SECTION 078413 - THROUGH-PENETRATION FIRESTOPPING

1. GENERAL
   * + 1. RELATED DOCUMENTS
          1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
       2. SUMMARY
          1. Section includes:

Penetrations in floor-ceiling assemblies.

Penetrations in roof-ceiling assemblies.

Penetrations in walls and partitions.

Penetrations in smoke barriers.

Construction enclosing compartmentalized areas.

* + - * 1. REFERENCES

Underwriters Laboratories (UL) of Northbrook, IL “Fire Resistance Directory”.

Through Penetration Firestop Systems (XHEZ)

Fill, Void or Cavity Materials (XHHW)

Firestop Devices (XHJI)

Forming Materials (XHKU)

Wall Opening Protective Materials (CLIV)

Fire-Resistant Pipe-Protection Systems (HNKJ)

All major building codes:

International Building Code published by ICC.

(Note to specifier: Retain or delete the building codes listed above as applicable).

National Fire Protection Association (NFPA) “NFPA 101: Life Safety Code”.

National Fire Protection Association (NFPA) “NFPA 70: National Electrical Code”.

Factory Mutual Approvals (FM) “FM 4991: Standard for Approval of Firestop Contractors”.

Underwriters Laboratories (UL) “UL Qualified Firestop Contractor Program”

* + - 1. SUBMITTALS
         1. Product Data: For each type of through-penetration firestop system product indicated.
         2. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
         3. Product Certificates: Certificate of conformance signed by manufacturers of through-penetration firestop system products certifying that products comply with requirements.
      2. QUALITY ASSURANCE
         1. Provide through-penetration firestop systems that comply with the following requirements and those specified in “Performance Criteria” Article.

Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

Through-penetration firestop system products bear classification marking of qualified testing and inspection agency.

* + - * 1. Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991, Certified by UL as a Qualified Contractor, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer’s willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.
        2. Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer.
        3. Conduct conference at Project site to comply with requirements in Division 01.
      1. DELIVERY, STORAGE AND HANDLING
         1. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturer’s labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency’s classification marking; and mixing instructions for multicomponent materials.
         2. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.
      2. PROJECT CONDITIONS
         1. Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limitations recommended by manufacturer.
         2. Do not install through-penetration firestop systems when substrates are wet due to rain, frost, condensation, or other causes.
         3. Do not use materials that contain flammable solvents.
      3. COORDINATION
         1. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
         2. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
         3. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

1. PRODUCTS
   * + 1. FIRESTOPPING, GENERAL
          1. Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
          2. Provide components for each through-penetration firestop system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
          3. PERFORMANCE REQUIREMENTS

Fire Test Requirements:

Underwriters Laboratories, Inc. (UL):

UL 1479, “Fire Tests of Through Penetration Firestops”.

UL 263, “Fire Tests of Building Construction and Materials”.

UL 723, “Surface Burning Characteristics of Building Materials”.

UL 1489. “Standard for Fire Tests of Fire Resistance Pipe Protection Systems Carrying Combustible Liquids”.

American Society of Testing and Materials (ASTM):

ASTM E814, “Fire Tests of Penetration Fire Stops”.

ASTM E119, “Fire Tests of Building Construction and Materials”.

ASTM E84, “Surface Burning Characteristics of Building Materials”.

ASTM E2174, “Standard Practice for On Site Inspection of Installed Fire Stops”.

ASTM E1725, “Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems for Electrical System Components”.

Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.

When intumescent products are used, provide products that do not contain sodium silicate or any other water soluble intumescent ingredient in the formulation.

Provide firestop products that do not contain ethylene glycol.

Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.

Removal, cut-aways, or otherwise interrupted through wall or floor opening of pipe insulation in prohibited. Provide products appropriately tested for the thickness and type of insulation utilized.

Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur. Such devices shall include:

Capable of retrofit around existing cables

Designed such that two or more devices can be ganged together

Maintenance free such that no action is required to activate the smoke and fire sealing mechanism

When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.

Provide through-penetration firestop systems subjected to an air leakage test conducted in accordance with the Standards, UL 1479 for penetration firestop systems, with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.

Provide a fire-rated grommet for all individual or small grouped cable applications up to 0.53 inch (14 mm).

Provide moisture-curing products where inclement weather or greater than transient water exposure is expected.

* + - 1. MANUFACTURERS
         1. Subject to compliance with through-penetration firestop systems (XHEZ) and wall opening protective materials (CLIV) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

Acceptable Manufacturer: Specified Technologies Inc., 210 Evans Way, Somerville, NJ 08876. Tel: (800) 992-1180, Fax: (908) 526-9623, Email: [specseal@stifirestop.com](mailto:specseal@stifirestop.com), Website: [www.stifirestop.com](http://www.stifirestop.com/).

Substitutions: Not permitted.

* + - * 1. Single Source: Obtain firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.
      1. MATERIALS
         1. General: Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
         2. Intumescent Sealants: Single component intumescent latex formulations containing no water soluble intumescent ingredients capable of expanding a minimum 8 times. When installed in contact with CPVC piping systems, intumescent sealants shall be deemed compatible as determined by the respective CPVC manufacturer. The following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant

Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant

* + - * 1. Endothermic Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant

* + - * 1. Firestop Devices: Factory-assembled steel collars lined with intumescent material capable of expanding a minimum 30 times sized to fit specific outside diameter of penetrating item, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars

Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars

* + - * 1. Fire Rated Cable Pathways: Gangable device modules capable of being retrofitted around existing cables and comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill and requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings. Device’s must be maintenance free having a corresponding Evaluation Services Report from a Nationally Recognized Third Party Laboratory. Maintenance free is defined as requiring no additional action in the form of plugs, twisting closure, putty, pillow, or sealant to achieve fire and leakage ratings. The following products are acceptable:

Specified Technologies Inc. (STI) EZ-Path Fire Rated Pathway

* + - * 1. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24 inches (610 mm), the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads

Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads

* + - * 1. Firestop Putty: Intumescent, 100% solids, non-hardening, water resistant, butyl rubber-based putties containing no solvents or silicone compounds, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty

* + - * 1. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film and capable of expanding a minimum 30 times, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series RED2 Wrap Strip

Specified Technologies, Inc. (STI) SpecSeal Series BLU2 Wrap Strip

* + - * 1. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating on all six sides contained in a flame-retardant poly bag. Pillows shall require no modification such as cutting or shaving in order to maintain fire and leakage ratings. The following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows

* + - * 1. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar

* + - * 1. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag). Sealant shall be suitable for use in interior and exterior joint conditions. The following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal SIL300 Silicone Firestop Sealant

Specified Technologies, Inc. (STI) SpecSeal SIL300 SL Self-Leveling Silicone Firestop Sealant’

* + - * 1. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:

Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam

* + - * 1. Composite Sheet: Intumescent material sandwiched between a galvanized steel sheet and steel wire mesh protected with aluminum foil capable of sustaining a minimum 2,500 lbs (1,134 kg) when subjected to load testing, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal CS Composite Sheet

* + - * 1. Cast-In-Place Firestop Device: Molded plastic sleeve with integral, tamper-proof, intumescent firestop system and encapsulated smoke and water-tight sealing gasket, installed on forms during construction phase. Sturdy one-step installation plastic body to accommodate concrete floor and metal deck thicknesses from 2-1/2 to 36 inches with extensions utilizing an adjustable pin. The sleeve has a bidirectional design allowing combustible and non-combustible pipe installation from either top or bottom. Class I W-Rating per UL 1479 without the use of plugs, sealants, or any other additional materials. The following products are acceptable:​

Specified Technologies, Inc. (STI) SpecSeal CID Cast-In Firestop Device

* + - * 1. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use on steel HVAC ducts, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal FyreFlange Firestop Angles

* + - * 1. Firestop Plugs: Re-enterable, foam rubber plug impregnated with intumescent material capable of expanding minimum 10 times with expansion beginning at 350°F (177°C) for use in blank openings, with bare metallic pipe, bare non-metallic pipe, and cable sleeves. The following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series FP Firestop Plug

* + - * 1. Fire-Rated Cable Grommet: Molded two-piece grommet made from plenum grade polymer with a foam inner core for sealing cable penetrations up to 0.53 in. (14 mm) diameter. Grommet shall be tested in single membrane or through-penetration conditions. The following products are acceptable:

Specified Technologies, Inc. (STI) EZ-Firestop Grommet (RFG1 or RFG2)

* + - * 1. Fire-Rated Closet Flange Gasket: Molded, single-component, intumescent gasket for use beneath a closet flange in floor applications, the following products are acceptable:

Specified Technologies, Inc. (STI) SpecSeal Series CF34 Closet Flange Firestop Gasket

* + - * 1. Protective Wrap: Endothermic Wrap incorporating foil scrim evaluated for protection of cable pathways, liquid fuel lines, as well as in through-penetration and membrane-penetration firestopping. Testing to incorporate protection of Electrical Metallic Tubing (EMT), Rigid Metallic Conduit (RMC), Cable Trays, single and/or multi containment liquid fuel lines. Wrap to have a maximum weight of no greater than 1.4 lbs/ft2 and allow for the use of steel tie wire when installed around piping, conduits, and/or cable trays. The following products are acceptable:

Specified Technologies, Inc. (STI) E-Wrap™ Endothermic Wrap

1. EXECUTION
   * + 1. PREPARATION
          1. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
          2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.
          3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
          4. Do not proceed until unsatisfactory conditions have been corrected.
       2. THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION
          1. General Requirements: Install through-penetration firestop systems in accordance with “Performance Criteria” Article and in accordance with the conditions of testing and classification as specified in the published design.
          2. Manufacturer’s Instructions: Comply with manufacturer’s instructions for installation of through-penetration firestop systems products.

Seal all openings or voids made by penetrations to ensure an air and water-resistant seal.

Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of through-penetration firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

Protect materials from damage on surfaces subjected to traffic.

* + - 1. FIELD QUALITY CONTROL

(Note: Manufacturers are not qualified inspection agencies, and it is a conflict of interest for the manufacturer to perform inspections of installed firestopping systems according to the aforementioned inspection standards.)

* + - * 1. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems in accordance with ASTM E2174, “Standard Practice for On Site Inspection of Installed Fire Stops”.
        2. Keep areas of work accessible until inspection by authorities having jurisdiction.
        3. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
      1. ADJUSTING AND CLEANING
         1. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
         2. Clean all surfaces adjacent to sealed openings to be free of excess through-penetration firestop system materials and soiling as work progresses.

END OF SECTION