance of firestopping installations; confirm dates and times on days preceding each series of installations.
- B. Do not cover up those firestopping installations that will become concealed behind other construction until the Architect and Resident Engineer, and authorities having jurisdiction, if required, have examined each installation.

1. Provide inspection schedule for anticipated work and submit as of part 1.08A.

### **PART 2 - PRODUCTS**

#### 2.01 FIRESTOPPING, GENERAL

- A. Compatibility: 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 firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:
  - 1. Permanent forming/damming/backing materials including the following:
    - a. Semi-refractory fiber (mineral wool) insulation.
    - b. Ceramic fiber.
    - c. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
    - d. Fire-rated formboard.
    - e. Joint fillers for joint sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.
  - 6. Safing Clips.
  - 7. Metal support plates.

- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.

## 2.02 MANUFACTURERS AND PRODUCTS

- A. General: Specified products may be components of a complete firestopping system. Provide all components necessary to provide complete systems as designated on Drawings.
- B. Manufacturers: Subject to compliance with requirements, provide firestop systems for each application indicated that are produced by the following manufacturers:
  - 1. Hilti Construction Chemicals, Inc.
  - 2. 3M Fire Protection Products.
  - 3. Specified Technologies Inc. (STI).
  - 4. Or Approved equal.
- C. Firestopping Products: Subject to compliance with all other requirements, provide the following approved products, acceptable to the Resident Engineer and in accordance with an Approved UL System as provided by the firestop manufacturers published UL Listed Drawing.
  - 1. Water Based Intumescent Firestop Sealant
  - 2. Intumescent Firestop Flexible Block / Pillows
  - 3. Water Based Elastomeric Firestop Joint Spray
  - 4. Silicone Based Elastomeric Firestop Sealant
  - 5. Acrylic Based Firestop Sealant
  - 6. Intumescent Firestop Collar
  - 7. Cast-In Place Intumescent Firestop Sleeve Device
  - 8. Intumescent, Non-hardening Firestop Putty
  - 9. Trowable Firestop Compound/Mortar

## 2.03 MIXING

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

## PART 3 - EXECUTION

### 3.01 EXAMINATION

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

### 3.02 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
  - 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
  - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove latence and form release agents from concrete.
- B. 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.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

### 3.03 INSTALLATION / GENERAL

- A. The Contractor shall select the material and UL test assemblies to be used as may be required for each type of material, location, rating and penetration or hole size. Do not proceed with the work until all submittals have been fully approved.
- B. Materials and equipment shall be as approved by the manufacturer. Application procedures shall be in strict accordance with the manufacturer's directions and specifications. Only experienced, skilled mechanics approved by the materials manufacturers shall be allowed to place the materials.
- C. Provide firestopping materials and thicknesses as required to provide indicated ratings. Where not otherwise indicated, comply with U.L. standard designs. In multiple layer work, offset joints by at least 6 inches.
- D. Anchor firestopping using manufacturers' recommended system and in compliance with U.L. standard designs.
- E. Install firestopping without gaps and voids of any kind. Do not use damaged materials. Remove and replace nonfitting or disturbed work. Do not use fire safing materials containing solvents.

### 3.04 INSTALLING THROUGH-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.

- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- 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. 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 Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
  - 4. Provide 20 gage minimum metal plates where required for fire safing support to comply with fire rating.
  - 5. For mineral safing insulation, apply in continuous length using manufacturer's standard safing clips compress insulation until stable without movement.

### 3.05 INSTALLING FIRE-RESISTIVE JOINT SEALANTS

- A. General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and Drawings pertaining to products and applications indicated.
- B. Install fire resistive joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

### 3.06 FIELD QUALITY CONTROL

- A. A qualified Inspecting agency performing controlled inspections will be employed and paid by the Contractor and will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor and Resident Engineer.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

- D. Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

### 3.07 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION