

Excerpts from the Canadian National Building Code (NBC)

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3.1.9 Building Services in Fire Separations and Fire Rated Assemblies

3.1.9.1. Fire Stopping of Service Penetrations

Piping, tubing, ducts, chimneys, electrical wires and cables, totally enclosed noncombustible raceways, electrical outlet boxes and other similar building services that penetrate a membrane forming part of an assembly required to have a fire-resistance rating, or a fire separation, shall be

- a. tightly fitted, or
 - b. sealed by a firestop system that, when subjected to the fire test method in CAN4-S115-M, "Standard Method of Fire Tests of Firestop Systems," has an F rating not less than the fire-protection rating required for closures in the fire separation. (See A- 9.10.9.6.(1) in Appendix A.)
(See also Article 3.1.9.4. for penetrations involving combustible drain, waste and vent piping.)
2. Piping, tubing, ducts, chimneys, electrical wires and cables, totally enclosed noncombustible raceways, electrical outlet boxes and other similar building services that penetrate 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 fire stop systems that, when subjected to the fire test method in CAN4-S115-M, "Standard Method of Fire Tests of Firestop Systems," has an FT rating not less than the fire-resistance rating for the fire separation.

3.1.9.2. Combustibility of Service Penetrations

1. Except as permitted in Articles 3.1.9.3. and 3.1.9.4., pipes, ducts, electrical outlet boxes, totally enclosed noncombustible raceways or other similar service equipment that partially or wholly penetrate an assembly required to have a fire resistance rating shall be noncombustible unless the assembly has been tested incorporating such equipment.

3.1.9.3. Penetration by Wires, Cables and Outlet Boxes

1. Electrical or similar wiring in totally enclosed noncombustible raceways is permitted to partly or wholly penetrate an assembly required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2.
2. Except as permitted by Sentence (3), electrical wires and cables, single or grouped, with combustible insulation, jackets or sheathes that conform to the requirements of clause 3.1.5.17.(1)(a) and that are not installed in totally enclosed noncombustible raceways are permitted to partly or wholly penetrate and assembly required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2. provided the overall diameter of the single or grouped wires or cables is not more than 25mm.
3. Single conductor metal sheathed cables that are not grouped, have combustible jacketing and have more than 25mm in overall diameter are permitted to penetrate a fire separation required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2.

4. Combustible totally enclosed raceways which are embedded in a concrete floor slab are permitted in an assembly required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2., where the concrete provides not less than 50 mm of cover between the raceway and the bottom of the slab.
5. Combustible outlet boxes are permitted in an assembly required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2. provided the opening through the membrane into the box is not more than 160 cm².
6. Outlet boxes that penetrate opposite sides of a wall assembly shall be offset where necessary to maintain the integrity of the fire separation.

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
2. Combustible water distribution piping that has an outside diameter not more than 30 mm is permitted to partly or wholly penetrate a vertical fire separation that is required to have a fire-resistance rating without being incorporated in the assembly at the time of testing as required in Article 3.1.9.2. provided the piping is sealed in conformance with 3.1.9.1.(1)(b).
3. Except as permitted in Sentences (4) to (6), combustible piping shall not be used in a drain, waste and vent piping system where any part of that system partly or wholly penetrates a fire separation required to have a fire-resistance rating or penetrates a membrane that forms part of an assembly required to have a fire-resistance rating.
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) the piping is sealed at the penetration by a fire stop system 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 CAN4-S115-M, "Standard Method of Fire Tests of Firestop Systems," with a pressure differential of 50Pa between the exposed and unexposed sides, with the higher pressure on the exposed side, and

(b) the piping is not located in a vertical shaft.

5. Combustible drain piping is permitted to penetrate a horizontal fire separation provided it leads directly from a noncombustible water closet through a concrete floor slab.

6. Combustible drain, waste and vent piping is permitted on one side of a vertical fire separation provided it is not located in a vertical shaft.

3.1.9.5. Openings through Membrane Ceilings

1. A membrane ceiling forming a part of an assembly assigned a fire-resistance rating on the basis of Chapter 2, "Fire Performance Rating" of the Supplement to the NBC 1990 is permitted to be pierced by openings leading into ducts within the ceiling space provided the ducts are sheet steel and the amount of openings and their protection conform to the requirements of Chapter 2, "Fire Performance Ratings."

3.1.9.6. Plenums

1. A ceiling assembly used as a plenum shall conform to Article 3.6.4.3.

3.1.10. Firewalls

3.1.10.1. Prevention of Firewall Collapses

1. Except as permitted in Sentence (2) , where structural framing members are connected to or supported on a firewall and such members have fire-resistance ratings less than that required for the firewall, the connections and supports for such members shall be designed so that the collapse of the framing members during a fire will not cause the collapse of the firewall.
2. Sentence (1) does not apply when a firewall consists of two separate wall assemblies each tied to its respective building frame but not to each other provided each wall assembly is constructed as a fire separation having one half of the fire-resistance rating required for the firewall in Sentences 3.1.10.2.(1) and (2) and designed so that the collapse of one wall assembly will not cause collapse of the other.
3. A firewall may be supported on the structural frame of the building in buildings of noncombustible construction provided such supporting frame has a fire-resistance rating not less than that required for the firewall.
4. Piping, ducts and totally enclosed noncombustible raceways shall be installed so that their collapse will not cause collapse of the firewall.

3.1.10.2. Rating of Firewalls

1. Every required firewall which separates a building or buildings with floor areas containing a Group E or Group F, Division 1 or 2 major occupancy shall be constructed as a fire separation of noncombustible construction having a fire-resistance rating of not less than 4 h, except that where the upper portion of a firewall separates floor areas containing other than Group E or Group F, Division 1 or 2 major occupancies, the fire-resistance

rating of the upper portion of the firewall is permitted to be not less than 2 h.

2. Every required firewall which separates a building or buildings with floor areas containing major occupancies other than Group E or Group F, Division 1 or 2 shall be constructed of a fire separation of noncombustible construction having a fire resistance rating of not less than 2 h.
3. Except for closures, the required fire-resistance rating of every firewall shall be provided by masonry or concrete

3.1.10.3. Continuity of Firewalls

1. Every firewall shall extend from the ground continuously through all stories of a building or buildings so separated, except that where a firewall is located above a basement storage garage conforming to Article 3.2.1.2., the firewall is permitted to terminate at the floor assembly immediately above the storage garage. (See also Sentence 3.1.10.1.(3).)
2. A firewall is permitted to terminate on the underside of a reinforced concrete roof slab provided

(a) the roof slab on both sides of the firewall has a

(1) fire-resistance rating of not less than 1 hour if the firewall is required to have a fire-resistance rating of not less than 2 h, or

(ii) fire-resistance rating of not less than 2 hour if the firewall is required to have a fire-resistance rating of not less than 4 h, and

(b) There are no concealed spaces within the roof slab in that that portion immediately above the firewall.

3.1.10.4. Parapets

1. Except as provided in Sentence (2) and 3.1.10.3.(2), every firewall shall extend above the roof surface to form a parapet not less than
 - (a) 150 mm high for a firewall required to have a fire-resistance rating of not less than 2 h, and
 - (b) 900 mm high for a firewall required to have a fire-resistance rating of not less than 4 h.
- A firewall separates 2 buildings with roofs at different elevations, the firewall need not extend above the upper roof surface to form a parapet where the difference in elevation between the roofs so separated is more than 3 m.

3.1.10.5. Maximum Openings

Openings in a firewall shall conform to the size limits described in Article 3.1.8.6. and the aggregate width of openings shall be not more than 25 per cent of the entire length of the firewall.

3.1.10.6. Exposure Protection for Adjacent Walls

Where the external walls of 2 buildings meet at a firewall at an angle of 135° or less, the requirements of Article 3.2.3.14. shall apply.

3.1.10.7. Combustible Projections

1. Combustible material shall not extend across the end of a firewall but is permitted to extend across a roof above a firewall that is terminated in conformance with Sentence 3.1.10.3.(2).
2. When buildings are separated by a firewall, combustible projections on the exterior of one building, such as balconies, platforms, canopies, eave projections and stairs, that extend outward beyond the end of the firewall, shall not be permitted with 2.4 m of combustible projections and window or door openings of the adjacent building. (See also Article 3.2.3.6.)

3.1.11. Fire Stops in Concealed Spaces

3.1.11.1. Separation of Concealed Spaces

Concealed spaces in interior wall, ceiling and crawl spaces shall be separated from concealed spaces in exterior walls and attic or roof spaces by fire stops conforming to Article 3.1.11.7.

3.1.11.2. Fire Stopping in Wall Assemblies

- (1) Except as permitted in Sentence (2), fire stops conforming to Article 3.1.11.7. shall be provided to block off concealed spaces within a wall assembly
- (a) at every floor level,
 - (b) at every ceiling level where the ceiling forms part of an assembly required to have a fire-resistance rating, and
 - (c) so that the maximum horizontal dimension is not more than 20 m and the maximum vertical dimension is not more than 3 m.
- (2) Fire stops conforming to Sentence (1) are not required provided
- (a) the wall space is filled with insulation
 - (b) the exposed construction materials and any insulation within the wall space are noncombustible,
 - (c) the exposed construction materials and any insulation within the wall space have a flame-spread rating of not more than 25 on any exposed surface or on any surface that would be exposed by cutting through the material in any direction and fire stops are installed so that the vertical distance between them is not more than 10 m, or
 - (d) the insulated wall assembly contains not more than one concealed air space, and the horizontal thickness of that air space is not more than 25 mm .