

BC BUILDING CODE INTERPRETATION COMMITTEE

A joint committee with members representing
AIBC, EGBC, BOABC

File No: 18-0086

INTERPRETATION

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Interpretation Date:	January 19, 2021
Building Code Edition:	BC Building Code 2018
Subject:	Plenums in Dwelling Units
Keywords:	Plenum, Heat-Recovery Ventilator, Heat Pump
Building Code Reference(s):	3.1.4.3.(2), 3.1.5.18.(3), 3.1.5.21.(2), 3.1.5.23.(2) 3.6.4.3, 3.6.5.1., 3.6.5.4.

Question:

In a building regulated by Division B, Part 3, where a dwelling unit has a heat-recovery ventilator (HRV) or heat pump that draws return air through a dropped ceiling space within the dwelling unit such as over the kitchen and bathrooms, are those ceiling spaces required to comply with requirements for plenums?

Interpretation:

No, if the ceiling space is contained entirely within one dwelling unit.

The widespread use of dropped ceiling spaces within dwelling units for return air is a relatively recent design development, and has become fairly common in major residential buildings with the extensive use of HRVs or heat pumps. In the past, in some buildings the return air had been drawn through the floor area of the dwelling unit, to a return air grille directly to an HRV or heat pump. Drawing the return from more than one intake point, through the ceiling space, allows better air distribution within the dwelling unit. The return air is at room temperature.

A plenum is defined as “a chamber forming part of an air duct system.” For buildings where combustible construction is permitted, Sentence 3.1.4.3.(2) requires optical fibre cables and electrical wires and cables in a plenum (with minor exceptions) to have an FT4 rating. For buildings where noncombustible construction is required, with some exceptions Sentences 3.1.5.21.(2) and 3.1.5.23.(2) require wires/cables and non-metallic raceways to have an FT6 rating when they are installed in a plenum.



Patrick Shek, P.Eng., CP, FEC, Committee Chair

The views expressed are the consensus of the joint committee with members representing AIBC, EGBC and BOABC, which form the BC Building Code Interpretation Committee. The Building and Safety Standards Branch, Province of BC and the City of Vancouver participate in the committee's proceedings with respect to interpretations of the BC Building Code. The purpose of the committee is to encourage uniform province wide interpretation of the BC Building Code. These views should not be considered as the official interpretation of legislated requirements based on the BC Building Code, as final responsibility for an interpretation rests with the local *Authority Having Jurisdiction*. The views of the joint committee should not be construed as legal advice.

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Sentence 3.6.4.3.(1) allows services and other material within a plenum to not be noncombustible, in a building where noncombustible construction is required, and to waive the provisions of Article 3.6.5.1 restricting the use of combustible ducts and fittings within a plenum, provided all materials within the plenum have a flame spread rating not more than 25 and smoke developed classification not more than 50, except for electrical services that comply with Sentences 3.1.4.3.(2) or 3.1.5.21.(2) as applicable, or for totally enclosed noncombustible raceways that have FT4 or FT6 ratings depending on whether combustible construction is permitted. The intent statements for Sentence 3.6.4.3.(1) refer to limiting the spread of fire and smoke from one fire compartment to another by means of the plenum.

Sentences 3.6.5.1.(1) and (2) regulate the materials allowed for duct systems in plenums. Sentence 3.1.5.18.(3) waives the requirements of Sentences 3.6.5.1.(1) and (2) for ventilation air ducts that are contained entirely within a dwelling unit. Sentence 3.6.5.1.(3) makes a similar statement to allow combustible ducts within a dwelling unit. In other words, there is no need to apply Sentence 3.6.4.3.(1) to ventilation ducts that are entirely within a dwelling unit. For both Sentences 3.1.5.18.(3) and 3.6.5.1.(3), the Building Code intent statement states that these materials are deemed to insignificantly contribute to fire growth and spread.

However, Sentence 3.6.5.4.(2) still requires a maximum flame spread rating of 25 and maximum smoke developed classification of 50 for coverings, linings, adhesives and insulation for ducts and plenums. The intent statement for this requirement refers to limiting fire and smoke spread to other parts of the building by means of the air duct systems.

The Building Code intent statements for the requirements in Subsection 3.1 that limit the electrical services in a plenum are similar to each other, and refer to limiting the spread of fire along the surface of electrical services.

Sentences 3.1.5.18.(3) and 3.6.5.1.(3) represent some recognition in the Building Code that services contained entirely with a dwelling unit pose a lower risk than in other service spaces. A dropped ceiling space within one dwelling unit is different from a typical plenum in most other buildings. The dwelling unit is required to be separated from the remainder of the building by 45 min. or 1 h fire separations, so that a Code-complying ceiling space will have no openings for fire to spread to another fire compartment. Therefore, the intent of limiting fire spread along the services would be to limit the fire spread within one dwelling unit.



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Within a dwelling unit, fire spread along wiring, cables or raceways in a dropped ceiling is unlikely to be more hazardous than fire spread through the occupied areas of the unit. If the return air is drawn through the living area of a dwelling unit instead of the ceiling space, there would be no additional plenum requirements for the living area. The return air for a HRV or heat pump typically does not have any installed ductwork. The return air passes through the dropped ceiling to the HRV or heat pump. This is not a typical plenum such as in an office or other commercial building, where air from a plenum is usually drawn from an entire floor area to a shaft that serves multiple fire compartments.

Based on the related Building Code requirements and on the characteristics of the return air through an in-suite dropped ceiling, it would not be reasonable to apply the plenum requirements to a dropped ceiling space within one dwelling unit.



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