

NBCC 2020 Firestop-related Code sections



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Code Sections				
Through Penetrations	Membrane Penetrations	Construction Joints	Curtain Wall	Combustible pipe variances
3.1.9.1	3.1.9.3	3.1.8.3.(2)	3.1.8.3.(4)	3.1.9.4
3.1.9.2		3.1.8.3.(3)	9.10.9.2.(3)	3.1.5.19.(3)
3.1.9.4		9.10.9.2.(3)		

1. Penetrations

1a General requirement

3.1.9.1. Firestops

1) Except as provided in Sentences (2) to (7) and Article 3.1.9.3., penetrations of a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating shall be

a) sealed by a firestop that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an F rating not less than the required fire-resistance rating of the fire separation, or

b) cast in place, where the item penetrating the fire separation is steel, ferrous, copper, concrete or masonry (see Note A-3.1.9.1.(1)(b)). (See also Article 3.1.9.4. for requirements regarding penetrations by combustible drain, waste and vent piping.)

A-3.1.9. Penetrations. In the application of Subsection 3.1.9., a building service or structural element is considered to penetrate an assembly if it passes into or through the assembly.

Firestopping of membrane penetrations and through-penetrations involves installing an assemblage of specific materials or products that are designed, tested and fire-resistance-rated to resist for a prescribed period of time the spread of fire through the penetrations.

A-3.1.9.1.(1)(b) Penetration. The intention behind the use of the term “cast in place” is to reinforce that there are to be no gaps between the building service or penetrating item and the membrane or assembly it penetrates. The term “cast in place” describes a typical means of firestopping for a service penetration through a concrete slab or wall.

Summary

- Penetrations into or through a rated assembly by buildings services or structural elements need to be firestopped
- Fire test method to determine firestop rating is CAN/ULC-S115
- Base requirement (unless modified elsewhere) is for firestop system to have F-rating not less than the required fire resistance rating of the fire separation
- Cast-in penetrating item can be accepted without firestopping if it's metallic or masonry, and there must be no gaps (revised 2020)

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1b Penetrations of fire walls, or of floor above a parkade

3.1.9.1. Firestops

- 1)...
- 2) Except as permitted in Sentence (6), penetrations of a *firewall* or a horizontal *fire separation* that is required to have a *fire-resistance rating* in conformance with Article 3.2.1.2. shall be sealed at the penetration by a *firestop* that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an FT rating not less than the *fire-resistance rating* for the *fire separation*.
- 3)...
- 6) Service equipment penetrations through a horizontal *fire separation* having a *fire-resistance rating* as described in Sentences (2) and (3) that are contained within the cavity of a wall above and below the horizontal *fire separation* are permitted to be sealed at the penetration by a *firestop* that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an F rating not less than the *fire-resistance rating* for the *fire separation*.

Summary

- Firestopping of penetrations of a fire wall or of a floor above a parkade must have an FT rating.
- Penetrations of such a floor can have only an F rating if the penetration is concealed within the cavity of a wall above and below the floor. (new 2020)

2. Joints

2a Joints within and between fire separations

3.1.8.3. Continuity of Fire Separations

2) Except as provided in Sentence (5), the continuity of a *fire separation* having a *fire-resistance rating* that abuts another *fire separation*, a floor, a ceiling, or a roof shall be maintained by a *firestop* conforming to Sentence (3). (See Note A-3.1.8.3.(2).)

3) The *firestop* required in Sentence (2) shall have an FT rating not less than the *fire-resistance rating* of the abutting *fire separation* when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems.”

Summary

- The juncture of any two fire rated assemblies must have a fire resistance rated joint system (joint firestop) (new 2020)
- Joint firestopping must provide an FT rating not less than the rating of the abutting fire separation (wall or floor), as tested per CAN/ULC-S115 (new 2020)

2b Curtain wall perimeter joint

3.1.8.3. Continuity of Fire Separations

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4) Except as provided in Sentence (5), joints located in a horizontal plane between a floor and an exterior wall shall be sealed by a *firestop* that, when subjected to the fire test method in ASTM E2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-storey Test Apparatus,” has an F- rating not less than the *fire-resistance rating* of the horizontal *fire separation*.

Summary:

- The edge-of-slab joint must have a firestop system tested to ASTM E2307, with an F-rating equal to the rating of the floor. (new 2020)

2c Joint firestopping must accommodate movement

A-3.1.8.1.(1)(b)

When choosing products for firestopping, the physical characteristics of the material used at the joints as well as the nature of the assembly and its potential movement should be taken into consideration.

A-3.1.8.3.(2)

Fire-resistance-rated joint firestop systems can be tested and listed as either static or dynamic. Dynamic joint firestop systems are subjected to movement cycling prior to undergoing fire testing at maximum joint extension. This approach ensures that the fire-resistance rating of the joint firestop system will be maintained even after the joint has cycled through its anticipated range of movement over the service life of the building. Most joints between fire-resistance-rated assemblies, other than those between loadbearing elements, experience some movement over the service life of the building.

Summary:

- Joint firestopping must consider the anticipated range of movement of the joint. Select joint firestopping with the suitable % movement, as indicated in the system listing.

3. Membrane penetrations (Outlet boxes)

3a All recessed boxes

3.1.9.3. Penetration by Outlet Boxes

1) Except as provided in Sentence (3), outlet boxes are permitted to penetrate the membrane of an assembly required to have a *fire-resistance rating*, provided they are sealed at the penetration by a *firestop* that has an FT rating not less than the *fire-resistance rating* of the *fire separation* when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems.”

A-3.1.9.3. Outlet Boxes. For the purposes of Article 3.1.9.3., outlet boxes include, but are not limited to, electrical boxes, junction boxes, high and low voltage outlets, switches, enclosures for electrical equipment, laundry boxes, and shower diverters.

Summary:

- All boxes recessed in the membrane of a fire rated wall or floor/ceiling must be firestopped with a firestop system providing an FT rating equal to the fire rating of the assembly.
- Some exceptions to the need for firestopping exist for noncombustible boxes, as detailed below in 3.1.9.3.(3) and 3.1.9.3.(4)

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3b Combustible recessed boxes

3.1.9.3. Penetration by Outlet Boxes

2) *Combustible* outlet boxes are permitted to penetrate the membrane of an assembly required to have a *fire-resistance rating*, provided they are sealed at the penetration by a *firestop* that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an FT rating not less than the *fire-resistance rating* for the *fire separation*.

Summary:

- This requires exactly the same as 3.1.9.3.(1) just above (FT-rated firestop) for outlet boxes in general. But, there are no instances where a combustible outlet box would not need firestopping. (new 2020)

3c Exceptions to the need for firestopping for noncombustible recessed boxes

3.1.9.3. Penetration by Outlet Boxes

3) Except as provided in Sentences 3.1.9.1.(2) and (3), *noncombustible* outlet boxes that penetrate a vertical *fire separation* or a membrane forming part of an assembly required to have a *fire-resistance rating* need not conform to Sentence (1), provided

a) they do not exceed

- i) 0.016 m² in area, and
 - ii) an aggregate area of 0.065 m² in any 9.3 m² of surface area, and
- b) the annular space between the membrane and the *noncombustible* electrical outlet boxes does not exceed 3 mm.

4) Outlet boxes on opposite sides of a vertical *fire separation* having a *fire-resistance rating* shall be separated by

a) a horizontal distance of not less than 600 mm,

b) a *fire block* conforming to Article 3.1.11.7., or

c) a *firestop* installed on each outlet box that has an FT rating not less than the *fire-resistance rating* of the *fire separation* when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems.”

Summary:

- Firestopping of a noncombustible outlet box is not needed if the box meets all of these requirements:
 - Box isn't too big (max nominal size 5" x 5", 126 mm x 126 mm)
 - There aren't too many in close proximity (max 100 sq. inches (0.065 m²) per 100 sq ft (9.3 m²) of wall area)
 - Gap around the box isn't too large (max 3 mm space)
 - Boxes are suitably separated on opposite sides of a wall, by either 600 mm measured horizontally, or by fire blocking (e.g. 5-sided gypsum box)
- Boxes that are not suitably separated on opposite sides of wall (even if they meet other requirements) must be firestopped to provide FT-rating (e.g. putty pad used within its listing limits)

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4. Special rules for combustible piping penetrations

4a Combustible DWV pipes

3.1.9.4. Combustible Piping Penetrations

4) *Combustible* drain, waste and vent piping is permitted to penetrate a *fire separation* required to have a *fire-resistance rating* or a membrane that forms part of an assembly required to have a *fire-resistance rating*, provided

a) except as provided in Clause (b), the piping is sealed at the penetration by a *firestop* that has an F rating not less than the *fire-resistance rating* required for the *fire separation* when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,”

b) in *buildings* more than 3 *storeys* in *building height*, the piping is sealed at the penetration by a *firestop* that has an F rating not less than the fire-resistance rating required for the fire separation when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side

Summary:

- Penetrations by combustible DWV pipes are permitted if penetration is firestopped to provide an F-rating at least equal to fire rating of penetrated assembly
- Penetrations in buildings 4 storeys or higher must have firestopping that has been fire tested to CAN/ULC S-115 using an elevated pressure (50 Pa instead of the “normal” firestop test pressure difference of 2,5 Pa) (revised 2020)

4b Combustible water distribution piping

3.1.9.4. Combustible Piping Penetrations

2) *Combustible* water distribution piping is permitted to penetrate a *fire separation* that is required to have a *fire-resistance rating*, provided the piping is protected at the penetration with a *firestop* in conformance with Clause (4)(a) or (b).

Summary:

- Penetrations of combustible water distribution piping are permitted as long as they are protected the same as DWV pipes (see above)

4c Penetrations by combustible fire sprinkler pipes

3.1.9.4. Combustible Piping Penetrations

1) *Combustible* sprinkler piping is permitted to penetrate a *fire separation* provided the *fire compartments* on each side of the *fire separation* are *sprinklered*.

Summary:

- Combustible sprinkler pipes are only allowed to penetrate fire rated assemblies if the space on both sides of the assembly is sprinklered
- The general requirements for firestopping of all penetrations (3.1.9.1) apply.

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- Sprinkler piping provides water distribution, so it's expected that 3.1.9.4.(2) above applies, and thus combustible sprinkler piping should be firestopped as mandated for other combustible piping (F-rating, 50Pa fire test pressure if penetrating 4+ storeys).

5. Charging statement (requirement for unbroken fire compartmentation)

3.1.8. Fire Separations and Closures

3.1.8.1. General Requirements 1) Any wall, *partition* or floor assembly required to be a *fire separation* shall a) except as permitted by Sentence (2), be constructed as a continuous element in conformance with Article 3.1.8.3., and

b) as required in this Part, have a *fire-resistance rating* as specified (see Note A-3.1.8.1.(1)(b)).

2) Openings in a *fire separation* shall be protected with *closures*, shafts or other means in conformance with Articles 3.1.8.4. to 3.1.8.19. and Subsections 3.1.9. and 3.2.8. (See Note A-3.1.8.1.(2).)

Summary:

- Fire separations must be “continuous” (no locations with reduced fire resistance)
- Openings have their specific rules. Firestopping of joints and penetrations is covered within 3.1.9.

2.2.1.6. Penetrations in Fire Separations and Fire-Rated Assemblies

1) Penetrations of a *fire separation* or a membrane forming part of an assembly required to have a *fire-resistance rating* shall conform to Articles 3.1.9.1. to 3.1.9.4.

Summary:

General charging statement that any/all penetrations of fire separations or of a membrane forming part of a fire-rated assembly must follow the detailed firestopping rules in 3.1.9.1 through 3.1.9.4

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