SECTION 07 84 43

JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Intumescent gypsum wall framing gaskets.
   2. Perimeter fire-barrier system.
   3. Joints in or between fire resistance rated constructions.
   4. Joints at exterior curtain wall/floor intersections.
   5. Joints in smoke barriers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: Technical data for each joint firestopping system including illustration of firestopping system and design designation.

B. Unlisted Firestopping Systems: Obtain an Engineering Judgment (EJ) from firestop manufacturer where no UL, FM Approvals, or other listed assembly is available for particular firestop configuration. Follow International Firestop Council (IFC) recommended guidelines for evaluating firestop systems in EJs

C. Product Schedule: Submit schedule for each joint firestopping system including location, illustration of firestopping system, and design designation of qualified testing agency.
   1. Provide UL Design Assembly sheets for all assemblies intended to be included in the Project. Each assembly shall clearly indicate Design Number, Fire Rating expressed in number of hours and show all materials relative to the certification. Provide reference plans or other drawings indicating the location and intent of the designs submitted.
   2. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire protection engineer as an engineering judgment or equivalent fire resistance rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit data for Installer.

B. Product Test Reports: Submit reports for each joint firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: Submit certificates from Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Single entity having minimum 5 years documented experience that has been approved by FM Global according to FM Global 4991 Approval of Firestop Contractors or evaluated by UL and found to comply with its “UL Solutions Qualified Firestop Contractor Program” requirements and employs applicators with the required experience and training to perform the work.

1. Manufacturer's willingness to sell its fire resistive joint system products to Contractor or to Installer does not confer qualification on buyer.

B. Preinstallation Conference: Conduct conference at site.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced air circulation.

1.8 COORDINATION

A. The Contractor shall coordinate all Joint Firestopping assembly requirements and specific UL assemblies prior to Bid. Provide all UL assemblies as listed on the Drawings and as required to maintain all fire ratings pertaining to the Project in its entirety.

1. All questions and clarifications shall be posed to the Design Professional by the Contractor prior to Bid and without assumption.

B. Do not cover up joint firestopping system installations that become concealed behind construction until each installation has been examined by Owner's inspecting agency and building inspector when required by authorities having jurisdiction.

1. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

C. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.

D. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Test Response Characteristics:
   1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
   2. Test in accordance with testing in referenced standards. Provide rated systems complying with requirements:
      a. Joint firestopping systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.
         1) UL Fire Resistance Directory.
         2) Intertek Group Directory of Listed Building Products.

B. Rain/Water Resistance: For perimeter fire-barrier system applications, where inclement weather or greater-than-transient water exposure is expected, use products that dry rapidly and cure in the presence of atmospheric moisture sufficient to pass ASTM D6904 early rain-resistance test (24-hour exposure)

2.2 JOINT FIRESTOPPING SYSTEM TYPES

A. General: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases. All joints shall have a UL Rating unless noted otherwise.
   1. Joint firestopping systems that are compatible with one another, with the substrates forming openings, and with penetrating items, if any.
   2. Provide products that, upon curing, do not re-emulsify, dissolve, leach, break down, or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture.
   3. Provide firestop products that do not contain ethylene glycol.

B. Intumescent Gypsum Wall Framing Gaskets: Applied to steel tracks, runners, and studs prior to framing installation. Provide products with fire, smoke, and acoustical ratings that allow movement of up to 100 percent compression and/or extension when tested in accordance with UL 2079 or ASTM E1966; have an L Rating of less than 1 cfm/ft. (0.00115 cu. m/s x m) when tested in accordance with UL 2079; and a minimum Sound Transmission Class (STC) rating of 56 when tested in accordance with ASTM E90 or ASTM C919.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide products by Safti-Seal, or comparable products by one of the following:
      a. CEMCO; California Expanded Metal Products Co.

b. ClarkDietrich.
c. Specified Technologies Inc.

C. Joints in or between Fire Resistance Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.

1. Basis-of-Design Products: Subject to compliance with requirements, provide joint firestopping systems listed in the Fire Resistive Joint System Schedule at the end of this Section by Hilti, Inc., or comparable systems by one of the following:
   a. 3M Fire Protection Products.
   b. A/D Fire Protection Systems Inc.
   c. Blazeframe Industries.
   d. CEMCO.
   e. Grabber Construction Products.
   f. Nelson Firestop; a brand of Emerson Industrial Automation.
   g. NUCO Inc.
   h. Passive Fire Protection Partners.
   i. RectorSeal.
   j. ROXUL.
   k. Safti-Seal
   l. Specified Technologies, Inc.
   m. Thermafiber, Inc.; an Owens Corning company.
2. Fire Resistance Rating: Equal to or exceeding the fire resistance rating of the wall, floor, or roof in or between which it is installed.
3. Location: Joints include those installed in or between fire resistance rated walls floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies.

D. Joints at Exterior Curtain Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. 3M Fire Protection Products.
   b. Hilti, Inc.
   c. Nelson Firestop; a brand of Emerson Industrial Automation.
   d. NUCO Inc.
   e. RectorSeal.
   f. Rockwool/Roxul.
   g. Specified Technologies, Inc.
   h. Thermafiber, Inc.; an Owens Corning company.
2. F-Rating: Equal to or exceeding the fire resistance rating of the floor assembly.

A. Perimeter Fire-Barrier Systems at Exterior Wall / Floor Intersections: Provide perimeter fire-barrier system that does not require direct screw attachment to mullions and transoms to support and fasten curtain-wall insulation for aluminum curtain-wall assemblies with one- or two-piece rectangular mullions at least 2-1/2 by 5 inches (64 by 127 mm). System will be tested in accordance with ASTM E2307 for up to two-

hour fire resistance and with ASTM E1233/E1233M for wind cycling equivalent to 108 mph (174 km/h) wind for 500 cycles.

1. Basis-of-Design Products: Subject to compliance with requirements, provide joint firestopping systems listed in the Fire Resistive Joint System Schedule at the end of this Section by Hilti, Inc., or comparable systems by one of the following:
   a. 3M Fire Protection Products.
   b. Hilti, Inc.
   c. Nelson Firestop; a brand of Emerson Industrial Automation.
   d. NUCO Inc.
   e. RectorSeal.
   f. Rockwool/Roxul.
   g. Specified Technologies, Inc.
   h. Thermafiber, Inc.; an Owens Corning company.
2. F-Rating: Equal to or exceeding the fire resistance rating of the floor assembly.
3. General:
   a. Provide compatible perimeter fire containment system products, forming material, fillers, sealants and other items, to substrates forming openings, under conditions of service and application.
   b. Provide components for each perimeter fire containment system needed to install fill materials.
   c. Utilize products tested for specific fire-resistance-rated construction to non-rated construction conditions conforming to construction assembly type, linear void width, and fire-rating involved for each separate instance.
4. Silicone Sealants:
   a. One part non-sag or self-leveling silicone elastomeric firestopping sealant.
   b. Latex sealant not permitted for Fire Containment Systems at Exterior Wall / Floor Intersections.
5. Mineral Wool Insulation:
   a. Faced or unfaced batts or blankets used for exterior walls with the capacity to contribute to fire-resistance of assembly.
   b. Approved component of the UL-system proposed.
6. Safing Insulation:
   a. Board or sheet products used as forming materials in edge of slab openings with capacity to provide a degree of fire resistance required when used with approved fill material.
7. Closure Plates: Provide closure plates as indicated and required for the UL rated assemblies indicated for perimeter fire containment systems at exterior wall / floor intersections.
8. Provide UL classified systems referred to system numbers in UL Fire Resistance Directory under product Category XHDG or Category XHBN.

B. Joints in Smoke Barriers: Provide fire resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).

1. Basis-of-Design Products: Subject to compliance with requirements, provide joint firestopping systems listed in the Fire Resistive Joint System Schedule at the end of this Section by Hilti, Inc., or comparable systems by one of the following:
   a. 3M Fire Protection Products.
   b. A/D Fire Protection Systems Inc.
   c. Hilti, Inc.
   d. Nelson Firestop; a brand of Emerson Industrial Automation.
   e. NUCO Inc.
   f. Passive Fire Protection Partners.
   g. RectorSeal.
   h. Rockwool/Roxul.
   i. Specified Technologies, Inc.
   j. Thermafiber, Inc.; an Owens Corning company.
2. L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.

C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

D. Accessories: Provide components of fire resistive joint systems, including primers and forming materials, necessary to install elastomeric fill materials and to maintain ratings required. Use components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the work.

B. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Surface Cleaning: Before installing fire resistive joint systems, clean joints immediately to comply with fire resistive joint system manufacturer's written instructions and the following requirements:
   1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire resistive rating.
   2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form release agents from concrete.

B. Prime substrates where recommended in writing by joint firestopping system 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. Protection: Use masking tape or other protection method to prevent materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

A. General: Install fire resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during application and in position needed to produce cross sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire resistive joint system.

C. Install elastomeric fill materials for fire resistive joint systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
4. Install firestop devices for telecommunications and other cabling in accordance with manufacturer’s tested assemblies and UL ratings. Follow all recommendations by the manufacturer for preparation, installation and rating to match that of surrounding construction.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375 inch (9.5 mm) strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

B. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. 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:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Manufacturer’s product and UL assembly number.
7. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire resistive joint systems immediately and install new materials to produce fire resistive joint systems complying with specified requirements.

3.7 FIRE RESISTIVE JOINT SYSTEM SCHEDULE

A. Provide all Joint Firestopping System Assemblies as indicated on the Drawings and as required to maintain all fire ratings of assemblies throughout the Project.

B. Where UL classified systems are indicated, they refer to system numbers in UL Fire Resistance Directory under product Category XHBN or Category XHDG.

C. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group’s "Directory of Listed Building Products" under product category Expansion/Seismic Joints or Firestop Systems.

Joint Types		Hilti Basis-of-Design UL 2079 Systems

	F-Rating (Hr)	Joint Width Less than or Equal to 2”	Joint Width Greater than 2” Less than or Equal to 6” [4]
Floor-to-Floor (Concrete)	1	FF-D-1012, FF-D-1013[1]	FF-D-1012, FF-D-1013[1]
	2	FF-D-1012, FF-D-1013[1]	FF-D-1012, FF-D-1013[1]
	3	FF-D-1011, FF-D-1026[1]	FF-D-1011, FF-D-1026[1]
	4	FF-D-1047	FF-D-1125
Edge of Slab to Wall (Concrete)	1	FW-D-1011, FW-D-1012, FW-D- 1013	FW-D-1011, FW-D-1012, FW-D- 1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW- D-1013, FW-D-0041	FW-D-1011, FW-D-1012, FW- D-1013, FW-D-1021, FW-D-1043
	3	FW-D-1011	FW-D-1011, FW-D-1021
	4	FW-D-1047	FW-D-1092
Top-of-Wall (Concrete or Block Wall to Flat Concrete Floor)	1	N/A**	N/A**
	2	HW-D-0097	HW-D-1009
	3	HW-D-1008[1], HW-D-0268	HW-D-1008
	4	HW-D-1042	HW-D-1103
Top-of- Wall (Concrete or Block Wall to Concrete Over Fluted Metal Deck)	1	HW-D-0098	N/A**
	2	HW-D-0080, HW-D-0081, HW-D- 0098	HW-D-1037
	3	N/A**	N/A**
	4	HW-D-0294	N/A**
Top-of-Wall (Gypsum Wall to Flat Concrete Floor)	1	HW-D-0757, HW-D-0082, HW-D- 0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW- 1020
	2	HW-D-0757, HW-D-0082, HW-D- 0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW- 1020
	3	HW-D-0119	HW-D-1011, HW-D-1012, HW- 1020
Top-of-Wall (Gypsum Shaft Wall to Deck)	2	HW-D-0342 (FLAT CONCRETE) HW-D-0541, HW-D-0542 (CONCRETE OVER METAL DECK)	N/A**
Bottom-of-Wall (Gypsum Shaft Wall to Concrete Floor)	1	BW-S-0023	N/A**
	2	BW-S-0023	N/A**
Bottom-of-Wall (Gypsum Wall to Concrete Floor)	1	BW-S-0001, BW-S-0002	N/A**
	2	BW-S-0001, BW-S-0002	N/A**
Top-of-Wall (Gypsum Wall to Concrete Over Fluted Metal Deck)	1 or 2	HW-D-0042*, HW-D-0049*, HW- D-0060, HW-D-0087*, HW-D-0089*, HW-D-0045, HW- D-0046*, HW-D-0076*, HW- D-0077*, HW-D-0154, HW-D-0184*, HW-D-209, HW-D-0292, HW-D-0295, HW-D-0538*, HW- D-0757, HW-D-0880, HW-D-1066, HW-D-1067	HWD-1011, HWD-1012, HW-D- 1020
	3	HW-D-0292, HW-D-0295	HWD-1011, HWD-1012, HW-D- 1020
	4	HW-D-0292, HW-D-0295	N/A**
Wall-to-Wall (Concrete)	2	WW-D-0017, WW-D-0082	WW-D-1080, WW-D-1084

	3	WW-D-1011[1], WW-D-0032	WW-D-1011
	4	WW-D-1047	WW-D-1128
Wall-to-Wall (Gypsum to Concrete)	1	WW-D-0040	N/A**
	2	WW-D-0040, WW-S-0052	N/A**

Joint Types	**Fire-Rating (Hr)**	**Edge of Slab at Curtainwall (Intertek or UL) ASTM E2307**	
		Joint Width Less than or Equal to 2”	Joint Width Greater than 2” Less than or Equal to 6” [4]
Edge of Slab to Curtain Wall (Spandrel Glass with Backpan)	2	HI/BPF 120-09 or CW-D-1015**	N/A**
Edge of Slab to Curtain Wall (Spandrel Glass without Backpan)	2	HI/BP 150-01 CW-D-1015**	N/A**

*SEE NOTE 3 ** CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-8000 NOTES:

1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.
4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.
5. IF CONDITIONS DON'T APPLY TO ANY OF THE ABOVE SYSTEMS, SEEK ENGINEERING JUDGEMENT

END OF SECTION