



Structural Sufficiency Of Glass

The Building Standards Department issues Builder Tips as part of our customer service program. They are designed to provide an improved understanding of the Building Code and to reduce the costs associated with correcting infractions. Please contact your area building inspector for further information or call the Building Standards Department at 905.475.4848 extension 2189

9.6.1.3. Structural Sufficiency of Glass

(2) Where the building has an essentially uniform distribution of paths for air leakage, including operable openings, but no large openings that would permit wind gusts to rapidly enter the building and the building is not in an exceptionally exposed location such as a hilltop, the maximum area of individual panes of glass for windows shall conform to

- (a) Tables 9.6.1.3.-A. to 9.6.1.3.-C., where the building has a height from grade to the uppermost roof of 12 m or less and is located in a built-up area, no less than 120 m away from the boundary between this area and open terrain, or
 - (b) Tables 9.6.1.3.-D to 9.6.1.3.-F.
- (See Note A-9.6.1.3.(2))

OBJECTIVE

An excessive area of glass used in a window could lead to the glass being unable to resist wind and impact loads. Therefore, glass used in windows is required to comply with CAN/DGSB-12.30-M, “Structural Design of Glass for Buildings”, using an adjustment factor on the wind load, W , of not less than 0.75.

However, Part 9 of the Building Code permits glass used for houses to comply with Tables 9.6.1.3.-A to F, depending on the height of the building and the location of the building. For this Builder Tip, the following building parameters have been identified;

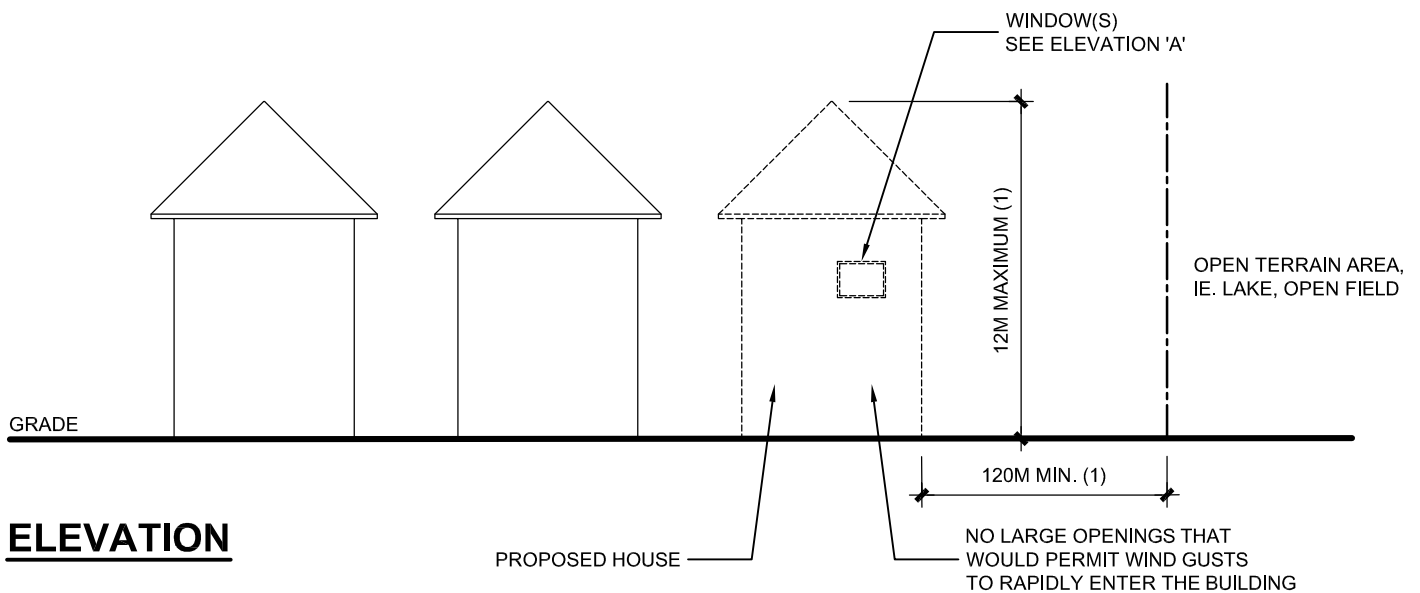
- The height of the building is a maximum of 12 m from grade to the upper most part of the roof,
- The building is located in an urban or built-up area, and
- The building is located not less than 120 m from open terrain area.

Generally, when using Part 9 of the Building Code to design the glass used in windows, the area of the glass maybe larger when the building is located in an urban setting compared to the same building located in an open area. Additionally, the building must

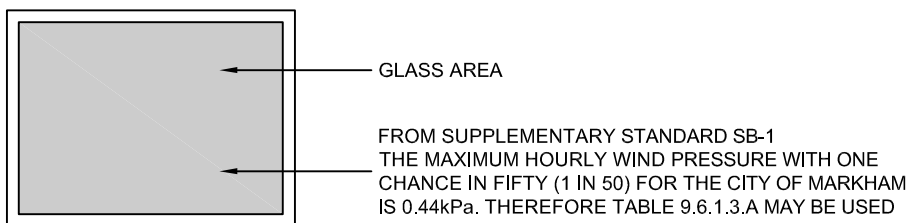


not have large openings that would permit wind gusts to rapidly enter the building. Large openings would include very wide glass door openings and if install may require the glass for the windows to be designed in accordance with Part 4 of the Building Code.

The following diagram is an example of a building located within a City of Markham urban area and the maximum glass area permitted based on the glass thickness used in the window.



- (1) GLASS MUST BE DESIGNED IN CONFORMANCE WITH TABLE 9.6.1.3.D WHEN GREATER THAN 12m MAXIMUM HEIGHT OR LESS THAN 120M MINIMUM.



ELEVATION A



Table 9.6.1.3.-A
Maximum Glass Area for Windows in Areas for which the 1-in-50 Hourly Wind Pressure (HWP) is Less than 0.55 kPa⁽¹⁾
 Forming Part of Clause 9.6.1.3.(2)(a)

Type of Glass	Maximum Glass Area, m ²							
	Glass Thickness, mm							
	2.5	3	4	5	6	8	10	12
Annealed	0.58	0.96	1.47	2.04	2.84	4.74	6.65	9.74
Factory-sealed insulated glass (IG) units ⁽²⁾	1.02	1.71	2.68	3.74	5.24	7.93	9.92	13.92
Heat-strengthened or tempered	1.24	1.93	2.60	3.18	3.99	5.55	6.99	9.74
Wired	0.27	0.45	0.68	0.93	1.31	2.15	3.07	5.03

Notes to Table 9.6.1.3.-A:

- (1) The maximum hourly wind pressure with one chance in fifty of being exceeded in any one year, as provided in MMAH Supplementary Standard SB-1, "Climatic and Seismic Data."
- (2) Maximum glass area values apply to IG units of two identical lites (annealed, heat-strengthened or tempered) spaced at 12.7 mm.

Table 9.6.1.3.-D
Maximum Glass Area for Windows in Areas for which the 1-in-50 Hourly Wind Pressure (HWP) is Less than 0.55 kPa –
Open Terrain⁽¹⁾
 Forming Part of Clause 9.6.1.3.(2)(b)

Type of Glass	Maximum Glass Area, m ²							
	Glass Thickness, mm							
	2.5	3	4	5	6	8	10	12
Annealed	0.46	0.75	1.16	1.60	2.25	3.76	5.32	8.70
Factory-sealed insulated glass (IG) units ⁽²⁾	0.80	1.34	2.11	2.93	4.10	6.90	9.66	12.53
Heat-strengthened	0.98	1.74	2.33	2.86	3.59	5.00	6.26	8.78
Tempered	1.25	1.74	2.33	2.86	3.59	5.00	6.26	8.78
Wired	0.22	0.36	0.55	0.76	1.05	1.75	2.47	4.09

Notes to Table 9.6.1.3.-D:

- (1) The maximum hourly wind pressure with one chance in fifty of being exceeded in any one year, as provided in MMAH Supplementary Standard SB-1, "Climatic and Seismic Data."
- (2) Maximum glass area values apply to IG units of two identical lites (annealed, heat-strengthened or tempered) spaced at 12.7 mm.