

Glass Wind load Tables

The attached IG glass strength tables are to assist customers with glass selection to meet a given wind load. Wind loads are given as a DP or design pressure rating, usually in units of pounds per square foot (psf). A DP80 rating means the glass is required to resist a lateral wind force of 80 psf.

Assumptions

The attached tables are based on the governing standard for glass strength, ASTM E1300-12, "*Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load*" which assumes a load duration of 3 seconds and a breakage potential of 8/1000 at design wind load. In addition, the table values reflect manufacturing and safe handling limits. As a result, some glass sizes may meet ASTM E1300 for a given wind load but not be acceptable due to safety and manufacturing concerns. In addition, Cardinal may increase glass thickness in order to meet safe handling and manufacturing limits.

Load Duration

As noted above, the attached tables are based on a 3 second load duration as given in ASTM E1300-12. Prior to the 2002 version of this standard, all loading was performed at a 60 second load duration. Glass is a material that experiences what is known as "static fatigue". This means that the longer the load is applied the higher the probability of glass breakage. In the late 1990's design wind loads, as determined by ASCE 7, were adjusted to new weathering data and were seen to increase. However, this new weathering data was at a gust wind of 3 seconds in duration. Accordingly, the ASTM E1300 charts were adjusted in 2002 to reflect this change in duration from 60 seconds to 3 seconds. This change to a 3 second load duration is

now incorporated into the International Building Code (IBC) and the International Residential Code (IRC). Use of the attached tables assures that glass is being selected according to requirements in these model codes.

Using the Tables

The user of the attached tables needs to first know the DP rating required. Then choose either Annealed Glass or Heat Treated Glass table (fully tempered or heat-strengthened glass) depending on the glass type. Determine the square footage and Aspect Ratio. The Aspect Ratio is the long dimension divided by the short dimension. In the table, find the glass thickness which is less than or equal to the square footage listed under the appropriate column for DP and Aspect Ratio.

Example: A two pane IG with a dimension of 24" x 48" (8 square feet.) with annealed 3.0mm glass will meet a DP60 design pressure rating.

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Dual Pane Insulating Glass Size Limits Annealed Glass

Maximum Area in Square Footage

Glass Thickness (mm)	DP80		DP60		DP50		DP40		DP30		Recommended Maximum Length (inches)
	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	
2.2	4	3	7	5	9	6	10 ⁶	8	10 ⁶	10 ⁶	70
3.0	7	6	11	8	15	10	15 ⁶	13	15 ⁶	15 ⁶	80
3.9	10	9	16	13	21	15	24 ⁶	20	24 ⁶	24 ⁶	90
4.7	14	13	20	18	27	21	33 ⁶	27	33 ⁶	33 ⁶	100
5.7	18	18	27	24	35	29	45	37	50 ⁶	50 ⁶	120
8.0	29	28	41	39	52	47	72	72 ⁶	72 ⁶	72 ⁶	144

Heat Treated Glass

Maximum Area in Square Footage

Glass Thickness (mm)	DP80		DP60		DP50		DP40		DP30		Recommended Maximum Length (inches)
	HS/HS	FT/FT	HS/HS	FT/FT	HS/HS	FT/FT	HS/HS	FT/FT	HS/HS	FT/FT	
2.2	8	NA	15 ⁶	NA	15 ⁶	NA	15 ⁶	NA	15 ⁶	NA	70
3.0	13	20 ⁴	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	80
3.9	20	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	90
4.7	27	50 ⁶	37	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	100
5.7	37	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	144
8.0	83	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	144

Notes:

1. Limitations are based on wind load, manufacturing and safe handling limits.
2. The ASTM Standard E1300-12 "Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load" was used for determining the design allowance.
3. DP Rating-Design Pressure in pounds/ft²
4. Limits shown do not apply to the IG units fabricated with mismatched glass.
5. Limitations on square footage are based on design pressure and the maximum length factors. Both factors must be considered. The maximum length tolerance cannot be exceeded regardless of the square footage. Exceeding maximum tolerance could result in design pressures less than the values shown.
6. Limitations based on safe handling & manufacturing tolerances.
7. Weight limits may restrict square foot limits. Check with Cardinal IG fabricator for possible weight limit restrictions.
8. Tables do not restrict dimensions for glass deflection. Center glass deflections may exceed 1 inch at maximum wind load.

Triple Pane Insulating Glass Size Limits Annealed Glass

Maximum Area in Square Footage

Glass Thickness (mm)	DP80		DP60		DP50		DP40		DP30		Recommended Maximum Length (inches)
	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	Aspect Ratio less than or equal to 2	Aspect Ratio Greater than 2	
2.2	7	5	10 ⁶	7 ⁵	10 ⁶	9 ⁵	10 ⁶	10 ⁶	10 ⁶	10 ⁶	70
3.0	11	8 ⁵	15 ⁶	12 ⁵	15 ⁶	14 ⁵	15 ⁶	15 ⁶	15 ⁶	15 ⁶	80
3.9	16	13 ⁵	24 ⁶	19 ⁵	24 ⁶	24 ⁶	24 ⁶	24 ⁶	24 ⁶	24 ⁶	90
4.7	20	18 ⁵	32	25 ⁵	33 ⁶	33 ⁵	33 ⁶	33 ⁵	33 ⁶	33 ⁶	100
5.7	27	24 ⁵	41 ⁶	33 ⁵	50 ⁶	40 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	144
8.0	41	39	60	53	72 ⁶	72 ⁵	72 ⁶	72 ⁵	72 ⁶	72 ⁵	144

Heat Treated Glass

Maximum Area in Square Footage

Glass Thickness (mm)	DP80		DP60		DP50		DP40		DP30		Recommended Maximum Length (inches)
	HS/HS/HS	FT/FT/FT	HS/HS/HS	FT/FT/FT	HS/HS/HS	FT/FT/FT	HS/HS/HS	FT/FT/FT	HS/HS/HS	FT/FT/FT	
2.2	15 ⁶	NA	15 ⁶	NA	15 ⁶	NA	15 ⁶	NA	15 ⁶	NA	70
3.0	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	20 ⁶	80
3.9	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	30 ⁶	90
4.7	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	50 ⁶	100
5.7	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	60 ⁶	144
8.0	96 ⁵	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	96 ⁶	144

Notes:

1. Limitations are based on wind load, manufacturing and safe handling limits. Heat Treated Triple Panes wind load values assumes all three lites are Heat Treated.
2. The ASTM Standard E1300-12 "Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load" was used for determining the design allowance.
3. DP Rating-Design Pressure in pounds/ft².
4. Limits shown do not apply to the IG units fabricated with mismatched glass.
5. Limitations on square footage are based on design pressure and the maximum length factors. Both factors must be considered. The maximum length tolerance cannot be exceeded regardless of the square footage. Exceeding maximum tolerance could result in design pressures less than the values shown.
6. Limitations based on safe handling and manufacturing tolerances.
7. Weight limits may restrict square footage limits. Check with Cardinal IG fabricator for possible weight restrictions
8. Table do not restrict dimensions for glass deflection. Center glass deflections may exceed 1 inch at maximum wind load.