SECTION 07 84 00

FIRE STOPPING

BASED ON DFD MASTER SPECIFICATION DATED 12/01/14

This section has been written to cover most (but not all) situations you will encounter. Use the most current master specification section available on the DFD website on each project.

Specifier instructions are shown in red type. Optional language identified within [brackets] may be deleted or added to as required by the scope of project. Depending on the specific project requirements, you may have to add to, delete, or modify what is currently written. DFD expects revisions and comments from the A/E.

***Indicate all fire and smoke rated assemblies with their ratings on the plans. These may be incorporated into: 1) life safety plans referenced by all disciplines, 2) plan backgrounds common to all discipline plans, or 3) descriptive notes.***

part 1 - GENERAL

Scope

The work under this section includes all labor, material, equipment and related services necessary to provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire or smoke rated construction in accordance to the Building Code. The fire stopping systems shall maintain an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings and construction joints in fire or smoke rated construction, or at perimeter fire containment in or adjacent to fire-rated barriers.

PART 1 - GENERAL

Scope

Related Work

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Delivery, Storage and Handling

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PART 2 - PRODUCTS

Manufacturers

Penetration Fire Stopping

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PART 3 - EXECUTION

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Penetration Fire Stopping

Smoke Barriers and Smoke Partitions

Fire-Resistive Joint Fire Stopping

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Identification

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RELATED WORK

Applicable provisions of Division 1 shall govern work under this Section. Contractor shall consult these provisions in detail prior to proceeding with work.

 Include only related sections specified for Project; delete section references if not relevant.

Section 21 05 00 “Common Work Results for Fire-Suppression”

Section 22 05 00 “Common Work Results for Plumbing”

Section 23 05 00 “Common Work Results for HVAC”

Section 26 05 00 “Common Work Results for Electrical”

REFERENCES STANDARDS

ASTM E 84 Test Method for Surface Burning Characteristics of Building Materials.

ASTM E 119 Test Method for Fire Tests of Building Construction and Materials.

ASTM E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F.

ASTM E 814 Fire Tests of Through-Penetration Fire Stops.

ASTM E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths.

ASTM E 1966 Test Method for Resistance of Building Joint.

ASTM E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops.

ASTM E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems.

ASTM E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA).

ASTM G 21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

NFPA 70 National Electric Code.

NFPA 101 Life Safety Code.

NFPA 221 Standard for High Challenge Firewalls, Firewalls, and Fire Barriers Walls

NFPA 251 Tests of Fire Resistance of Building Construction and Materials.

UL 263 Fire Tests of Building Construction and Materials.

UL 555 Fire Dampers.

UL 723 Surface Burning Characteristics of Building Materials.

UL 1479 Fire-Tests of Through-Penetration Fire Stops.

UL 2079 Tests for Fire Resistance of Building Joint Systems.

International Firestop Council Guideline for Evaluating Firestop System Engineering Judgments.

SYSTEM PERFORMANCE REQUIREMENTS

Fire or Smoke Rated Construction Requirements: Maintain barrier containment and structural floor fire resistance ratings including resistance to smoke at all penetrations, connections with other surfaces or types of construction, at separations required to permit building movement and at other fire or smoke rated construction gaps. Provide fire stopping systems that resist the spread of fire and the passage of smoke and other gases according to the requirements indicated, including but not limited to the following:

Penetrations:

Firestop all penetrations passing through fire resistance rated construction or smoke barriers.

Provide and install complete penetration fire stopping systems that have been tested and approved by a third party testing agency.

F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F Flame spread ratings indicated, as determined per ASTM E 814, but not less than one hour or the fire-resistance rating of the construction being penetrated.

T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T Thermal Transmission ratings, in addition to F ratings, as determined per ASTM E 814, where required by code and as otherwise indicated.

L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L Air Leakage ratings, in addition to F and T ratings, as determined per UL 1479, where required by code and as otherwise indicated.

W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined per UL 1479, where indicated.

Penetration Fire stopping Assembly: Assemblies are specified generally under UL system categories by penetrating item. Manufacturers' product applications shall have specific UL system designations.

 **UL Through Penetration Classifications**

 **Construction Type of System**

 **Fire Stopping System Penetrated Construction Identification**

1 No Penetrating Items F, W, C A, B, J, K, L 0001-0999

2 Metallic Pipes, Conduit or Tubing F, W, C A, B, J, K, L 1001-1999

3 Nonmetallic Pipe, Conduit or Tubing F, W, C A, B, J, K, L 2001-3999

4 Electric Cables F, W, C A, B, J, K, L 4001-4999

5 Cable, Trays with Electric Cables: F, W, C A, B, J, K, L 5001-5999

6 Insulated Pipes F, W, C A, B, J, K, L 6001-6999

7 Electrical Bus duct Penetrations F, W, C A, B, J, K, L 7001-7999

8 Mechanical Ductwork Penetrations: F, W, C A, B, J, K, L 8001-8999

9 Multiple Penetrations Through Common Openings F, W, C A, B, J, K, L 9001-9999

 ***F*** *= Floor* ***A*** *= concrete floors 5” or less*

***W*** *= Wall* ***B*** *= concrete floors greater than 5”*

***C*** *= Floor or Wall* ***J*** *= concrete or masonry walls 8” or less*

***K*** *= concrete or masonry walls greater than 9”*

 ***L*** *= framed wall*

Joints and Perimeter Systems:

Firestop all connections with other surfaces or types of construction, at separations required to permit building movement and at other fire rated or smoke barrier construction gaps.

Provide and install complete fire stopping systems that have been tested and approved by a third party testing agency.

Provide fire-resistive joint systems with fire and smoke resistance ratings indicated and as determined per ASTM E 1966 or UL 2079, but not less than the fire or smoke resistance rating of the construction in which the joint occurs.

Provide perimeter fire barrier systems with fire and smoke resistance ratings indicated and as determined per ASTM E 2307, but not less than the fire or smoke resistance rating of the floor construction.

**UL Joint & Curtainwall Classifications**

**System Type: Movement Capability Joint Width**

Floor to Floor (FF): S, D 0000-0999

Wall to Wall (WW): S, D 0000-0999

Floor to Wall (FW): S, D 0000-0999

Head of Wall (HW): S, D 0000-0999

Floor to Wall (FW): S, D 0000-0999

Curtain Wall (CW\*) S, D 0000-0999

 ***S*** *= Static 0000-0999 = less than or equal to 2”*

***D*** *= Dynamic 1000-1999 = greater than 2”, less than or equal to 6”*

 *2000-2999 = greater than 6”, less than or equal to 12”*

 *3000-3999 = greater than 12”, less than or equal to 24”*

 *4000-4999 = greater than 24”*

 *Note: If* ***Intertek Curtain Wall*** *Classification system is used, nomenclature will be* **CEJ** *or* **HI/BP**

Smoke Partition Penetrations and Joints: Fully seal penetrations and joints to prevent the passage of smoke.

Provide products that upon curing do not re-emulsify, dissolve, break down or deteriorate from exposure to atmospheric moisture or moisture characteristic to construction.

SUBMITTALS

The following information shall be included on all submitted documents:

Building Name and DFD Project Number taken from bidding documents.

Submit Manufacturers Product Data Sheets and material safety data sheets (MSDS) for each type of product selected.

Where there is no specific third party tested and listed, classified firestop system available for a particular firestop configuration, the contractor shall obtain from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal following the “Recommended International Firestop Council Guidelines for Evaluating Firestop Systems in Engineering Judgments”.

Submit the following:

Firestopping schedule. Listing agency approved installation detail for each type of penetration treatment with drawing reference of where each is used (type of penetration).

Certification that Firestop Material is asbestos free and complies with local regulations.

Certification by fire stopping manufacturer that products supplied comply with specified requirements for volatile organic compounds (VOC’s) and are nontoxic to building occupants.

Contractor qualifications as noted in “Quality Assurance” article, including certification of manufacturer’s training.

"Product Data for Credit IEQ 4.1" Subparagraph below applies to LEED-NC, LEED-CI, and LEED-CS; coordinate with requirements selected in Part 2. Delete LEED article if not required.

Product Data for Credit IEQ 4.1: For fire stopping sealants and sealant primers, documentation including printed statement of VOC content.

QUALITY ASSURANCE

Provide Fire-resistive System Listing by a testing and inspection agency in accordance with the appropriate ASTM Standard(s) listed. A qualified testing and inspection agency may be UL, FM Research, Intertek Testing Services, Omega Point Laboratories (OPL) or another agency performing testing and follow-up inspection services for fire-resistive system materials that is acceptable to the authority having jurisdiction.

Contractor Qualifications: Acceptable installer firms shall be:

A firm experienced in installing fire stopping systems similar in material, design, and scope to that indicated for this Project, and who has a record of completing past projects. Qualifications include having three years of fire stopping installation experience, staff, and training to install manufacturer's products per specified requirements. Provide statement from manufacturer certifying contractor’s staff has successfully completed manufacturer’s training on installation requirements of fire stopping systems that will be used on this Project.

Single Source Responsibility:

Materials made by different manufacturers shall not be intermixed in the same opening.

Tested and listed, classified fire-resistive systems are to be used.

If another manufacturer has a tested and listed system, then that system shall be considered before an Equivalent Fire Resistance Rated Assembly (EFRRA) is considered.

Require mock-up only for critical or complicated applications. List specific applications to be mocked up. Delete applications and/or requirement not required.

Field Constructed Mockup: Prior to installing fire-resistive systems, erect mockups for each different fire-resistive system indicated to verify product selections and to demonstrate qualities of materials and execution:

***List project fire-resistive systems that require mock-up***

Provide mockups complying with the following requirements, using materials indicated for final installations, for the following applications:

Provide mock-up in conjunction with other required mock-ups where fire stopping assemblies will be part of the construction.

Locate mockups on site in locations indicated or, if not indicated, as directed by Architect. Include mockup for each type of system.

Notify Architect in advance of the dates and times when mockups will be installed.

Obtain DFD acceptance of mockups before start of Work.

Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work. Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

DELIVERY, STORAGE, AND HANDLING

Deliver fire stopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer.

Store and handle fire-resistive materials in accordance with manufacturer’s written instructions.

PROJECT CONDITIONS

Environmental Conditions: Install fire-resistive system in accordance with manufacturer’s written instructions.

Ventilation: Ventilate per manufacturers' instructions or Material Safety Data Sheet (MSDS).

preinstallation coordination

A firestopping specific preinstallation coordination meeting shall be conducted prior to installing any construction affected by or penetrated by firestopping. This meeting shall include the General Prime Contractor and all contractors installing firestopping, as well as DFD. Each type of firestopping shall be discussed, identifying the penetrating component, the building component or system being penetrated, the firestopping system to be utilized and the contractor responsible to install the firestopping. All firestopping submittals should be consistent with the conclusions of this meeting.

PART 2 - PRODUCTS

Where specific manufacturers are named, products by other manufacturers may be considered equal in accordance with the provisions of Article 17 of the General Conditions.

MANUFACTURERS

Systems listed by approved testing agencies may be used providing they conform to the construction type, penetrant type, annular space requirements, and fire rating required for each separate instance.

Manufacturers of fire stopping shall have been successfully producing and supplying these products for a period of not less than 3 years, and shall be able to show evidence of at least 10 projects where similar products have been installed and accepted.

Subject to compliance with requirements, provide products by one of the following manufacturers:

3M Fire Protection Products.

HILTI, Inc.

ProSet Systems, Inc.

Specified Technologies, Inc.

Tremco Construction Division.

PENETRATION FIRE STOPPING

Penetrations in Fire-Resistance-Rated Walls: Provide penetration fire stopping with the following ratings determined per ASTM E 814 or UL 1479:

Fire-resistance-rated walls include fire walls and fire-barrier walls.

F-Rating: Not less than the fire-resistance rating of constructions penetrated.

Penetrations in Horizontal Assemblies: Provide penetration fire stopping with the following ratings determined per ASTM E 814 or UL 1479:

Horizontal assemblies include floor assemblies, floor/ceiling assemblies, roof/ceiling assemblies and roof assemblies.

F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.

T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall or shaft enclosure above the floor or below the floor.

Penetrations in Smoke Barriers: Provide penetration fire stopping with the following ratings determined per UL 1479 with required “L” rating:

L-Rating: Air leakage rate of the penetration assemblies measured at .30 inches of water column in both the ambient temperature and elevated temperature tests shall not exceed 5.0 cfm/square foot of penetration opening for each through penetration fire stop system or a total cumulative leakage of 50 cfm for any 100 sf of wall or floor area.

Penetrations in Smoke Partitions:

Seal penetrations with mildew resistant water based latex smoke and acoustic sealant with flame-spread smoke-developed rating of less than 25 as tested in accordance with ASTM E84.

Penetrations with Insulated Piping or Ductwork:

Provide penetration fire stop systems designed for continuous insulation except when penetrating piping is constructed of plastic which shall penetrate fire stop without insulation.

Penetrations in Floors with Annular Spaces Exceeding 4” and Exposed to Loading and Traffic:

Provide approved means of supporting floor loads and protecting firestop systems.

Penetrations for Telecom Equipment Rooms or Where Cable Tray is Discontinuous:

Provide a manufactured re-enterable system that features a built-in fire and smoke sealing system that allows cables to be added or removed without the need to remove or reinstall fire stopping materials. Examples of such systems are the STI EZ Path and HILTI Speed Sleeve.

Penetrations for All Other Communication Cabling Applications 2” Diameter and Larger:

Provide a system that utilizes removable and reusable fire stop material. Examples of such systems are the 3M Pass-Through Device, STI FP fire stop plug and HILTI CFS-PL fire stop plug.

Penetrations Designed for Future Penetrants:

Provide removable non-sealant fire stop for spare penetrations.

Flame Spread and Smoke Developed Ratings:

Provide products with flame-spread and smoke-developed indexes of 25 and 450 or less, respectively, or 25 and 50 or less in air plenums, as determined per ASTM E 84.

VOC Content: Penetration fire stopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Sealants: 250 g/L.

Sealant Primers for Nonporous Substrates: 250 g/L.

Sealant Primers for Porous Substrates: 775 g/L.

Accessories:

Provide components for each penetration fire stopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration fire stopping manufacturer and approved by qualified testing and inspecting agency for fire stopping indicated.

Refer to Section 21 05 00 “Common Work Results for Fire-Suppression”, Section 22 05 00 “Common Work Results for Plumbing”, Section 23 05 00 “Common Work Results for HVAC” and Section 26 05 00 “Common Work Results for Electrical” for sleeves and openings and for additional requirements at penetrations.

**FIRE-RESISTIVE JOINT FIRE STOPPING**

Where required, provide fire-resistive joint fire stopping that is produced and installed to resist spread of fire according to code and requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint stopping is installed. Fire-resistive joint fire stopping shall accommodate building movements without impairing its ability to resist the passage of fire and hot gases.

Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with the following ratings determined per ASTM E 1966 or UL 2079:

Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies, and roofs or roof/ceiling assemblies.

Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.

Joints at Exterior Curtain Wall/Floor Intersections and Perimeter Fire Barriers: Provide fire-resistive joint systems and perimeter fire barrier systems with the following rating determined by ASTM E 2307.

 Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

Joints in Smoke Barriers:

Fire-resistive Rated Construction: Provide fire-resistive joint systems with the following ratings determined per UL 2079 with required “L” rating.

L-Rating: Not exceeding 5.0 cfm/ft (0.00775 cu. m/s x m) of joint at 0.30 inch wg (74.7 Pa) at both ambient and elevated temperatures.

Joints in Smoke Partitions:

Seal joints with mildew resistant water based latex smoke and acoustic sealant with flame-spread smoke-developed rating of less than 25 as tested in accordance with ASTM E84.

Flame Spread and Smoke Developed Ratings:

Provide products with flame-spread and smoke-developed indexes of 25 and 450 or less, respectively, or 25 and 50 or less in air plenums, as determined per ASTM E 84.

VOC Content: Fire-resistive joint system and perimeter fire barrier sealants shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

Architectural Sealants: 250 g/L.

Sealant Primers for Nonporous Substrates: 250 g/L.

Sealant Primers for Porous Substrates: 775 g/L.

Accessories:

Provide components of fire-resistive joint systems and perimeter fire barrier systems, including primers and forming materials, which are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

APPLICATION

Fire stopping systems shall be used in applications approved by the manufacturer and in locations including, but not limited to, the following where required by code and as otherwise indicated:

Penetrations through fire-resistance-rated floor assemblies, floor/ceiling assemblies, roof/ceiling assemblies and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.

Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.

Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.

Joints in fire-resistance-rated assemblies to allow independent movement.

Perimeter joints between fire-resistance-rated floor assemblies, floor/ceiling assemblies, roof/ceiling assemblies or roofs and exterior wall assemblies.

Joints, through penetrations, and membrane penetrations in Smoke Barriers and Smoke Partitions.

EXAMINATION

Examine substrates and conditions, with installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of fire-resistive system. Notify the Project Representative of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION

Cleaning and Preparation: Clean and prepare surfaces as recommended by system manufacturer.

Verify system components are clean, dry, and ready for installation.

Verify field dimensions are as shown on the Drawings, are as tested and listed for classified systems, and meet manufacturer requirements and recommendations.

PENETRATION FIRE STOPPING

Comply with the "System Performance Requirements" listed in Part 1 and with the manufacturer's installation instructions and drawings pertaining to products and applications indicated. Protect fire stopping systems, including those raised 2” above surrounding floor, from damage due to construction activities.

Smoke Barriers AND SMOKE PARTITIONS

Comply with the "System Performance Requirements" listed in Part 1 and with the manufacturer's installation instructions and drawings pertaining to products and applications indicated.

FIRE-RESISTIVE JOINT FIRE STOPPING

Comply with the "System Performance Requirements" listed in Part 1 and with the manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install tested and listed classified systems that result in fire-resistive joint and perimeter fire barrier materials:

Directly contacting and fully wetting joint substrates.

Completely filling recesses provided for each joint configuration,

Providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability and meet tested and listed system requirements.

Tool non-sag materials immediately after their application and prior to the time skinning begins. Form smooth, uniform beads of configuration indicated or required to:

Produce fire-resistance rating

To eliminate air pockets

To ensure contact and adhesion with sides of joint.

FIELD QUALITY CONTROL

Inspection: Independent inspection agency may be employed and paid by Owner to examine and photograph fire stopping.

Where deficiencies are found or fire stopping systems are damaged or removed because of testing, repair or replace fire stopping to comply with requirements.

Proceed with enclosing fire stopping with other construction only after inspection reports are issued and installations comply with requirements.

**IDENTIFICATION**

Identify fire stopping with preprinted labels. Attach labels permanently to surfaces adjacent to and within 6 inches (152 mm) of fire stopping edge so labels will be visible to anyone seeking to remove penetrating items or fire stopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

“FIRESTOPPED PENETRATION”

Installed Product

UL System Number

Date of Installation

Installing Contractor and Phone Number

Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling which include the hourly rating. Such identification shall:

Be located in accessible concealed floor, floor-ceiling or attic spaces;

Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition.

Include lettering not less than 3 inches in height with a minimum 3/8 inch stroke in a contrasting color incorporating the wording.

“FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS, \_ HOURLY RATING”

CLEANING

Clean off excess fill materials and sealants adjacent to openings and joints as work progresses. Use methods and cleaning materials approved by manufacturers of fire stopping products and or assemblies in which openings and joints occur.

\*\*\* END OF SECTION \*\*\*