

Extracts from the National Building Code of Canada 1990 Re: Installation of plastic piping materials

3.1.5.15. Combustible Piping Materials

Code 3.1.5.15. states the following...

"(1) Except as permitted in Clause 3.1.5.2.(1)(e) and Sentence (2), combustible totally enclosed raceways, **piping** and **tubing** and associated adhesives are permitted to be used in a building required to be of noncombustible construction provided they

- (a) have a flame spread rating of not more than 25, **except when concealed in a wall or a concrete floor slab**, and
- (b) when used in buildings described in Subsection 3.2.6., have a smoke developed classification of not more than 50, **except when concealed in a wall or a concrete floor slab.**"

*HeatLink Application/Interpretation: All "Wet" HeatLink systems have the tubing **concealed in a wall or a concrete floor slab** and are therefore exempt from the requirements for flame spread and smoke developed classification as mentioned above.*

3.1.9.1. Fire Stopping of Service Penetrations

Code 3.1.9.1. states the following...

"(1) Piping, tubing, ducts, ... that penetrate a membrane forming part of an assembly required to have a fire-resistance rating, or fire separation, shall be

- (a) tightly fitted, or
- (b) sealed by a fire stop system that, when subjected to the fire test method in CAN4-S115-M, "Standard Method of Fire Tests of Firestop Systems", **has a fire rating of not less than the fire-protection rating required for closures in the fire separation.**

(2) Piping, tubing, ducts, ... that penetrates a firewall or a horizontal fire separation that is required to have a fire-resistance rating shall be sealed at the penetration by a fire stop system that, when subjected to the fire test method in CAN4-S115-M, "Standard Method of fire Tests of Firestop Systems", **has a fire rating of not less than the fire-protection rating required for closures in the fire separation.**

HeatLink Application/Interpretation: This clause only applies to our tubing of diameter less than 30mm in the matter of providing a tight seal at point of penetration because of the exemption in clause 3.1.9.4. (below) Where piping and/or a distribution manifold must be placed so that they penetrate a firewall or fire separation, a fire rated access box having a rating equal to the fire separation that is being penetrated must be provided. (See also point 6 in the Summary).

3.1.9.4. Combustible Piping Penetrations

Code 3.1.9.4. states the following...

(2) Combustible water distribution piping that has an outside diameter not more than 30mm 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).(above)

HeatLink Application/Interpretation: HeatLink tubing sizes are 16mm and 20mm. PEX pipe of 25mm diameter is available for running mains to manifolds and therefore also classifies under clause 3.1.9.4. In the case of a penetration of a firewall or fire separation insure that the sealant or firestop used has an approved fire resistance rating.

Definitions (Extracted from the National Building Code)

Combustible means that a material fails to meet the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Non-Combustibility in Building Materials."

Fire-protection rating means the time in hours or fraction thereof that a closure will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in this Code.

Fire-resistance rating means the time in hours or fraction thereof that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived therefrom as prescribed in this Code.

Fire separation means a construction assembly that acts as a barrier against the spread of fire.

Firewall means a type of fire separation of noncombustible construction which subdivides a building or separates adjoining buildings to resist the spread of fire and which has a fire-resistance rating as prescribed in this Code and has structural stability to remain intact under fire conditions for the required fire-rated time.

Flame-spread rating means an index or classification indicating the extent of spread-of-flame on the surface of a material or an assembly of materials as determined in a standard fire test prescribed in the National Building Code.

Noncombustible means that a material meets the acceptance criteria of CAN4-S114, "Standard Method of Test for Determination of Non-Combustibility in Building Materials."

Summary

1) The National Building Code does not specifically outline material or installation requirements for hydronic radiant floorheating systems. In most cases of radiant heating the tubing is embedded in a concrete pad or mass and therefore is exempt from the requirements pertaining to flame spread ratings for combustible piping. Thus, flame spread ratings and smoke developed classification ratings hold very little significance in most of our applications. One must also note that flame spread ratings are based on a relative scale, that is, material that is noncombustible has a flame spread rating of 0 whereas red oak lumber has a flame spread rating of 100. Some materials may rate as high as 500 to 1000.

2) HeatLink has also supplied hydronic floorheating systems that are installed underneath the subfloor (called "dry" systems) for residential, single family dwellings and in limited commercial applications. Installation of these "dry" systems have been approved by building inspectors throughout Canada but in all commercial applications each "dry" system must be approved by the local inspection branches for each particular project.

3) Floorheating systems generally contain noncombustible fluids and may be included under the requirements for combustible water piping (see 3.1.9.4).

4) Manifolds or tubing not in the concrete are to be protected from dust, mishandling, abuse or high heat exposure by using cabinets or concealed enclosures. These precautionary measures have also found approval among the building inspectors involved with our projects.

5) Penetration directly through fire walls is not normal practice when installing floor heating. Usually the tubing is embedded in concrete before passing under the wall. Tubing of diameter less than 30 mm is permitted to pass through a fire wall according to 3.1.9.4.

6) Where manifold locations are required to be placed in a fire separation, then an acceptable procedure is to place the manifold assembly in a fully enclosed fire rated access box.

7) The engineer should contact his local building authority should there be any questions regarding the approval of design, installation and operation of the HeatLink FloorHeat system in a particular project.

Also: It should be noted that according to Underwriters Laboratory of Canada no flame tunnel tests (S-102) have been performed on any combustible plastic tubing (including polyethylene) to this date. The National Building Code provides acceptance of plastic or combustible tubing in various types of construction. Refer to the National Building Code or provincial building code authorities in your jurisdiction for details of installation.

Extracts from the National Building Code of Canada 1990 Re: Installation of electrical wiring and components

2.1.3.1. Scope

(1) Except as provided in Subsection 2.1.5., Part 9 applies to buildings of 3 storeys or less in building height, having a building area not exceeding 600 m² and used for major occupancies classified as

- (a) Group C, residential occupancies
- (b) Group D, business and personal services occupancies

3.1.4. Combustible Construction

Code 3.1.4.1 states the following...

Where a building is permitted to be of combustible construction, it is permitted to be constructed of combustible materials described in Part 9, with or without noncombustible components.

3.1.4.3. Electrical Wires and Cables

(1) Optical fibre cables and electrical wires and cables installed in buildings permitted to be of combustible construction shall

- (a) not convey flame or continue to burn for more than 1 min when tested in conformance with the Vertical Flame Test in Clause 4.11.1. of CSA C22.2 No. 0.3 (Test Methods for Electrical Wires and Cables)

HeatLink Application/Interpretation: Flame test rating stated above falls under a FT-1 classification, which is the same rating as the StatLink™ wires. In residential or small commercial applications the StatLink™ flat 5 and 2 wire are acceptable.

2.1.2.1. Scope

- (1) Except as provided in Subsection 2.1.5., Part 3,4,5 and 6 apply to
- (a) all buildings used for major occupancies classified as
 - (i) Group A, assembly occupancies
 - (ii) Group B, institutional occupancies, or
 - (iii) Group F, Division 1, high hazard industrial occupancies, and
 - (b) all buildings exceeding 600 m² in building area or exceeding 3 storeys in building height used for major occupancies classified as
 - (i) Group C, residential occupancies
 - (ii) Group D, business and personal services occupancies

3.1.5. Noncombustible Construction

Code 3.1.5.1. states the following...

Except as permitted in Articles 3.1.5.2. to 3.1.5.18, 3.1.13.4. and 3.2.2.13, where a building or part of a building is required to be of noncombustible construction, the construction shall be made from noncombustible materials.

3.1.5.2. Minor Combustible Components

(1) The following minor combustible components are permitted in a building required to be of noncombustible construction;

- (g) electrical outlet and junction boxes
- (h) similar minor components

3.1.5.17. Electrical Wires and Cables

(1) Except as permitted in Article 3.1.5.16., optical fibre cables and electrical wires and cables with combustible insulation, jackets or sheathes are permitted in a building required to be of noncombustible construction provided

- (a) the wires and cables exhibit a vertical char of not more than 1.5m when tested in conformance with the Vertical Flame Test-Cables in Cabletrough in Clause 4.11.4. of CSA C22.2 No. 0.3 (Test Methods for Electrical Wires and Cables) or
- (b) the wires are located in
 - (i) totally enclosed noncombustible raceways (see A-3.1.4.3.(1)(b)(i))
 - (ii) masonry walls,
 - (iii) concrete slabs
 - (iv) a service room separated from the remainder of the building by a fire separation
 - (v) Totally enclosed nonmetallic raceways conforming to Article 3.1.5.19.

A-3.1.4.3.(1)(b)(i) Raceway Definition

The term raceway is defined in CSA C22.1, "Canadian Electrical Code, Part 1: and includes both rigid and flexible conduit.

HeatLink Application/Interpretation: Flame test rating for non-combustible buildings falls under a FT-4 classification. As the StatLink™ wires are FT-1 rated, the flat 5 and 2 wires are to be run either in an approved electrical conduit, masonry walls, concrete slabs or as noted in part (b) in section 3.1.5.17.

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