
USACE / NAVFAC / AFCEA / NASA UFGS-07 84 00 (May 2010)

Preparing Activity: USACE Superseding
UFGS-07 84 00 (October 2007)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMLR dated October 2011

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DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 07 84 00

FIRESTOPPING

05/10

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SECTION 07 84 00

FIRESTOPPING 05/10

NOTE: This guide specification covers the requirements for firestopping using tested and listed firestop systems to form an effective barrier against the spread of fire, smoke and gases, and to maintain the integrity of fire resistance rated construction.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the

reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

- | | |
|-------------|--|
| ASTM E 119 | (2011) Standard Test Methods for Fire Tests of Building Construction and Materials |
| ASTM E 1399 | (1997; R 2009) Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems |
| ASTM E 1966 | (2007) Fire-Resistive Joint Systems |
| ASTM E 2174 | (2010a) Standard Practice for On-Site Inspection of Installed Fire Stops |
| ASTM E 2307 | (2010) Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus |
| ASTM E 2393 | (2010a) Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers |
| ASTM E 814 | (2011a) Standard Test Method for Fire Tests of Through-Penetration Fire Stops |
| ASTM E 84 | (2011a) Standard Test Method for Surface Burning Characteristics of Building Materials |

FM GLOBAL (FM)

- | | |
|--------------|---|
| FM APP GUIDE | (updated on-line) Approval Guide
http://www.approvalguide.com/ |
| FM AS 4991 | (2001) Approval of Firestop Contractors |

UNDERWRITERS LABORATORIES (UL)

- | | |
|---------|--|
| UL 1479 | (2003; Reprint Mar 2010) Fire Tests of Through-Penetration Firestops |
| UL 2079 | (2004; Reprint Jun 2008) Tests for Fire |

Resistance of Building Joint Systems

UL 723

(2008; Reprint Sep 2010) Test for Surface Burning Characteristics of Building Materials

UL Fire Resistance

(2011) Fire Resistance Directory

1.2 SYSTEM DESCRIPTION

1.2.1 General

Furnish and install tested and listed firestopping systems, combination of materials, or devices to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, partitions, floors, and ceiling-floor assemblies, including through-penetrations and construction joints and gaps.

a. Through-penetrations include the annular space around pipes, tubes, conduit, wires, cables and vents.

b. Construction joints include those used to accommodate expansion, contraction, wind, or seismic movement; firestopping material shall not interfere with the required movement of the joint.

Gaps requiring firestopping include gaps between the curtain wall and the floor slab and between the top of the fire-rated walls and the roof or floor deck above and at the intersection of shaft assemblies and adjoining fire resistance rated assemblies.

1.2.2 Sequencing

**NOTE: Edit this paragraph depending on whether
existing insulation is to remain or be removed.**

Coordinate the specified work with other trades. Apply firestopping materials, at penetrations of pipes and ducts, prior to insulating, unless insulation meets requirements specified for firestopping. Apply firestopping materials at building joints and construction gaps, prior to completion of enclosing walls or assemblies. Cast-in-place firestop devices shall be located and installed in place before concrete placement. Pipe, conduit or cable bundles shall be installed through cast-in-place device after concrete placement but before area is concealed or made inaccessible. Firestop material shall be inspected and approved prior to final completion and enclosing of any assemblies that may conceal installed firestop.

1.2.3 Submittals Requirements

**NOTE: Projects designed to be LEED registered must
include submittal for low-emitting materials; LEED
credit EQ 4.1 VOC content of product, providing a
maximum allowable VOC content of <5 g/l as
calculated by EPA method 24. Projects not
registering for LEED certification but are designed
to LEED standards must still include VOC content**

requirements.

- a. Submit detail drawings including manufacturer's descriptive data, typical details conforming to **UL Fire Resistance** or other details certified by another nationally recognized testing laboratory, installation instructions or UL listing details for a firestopping assembly in lieu of fire-test data or report. For those firestop applications for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgment, derived from similar UL system designs or other tests, shall be submitted for review and approval prior to installation. Submittal shall indicate the firestopping material to be provided for each type of application. When more than a total of 5 penetrations and/or construction joints are to receive firestopping, provide drawings that indicate location, "F" "T" and "L" ratings, and type of application.
- b. Submit certificates attesting that firestopping material complies with the specified requirements. For all intumescent firestop materials used in through penetration systems, manufacturer shall provide certification from UL of passing the "Aging and Environmental Exposure Testing " portion of **UL 1479**.
- c. Submit documentation of training and experience for Installer.
- d. Submit manufacturer's representative certification stating that firestopping work has been inspected and found to be applied according to the manufacturer's recommendations and the specified requirements.

1.3 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section **01 33 00 SUBMITTAL PROCEDURES** and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force
and NASA projects, or choose the second bracketed
item for Army projects.

Government approval is required for submittals with a "G" designation;
submittals not having a "G" designation are for [Contractor Quality Control
approval.] [information only. When used, a designation following the "G"
designation identifies the office that will review the submittal for the
Government.] Submit the following in accordance with Section 01 33 00
SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Firestopping Materials[; G][; G, [____]].

SD-07 Certificates

Manufacturer's Technical Representative
Firestopping Materials.
Installer Qualifications[; G][; G, [____]].
Inspection[; G][; G, [____]].

1.4 QUALITY ASSURANCE

1.4.1 Installer

Engage an experienced Installer who is:

- a. FM Research approved in accordance with FM AS 4991, operating as a UL
Certified Firestop Contractor, or
- b. Certified, licensed, or otherwise qualified by the firestopping
manufacturer as having the necessary staff, training, and a minimum of
3 years experience in the installation of manufacturer's products in
accordance with specified requirements. A manufacturer's willingness
to sell its firestopping products to the Contractor or to an installer
engaged by the Contractor does not in itself confer installer
qualifications on the buyer. The Installer shall have been trained by
a direct representative of the manufacturer (not distributor or agent)
in the proper selection and installation procedures. The installer
shall obtain from the manufacturer written certification of training,
and retain proof of certification for duration of firestop installation.

1.4.2 Manufacturer's Technical Representative

The manufacturer's technical representative shall be a direct
representative of the manufacturer (not a distributor or an agent).
Provide current documentation from the manufacturer that he or she is a
direct representative of the manufacturer and is qualified to preform the
specified inspections and certify the firestopping installation.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the original unopened packages or containers showing
name of the manufacturer and the brand name. Store materials off the
ground, protected from damage and exposure to elements. Remove damaged or
deteriorated materials from the site.

PART 2 PRODUCTS

2.1 FIRESTOPPING MATERIALS

NOTE: Insert sentence if project is registering for
LEED certification or designed to LEED standards.
VOC content of firestop materials installed on
project is limited to [< 5 g/l] as calculated by EPA
method 24.

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic, water-based, noncombustible products FM APP GUIDE approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements:

2.1.1 Fire Hazard Classification

Material shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E 84 or UL 723. Material shall be an approved firestopping material as listed in UL Fire Resistance or by a nationally recognized testing laboratory.

2.1.2 Toxicity

Material shall be nontoxic and carcinogen free to humans at all stages of application or during fire conditions and shall not contain hazardous chemicals or require harmful chemicals to clean material or equipment. Firestop material must be free from Ethylene Glycol, PCB, MEK, or other types of hazardous chemicals.

2.1.3 Fire Resistance Rating

Firestop systems shall be UL Fire Resistance listed or FM APP GUIDE approved with "F" rating at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected. Where required, firestop systems shall also have "T" rating at least equal to the fire-rated floor in which the openings are to be protected.

2.1.3.1 Through-Penetrations

Note: Insert the appropriate time period required
in accordance with Chapter 7, Sections 711 through
716 of the International Building Code (IBC).
Indicate locations of fire resistance rated walls,
partitions, floors, ceiling-floor assemblies and
other locations requiring firestopping.

When second option in item a. is selected, rating of
walls and partitions being penetrated must be shown
on the drawings.

If smoke barrier walls are required in the project,
show them on the drawings.

Firestopping materials for through-penetrations, as described in paragraph SYSTEM DESCRIPTION, shall provide "F", "T" and "L" fire resistance ratings in accordance with [ASTM E 814](#) or [UL 1479](#). Fire resistance ratings shall be as follows:

- a. Penetrations of Fire Resistance Rated Walls and Partitions: F Rating = [_____] hour [Rating of wall or partition being penetrated].
- b. Penetrations of Fire Resistance Rated Floors, Floor-Ceiling Assemblies and the ceiling membrane of Roof-Ceiling Assemblies: F Rating = [_____] hour, T Rating = [_____] hour. Where the penetrating item is outside of a wall cavity the F rating and T rating must be equal to the fire resistance rating of the floor penetrated.
- c. Penetrations of Fire and Smoke Resistance Rated Walls, Floors, Floor-Ceiling Assemblies, and the ceiling membrane of Roof-Ceiling Assemblies: F Rating = [_____] hour, T Rating = [_____] hour and L Rating = [≤ 5 cfm/sf] [Where L rating is required].

2.1.3.2 Construction Joints and Gaps

Fire resistance ratings of construction joints, as described in paragraph SYSTEM DESCRIPTION, and gaps such as those between floor slabs or roof decks and curtain walls shall be [the same as the construction in which they occur.] [as follows: construction joints in walls, [_____] hour; construction joints in floors, [_____] hour; gaps between floor slabs and curtain walls, [_____] hour; gaps between top of the walls and the bottom of roof and floor decks, [_____] hour, and provide L rating of ≤ 5 cfm/lf where required.] Construction joints and gaps shall be provided with firestopping materials and systems that have been tested in accordance with [ASTM E 119](#), [ASTM E 1966](#) or [UL 2079](#) to meet the required fire resistance rating. Curtain wall joints shall be provided with firestopping materials and systems that have been tested in accordance with [ASTM E 2307](#) to meet the required fire resistance rating. Systems installed at construction joints shall meet the cycling requirements of [ASTM E 1399](#) or [UL 2079](#). All joints at the intersection of the top of a fire resistance rated wall and the underside of a fire-rated floor, floor ceiling, or roof ceiling assembly shall provide a minimum class II movement capability.

2.1.4 Material Performance

All firestop materials are subject to these minimum standards of performance.

- a. Firestop material shall be capable of installation at temperatures of [2 to 49 degrees C](#) [35 to 120 degrees F](#).
- b. Material must be able to be frozen, thawed and still maintain manufacturer approval for installation.
- c. Firestop material must convey a manufacturer's written warranty guaranteeing the performance of the material for the sustainable lifetime of the structure.
- d. Material must maintain a shelf life of no less than 2 years from date of manufacturing.
- e. Acceptable firestop cast-in-place devices are factory assembled

intumescent lined round or oval plastic cylinders capable of protecting plastic, metallic, cable, and blank openings through the cast-in-place device equal to the fire-resistance rating of the floor.

PART 3 EXECUTION

3.1 PREPARATION

Areas to receive firestopping shall be free of dirt, grease, oil, or loose materials which may affect the fitting or fire resistance of the firestopping system. For cast-in-place firestop devices, formwork or metal deck to receive device prior to concrete placement shall be sound and capable of supporting device. Prepare surfaces as recommended by the manufacturer.

3.2 INSTALLATION

NOTE: Drawings must indicate location and fire ratings of all fire-rated walls, partitions, floors and ceilings; and details of firestopping for each type of construction.

Completely fill void spaces with firestopping material regardless of geometric configuration, subject to tolerance established by the manufacturer. Firestopping systems for filling floor voids 100 mm 4 inches or more in any direction shall be capable of supporting the same load as the floor is designed to support or shall be protected by a permanent barrier to prevent loading or traffic in the firestopped area. Install firestopping in accordance with manufacturer's written instructions. Provide tested and listed firestop systems in the following locations, except in floor slabs on grade:

- a. Penetrations of duct, conduit, tubing, cable and pipe through floors and through fire-resistance rated walls, partitions, and ceiling-floor assemblies.
- b. Penetrations of vertical shafts such as pipe chases, elevator shafts, and utility chutes.
- c. Gaps at the intersection of floor slabs and curtain walls, including inside of hollow curtain walls at the floor slab.
- d. Gaps at perimeter of fire-resistance rated walls and partitions, such as between the top of the walls and the bottom of roof decks.
- e. Construction joints in floors and fire rated walls and partitions.
- f. Other locations where required to maintain fire resistance rating of the construction.

3.2.1 Insulated Pipes and Ducts

NOTE: Coordinate insulation requirements with appropriate Sections.

Thermal insulation shall be cut and removed where pipes or ducts pass through firestopping, unless insulation meets requirements specified for firestopping. Replace thermal insulation with a material having equal thermal insulating and firestopping characteristics.

3.2.2 Fire Dampers

NOTE: When including this paragraph, ensure that
the appropriate information is contained in Section
23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND
EXHAUST SYSTEM.

Install and firestop fire dampers in accordance with Section 23 00 00 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEM. Firestop installed with fire damper must be tested and approved for use in fire damper system. Firestop installed with fire damper must be tested and approved for use in fire damper system.

3.2.3 Data and Communication Cabling

NOTE: The designer will add a note to the
electrical drawings stating: "Penetrations of
fire-rated partitions, walls or floors by data and
communication wiring or cable shall be through
modular, re-enterable firestopping device(s)
containing self-sealing intumescent inserts and
maintain an air leakage rating of <5 cfm/sf
[measured at ambient air temperature and 205 degrees
C (400 degrees F)] at 0 to 100 percent visual fill
per Section 07 84 00."

Cabling for data and communication applications shall be sealed with re-enterable firestopping products. Firestopping devices shall be pre-manufactured modular devices, containing built-in self-sealing intumescent inserts. Firestopping devices shall allow for cable moves, additions or changes without the need to remove or replace any firestop materials. Devices must be capable of maintaining the fire resistance rating of the penetrated membrane at 0% to 100% visual fill of penetrants; while maintaining "L" rating of <5 cfm/sf [measured at ambient temperature and 400* F] at 0% to 100% visual fill. Each device must be capable of retrofit applications and be available in square and round configurations, with single, double, triple and six-plex bracket systems provided. Firestop devices must also allow for plastic pipe, metallic pipe, and mixed multiple penetrations [plastic, metallic, insulated metallic, and cable] through a single device.

3.3 INSPECTION

3.3.1 General Requirements

NOTE: For Army projects start at the third sentence
and use the second bracketed statement after
deleting the first bracketed statement; also, delete
inspection by manufacturer's representative for

small Army projects. For Navy projects use all
bracketed statements.

[For Navy projects, install one of each type of penetration and have it inspected and accepted by the [_____] Division, Naval Facilities Engineering Command, Fire Protection Engineer prior to the installation of the remainder of the penetrations. At this inspection, the manufacturer's technical representative of the firestopping material shall be present.] For all projects, [the remainder of] [the firestopped areas] shall not be covered or enclosed until inspection is complete and approved by the manufacturer's technical representative. The manufacturer's representative shall inspect the applications initially to ensure adequate preparations (clean surfaces suitable for application, etc.) and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements. Submit written reports indicating locations of and types of penetrations and types of firestopping used at each location; type shall be recorded by UL listed printed numbers.

3.3.2 Inspection Standards

Inspect all firestopping in accordance to ASTM standards for firestop inspection, and document inspection results to be submitted to GC, Architect and Owner.

a. ASTM E 2393

b. ASTM E 2174

-- End of Section --