

## 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 2005, 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** refers to that part of the exterior wall of a building which faces one direction and is located between ground level and the ceiling of its top storey, or if a building is divided into fire compartments, the exterior wall of a fire compartment facing in one direction.

**Limiting Distance** is defined as the distance from the exposing building face to a property line, lot line, centerline of a street or public thoroughfare, or an imaginary line between two buildings on the same site.

**Unprotected Opening** refers to 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.

The following options for obtaining the required fire-resistance ratings of exterior walls may be considered:

### ¾ Hour Rating

- Listed Assembly
- Concrete Block
- Design under D-2.3#
- 1 layer of 5/8" FR GWB
- Equivalents\*\*

### 1 Hour Rating

- Listed Assembly
- Concrete Block
- Design under D-2.3#
- 1 layer of 5/8" FR GWB + thermal barrier†
- 2 layers of 5/8" FR GWB
- Equivalents\*\*

### 2 Hour Rating

- Listed Assembly
- Concrete Block\*
- 2 layers of 5/8" FR GWB + thermal barrier†
- 3 layers of 5/8" FR GWB‡
- Equivalents\*\*

### **#Design under D-2.3**

The Component Additive Method described in Appendix D can be used to design an exterior wall assembly with the required fire-resistance rating for a maximum 90 minute rating.

### **†Thermal Barrier**

Exterior wall assemblies shall have an outer membrane consisting of sheathing and exterior cladding with spaces between the studs filled with insulation as per D-2.3.5(2) in addition to the fire-rated gypsum board applied to the inside face of the exterior wall. This sheathing membrane or thermal barrier is considered to have a 15 minute fire-resistance rating based on Appendix D from the NBC 1990.

Where the building construction does not typically include sheathing (ie. pre-engineered metal buildings), an additional layer of 5/8" Type X (or Fireguard) gypsum board applied to the inside face of the wall is acceptable in order to achieve the required 1 or 2 hour fire-resistance rating. An extra layer of rated drywall is not required for a ¾ hour fire-resistance rating.

### **#3 layers of 5/8" Fire Rated (FR) Gypsum Wallboard (GWB)**

5/8" thick, 4'0" wide FireGuard Gypsum Board applied in three layers on the interior side. The base layer is applied horizontally to the studs with 1" Type S, self-drilling, self-tapping Bugle head steel screws 24" on center. The second layer is applied horizontally with the horizontal joints offset 24" from the horizontal joints in the base layer and with any vertical butt joints centered between studs. Vertical butt joints are staggered between succeeding courses. The second layer is secured with 1 5/8" Type S, self-drilling, self-tapping, Bugle head steel screws 16" on center to stud framing and with 1 ½" Type G, #10 laminating screws, 16" on center and spaces 2" from any vertical butt joints. The face layer is applied vertically to the studs with 2 ¼" Type S, self-drilling, self-tapping Bugle head steel screws 12" on center. Any horizontal butt joints in the face layer are staggered 24 " between adjoining panels. At horizontal butt joints, 1 ½" Type G, laminating screws are driven 12" on center at 2" from both sides of the joint. The face layer joints are covered with paper tape and joint compound. Exposed screw heads are covered with joint compound. (Based on Warnock Hersey (Intertek) Design No. DG/WA 180-01 – 1995 Certification Listings)

### **#Concrete Block**

Concrete block that is used in construction that is required to have a fire-resistance rating greater than 90 minutes must meet the requirements of Table D-2.1.1 for the required rating or be constructed in conformance with a listed assembly for concrete blocks. Typically, 8 inch concrete block is considered to have a 2 hour fire-resistance rating.

### **\*\*Equivalents**

Equivalents must be based on actual building code data, listing information from ULC or Intertek etc., or documented past performance of the type of assembly being proposed. Equivalents must be presented by an architect or engineer licensed to practice in the province of Saskatchewan.

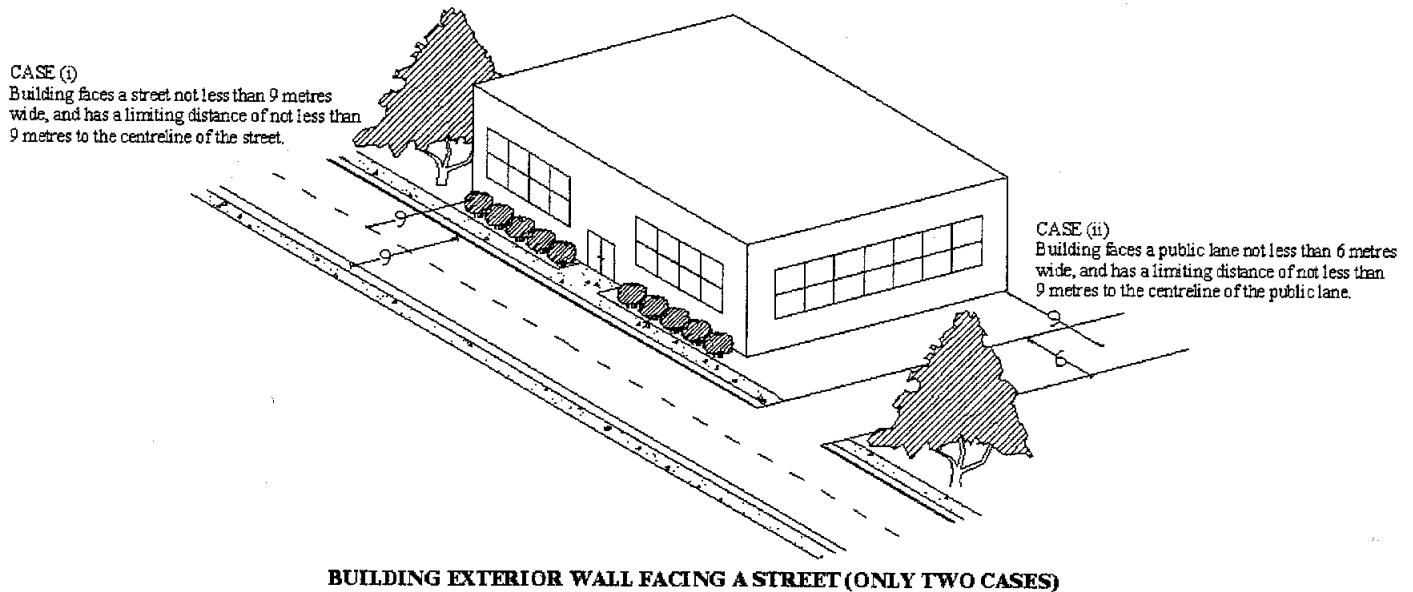
## **Special Cases For Spatial Separation Requirements**

### **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.



### **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. Single storey self storage warehouses are permitted to be grouped as indicated in the handout for such buildings.