SECTION 078400 – FIRESTOPPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Section, apply to work specified in this section.

1.2 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.3 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Openings between structurally separate sections of wall or floors.

C. Gaps between the top of walls and ceilings or roof assemblies.

D. Expansion joints in walls and floors.

E. Openings and penetrations in fire-rated partitions or walls containing fire doors.

F. Openings around structural members which penetrate floors or walls.

1.4 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Division 3 Section “Cast-In-Place Concrete”
2. Division 7 Section “Joint Sealants”
3. Division 9 Section “Gypsum Board Assemblies”
4. Division 22 Section “Plumbing”
5. Division 23 Section “HVAC”
6. Division 26 Section “Electrical”
7. Division 28 Section “Fire Alarm and Security”

1.5 REFERENCES

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops".

B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops"

C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems"

D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through-Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)
   f. Joint Systems (XHBN)
   g. Perimeter Fire Containment Systems (XHDG)

2. Alternate Systems: "Omega Point Laboratories Directory" (updated annually).

E. Test Requirements: ASTM E 1966, "Standard Test Method for Fire Resistive Joint Systems"

F. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus"

G. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops"

H. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials"

I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

J. International Building Code: Current Edition

K. NFPA 101 - Life Safety Code

L. NFPA 70 - National Electric Code

1.6 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems and fire-resistive joint systems that comply with specified requirements of tested systems.

B. Fire stop 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.

C. Proposed fire stop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Fire stop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Contractor shall consult the Architect's Structural Engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.7 SUBMITTALS

A. General: Submittals shall be in accordance with Specification Section 01 33 00.

B. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions.

C. Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.

D. Submit material safety data sheets provided with product delivered to job-site.

1.8 INSTALLER QUALIFICATIONS

A. Contractor to engage an experienced installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. Single-Source Responsibility: All fire stopping to be performed by a single contractor who procures all fire stopping materials from a single source.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

1.11 WARRANTY

A. Provide manufacturer's standard warranty covering fire stopping materials.

C. Provide applicator's standard warranty covering workmanship for a period of one (1) year following substantial completion.

1.12 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide fire stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases as required by code.

B. Provide through-penetration fire stop systems with F ratings as determined per ASTM E 814/UL1479, but not less than that equaling or exceeding the fire resistance rating of the constructions penetrated.

C. Provide joint sealants with fire-resistance as determined per ASTM E 1966/UL 2079, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

D. For fire stopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, specify moisture-resistant through-penetration fire stop systems.
2. For penetrations involving insulated piping, specify through-penetration fire stop systems not requiring removal of insulation.

E. For fire stopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84

1.13 TEST CRITERIA

A. Specify the materials listed above or approved equals shall meet the criteria herein.

B. Deflection: When tested in accordance with ASTM E759, the material shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical centerload resulting in a downward deflection of 1/120th of the span.

C. Bond Impact: When tested in accordance with ASTM E760, the material shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.

D. Cohesion/Adhesion (bond strength): When tested in accordance with ASTM E736, the material applied over uncoated or galvanized steel shall have an average bond strength of 150 psf.

E. Air Erosion: When tested in accordance with ASTM E859, the material shall not be subject to losses from the finished application greater than 0.025 grams per sq. ft. (0.27 grams per square meter).

F. Compressive Strength: When tested in accordance with ASTM E761, the material shall not deform more than 10 percent when subjected to a crushing force of 750 psf (35.9 kPa).

G. Corrosion Resistance: When tested in accordance with ASTM E937, the material shall not promote corrosion of steel.

H. Non-combustibility: When tested in accordance with ASTM E136 or CAN4-S114, the material shall be non-combustible.

I. Surface Burning Characteristics: When tested in accordance with ASTM E84 or CAN4-S102, the material shall exhibit the following surface burning characteristics:
1. **Flame Spread 0**
2. **Smoke Developed 0**

J. Density: When tested in accordance with ASTM E605, the material shall meet the minimum individual and average density values as listed in the appropriate UL/ULC design or as required by the authority having jurisdiction, or shall have a minimum average of 15 pcf (240 kg/m3).

1.14. INTUMESCENT FIRE PROTECTION SYSTEM

A. Intumescent fire resistive material shall have been tested in

accordance with the procedures of UL 263 or ASTM E119 or CAN/ULC-S101, and reported by Underwriters Laboratories, Inc. or Underwriters Laboratories of Canada only.

B. Thin-Film Fire-Resistive Intumescent Mastic Coating shall be a Factory-mixed formulation.

C. Water-Based Formulation shall be approved by manufacturer and authorities having jurisdiction for indicated use.

D. Verify with manufacturer that products specified and selected are suitable for all intended uses.

E. UL Fire Tested Designs Only based on UL 263 (ASTM-E119).

F. No mesh is permitted.

G. Application of intumescent fire protection shall occur at exposed structural steel columns, diagonal braces, beams and all associated structural steel components as required by and applicable to the International Building Code.

1.15. DECORATIVE TOPCOATING

A. Topcoat materials shall be as required for color-coding, aesthetics or additional surface protection, approved by the thin-film fire resistive material manufacturer and applied in full accordance with the coating manufacturer's written instructions.

PART 2 – PRODUCTS

2.1 FIRESTOPPING – GENERAL

A. 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 the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

F. Mold Resistance: Provide penetration firestoppping with mold and mildew resistance rating of 0 as determined by ASTM G21.

G. **Further Requirements**

1. Spray-applied fire resistive materials shall be applied at the required thickness and density to achieve the following ratings:
a. Composite Floor System (Spray Beams Only) 1 hour
b. Metal Decking at bottom of roof trusses) 1 hour
2. Potable water shall be used for the application of spray-applied fire resistive materials.
3. Spray-applied fire resistive materials shall be free of all forms of asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite. Material manufacturer shall specify certification of such upon request.
4. Primers shall be approved by manufacturer and applied in full accordance with the primer manufacturer's written instructions.
5. Compatibility: Provide fire stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the fire stopping under conditions of service and application, as demonstrated by fire stopping manufacturer based on testing and field experience.
6. Accessories: Provide components for each fire stopping 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 fire stopping 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:
a. Permanent forming/damming/backing materials including the following:
i. Semi refractory fiber (mineral wool) insulation.
ii. Ceramic fiber.
iii. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
iv. Fire-rated form board.
v. Joint fillers for joint sealants.
b. Temporary forming materials.
c. Substrate primers.
d. Collars.
e. Steel sleeves.
7. Applications: Provide fire stopping systems composed of materials specified in this Section that comply with system performance and other requirements.

2.2 FIREPROOFING MANUFACTURERS

A. Provide products of the following manufacturers as identified below:

1. The spray-applied fire resistive material shall be manufactured by:
   a. ISOLATEK INTERNATIONAL
   b. W. R. GRACE CONSTRUCTION PRODUCTS
   c. Hilti, Inc., Tulsa, Oklahoma
      800-879-8000
      www.us.hilti.com
   d. Or Architect approved equal.

2. Intumescent fire protection materials
   a. CAFCO® BLAZE-SHIELD® II, Isolatek International (basis of design)
   b. CAFCO® 300, Isolatek International
   c. Monokote® MK-6, W. R. Grace

2.3 FIRESTOPPING MATERIALS

A. Acceptable manufacturer: Tremco, Inc.

B. Proprietary Product(s)/System(s): Tremco Firestop Systems Products.
1. TREMstop IA+ High Performance Intumescent Acrylic Sealant
2. TREMstop Acrylic Flexible Acrylic Sealant
3. TREMstop Acrylic - SP Sprayable, Flexible Acrylic Sealant
4. Fyre-Sil Fire Resistant Silicone Sealant
5. Fyre-Sil S/L Self-Leveling Fire Resistant Silicone Sealant
6. Dymeric 240/240FC Two Part Urethane Sealant
7. Dymonic One Part Modified Polyurethane Sealant
8. THC 900 Multi-Component Chemically Curing Polyurethane Sealant
9. TREMstop Fire Mortar Trowelable Firestop Mortar
10. TREMstop MCR Flexible Metal Restricting Collar for Wrap Strips
11. TREMstop MP Moldable Putty Pad for Electrical Outlet Boxes
12. TREMstop SuperStrip Flexible Intumescent Strip

C. Product(s)/System(s) Testing: UL Fire Resistance Directory, *Fill, Void or Cavity Materials (XHHW)* and *Firestop Devices (XHJI)* for listed product(s)/system(s).

2.4 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific firerated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE) (Basis of Design)
2. Hilti Flexible Firestop Sealant (CP 606)
3. Or Architect approved equal.

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti Flexible Firestop Sealant (CP 606) (Basis of Design)
2. Hilti Intumescent Firestop Sealant (FS-ONE)
3. Or Architect approved equal.

E. Sealants and caulking materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti Flexible Firestop Sealant (CP 606) (Basis of Design)
2. Or Architect approved equal.

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.

1. Hilti Speed Plugs (CP 777) (Basis of Design)
2. Hilti Speed Strips (CP 767)
3. Or Architect approved equal.

G. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE) (Basis of Design)
2. Or Architect approved equal.

H. Intumescent sealants or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE) (Basis of Design)
2. Hilti Flexible Firestop Sealant (CP 606)
3. Or Architect approved equal.

I. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti Firestop Putty Pad (CP 617) (Basis of Design)
2. Hilti Firestop Box Insert
3. Or Architect approved equal.

J. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti Firestop Collar (CP 643N) (Basis of Design)
2. Hilti Firestop Collar (CP 644)
3. Or Architect approved equal.

K. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

L. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

PART 3 – EXECUTION

3.1 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector, per requirements of Section 109, International Building Code 2000, ed.

3.3 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through penetration and construction joint materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
2. Consult with Architect's Mechanical Engineer and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

K. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

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END OF SECTION 078400