

SECTION 07 84 00 – USA
FIRESTOPPING PENETRATIONS, JOINTS AND PERIMETER FIRE BARRIERS

[FCIA NOTE TO SPECIFIER: This is a single spec section for ALL Firestopping, including penetrations, joints and perimeter fire barriers. The reason for a single spec and not multiple sections is that the firestop installation contractor qualifications, inspection agency and inspector qualifications, and procedures to select and install systems listings to the manufacturer’s instructions, are all the same. Second, all the requirements in one place means no conflicts with the same work result, extending the fire-resistance of the wall or horizontal assembly.]

PART 1 GENERAL

1.00 RELATED DOCUMENTS

- A. The BIDDING REQUIREMENTS, CONTRACTING REQUIREMENTS, and applicable parts of DIVISION 1 - GENERAL REQUIREMENTS, as listed in the Table of Contents, shall be included in and made a part of this Section.

[FCIA NOTE TO SPECIFIER: The appropriate section to reference in Division 1 is 01-78-39, Project Record Documents, for the Systems Listings, Manufacturers Installation Instructions and Maintenance/Repair Procedures for all types of firestopping. In Section 01-78-39, reference to 07-84-00 to assure that repairs for the life of the structure are in accordance with the manufacturer’s installation instructions and the listings.]

1.01 SUMMARY

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity the fire-resistance rated construction by maintaining an effective barrier against the spread of flame, or smoke, and/or hot gases through penetrations, blank openings, construction joints, or at the gap that is created at the building perimeter of the horizontal fire resistance rated assembly and non-fire-resistance rated exterior wall and in or adjacent to either fire-resistance or non-fire-resistance rated barriers in accordance with the requirements of the Building Code for this project.
- B. Firestop systems shall be used in locations including, but not limited to, the following:
1. Penetrations through fire-resistance-rated floor and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.
 2. Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.
 3. Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.
 4. Joints in fire-resistance-rated assemblies that ~~to~~ allow independent movement.
 5. Perimeter of the horizontal fire-resistance rated assembly and exterior wall between a rated floor/roof and an exterior wall assembly that is not fire-resistance rated.
 6. Joints, through penetrations and membrane penetrations in Smoke Barriers, Smoke Partitions and those assemblies required to limit, restrict or retard the passage of smoke.

1.02 RELATED WORK

- A. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that relate directly to Work of this Section include, but are not limited to:
1. Division 03 00 00 - CONCRETE; Concrete work
 2. Division 04 00 00 - MASONRY
 3. Division 07 80 00 - THERMAL AND MOISTURE PROTECTION
 4. Division 08 44 00 – OPENINGS; CURTAINWALL AND GLAZED ASSEMBLIES CURTAIN WALL SYSTEMS
 5. Division 09 20 00 - PLASTER AND GYPSUM BOARD
 6. MasterFormat 1995 - Division 15 - MECHANICAL
 7. MasterFormat 1995 - Division 16 - ELECTRICAL, LIGHTING, POWER, ALARMS and COMMUNICATIONS
 8. MasterFormat 2014 – Division 21 00 00 FIRE SUPPRESSION
 9. MasterFormat 2014 – Division 22 00 00- PLUMBING
 10. MasterFormat 2014 – Division 23 00 00 – HEATING, VENTILATION AND AIR CONDITIONING(HVAC)
 11. MasterFormat 2014 – Division 25 00 00 – INTEGRATED AUTOMATION
 12. MasterFormat 2014 – Division 26 00 00 – ELECTRICAL
 13. MasterFormat 2014 – Division 27 00 00– COMMUNICATIONS
 14. MasterFormat 2014 – Division 28 00 00 – ELECTRONIC SAFETY AND SECURITY

1.03 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
1. American Society for Testing and Materials (ASTM).
 - a) E 84 Test Method for Surface Burning Characteristics of Building Materials
 - b) E 119 Test Method for Fire Tests of Building Construction and Materials
 - c) E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
 - d) E 814 Fire Tests of Through-Penetration Fire Stops
 - e) E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths
 - f) E 1966 Test Method for Resistance of Building Joint
 - g) E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops
 - h) E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems
 - i) E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA)
 - j) E 2837 Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies
 2. Factory Mutual (FM) Approvals:
 - a) FM Approval Standard of Firestop Contractors – Class 4991
 - b) FM Firestop Exam
 - c) FM Approvals Standard for Firestops – Class 4990
 3. Firestop Contractors International Association (FCIA):
 - a) MOP – FCIA Firestop Manual of Practice
 - b) FCIA Recommended Professional Practice RPP-L-2018-1, for the Identification of Fire-Resistance Rated and Smoke Resistant Penetration and Joint Firestopping

4. International Accreditation Services
 - a) iAS Accreditation Criteria for Special Inspection Agencies AC-291
5. International Firestop Council (IFC):
 - a) Ref. 1 Recommended IFC Guidelines for Evaluating Firestop Engineering Judgments
 - b) Ref. 2 Inspectors Field Pocket Guide
 - c) Ref. 3 IFC Recommended Guidelines for Performing Destructive Testing for Installed Penetration Firestop Systems, Fire Resistive Joint Systems, or Perimeter Fire Barrier Systems.
6. National Fire Protection Association (NFPA):
 - a) NFPA 1 – The Fire Code
 - b) NFPA 70 - National Electric Code
 - c) NFPA 101 - Life Safety Code
 - d) NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
 - e) NFPA 251 - Fire Tests of Building Construction and Materials
7. Underwriters Laboratories, Inc. (UL):
 - a) UL Qualified Firestop Contractor Program
 - b) UL Firestop Exam
 - c) UL 263 Fire Tests of Building Construction and Materials
 - d) UL 723 Surface Burning Characteristics of Building Materials
 - e) UL 1479 Fire-Tests of Through-Penetration Fire Stops
 - f) UL 2079 Tests for Fire Resistance of Building Joint Systems

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. Penetrations: Provide and install firestopping products that once installed to the tested and listed system or engineering judgment (EJ) / equivalent fire-resistance rated assembly (EFRRA) to become firestop systems or EJ/EFRRA's that are produced to resist the spread of fire, and/or the passage of smoke through breaches, gaps, openings, in fire-resistance-rated and smoke resistant assemblies according to requirements indicated, including but not limited to the following:
 1. Firestop all breaches made in fire-resistance rated assemblies for penetrating items passing through fire-resistance-rated wall and floor assemblies and other locations as indicated on the drawings.
 2. Provide and install complete penetration firestopping systems that have been tested and approved by a nationally recognized third-party testing agency to the listing and the manufacturers installation instructions.
 3. F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined through testing in accordance with ASTM E 814 or UL 1479, but not less than one hour or the no less than the fire-resistance rating of the construction assembly being penetrated by the penetrating item.
 4. T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T (temperature) ratings, in addition to F ratings, as determined per ASTM E 814 or UL 1479, where indicated and required by the applicable Building Code.

[FCIA NOTE TO SPECIFIER: The T Rating has exceptions for when breaches occur and penetrations are made in horizontal assemblies that are inside a rated wall assembly or shaft]

5. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with Air Leakage (L) ratings, in addition to F and T ratings, as determined in accordance with UL 1479, where indicated.

[**FCIA NOTE TO SPECIFIER:** Air Leakage Ratings are required for fire-resistance rated assemblies that are also to resist the passage of smoke, typically smoke barriers. For smoke partitions which are not fire-resistance rated, the non rated smoke and sound products might be acceptable to retard the passage of smoke if adequate testing exists from the manufacturer. Another option is to specify a L Rated Firestop System, installed as if the assembly was fire-resistance rated in addition to smoke resistant. This is the designer and building owner's choice to make.]

6. (Optional) W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined in accordance with UL 1479, UL 2079, where indicated.

[**FCIA NOTE TO SPECIFIER::** Tested and listed systems and the manufacturers installation instructions are key to whether the products will be suitable for use in specific applications. There are various ratings produced from tests based on ASTM E 814, UL 1479, ASTM E 1966, UL 2079, ASTM E 2837, and ASTM E2307.

F-Fire Resistance, is the time in minutes or hours, when flame pokes through the assembly to the non-fire-exposed side of test assembly.

The T-Temperature rating, is to test to measure if the through penetration firestop penetrating item(s) or fire-resistance rated joint assembly increase in temperature 325F above ambient 12" above the horizontal assembly. The T Rating is to measure how long it takes for the penetrating item or assembly to increase in temperature enough to catch combustibles on the non-exposed side of the assembly on fire 12" away.

The **H-Hose Stream** is mandatory for the F and T Ratings in ASTM and UL Standards. It is optional in the Canadian standards.

The L Rating, is for air leakage through the assembly at ambient temperature and 400F. The air simulates smoke moving through the assembly, with the L providing a quantifiable value for contractors to meet some code requirements in smoke barriers. The International Building Code requires <5cfm/sf of opening area for each penetrant and no more than 100cfm / 100sf of wall area.

The W-Rating is for water resistance. The W rating tests conditioned material (about 30 days old) to see if water leaks through the assembly after 72 hours under a 3' water column over the firestop. It is an optional rating and is used to protect areas from water leaking through the assembly. Note that the test is performed when the material is fresh, not aged, nor exposed to cleaning chemicals, movement of the assembly or the penetrating item(s).

The I-Insulation Rating, is similar to the T Rating and measures temperature rise on the unexposed side of the assembly.

The I-Integrity Rating, is similar to the F-Fire rating in that the failure point is when flame pokes through the assembly.]

[The various building codes require firestopping with fire-resistance-ratings equal to the assembly where the void, breach, opening or gap is made for a joint, or penetrating item to pass through the assembly. The **F-Rating**, then, is equal to the fire-resistance of the assembly. The **T-Rating**, however, is different. There are a few exceptions in the codes where T-Ratings are not required such as in fire-resistance-rated shafts and inside walls. **L-Ratings** are required for smoke barriers in the International Building Code (IBC), and are listed in Chapter 8 of NFPA 5000 and NFPA 101, but not required by the occupancy chapters in

NFPA's Standards.. They are not mentioned in the IBC's smoke partition section. FCIA's position is that anyplace smoke is mentioned as a resistance requirement in a fire-resistance rated assembly, that the **L-Rating** is the way to establish quantified smoke resistance. The **L-Rating** is the best way to establish smoke resistance for Firestopping. Where there is no fire resistance rating, manufacturers of products have declared their smoke and sound sealants as suitable for use in those situations. Specifier to verify that the products used in non fire-resistance rated assemblies is suitable. **W-Ratings** are not referenced in the codes. Refer to Chapter 7 of the International Building Code and Chapter 8 of NFPA 5000/101 for specific situations].

- B. Perimeter Interior Fire Barrier Systems: Provide perimeter interior fire barrier systems with fire-resistance ratings indicated, as determined per ASTM E 2307, but not less than the fire-resistance rating of the floor construction.
- C. Fire-Resistive Joints: Provide fire resistive joint systems with fire-resistance ratings indicated, as determined by tests performed to ASTM E 1966 and ASTM E 1399, E 2837, or UL 2079, but not less than the fire-resistance rating of the assembly in which the breach, void or joint occurs. For where fire resistance rated walls do not meet and create a breach between a non-fire resistant horizontal assembly, provide fire resistive joint systems with fire-resistance ratings as determined by testing performed in accordance with ASTM E 2837.
- D. For firestopping breaches, gaps or joints exposed to view, traffic, moisture, and physical damage, provide firestop systems that meet conditions expected as communicated through construction documents.
- F. Where there is no specific third party tested and listed, classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer, an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal. All EJ's or EFRRA's to state the manufacturer EJ/EFRRA will pass the fire tests referenced in this specification section for the application, if tested.

[FCIA NOTE TO SPECIFIER: There are some jurisdictions that require an engineer's stamp on EJ/EFRRA's.]

1.05 SUBMITTALS

[FCIA NOTE TO SPECIFIER: It is critical that BOTH the manufacturers installation, inspection and repair instructions be provided in addition to the system design listings. Repair procedures are needed for destructive testing that is an option within ASTM E2174 and ASTM E 2393 Inspection Standards. Inspection acceptance criteria needs to be established by the listing and manufacturer's instructions. Without these, fire and life safety is compromised.]

- A. Submit Manufacturers Product Data Sheets and Manufacturer Installation Instructions, and repair procedures for each type of product selected for the firestop system. Certify that Firestop Material shall be asbestos free and complies with local regulations.
 - 1. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's) and are nontoxic to building occupants.
- B. Submit system design listings, including illustrations from a nationally recognized testing agency that is applicable to each firestop configuration.

[FCIA NOTE TO SPECIFIER: It is important to NOT have specific systems selected in specifications and on the plans. Penetrating items change as do joint sizes and types from design to construction. That's why the firestop installation contractor selects the systems.]

1. Systems shall be submitted and reference system numbers in the UL Fire Resistance Directory or Online Certification Directory, under product categories XHEZ, XHDG or XHBN. As an alternative, system numbers from other approved agencies shall be submitted. An example of selected numbering, but not the complete numbering system is:
 - a. Breaches in Concrete Assemblies with penetrating items listed below passing through:
 - i. Metal Penetrating Items. – C-AJ-1XXX.
 - ii. Plastic Penetrating Items – C-AJ-2XXX
 - iii. Cables – C-AJ-3XXX
 - iv. Cable Trays – C-AJ-4XXX
 - v. Insulated Penetrating Items – C-AJ-5XXX
 - vi. Multiple Penetrating – C-AJ-8XXX

NOTE: There may be some systems available in other alpha numeric categories.
 - b. Breaches in Gypsum Wallboard Assemblies with penetrating items listed below passing through:
 - i. Metal Penetrating Items – W-L-1XXX.
 - ii. Plastic Penetrating Items – W-L-2XXX
 - iii. Cables – W-L-3XXX
 - iv. Cable Trays – W-L4XXX
 - v. Insulated Penetrating Items – W-L-5XXX
 - vi. Multiple Penetrating – W-L-8XXX
 - vii. NOTE: There may be some systems available in other alpha numeric categories.
 - c. Breaches between Walls and floors, with voids, gaps, intersections of dissimilar materials:
 - i. Concrete to Concrete Wall to Floor – HW-S or HW-D-XXXX
 - ii. Framed Wall to Concrete Wall – WW-S or WW-D-XXXX

NOTE: There may be some systems available in other alpha numeric categories.
 - d. Breaches between curtain walls and horizontal Assemblies:
 - i. CW-S-XXXX or CW-D-XXXX
 - ii. NOTE: There may be some systems available in other alpha numeric categories.
 - e. Breaches between the bottom of the fire-separation and horizontal assembly.
 - i. BW-S-XXXX
2. Where there is no specific third party tested and classified Firestop System available for particular firestop configuration from any manufacturer, the firestopping contractor shall obtain from the firestop manufacturer an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal. The EJ or EFRRA shall state that the assembly is expected to pass the appropriate fire test and is equivalent to a tested and listed firestop system.

C. Submit contractor qualifications as noted in 1.06 “Quality Assurance”.

1.06 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide firestopping System Design Listing by a nationally recognized testing agency in accordance with the appropriate ASTM or UL Standard(s) per article 1.04 or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the authority having jurisdiction.]

[FCIA NOTE TO SPECIFIER:: A nationally recognized testing agency may be UL, LLC, FM Approvals, Intertek Testing Services, or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the authority having jurisdiction.]

- B. Contractor Qualifications: Acceptable firestop installation (installer) firms shall be:
1. FM Approved in accordance with FM 4991 – Standard for the Approval of Firestop Contractors, or.
 2. UL Qualified Firestop Contractor, AND,
 3. Firestop Contractors International Association Contractor Member in good standing. Submit written proof of current membership in good standing.
 4. Licensed by the State or local authority, where applicable.
 5. Shown to have successfully completed not less than 5 comparable scale projects.

[FCIA NOTE TO SPECIFIER: The FM 4991 and UL Qualified Firestop Contractor Programs are optional, third party audit programs of a firestop installation contractor's management system – how the contractor gets systems selected, materials in conformance with the listing and construction documents, in addition to a person at the firm that has passed a rigorous examination. FM 4991 Approved and UL Qualified Firestop Contractors are available and travel regionally. Firestop manufacturers programs are NOT equal to the FM 4991 or UL QFCP Programs because they are not independent evaluators of the contractor's management system. FM 4991 and UL QFCP costs to the firestop installation contractor are annual fees of about \$3500USD spread across all the projects of the firm for the entire year. Initial approval or qualification range is about \$6500USD. FM 4991 was introduced in 2001 and UL QFCP in 2007. To find FM 4991 or UL Qualified Firestop Contractors, visit www.FCIA.org.]

- C. Special Inspection Agency Qualifications: Special Inspection agencies shall be:
- i. IAS AC 291 Accredited for Firestop Systems.

[FCIA NOTE TO SPECIFIER: Special Inspection is required by the IBC in Chapter 17 in accordance with ASTM E 2174 and ASTM E 2393 Inspection Standards. The IBC requires that BOTH the special inspection agency and special inspector be approved by the AHJ. The IAS AC291 is a way to quantifiably quantify the special inspection agency qualifications. Visit www.FCIA.org for more info. Verify availability of IAS AC291 Accredited Special Inspection Agencies in the project locations.]

- D. Special Inspectors Credentials: Special Inspectors shall have experience in the same type and complexity of work inspected. In addition, both the competence and experience shall be acceptable to the authority having jurisdiction, where inspection is code mandated Special inspectors shall prove competence by passing at 80%, the following Firestop Industry Exams:
- i. FM Firestop Exam
OR
 - ii. UL Firestop Exam
AND
 - iii. IFC Firestop Exam

[FCIA NOTE TO SPECIFIER: According to the IBC, special inspectors need to demonstrate competence and experience in the same type and complexity of work inspected. One way to prove competency is through passing the FM or UL Firestop Exam. Both have inspection and installation questions as part of the exam in addition to general and systems selection and analysis knowledge.

- E. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer, to the greatest extent possible.
1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system, void, breach, gap, intersection or opening.
 2. Tested and listed, classified firestop systems are to be used. If another manufacturer has a tested and listed system, then that system shall be used prior to an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRR).

F. Field Constructed Mockup: Prior to installing firestopping, erect mockups for each different firestop system indicated to verify selections made and to demonstrate qualities of materials and execution as well as acceptance criteria. Build mockups to comply with the following requirements, using materials indicated for final installations.

1. Locate mockups on site in locations indicated or, if not indicated, as directed by Architect. Include mockup for each type of system.
2. Notify Architect in advance of the dates and times when mockups will be installed.
3. Obtain Architect and AHJ's acceptance of mockups before start of Work.
4. 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.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer.
- B. Store and handle firestopping materials in accordance with manufacturer's instructions.

1.08 PROJECT CONDITIONS

- A. Environmental Conditions: Install firestopping in accordance with manufacturers written instructions and the system design listings.
- B. Ventilation: Ventilate per firestopping manufacturers' instructions or Safety Data Sheet (SDS)

1.09 SEQUENCING, SCHEDULING

- A. Project coordination is essential to inform and educate all the parties involved with the firestopping process of their role and how they can affect firestopping on the project. A pre-construction meeting shall be scheduled and required for all parties involved prior to the start of construction. Firestop Systems tested and listed systems from laboratory directories, engineering judgements/equivalent fire resistance rated assembly documentation shall be used to prepare breaches in fire-resistance rated and smoke resistant assemblies.

1.10 ENVIRONMENTAL REGULATIONS

- A. All materials shall be asbestos free and comply with local VOC Regulations.
- B. If required, hazardous disposal of firestop materials shall be strictly observed as noted on the individual SDS.

PART 2 PRODUCTS

2.01 FIRESTOPPING, GENERAL

- A. Systems listed by approved testing agencies, as identified in part 1 above, may be used, providing they conform to the construction type, penetrant type, physical properties, joint, breach, gap or opening size, annular space requirements and fire-resistance rating involved in each separate instance.
- B. Manufacturer of firestop products shall have been successfully producing and supplying these products for a period of not less than 3 years, and be able to show evidence of at least 10 projects where similar products have been installed and accepted.

- C. Firestop products produced by FCIA Manufacturer Members in good standing.
 - a. 3M Fire Protection Products
 - b. BALCO, Inc.
 - c. Construction Specialties, Inc.
 - d. EMSEAL Joint Systems, Ltd.
 - e. Fireline 520, an Inpro Company
 - f. HILTI, Inc.
 - g. International Carbine Technology Co., Ltd.
 - h. NUCO, Inc.
 - i. Rectorseal/CSW Industrials
 - j. ROCKWOOL
 - k. Specified Technologies, Inc.
 - l. Thermafiber, Inc. (An Owens Corning Company)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with manufacturers installation requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Notify the responsible party or parties of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Cleaning & Preparation: Clean and prepare surfaces as recommended by firestop system Manufacturer's installation instructions and the system design listing.
- B. Verify that system components are clean, dry, and ready for installation.
- C. Verify that field dimensions are as shown on the Drawings, tested and listed, classified systems, Engineering Judgments, EFRRA's and as recommended by the manufacturer's installation instructions.

3.03 INSTALLING PENETRATION FIRESTOPS

- A. General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications, systems indicated.
 - 1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire-resistance rated construction, have been permanently installed prior to installation of firestop assemblies.
 - 2. Multiple penetrations require minimum space between penetrating items equal to the size of the smallest penetrating item, minimum 50mm (2") spacing.
 - 3. Schedule the work to assure that partitions and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- B. Install packing/backing/forming materials and other accessories in accordance with manufacturers installation instructions, tested and listed, classified systems
- C. Install fill, void and cavity materials for through-penetration firestop systems by proven techniques as recommended by the manufacturer, tested and listed, classified system and tooled to produce the following results:

1. Clean surfaces as recommended by manufacturers' written instructions and the system design listing.
2. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items, in accordance with the system design listing.
3. Install materials so they contact and adhere to substrates formed by openings and penetrating items.
4. Finish to produce smooth, uniform surfaces as recommended by manufacturer's installation instructions and tested and listed, classified system requirements.

3.04 INSTALLING FIRESTOP JOINT SYSTEMS

- A. General: Comply with the "System Performance Requirements" article in Part 1 and with the firestop manufacturer's installation instructions, system design listings and drawings pertaining to products and applications indicated.
 1. Install joint forming materials to provide support of firestop materials during application and at the position required to produce the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- B. Install tested and listed, classified systems and non-tested EJ's, EFRRA's that result in firestop materials:
 1. Directly contacting and fully wetting joint substrates.
 2. Completely filling recesses provided for each joint configuration in accordance with the system design listing,
 3. Providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability and meet tested and listed system requirements.
- C. Tool or smooth non-sag firestop sealant materials immediately after their application and prior to the time skinning or begins as stated in the manufacturer's installation instructions. Form smooth, uniform beads of configuration indicated or required to:
 1. produce fire-resistance rating
 2. to eliminate air pockets
 3. to ensure contact and adhesion with sides of joint.

3.05 INSTALLING PERIMETER FIRE BARRIER SYSTEMS

- A. General: Comply with "System Performance Requirements" article in Part 1 and with the firestop manufacturer's installation instructions, systems design listings and drawings pertaining to products and applications indicated.
- B. Install metal framing, curtain wall insulation, mechanical attachments, safing materials and other firestop system components as applicable within the system design, engineering judgement/equivalent fire-resistance rated assembly.

3.06 FIELD QUALITY CONTROL

A. Provide either of the following:

- a. **CERTIFICATE OF CONFORMANCE** – Firestopping shall be installed by an FM 4991 Approved Firestop Contractor and/or UL Qualified Firestop Contractor. The installer shall issue to AHJ and Owner a Certificate of Conformance confirming that the work has been carried out in accordance with specifications.

...AND/OR...

- b. **INSPECTION** – Independent inspection agency employed and paid by owner, will examine firestopping in accordance with ASTM E – 2174, “Standard Practice for On-Site Inspection of Installed Firestops and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Firestop Joint Systems. The type of firestop is defined as by system design listing by firestop installation contractor.

[FCIA NOTE TO SPECIFIER:] Chapter 17 of the 2012-2018 International Building Code requires ASTM E 2174-09 and ASTM E 2393-09 for buildings 75’ and higher, and Occupancy Category III or IV buildings constructed in accordance with Section 1604. Firestopping is a very detailed, technical installation. Inspection for all contractors installing firestop is critical. If the percentage inspection does not include ‘by contractor’, then contractors might not get inspected. The same system design listing is used by many contractors from mechanical, plumbing electrical to communications and low voltage, piping contractors.

3.07 CLEANING

- A. Clean off excess fill materials and sealants adjacent to penetrations, openings and joints as work progresses. Use methods and cleaning materials approved by manufacturers of firestopping products and or assemblies in which penetrations, openings, gaps and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances. If damage caused by others, owner and general contractor to instruct firestop contractor to make appropriate repairs and charge to appropriate installer subcontractors.

3.08 DOCUMENTATION

- A. **Documentation:** Provide details of installations, with Listed Systems and/or EJ/EFRRAs and locations on Life Safety Drawings for restoring the fire resistance rating or smoke resistant properties where a breach in an assembly occurs for a fire-resistance rated joint, penetration and/or safing slot, perimeter interior fire containment system. Such documentation shall be delivered as a binder, electronic or software application/program to the building owner or manager at the end of construction. This information shall be part of the closeout documents. Documentation shall be composed in a concise and comprehensible manner by so that the Authority Having Jurisdiction (AHJ) can understand and verify installations.

[NOTE TO SPECIFIER:] A closeout document is required by the 2018 International Fire Code, and is called an Inventory. The inventory of fire-resistance including firestopping is important for the AHJ to be able to verify what the installed firestop systems are for final approval and building owner and manager maintenance. The International Fire Code, NFPA 1, NFPA 101 all state that fire-resistance rated and smoke-resistant assemblies be maintained for the life of the building. While this should be specified in Division 1, it is very specific here in 07-84-00. It would be better suited to have the work result documented by the contractor who installs the systems directed by 07-84-00. If this section is moved to Division 1, and used in its entirety for this work, it is also appropriate.

Firestop System selection and installation involves complex issues and concepts. Installers of firestop systems must be able to select the correct firestop system for that particular application, have exceptional knowledge of all aspects of firestopping and be able to communicate firestop systems well to the firestop/containment worker and back to project management. The closeout documentation is a required communication from the installer to provide the building owner and manager, through the proper channels, the documentation information needed to maintain firestopping in compliance with the International Fire Code Chapter 7, Maintenance, and NFPA 101, The Life Safety Code, Chapter 4, the National Fire Code of Canada, UAE Fire and Life Safety Code of Practice, and other codes requiring fire resistance rated and smoke resistant barriers to be maintained to provide continuous fire-resistance protection.]

B. On Site Firestop Identification Systems: (Optional) Wall and floor identification system, shall be permanent, affixed, labels made that self-destruct upon removal, consisting of paper, metal or ceramic fiber materials, or hanging tags in accordance with FCIA Recommended Professional Practice RPP-L-2018-1, for the Identification of Fire-Resistance Rated and Smoke Resistant Penetration and Joint Firestopping. The firestop system identification device shall be located within 6” of the firestop system edge, each side of the wall, accessible side of horizontal assemblies, in or out of view. Firestop identification systems shall be installed as each firestop system is completed. Firestop Identification system shall have the following minimum information:

- a. The words – “Warning - Firestop System – Do Not Remove or Tamper”
- b. UL or other laboratory tested and listed system number.
- c. Date of Installation.
- d. Installing Contractor Company name, contact information.
- e. Manufacturer Company Name
- f. Installing Individual Identifier

C. Fire Resistance Rated Assembly Markings

- a. Provide identification for all vertical fire resistance rated and smoke resistant assemblies.
- b. Identification markings: Adhesive tamper evident stickers, stencil painted with lettering at least 3” (75) mm in height with a minimum 3/8” (10) mm stroke in contrasting color.
- c. Marking to incorporate the assembly’s fire-resistance rating and the type of assembly that the wall is. Examples are below from the IBC and NFPA:

FIRE BARRIER – PROTECT ALL OPENINGS
SMOKE BARRIER – PROTECT ALL OPENINGS
FIRE WALL – PROTECT ALL OPENINGS
FIRE PARTITION – PROTECT ALL OPENINGS
SMOKE PARTITION – PROTECT ALL OPENINGS

[FCIA SPECIFIER NOTE: For areas exposed to view, verify acceptable options such as the use of red dots with the Owner to identify fire separations. Delete the following paragraph if not used.]

- d. For occupied areas with exposed ceilings: use 2” (50) mm red dot adhesive stickers, stencil painted red dots, without horizontal painted lines.

END OF SECTION 07 84 00

Specification is reprinted from Appendix H, “FCIA Firestop Manual of Practice” , Page App. H, FCIA Specification – Revision No. 14, Sept. 2019