

SECTION 07 84 00
FIRESTOPPING PENETRATIONS, JOINTS AND PERIMETER FIRE
CONTAINMENT

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.

1.01 SUMMARY

- A. Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-resistance rated construction by maintaining an effective barrier against the spread of flame, 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 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 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.
 - 6. Joints, through penetrations and membrane penetrations in Smoke Barriers, Smoke Partitions and those assemblies required to limit, restrict or regard 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)
 2. Factory Mutual (FM) Approvals:
 - a) FM Approval Standard of Firestop Contractors – Class 4991
 - b) FM Approvals FM Firestop Exam
 - c) FM Approvals Standard for Firestops – Class 4990
 3. Firestop Contractors International Association (FCIA):
 - a) MOP – FCIA Firestop Manual of Practice
 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
 6. National Fire Protection Association (NFPA):
 - a) NFPA 70 - National Electric Code
 - b) NFPA 101 - Life Safety Code
 - c) NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
 - d) NFPA 251 - Fire Tests of Building Construction and Materials
 7. Underwriters Laboratories, Inc. (UL):
 - a) UL Qualified Firestop Contractor Program

- b) UL 263 Fire Tests of Building Construction and Materials
- c) UL 723 Surface Burning Characteristics of Building Materials
- d) UL 1479 Fire-Tests of Through-Penetration Fire Stops
- e) 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 become firestop systems that are produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:
 - 1. Firestop all penetrations 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.
 - 3. F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814 or UL 1479, but not less than one hour or the fire-resistance rating of the construction being penetrated.
 - 4. T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814 or UL 1479, where indicated..
 - 5. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated.
 - 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 per UL 1479, where indicated.
- B. Perimeter Fire Containment Systems: Provide interior perimeter fire containment systems with fire-resistance ratings indicated, as determined per ASTM E 2307, but not less than the fire-resistance rating of the floor construction.
- D. Fire-Resistive Joints: Provide joint systems with fire-resistance ratings indicated, as determined per ASTM E 1966 and ASTM E 1399, or UL 2079, but not less than the fire-resistance rating of the construction in which the joint occurs.
- E. For firestopping exposed to view, traffic, moisture, and physical damage, provide firestop systems for these conditions 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.

1.05 SUBMITTALS

- A. Submit Manufacturers Product Data Sheets for each type of product selected. 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
 - 1. 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.
- C. Submit contractor qualifications as noted in "Quality Assurance" article.

1.06 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide firestopping System Design Listing by a testing agency in accordance with the appropriate ASTM Standard(s) per article 1.04. A nationally recognized testing agency may be UL, ULC, 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 installer firms shall be:
 - 1. FM Approved in accordance with FM Standard 4991 – Approval of Firestop Contractors, or.
 - 2. UL Qualified Firestop Contractor, or;
 - 3. Firestop Contractors International Association Contractor Member 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.
- C. Special Inspection Agency Qualifications: Special Inspection agencies shall be:
 - i. iAS AC 291 Accredited for Firestop Systems.
- D. Special Inspectors Credentials: Special inspectors shall pass at 80%, either:
 - i. FM Firestop Exam, Or
 - ii. UL/ULC Firestop Exam
- 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 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 (EFRRA).
- 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.

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 manufacturers instructions.

1.08 PROJECT CONDITIONS

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

1.09 SEQUENCING AND 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.

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 MSDS.

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, annular space requirements and fire 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. HILTI, Inc.
 - e. MM Systems
 - f. Rectorseal
 - g. Roxul
 - h. Specified Technologies, Inc.
 - i. Thermal Ceramics, Inc.
 - j. Thermafiber, Inc.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with 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.
- 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.

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 indicated.
 - 1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
 - 2. 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.
 - 2. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - 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 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 engineering judgments, EFRRA's that result in firestop materials:
 - 1. Directly contacting and fully wetting joint substrates.
 - 2. Completely filling recesses provided for each joint configuration,
 - 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 materials immediately after their application and prior to the time skinning or begins as stated in the manufacturers 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 manufacture's installation instructions 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.

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 or 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 penetration firestopping in accordance with ASTM E – 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems.

[NOTE FOR SPECIFIER: Chapter 17 of the 2012 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 1604.5.]

3.07 CLEANING

- A. Clean off excess fill materials and sealants adjacent to 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 trades.

END OF SECTION 07 84 00

Specification is reprinted from Appendix H, “FCIA Firestop Manual of Practice” , Page App. H, FCIA Specification – Revision No. 8, 15 May 2015