SECTION 078413 - PENETRATION FIRESTOPPING

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Penetration firestopping systems for the following applications:

Penetrations in fire-resistance-rated walls.

Penetrations in horizontal assemblies.

Penetrations in smoke barriers.

* + - 1. COORDINATION
				1. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
				2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
			2. DEFINITIONS
				1. UL Fire Resistance Directory: Product directory published yearly, with supplements, by Underwriters Laboratories Inc., containing listings and classifications in effect as of the published date for product categories covered by UL.
				2. Factory Mutual Approval Guide: Product directory published yearly, with supplements, by Factory Mutual Research Corp., containing listed building products, materials, and assemblies which have been tested by Factory Mutual Research Corp., to recognized governing standards.
				3. Intertek Group Directory of Listed Building Products: Product directory published yearly, with supplements, by Intertek Group, containing listed building products, materials, and assemblies.
				4. F Rating: Prohibits flame passage through the system and requires acceptable hose stream test performance.
				5. T Rating: Prohibits flame passage through the system and requires the maximum temperature rise on the unexposed surface of the wall or floor assembly, on the penetrating item and on the fill material not to exceed 325 degrees F above ambient and requires acceptable hose stream test performance.
				6. Company Field Advisor: An employee of the Company which lists and markets the primary components of the system under their name who is certified in writing by the Company to be technically qualified in design, installation, and servicing of the required products or an employee of an organization certified by the foregoing Company to be technically qualified in design, installation and servicing of the required products. Personnel involved solely in sales do not qualify.
			3. PREINSTALLATION MEETINGS
				1. Conduct conference at Project site.
				2. Before the firestop work is scheduled to commence, a conference will be called by the Director’s Representative for the purpose of reviewing the Contract Documents and discussing requirements for the Work. The conference shall be attended by related trade Contractors (if any), their qualified firestopping installers, and associated firestopping manufacturer’s Company Field Advisors.
			4. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Submittals Package: Submit the following items specified below the same time as a package:

Product Data.

Samples.

Quality Control Submittals.

Firestop Schedule.

* + - * 1. Product Data: For each type of product.

Indicate design number for each firestop proposed to be used which is detailed in the UL Fire Resistance Directory, Factory Mutual Approval Guide, or the Intertek Group Directory of Listed Building Products.

State the specific locations where each firestop system is proposed to be installed.

* + - * 1. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

Retain "Engineering Judgments" subparagraph below only after verifying that authorities having jurisdiction will accept modifications handled by method in subparagraph.

Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection Director’s Representative as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

* + - * 1. Quality Control Submittals:

Design Data: Show details and include engineering information and manufacturer’s written recommendations required under Design Requirements Article for each proposed firestop if other than a design detailed in the UL Fire Resistance Directory, Factory Mutual Approval Guide, or the Intertek Group Directory of Listed Building Products.

State the specific locations where each firestop is proposed to be installed.

Installer’s Qualifications Data:

Name of each person who will be performing the Work and their employer’s name, business address and telephone number.

Names and addresses of 3 similar projects that each person has worked on during the past 5 years.

Company Field Advisor Data:

Name, business address and telephone number of Company Field Advisor secured for the required services.

Certified statement from the Company listing the qualifications of the Company Field Advisor and listing of services and each product specifically listed for this Project for which Company Field Advisor is given authorization by the Company to render advice.

Insert copy of Sample Firestop Schedule in Project Manual Appendix.

* + - * 1. Firestop Schedule: Submit schedule itemizing the following:

Manufacturer’s product reference numbers and/or drawing numbers.

UL, Factory Mutual Research Corp., or Intertek Group design number.

Location of firestop material.

Penetrating Item Description/Limits: Material, size, insulated or uninsulated, and combustibility.

Maximum allowable annular space or maximum size opening.

Wall type construction.

Floor type construction.

Hourly Fire resistance rating of wall or floor.

F rating.

T rating, if available.

**NOTE:** Firestop Schedule is for information only and will not be acted on for approval. Refer to Sample Firestop Schedule bound in Appendix.

* + - * 1. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.
			1. CLOSEOUT SUBMITTALS
				1. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
			2. QUALITY ASSURANCE

Retain "Installer Qualifications" paragraph below, or delete this article if allowing each trade to firestop penetrations they create is acceptable. If retaining, verify that installers are available to perform work in Project location. A list of FM Approvals-approved firestop contractors may be found on www.fmapprovals.com, and a list of UL-qualified firestop contractors may be found on www.ul.com/contractor. A list of firestop contractors who are approved or qualified and are also members of Firestop Contractors International Association may be found at www.fcia.org.

* + - * 1. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
				2. Container/Package Labels: Include manufacturer’s name and identifying product number, date of manufacturer, lot number, shelf life (if applicable), qualified testing and inspecting agency classification marking, curing time, and mixing instructions for multi-component materials.
				3. Company Field Advisor: Secure the services of a Company Field Advisor for the following:

Render advice regarding suitability of firestopping materials and methods.

Assist in completing firestop schedule.

Attend pre-installation conference.

* + - * 1. Mockups: Prior to installing firestopping, erect mockup for each type through-penetration firestop system indicated in the Firestop Schedule to verify selections made and to establish standard of quality and performance by which the firestopping work will be judged.

Comply with the following requirements, using materials indicated for final installations.

Locate sample installations on site at locations where directed.

Obtain Director’s Representative’s acceptance of sample installations before start of firestopping installation.

Retain and maintain mockups during construction in an undisturbed condition.

Accepted sample installations in an undisturbed condition at time of substantial completion of Project may become part of completed firestopping work.

* + - 1. PROJECT CONDITIONS
				1. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
				2. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.
1. PRODUCTS
	* + 1. PERFORMANCE REQUIREMENTS
				1. Fire-Test-Response Characteristics:

Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.

Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

Penetration firestopping systems shall bear classification marking of a qualified testing agency.

UL in its "Fire Resistance Directory."

Intertek Group in its "Directory of Listed Building Products."

FM Approval in its "Approval Guide."

Exception: Where no listed designs exist that meet the requirements of a specific project condition, submit details and manufacturer’s written recommendations for a design meeting the requirements. Include evidence of engineering judgment and extrapolation from listed designs.

* + - 1. PENETRATION FIRESTOPPING SYSTEMS
				1. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
				2. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

Rating in "F-Rating" subparagraph below indicates resistance to flame spread.

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

* + - * 1. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

Ratings in "F-Rating" subparagraph below indicate resistance to flame spread.

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

Ratings in "T-Rating" subparagraph below indicate resistance to excessive thermal transmission.

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

Ratings in "W-Rating" subparagraph below indicate resistance to water leakage. W-ratings are not required by the BCNYS but may be needed if water leakage is a concern.

W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

Retain "Penetrations in Smoke Barriers" paragraph below if smoke barriers are included in Project, and indicate locations on Drawings. Coordinate with the Penetration Firestopping System Schedule.

* + - * 1. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.

Ratings in "L-Rating" subparagraph below indicate resistance to air leakage.

L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

* + - * 1. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

System in "Manufactured Piping Penetration Firestopping System" paragraph below is installed when the piping is installed. Verify availability of F-Ratings, T-Ratings, and W-Ratings. When this Section was updated, ProVent Systems was the only manufacturer to offer this type of firestopping system.

* + - * 1. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

Rating in "F-Rating" subparagraph below indicates resistance to flame spread.

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

Ratings in "T-Rating" subparagraph below indicate resistance to excessive thermal transmission.

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

Ratings in "W-Rating" subparagraph below indicate resistance to water leakage. W-ratings are not required by the BCNYS but may be needed if water leakage is a concern.

W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.

Fitting in "Stack Fitting" subparagraph below is for use with plastic stacks.

Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.

Coating in "Special Coating" subparagraph below is for use with corrosion-resistant plastic stacks.

Special Coating: Corrosion resistant on interior of fittings.

* + - * 1. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

Retain accessories in subparagraphs below required.

Permanent forming/damming/backing materials.

Substrate primers.

Collars.

Steel sleeves.

* + - 1. FILL MATERIALS

If fill materials are Contractor's choice, retain only those paragraphs below that suit Project. If retaining fill materials in the Penetration Firestopping System Schedule, coordinate paragraphs with materials specified in schedule.

* + - * 1. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
				2. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
				3. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
				4. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
				5. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
				6. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
				7. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
				8. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
				9. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
				10. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
			1. MIXING

Retain this article if products are specified that require mixing before application.

* + - * 1. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
				2. Examine existing junctures, control joints, and expansion joints in the Work areas.
				3. Where firestopping is missing or not intact, submit a written report to the Director’s Representative describing the existing conditions.
				4. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.

Remove laitance and form-release agents from concrete.

Retain paragraph below if products selected require priming.

* + - * 1. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
			1. INSTALLATION
				1. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

Where applicable design is not detailed in the Directories, use forming materials and fill, void or cavity material to form through-penetration firestop in accordance with approved printed details and installation instructions from the company producing the forming materials and fill, void or cavity material.

If the construction type(s) of the building cannot be determined, provide firestopping with fire resistance ratings as specified in the Building Code of New York State, Tables 720.1(1), 720.1(2), 720.1(3), and 302.3.2.

* + - * 1. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

* + - * 1. Install fill materials by proven techniques to produce the following results:

Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.

Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

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

* + - 1. IDENTIFICATION
				1. 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 high and with minimum 0.375-inch strokes.

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

Retain "Penetration Identification" paragraph below if required. Individual joint penetration labeling may not be required by authorities having jurisdiction if wall is identified, but labeling is useful if penetration firestopping systems must be replaced.

* + - * 1. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. 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:

The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

Contractor's name, address, and phone number.

Designation of applicable testing and inspecting agency.

Date of installation.

Manufacturer's name.

Installer's name.

* + - 1. FIELD QUALITY CONTROL
				1. Leave exposed those firestopping installations that are to be concealed behind other construction until the Director’s Representative has examined each installation.

If required, inspection of penetration firestopping systems in this article is performed according to ASTM E2174, "On-Site Inspection of Installed Fire Stops." To prevent conflicts of interest, ASTM E2174 precludes making Contractor responsible for engaging the testing agency. Inspectors may verify compliance by destructive examination of some completed installations.

* + - * 1. Director’s Representative will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
				2. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
				3. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.
			1. CLEANING AND PROTECTION
				1. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping 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 that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.
			2. PENETRATION FIRESTOPPING SYSTEM SCHEDULE

Retain paragraphs in this schedule and revise to suit Project. Delete schedule if penetration firestopping systems are selected by Contractor.

Retain first paragraph below if UL-classified systems are required.

* + - * 1. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

Retain first paragraph below if Intertek Group-listed systems are required.

* + - * 1. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

Retain first paragraph below if FM Approval-approved systems are required.

* + - * 1. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."

Copy and re-edit remaining paragraphs for each system required. Coordinate with manufacturers specified in Part 2. If retaining FS option as means of identifying location of each firestopping system application on Drawings, insert drawing designation.

Each system designation is based on testing of proprietary products; for non-proprietary specifications, list multiple or a range of system designations for each condition, add basis-of-design products and comparable manufacturers, or specify each condition by rating requirements and fill material.

* + - * 1. Penetration Firestopping Systems with No Penetrating Items <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 0001 to 0999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [W-J-] [W-L-] <Insert four-digit number> [0001-0999**].

Intertek Group-Listed Systems: <**Insert design numbers**>.

FM Approval-Approved Systems: <**Insert design numbers**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <Insert cfm/sq. ft. >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 1001 to 1999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [C-BK-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-K-] [W-L-] [W-N-] <Insert four-digit number> [1001-1999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <Insert **cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 2001 to 2999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [C-BK-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-K-] [W-L-] [W-N-] <Insert four-digit number> [2001-2999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Electrical Cables <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 3001 to 3999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [C**-AJ-] [C-BJ-] [C-BK-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-K-] [W-L-] <Insert four-digit number> [3001-3999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft. >.**

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Cable Trays with Electric Cables <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 4001 to 4999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [W-J-] [W-K-] [W-L-] <Insert four-digit number> [4001-4999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Insulated Pipes <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 5001 to 5999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [C-BK-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-L-] [W-N-] <Insert four-digit number> [5001-599**9].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 6001 to 6999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [F-A-] [W-L-] [W-J-] <Insert four-digit number> [6001-6999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 7001 to 7999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-L-] [W-N-] <Insert four-digit number> [7001-7999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

* + - * 1. Penetration Firestopping Systems for Groupings of Penetrants <**Insert drawing designation**>:

Retain one or more of first three subparagraphs below if required. If retaining first subparagraph, retain one alpha-alpha option followed by either a four-digit number or range of four-digit numbers from 8001 to 8999. See Evaluations for explanation of UL-system numbers.

UL-Classified Systems: [**C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [F-E-] [W-J-] [W-L-] <Insert four-digit number> [8001-8999**].

Intertek Group-Listed Systems: <**Insert design number**>.

FM Approval-Approved Systems: <**Insert design number**>.

Retain one or more of six subparagraphs below if not retaining system designation subparagraphs above.

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

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

L-Rating at Ambient: Less than <**Insert cfm/sq. ft.** >.

L-Rating at 400 Deg F: Less than <**Insert cfm/sq. ft.** >.

W-Rating: No leakage of water at completion of water leakage testing.

Type of Fill Materials: [**As required to achieve rating] <Insert material**>.

END OF SECTION 078413