

Definition of Spatial Separations

The requirements for the physical or spatial separation of buildings exist to limit the probability that fire will spread from one building to an adjacent building during the time required for emergency responders to perform their duties, which could lead to damage to adjacent buildings. The *National Building Code (NBC)* limits the number of openings in the exposing building face and restricts the type of construction of the exterior wall of the building based on the use of the building and its placement with respect to property lines or other buildings on the same site. Spatial separation requirements exist for property protection rather than to protect the life safety of the occupants. Spatial separations as described in this handout apply to **all commercial buildings**, regardless of size or occupancy.

Determination of Spatial Separation Requirements

Requirements are determined through the application of Subsections 9.10.14 and 9.10.15 for buildings falling within the scope of Part 9 of the NBC, and Subsection 3.2.3 for buildings within the scope of Part 3. Buildings are permitted to have a proportion of openings in an exterior wall based on limiting distance and the size of the exposing building face. The closer an exposing building face is to a property line or the face of another building, the higher the fire-resistance rating required for that building face and the more stringent the construction requirements for that exterior wall. For example, buildings located next to a property line are required to be built of non-combustible construction and have a fire-resistance rating of 1 or 2 hours, depending on the occupancy contained within the building.

The NBC defines the following commonly used terms as indicated below:

Exposing Building Face means that part of the exterior wall of a building that faces one direction and is located between ground level and the ceiling of its top storey or, where a building is divided into fire compartments, the exterior wall of a fire compartment that faces one direction.

Limiting Distance means the distance from an exposing building face to a property line, the centerline of a street, lane or public thoroughfare, or to an imaginary line between 2 buildings or fire compartments on the same property, measured at right angles to the exposing building face.

Unprotected Opening means a doorway, window or opening other than one equipped with a closure having the required fire-protection rating, or any part of a wall forming part of the exposing building face that has a fire-resistance rating less than that required for the exposing building face.

Fire-Resistance Ratings For Exterior Walls

The fire-resistance rating of an assembly, including an exterior wall assembly, may be determined based on tests conducted in accordance with CAN/ULC-S101. This is typically provided in the form of a ULC, cUL or Intertek listed assembly. Or, the assembly may be assigned a fire-resistance rating using Appendix D as per Article 3.1.7.1. An exterior wall assembly is rated for exposure to fire from inside the building as per Article 3.1.7.3.

Example Wall Assemblies

The following options for obtaining the required fire-resistance ratings of exterior walls may be considered: (Note: All components are required to be installed in the order listed. Wall components are listed in order from interior face to exterior face)

¾ hour Fire-Resistance Rating

Example 1: Loadbearing wood stud wall

- 12.7mm Type X Gypsum Board;
- Wood Studs (38mm x 89mm min⁽¹⁾) spaced ≤ 400mm o.c.;
- Exterior Sheathing⁽²⁾; and
- Exterior Cladding

Example 2: Non-loadbearing steel stud wall

- 15.9mm Type X Gypsum Board;
- Cold-formed-steel studs (63mm x 31mm x 0.5mm min⁽¹⁾) spaced ≤ 400mm o.c.;
- Exterior Sheathing⁽²⁾; and
- Exterior Cladding

1 hour Fire-Resistance Rating

Example 1: Loadbearing wood stud wall

- Two layers of 12.7mm Type X Gypsum Board;
- Wood Studs (38mm x 89mm min⁽¹⁾) spaced ≤ 600mm o.c.;
- Exterior Sheathing⁽²⁾; and
- Exterior Cladding

Example 2: Non-loadbearing steel stud wall

- Two layers of 12.7mm Type X Gypsum Board;
- Cold-formed-steel studs (63mm x 31mm x 0.5mm min⁽¹⁾) spaced ≤ 400mm o.c.;
- Exterior Sheathing⁽²⁾; and
- Exterior Cladding

Example 3: Pre-engineered building wall (UL Design No W404)⁽³⁾

- 2 layers of 15.9mm thick Type X Gypsum Board
- Furring channels (No. 20 MSG, 76mm wide, 38mm deep min) spaced ≤ 610mm o.c. perpendicular to girts
- 89mm thick (min) R-10 glass fiber blankets attached to horizontal girts
- Horizontal Z or C shaped girts (1.422mm thick, 203mm deep, 51mm wide flange min) spaced ≤ 2286mm o.c.; and
- Coated steel panels (No. 26 MSG x 28.6mm depth, 915mm wide min)

2 hour Fire-Resistance Rating

Example 1: Concrete block wall

- 190mm (min) concrete block wall with **ALL** cores filled with grout, mortar, or loose fill materials specified in D-1.6.1.(6)

Example 2: Pre-engineered building wall (UL Design No W413)⁽²⁾

- 3 layers of 15.9mm thick Type X Gypsum Board
- Furring channels (No. 20 MSG, 76mm wide, 38mm deep min) spaced ≤ 610mm o.c. perpendicular to girts
- 102mm thick (min) mineral fiber batts (64 kg/m³ min density)
- 89mm thick (min) R-10 glass fiber blankets attached to horizontal girts
- Horizontal Z or C shaped girts (1.422mm thick, 203mm deep, 76mm wide flange min) spaced ≤ 2286mm o.c.; and
- Coated steel panels (No. 26 MSG x 28.6mm depth, 915mm wide min)

⁽¹⁾ Minimum size and spacing required to achieve respective fire-resistance rating as per Appendix D-2.3.6. Framing members shall also be verified in accordance with the prescriptive requirements of Article 9.24.2.5. for a Part 9 building or be designed to resist the applied loads (i.e. wind load etc.) in accordance with Part 4 where required.

⁽²⁾ Exterior sheathing and cladding in accordance with D-2.3.5 of the 2015 National Building Code of Canada. Exterior sheathing is required to be one of the following:

1. Plywood
2. Oriented Strandboard (OSB)
3. Gypsum Sheathing

⁽³⁾ Tested assemblies are subject to changes. See the UL website for current assembly requirements. The assembly requirements specified by the testing agency will supersede the example assemblies provided in this handout. All assembly components are required to be sized and fastened in accordance with the listed UL Design. See UL Design for more information and alternate designs.

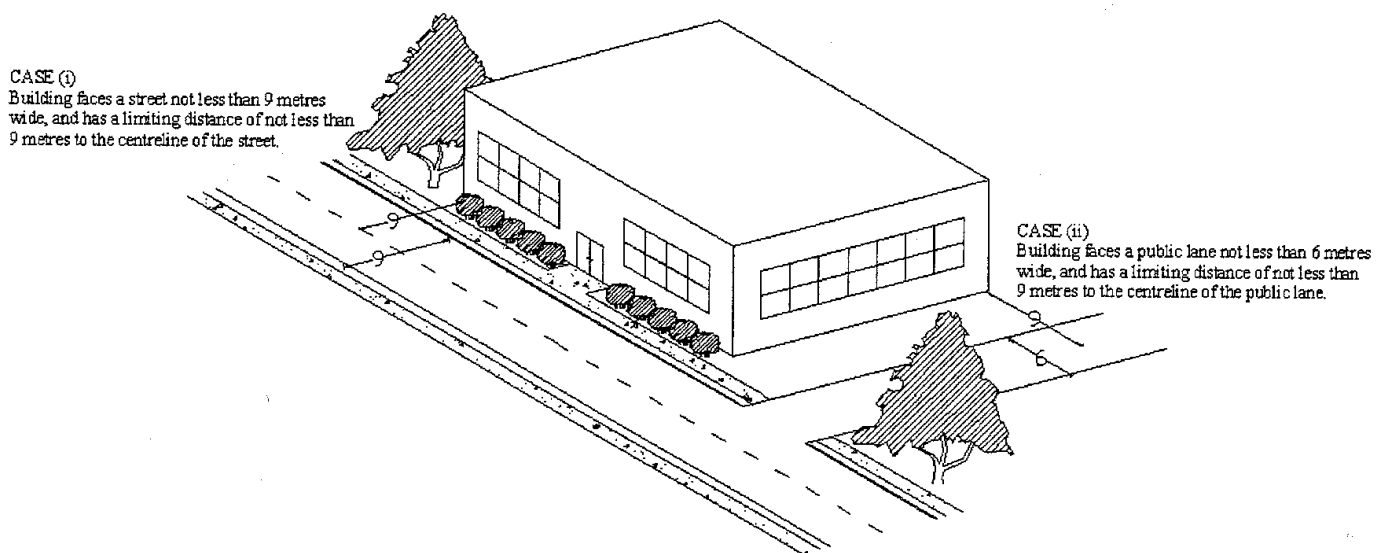
Special Cases For Spatial Separation Requirements

Buildings Facing a Street

Article 3.2.3.10 of the NBC permits an exposing building face that faces a street and is at the same level as the street to have unlimited unprotected openings if the limiting distance is not less than 9 m.

A “street” is defined by the NBC as “*any highway, road, boulevard, square or other improved thoroughfare 9 m or more in width, which has been dedicated or deeded for public use, and is accessible to fire department vehicles and equipment.*”

This definition of a street means that only property deeded for public use as a street may be considered as a street with respect to the requirements of Subsection 3.2.3. There are two cases where a building can be considered to face a street, as outlined below. The first is where the building faces a true street that in every way meets the definition of a street as shown in the figure below in Case (i). The other case is where the building faces a public lane that is at least 6 metres wide, and has a limiting distance to the centerline of the public lane as shown in Case (ii) below. Private access roads that are not deeded for public use are not considered to be streets, regardless of size.



BUILDING EXTERIOR WALL FACING A STREET (ONLY TWO CASES)

Buildings Facing a Lane

City lanes which are 6 metres in width, but do not meet the criteria of a street above, do not qualify as a street with respect to spatial separations. However, the limiting distance for an exposing building face facing a lane is permitted to be measured from the centerline of the lane to the face of the building, thus allowing more openings and possibly relaxed construction requirements.

Buildings on the Same Site

The limiting distance for each face of buildings where they face other buildings can be taken as the measurement from an imaginary line between the two buildings, to each exposing building face of the building. **Each building** is required to meet spatial separation requirements with respect to that imaginary line. Under special circumstances, buildings on the same site may be grouped in order to avoid spatial separation requirements between the two buildings. Only accessory buildings of industrial occupancy are permitted to be grouped with the main building on the site. When buildings are grouped, the aggregate area of the buildings, construction type and ratings of both buildings must be such that they may be considered as one building for classification purposes.