SECTION 260501 – FIRE STOP

PART 1 – GENERAL

1.1 APPLICATIONS

A. Firestop systems for **Penetrations** in fire-resistance-rated assemblies, including both membrane and through penetrations.

Assemblies	Penetration items:
Floors	Blanks
Roofs	Metallic Pipes
Walls and partitions	Non-Metallic Pipes
Smoke barriers	Cables
Floor/ceiling	Cable Trays
	Insulated Pipes
	Busways
	Duct and Vents
	Combinations

B. Listed and labeled by a nationally recognized testing laboratory.

C. Fire tested according to ASTM E814 (ANSI/UL1479)

D. Flame Spread Index of < 25 and Smoke Developed Index of < 400 according to ASTM E84

E. L-rating of < 20 CFM/Ft^2 for non-egress fire construction and < 5 CFM/Ft^2 for egress fire construction according to UL 1479 air leakage testing.

F. W-Rating of Class I when tested in accordance with UL Water Leakage Test for systems tested and listed in accordance with ANSI/UL 1479.

G. Volatile Organic Compounds (VOC) <1 according to ASTM E 595

H. Firestop products shall not contain asbestos according to ASTM D 6620.

1.2 FIRESTOP SYSTEMS FOR CONSTRUCTION JOINTS/GAPS OCCURING BETWEEN ASSEMBLIES:

A. Type of assemblies:

Floor/Floor	Head of Wall (Top of Wall)
Floor/Wall	Edge of Slab (Curtain Wall)
Wall/Wall	Smoke Barriers
Bottom of Wall	

B. Listed and Labeled by a nationally recognized testing laboratory.

C. Fire tested according to ASTM E 1966 (UL 2079)

D. Flame Spread Index of < 25 and Smoke Developed Index of < 400 according to ASTM E84.

E. L-rating of < 20 CFM/Lnft for non-egress fire construction and < 5 CFM/Lnft for egress fire construction according to UL 2079 air leakage testing.

F. Volatile Organic Compounds (VOC) <1 according to ASTM E 595

G. Firestop systems designed to have Sound Transmission Coefficient (STC) of 40 minimum according to ASTM E 413.

H. Firestop products shall not contain asbestos according to ASTM D 6620.

1.3 FIRE CONTAINMENT SYSTEMS FOR PROTECTION OF CRITICAL EQUIPMENT

A. Emergency Circuits Protection of:

Cables	Valves
Cable trays	Junction Boxes
Conduits	

B. Products listed and labeled by a nationally recognized testing laboratory.

Types of systems:

Power cables
Control cables
Communication cables
Mechanical systems

C. Fire tested according to ASTM E 1725 with fire exposure of either:
1. ASTM E119 (Standard fire exposure), or ASTM E1529 (Hydrocarbon fire exposure).
2. Flame Spread Index of < 25 and Smoke Developed Index of < 400 according to ASTM E84.
3. Volatile Organic Compounds (VOC) <1 according to ASTM E 595
4. Products shall not contain asbestos according to ASTM D 6620.

1.4 REFERENCES AND QUALITY ASSURANCE

A. American Society for Testing and Materials Standards (ASTM):
1. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E 814: Standard Test Methods for Fire Tests of Through-Penetration Firestops.
3. ASTM E 119: Standard Test Methods for Fire Tests of Building ConstructionMaterials.
4. ASTM E 1725: Standard Test Methods for Fire Tests of Fire-Resistive Barrier Systems of Electrical Systems Components.

5. ASTM E 1966: Standard Test Method for Fire-Resistive Joint Systems.
1. ASTM C 411: Standard Test Method for Hot Surface Perfomance of High Temperature Thermal Insulation

B. ASTM E 136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C

C. ASTM E 2307: Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate, Scale Multi-Story Apparatus

D. Underwriters Laboratories, Inc. (UL):
1. UL 723 Standard for Test of Surface Burning Characteristics of Building Materials
2. UL 1479 Standard for Fire Tests of Through-Penetration Firestops, including optional air leakage test.
3. UL 2079 Standard for Tests for Fire Resistance of Building Joint Systems
4. UL Water Leakage Test: W Rating – Class 1 (3 ft. water column for 72 hours)

E. National Fire Protection Agency (NFPA)
1. NFPA 90A, 1999 Edition: Standard for the Installation of Air Conditioning and Ventilation Systems.
2. NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
3. NFPA 101: Life Safety Code

F. Nationally Recognized Testing Laboratories:
1. Omega Point Laboratories (OPL)
2. Southwest Research Institute (SwRI)
3. Underwriters Laboratories Inc. (UL)
4. Warnock Hersey (WH)
5. Others as certified by the building code bodies.

1.5 DEFINITIONS

A. **Firestop System:** The use of a specific firestop material or combination of materials in conjunction with a specific fire rated wall, floor, or ceiling construction type and a specific penetrating material(s) to achieve a rated fire barrier.

B. **Assembly:** Particular arrangement of materials specific to a given type of construction described or defined in referenced documents.

C. **Barrier:** Any bearing or non-bearing floor, wall, or ceiling assembly that has an hourly fire or smoke rating.

D. **Firestopping:** Methods and materials applied in penetrations and unprotected openings to limit the spread of heat, fire, gasses and smoke.

E. **Intumescent:** Materials that expand with heat to seal around objects threatened by fire.

F. **Penetration:** Opening or foreign material passing through a floor, wall or ceiling barrier such that the full thickness of the rated material(s) is breached either in total or in-part.

G. **Fire Resistive Joint:** Any joint or opening, whether static or dynamic, within or between adjacent sections of fire rated interior or exterior walls, floors, ceilings or roof decks.

H. **Fireblocking:** Building materials installed to resist the free passage of flame, smoke and noxious gases to other areas of the building through concealed spaces.

I. **Perimeter Fire Barrier System:** The perimeter joint protection that provides fire resistance to prevent the passage of fire from floor to floor within the building at the opening between the exterior wall assembly and the floor assembly.

J. **Engineering Judgment:** Evaluations that are developed by a manufacturer for a new firestop system that complies with similar UL or Omega Point approved designs or tests that are acceptable to the code and enforced by the local jurisdictions. Reference E2032 for current definition

K. **Water Leakage Test:** Introduced by Underwriters Laboratories on August 9, 2004 for systems tested and listed in accordance with ANSI/UL 1479.

1.6 PERFORMANCE REQUIREMENTS

A. Penetrations: Provide through-penetration firestop systems that are installed to resist the spread of fire, passage of smoke and other hot gases according to requirements indicated, to restore the original fire-resistance rating of assembly penetrated.

B. Install complete through penetration firestop systems that have been tested and are listed by recognized testing agencies per ASTM E 814 or UL 1479 fire tests in a configuration that is representative of site conditions.

C. F-Rated Systems: Install through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814 or UL 1479, but not less than the fire resistance rating of the assembly being penetrated.

D. T-Rated Systems: Install through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814 or UL 1479, where required by the Building Code.

E. L-Rated Systems: Install through-penetration firestop systems with L-ratings as determined by UL 1479 and as required by the owner, architect or Authority Having Jurisdiction.

F. W-Rated Systems: Install through-penetration firestop systems meeting W-Rating Class 1 Requirements as determined by the UL Water Leakage Test for systems tested and listed in accordance with UL 1479 and as required by the owner, architect or Authority Having Jurisdiction.

G. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

H. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

I. Fire Resistive Joints: Provide joint systems with fire resistance assembly ratings indicated, as determined by UL 2079 (ASTM E 1966), but not less than the fire resistance assembly rating of the construction in which the joint occurs. Firestopping assemblies must be capable of withstanding anticipated movements for the installed field conditions.

J. For firestopping assemblies 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.

K. For floor penetrations exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.

L. Firestopping products shall have Flame Spread Index less than 25 and Smoke Developed Index less than 450, as determined per ASTM E 84.

M. Where there is no specific third party tested and classified firestop system available for an installed condition, the firestopping contractor shall obtain from the firestopping material manufacturer an Engineering Judgment (EJ) to be submitted to the Approving Authority and Authority Having Jurisdiction for approval prior to installation. The EJ shall follow International Firestop Council (IFC) guidelines.

1.7 SUBMITTALS

A. Submit in accordance with Section 01300, unless otherwise indicated.

B. **Product Data:** Manufacturer's product literature and tested assembly for each type of fire protection material as follows:
1. Product characteristics, typical uses, installation procedures, performance and limitation criteria.
2. Material Safety Data Sheets (MSDS).

C. **Shop Drawings:** For each fire protection system show construction conditions, relationships to adjoining construction, dimensions, description of materials and finishes, components, connections, anchorage methods, hardware and installation procedures, plus the following:
1. Fire protection design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.

2. Documentation, including illustrations, from a qualified testing and inspection agency, that is applicable to each fire protection system configuration for construction.

D. Where Project conditions require modification of a qualified testing and inspecting agency's illustration to suit a particular condition, submit Architect or Engineers illustration/digital pictures, with modifications marked and approved by fire protection system manufacturer's engineer.

E. **Qualification Data:** For firms and persons specified in "Quality Assurance" Article 1.7, to demonstrate their capabilities and experience, include a list of names and addresses of completed projects, architects, owners and other information specified.

F. **Product Certificate of Conformance:** Signed by manufacturers of fire protection system products certifying that products furnished comply with requirements.

G. **Assembly Listings:** Submit system assembly listings from a nationally recognized and accredited testing and inspection agency that is applicable to each firestop configuration.

1.8 QUALITY ASSURANCE

A. **Installer's Qualifications:** Engage an experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements, plus the following:
1. Option 1 (3M Master Contractor)
In addition, installer/contractor must provide proof of current status as a "Certified 3M – Trained Master Contractor" having successfully completed the three day 3M Master Contractor training course.
2. Option 2 (Certified 3M-Trained)
Installer/contractor must also provide proof of having successfully completed training conducted by 3M and being certified as having been 3M-Trained, or who is approved by Factory Mutual Research in accordance with Approval Standard FM 4991 – Approval of Firestop Contractors.
3. Option 3 (Minimum Requirements)

B. Acceptable to or licensed by manufacturer, state and local authority.

C. Established record of successful in-service experience with fire protection systems and completion of manufacturer's certified product installation training with valid training card supplied by the manufacturer.

D. **Source Limitations:** Obtain fire protection systems for each kind of construction application , from a single manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver fire protection products to Project site in original, unopened containers or packages, with intact and legible manufacturers' labels identifying product, manufacturer, date of manufacture, lot number, shelf life, qualified testing and inspection agency's classification marking, curing time and mixing instructions.

B. Store and handle materials for fire protection products to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes. Follow manufacturer's instructions. Stock rotation is recommended.

1.10 PROJECT CONDITIONS

A. **Existing Conditions:** Verify the condition of the substrates and correct unsatisfactory conditions before installing products. Follow manufacturer's instructions.

B. **Environmental Limitations:** Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation products.

C. **Ventilation:** Ventilate during installation per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

D. **Protection:** Provide masking and drop cloths to prevent contamination of adjacent surfaces, if required.

1.11 COORDINATION

A. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

B. Coordinate construction of openings and penetrating items to ensure that firestopping assemblies are installed according to specified requirements.

C. Schedule firestopping after installation of penetrants but prior to concealing the openings.

D. Do not conceal firestopping installations until the Owner's inspection agency or Authorities Having Jurisdiction have examined each installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. 3M
B. HILTI
C. STI

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which the fire protection material is to be installed and notify the architect of field conditions not conforming to tested assemblies causing schedule delays.

B. Examine substrates to determine they are satisfactory to receive the fire protection materials.

C. Conduct tests according to manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt or other foreign substances capable of impairing bond of fire protection materials.

D. Verify penetrating items being protected, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.

E. Verify substrates are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with applying fire protection materials.

F. Verify that environmental conditions are safe and suitable for installation of fire protection materials.

G. Do not proceed with installation until the contractor in a manner acceptable to the architect has corrected unsatisfactory conditions.

3.2 PREPARATION

A. Clean and repair substrates that could impair the adhesion or proper fitting of fire protection materials, including oil, grease, dust, rolling compounds, incompatible primers, and loose mill scale.

B. Provide masking and temporary covering, as required, to prevent contamination of adjacent surfaces by fire protection materials.

3.3 INSTALLATION – GENERAL

A. Installation of fire protection system shall be performed in strict accordance with the applicable listed system from a nationally accredited testing agency, manufacturer's detailed installation instructions and procedures.

3.4 INSTALLATION OF THROUGH-PENETRATION FIRESTOP SYSTEMS

A. Install through-penetration firestop systems to comply with "Performance Requirements" Article 1.05 and firestop systems manufacturer's written installation instructions and published drawings for products and applications indicated. (See Article 3.04E "Through-penetration Firestop Systems Schedule")

B. Install forming/damming/backing materials and other accessories of types required to support fill material during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop system.

C. Install fill materials for firestop systems 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 the fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
a. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining surfaces.

D Watertight. Meets UL Water Leakage Test - Class 1 requirements for systems tested and listed in accordance with the criteria of ASTM E 814 (UL 1479) Standard Test Method for Fire Tests of Through-Penetration Fire Stops. W Rating - Class 1 requirements include a minimum water column exposure of 3 ft. for 72 hours prior to the standard time / temperature curve for the fire test.

Through Penetration Sealants with a Fungicide. Sealants must meet the requirements of ASTM G 21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

E. Proceed with enclosing through-penetration firestop systems with other construction only after inspection and approval by Authority Having Jurisdiction.

F. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

G. Inspection Agency: If required, owner will engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports indicating whether through-penetration firestop systems comply with or deviate from requirements.

H. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
1. The words: “Warning: Through-Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage”
2. Contractor’s name, address, and phone number
3. Through-penetration firestop systems designation of applicable testing and inspecting agency
4. Date of installation
5. Through-penetration firestop system manufacturer’s name
6. Installer’s name

I. Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop systems manufacturer and that do not damage materials in which openings occur.

J. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut

out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

3.5 INSTALLATION OF FIREBLOCKING SEALANT

A. Shall comply with ASTM E-136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace of 750°C, current International Building Code (IBC), International Residential Code (IRC), International Residential Mechanical Code, International Fuel Gas Code, International Fire Code and NFPA 5000 draft, smoke and fireblocking requirements.

B. Install fill materials for fireblocking applications 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 the seal required to meet the intent of fireblocking code requirements.
   2. Apply fill material so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing, finish to produce smooth, uniform surfaces that are flush with adjoining surfaces.

C. Field Quality Control
   1. Proceed with enclosing fireblocking applications with other construction after inspection and approval by Authority Having Jurisdiction.
   2. Where deficiencies are found, repair or replace fireblocking applications so they comply with requirements.
   3. Inspection Agency: If required, owner will engage a qualified independent inspecting agency to inspect the fireblocking applications and to prepare test reports indicating whether fireblocking applications comply with or deviate from requirements.

D. Identification
   1. Identify fireblocking applications with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each fireblocking application installation where labels will be visible to anyone seeking to remove penetrating items or fireblocking applications. Include the following information on labels:
      a. The words: “Warning: Fireblocking Application-Do Not Disturb. Notify Building Management of Any Damage”
      b. Contractor’s name, address, and phone number
      c. Date of installation
      d. Fireblocking product manufacturer’s name
      e. Installer’s name

E. Cleaning And Protection
   1. Clean off excess fill materials adjacent to openings as work progresses by methods and with cleaning materials that are approved in writing by fireblocking product manufacturer and that do not damage materials in which openings occur.

2. Provide final protection and maintain conditions during and after installation that ensure fireblocking applications are without damage or deterioration at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated fireblocking applications immediately and install new materials to produce fireblocking applications complying with specified requirements.

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