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**SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS**

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. **RELATED DOCUMENTS**
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. **SUMMARY**
				1. This Section includes fire-resistive joint systems for the following:

Adjust list below to suit Project.

Floor-to-floor joints.

Floor-to-wall joints.

Head-of-wall joints.

Wall-to-wall joints.

UL's "Fire Resistance Directory" refers to below as "perimeter fire-containment systems," See Evaluations.

Perimeter fire-resistive joint systems consisting of floor-to-wall joints between perimeter edge of fire-resistance-rated floor assemblies and exterior curtain walls.

* + - * 1. Related Sections include the following:

List below only products and construction that the reader might expect to find in this Section but are specified elsewhere.

Delete first subparagraph below if perimeter fire-containment systems are specified in this Section.

Division 07 Section "Thermal Insulation" for floor-to-wall joints indicated as perimeter fire-containment systems between perimeter edge of fire-resistance-rated floor assemblies and back of non-fire-resistance-rated exterior curtain walls.

Division 07 Section "Manufactured Roof Expansion Joints" for fire-resistive roof expansion assemblies.

Division 07 Section "Penetration Firestopping" for systems installed in openings in walls and floors with and without penetrating items.

Division 07 Section "Joint Sealants" for non-fire-resistive joint sealants.

Division 07 Section "Expansion Control" for fire-resistive joint systems consisting of metal frames and [**covers**] [**flexible seals**] <**Insert description**>.

* + - 1. **PERFORMANCE REQUIREMENTS**
				1. General: Provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly in which fire-resistive joint systems are installed.

Retain options in paragraph below if dynamic joint systems selected for Project have been tested for determining movement capability and L-ratings and these ratings are included in the Fire-Resistive Joint System Schedule at the end of Part 3. See Evaluations.

* + - * 1. Joint Systems in and between Fire-Resistance-Rated Constructions: Provide systems with assembly ratings equaling or exceeding the fire-resistance ratings of construction that they join, [**and**] [**with movement capabilities**] [**and**] [**L-ratings**] indicated as determined by UL 2079.

If Project includes load-bearing joints, retain subparagraph below, but first verify that systems are available that have been tested and listed by a testing and inspecting agency; otherwise, delete. No systems with load-bearing capabilities were listed in UL's "Fire Resistance Directory" when this Section was updated.

Load-bearing capabilities as determined by evaluation during the time of test.

Delete paragraph and subparagraphs below if not applicable to Project. Retain first option in paragraph if Project is in a location where the UBC is in effect and authorities having jurisdiction accept perimeter fire-resistive joint systems tested and rated by UL or OPL based on this test method and UL 2079.

* + - * 1. Perimeter Fire-Resistive Joint Systems: For joints between edges of fire-resistance-rated floor assemblies and exterior curtain walls, provide systems of type and with ratings indicated below and those indicated in the Fire-Resistive Joint System Schedule at the end of Part 3, as determined by [**UBC Standard 26-9**] [**NFPA 285**] and UL 2079.

UL-Listed, Perimeter Fire-Containment Systems: Integrity ratings equaling or exceeding fire-resistance ratings of floor or floor/ceiling assembly forming one side of joint.

* + - * 1. For fire-resistive systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
			1. **SUBMITTALS**
				1. Product Data: For each type of product indicated.
				2. Shop Drawings: For each fire-resistive joint system, show each kind of construction condition in which joints are installed; also show relationships to adjoining construction. Include fire-resistive joint system design designation of testing and inspecting agency acceptable to authorities having jurisdiction that demonstrates compliance with requirements for each condition indicated.

Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each fire-resistive joint system configuration for construction and penetrating items.

* + - * 1. Product Certificates: For each type of fire-resistive joint system, signed by product manufacturer.

Coordinate first paragraph below with qualification requirements in Division 01 Section "Quality Requirements" and as supplemented in "Quality Assurance" Article.

* + - * 1. Qualification Data: For Installer.

Retain first paragraph below if Contractor is responsible for field quality-control testing.

* + - * 1. Field quality-control test reports.
				2. Research/Evaluation Reports: For each type of fire-resistive joint system obtain approval of the NIH Division of the Fire Marshal before installation.
			1. **QUALITY ASSURANCE**

Paragraph below cites a standard developed jointly by FMG and the Firestop Contractors International Association. See Evaluations.

* + - * 1. Installer Qualifications: A firm that has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors."

Retain option in first paragraph below along with same paragraph in Division 07 Section "Penetration Firestopping" only after verifying the feasibility with prospective contractors of enforcing requirement that installation of Work of this Section and of Division 07 Section "Penetration Firestopping" be assigned to a single firm.

* + - * 1. Installation Responsibility: Assign installation of[**through-penetration firestop systems and**] fire-resistive joint systems in Project to a single qualified installer.
				2. Source Limitations: Obtain fire-resistive joint systems, for each kind of joint and construction condition indicated, through one source from a single manufacturer.
				3. Fire-Test-Response Characteristics: Provide fire-resistive joint systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:

Retain or insert agency names in first subparagraph below that are acceptable and that correspond with agencies whose designations are indicated in the Fire-Resistive Joint System Schedule at the end of Part 3.

Fire-resistance tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is [**UL**] [**OPL**] <**Insert name**> or another agency performing testing and follow-up inspection services for fire-resistive joint systems acceptable to authorities having jurisdiction.

Fire-resistive joint systems are identical to those tested per methods indicated in Part 1 "Performance Requirements" Article and comply with the following:

Fire-resistive joint system products bear classification marking of qualified testing and inspecting agency.

Fire-resistive joint systems correspond to those indicated by referencing system designations of the qualified testing and inspecting agency.

* + - 1. **DELIVERY, STORAGE, AND HANDLING**
				1. Deliver fire-resistive joint system products to Project site in original, unopened containers or packages with qualified testing and inspecting agency's classification marking applicable to Project and with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life, curing time, and mixing instructions for multicomponent materials.
				2. Store and handle materials for fire-resistive joint systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.
			2. **PROJECT CONDITIONS**
				1. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
				2. Ventilate fire-resistive joint systems per manufacturer's written instructions by natural means or, if this is inadequate, forced-air circulation.
			3. **COORDINATION**
				1. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
				2. Coordinate sizing of joints to accommodate fire-resistive joint systems.
				3. Do not cover up fire-resistive joint system installations that will become concealed behind other construction (including floor cover plates) until the NIH Division of the Fire Marshal examines and approves each installation.
1. PRODUCTS
	* + 1. **MANUFACTURERS**

See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products.

* + - * 1. Available Products: Subject to compliance with requirements, fire-resistive joint systems that may be incorporated into the Work include, but are not limited to, those systems indicated in the Fire-Resistive Joint System Schedule at the end of Part 3.

Retain above for nonproprietary or below for semiproprietary specification. Refer to Division 01 Section "Product Requirements." In the Fire-Resistive Joint System Schedule, retain either "Available Products" or "Products" as the title introducing each group of products.

* + - * 1. Products: Subject to compliance with requirements, provide one of the fire-resistive joint systems indicated for each application in the Fire-Resistive Joint System Schedule at the end of Part 3.
			1. **FIRE-RESISTIVE JOINT SYSTEMS**
				1. Compatibility: Provide fire-resistive joint systems that are compatible with joint substrates, under conditions of service and application, as demonstrated by fire-resistive joint system manufacturer based on testing and field experience.
				2. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing and inspecting agency for systems indicated.
1. EXECUTION
	* + 1. **EXAMINATION**
				1. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of work.

Proceed with installation only after unsatisfactory conditions have been corrected.

* + - 1. **PREPARATION**
				1. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.

Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.

Remove laitance and form-release agents from concrete.

* + - * 1. Priming: Prime substrates where recommended in writing by fire-resistive joint 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.

Delete paragraph below if applications indicated do not require masking tape.

* + - * 1. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from fire-resistive joint system materials. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates or damaging adjoining surfaces.
			1. **INSTALLATION**
				1. General: Install fire-resistive joint systems to comply with Part 1 "Performance Requirements" Article and fire-resistive joint system manufacturer's written installation instructions for products and applications indicated.
				2. Install forming/packing/backing materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
				3. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

Fill voids and cavities formed by openings and forming/packing/backing materials as required to achieve fire-resistance ratings indicated.

Apply fill materials so they contact and adhere to substrates formed by joints.

For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

* + - 1. **FIELD QUALITY CONTROL**

Delete first paragraph below if not warranted by the size of the project.

* + - * 1. Inspecting Agency: Engage a qualified independent inspecting agency to inspect fire-resistive joint systems and prepare inspection reports.
				2. Testing Services: Inspecting of completed installations of fire-resistive joint systems shall take place in successive stages as installation of fire-resistive joint systems proceeds. Do not proceed with installation of joint systems for the next area until **[inspecting agency] [NIH Division of the Fire Marshal]** determines completed work shows compliance with requirements.

Inspecting agency shall state in each report whether inspected fire-resistive joint systems comply with or deviate from requirements.

* + - * 1. Remove and replace fire-resistive joint systems where inspections indicate that they do not comply with specified requirements.
				2. Additional inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
				3. Proceed with enclosing fire-resistive joint systems with other construction only after inspection and approval by the NIH Division of the Fire Marshal.
			1. **CLEANING AND PROTECTING**
				1. Clean off excess fill materials adjacent to joints as Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which openings occur.
				2. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint 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.
			2. **FIRE-RESISTIVE JOINT SYSTEM SCHEDULE**

Revise this Article if another testing and inspecting agency designation system is used to specify fire-resistive joint systems.

* + - * 1. Designation System for Joints in or between Fire-Resistance-Rated Constructions: Alphanumeric systems listed in UL's "Fire Resistance Directory" under Product Category XHBN.

Delete paragraph below if no perimeter fire-resistive joint systems.

* + - * 1. Designation System for Joints at the Intersection of Fire-Resistance-Rated Floor or Floor/Ceiling Assembly and an Exterior Curtain-Wall Assembly: Alphanumeric systems listed in [**UL's "Fire Resistance Directory" under Product Category XHDG**] [**OPL's "Directory of Listed Building Products, Materials, & Assemblies" as perimeter fire-barrier systems**]:

For a nonproprietary specification, retain "Available" in titles of subparagraphs in which UL- or OPL-classified systems are specified. Coordinate with Part 2 "Manufacturers" Article by retaining "Available Products" Paragraph. Also retain applicable ratings for purposes of establishing salient features of each system that suits Project.

Copy and re-edit appropriate paragraphs and subparagraphs below to suit Project.

Insert number to complete drawing designation for each fire-resistive joint system retained below. Use these designations on Drawings to show where each system is required. Retain "D" for second alpha character in UL designations along with "Nominal Joint Width" or "Joint Width" subparagraphs and "Movement Capabilities" subparagraphs for systems that have been cycled according to UL 2079 requirements, which became effective January 31, 2000.

When this Section was updated, existing model codes did not include L-rating requirements for fire-resistive joint systems. See Evaluations.

* + - * 1. Floor-to-Floor Fire-Resistive Joint Systems[**FRJS-**<**#**>]:

[**Available**]UL-Classified Systems: FF-[**D**] [**S**]-<**Insert separate four-digit number for each system selected to suit Project**>.

Assembly Rating: [**1 hour**] [**2 hours**] <**Insert number of hours**>.

[**Nominal**]Joint Width: [**As indicated**] <**Insert dimension**>.

Movement Capabilities: Class [**I**] [**II**] [**III**] - <**Insert number**> percent [**compression or extension**] [**compression, extension, or horizontal shear**].

L-Rating at Ambient: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L**-**Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

* + - * 1. Floor-to-Wall Fire-Resistive Joint Systems[**FRJS-**<**#**>]:

[**Available**]UL-Classified Systems: FW**-**[**D**] [**S**]**-**<**Insert separate four-digit number for each system selected to suit Project**>.

Assembly Rating: [**1 hour**] [**2 hours**] <**Insert number of hours**>.

[**Nominal**]Joint Width: [**As indicated**] <**Insert dimension**>.

Movement Capabilities: Class [**I**] [**II**] [**III**] - <**Insert number**> percent [**compression or extension**] [**compression, extension, or horizontal shear**].

L**-**Rating at Ambient: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L**-**Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

* + - * 1. Head-of-Wall Fire-Resistive Joint Systems[**FRJS-**<**#**>]:

[**Available**]UL-Classified Systems: HW-[**D**] [**S**]-<**Insert four-digit number for each system selected to suit Project**>.

Assembly Rating: [**1 hour**] [**2 hours**] <**Insert number of hours**>.

[**Nominal**]Joint Width: [**As indicated**] <**Insert dimension**>.

Movement Capabilities: Class [**I**] [**II**] [**III**] - <**Insert number**> percent[**compression or extension**].

L-Rating at Ambient: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L-Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

* + - * 1. Wall-to-Wall Fire-Resistive Joint Systems[**FRJS-**<**#**>]:

[**Available**]UL-Classified Systems: WW-[**D**] [**S**]**-**<**Insert a four-digit number for each system selected to suit Project**>.

Assembly Rating: [**1 hour**] [**2 hours**] <**Insert number of hours**>.

[**Nominal**]Joint Width: [**As indicated**] <**Insert dimension**>.

Movement Capabilities: Class [**I**] [**II**] [**III**] - <**Insert number**> percent[**compression or extension**].

L**-**Rating at Ambient: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L**-**Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

* + - * 1. Perimeter Fire-Resistive Joint Systems[**PFRJS-**<**#**>]:

Alphanumeric system for perimeter fire-containment systems in UL's "Fire Resistance Directory" includes both an "S" for identifying static systems and a "D" for dynamic systems.

[**Available**]UL-Classified Perimeter Fire-Containment Systems: CW**-**[**D-**] [**S-**] <**Insert four-digit numbers**>.

Integrity Rating: [**1 hour**] [**2 hours**] <**Insert number of hours**>.

Insulation Rating: [**0 hour**] [**1/4 hour**] [**3/4 hour**] [**1 hour**] <**Insert number of hours**>.

Linear Opening Width: [**2-1/2 inches (63 mm)**] [**8 inches (203 mm)**] [**As indicated**] <**Insert dimension**>, maximum.

Movement Capabilities: Class [**I**] [**II**] [**III**] - <**Insert number**> percent[**compression or extension**].

L-Rating at Ambient Temperature: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L-Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

[**Available**]OPL-Classified Perimeter Fire-Barrier Systems: CEJ-<**Insert three-digit number**>-P.

T-Rating: [**1/4 hour**] <**Insert number of hours**>.

F-Rating: [**2 hours**] <**Insert number of hours**>.

Linear Opening Width: [**2-1/2 inches (63 mm)**] [**8 inches (203 mm)**] [**As indicated**] <**Insert dimension**>, maximum.

L-Rating at Ambient Temperature: Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

L-Rating at 204 deg C (400 deg F): Less than <Insert number> cu. m/s x sq. m (<Insert number> cfm/lin. ft.).

Movement Capabilities per ASTM E 1399: <**Insert number**> percent.

END OF SECTION 078446