GLASS DEFLECTION LIMITS

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There have been long-standing limits on the deflection of framing members for glass panels. Manufacturers' literature and architects' specification commonly include a limit of 1/175 times the length of the glass edge or ¾ inch whichever is less. The rationale has been forgotten but, right or wrong, it seems to work.

The limits intended for framing members have, on occasion, been misapplied to the center of the glass. This practice places prohibitive restrictions on the use of glass in buildings.

If the glass is capable of resisting applied loads, deflections in many cases become an aesthetic or psychological consideration only.

There is no accepted basis for deflection limits except in special cases. However some general limits are needed, particularly for glass with one or more edges unsupported and for large panes of heat-treated glasses.

One basis for establishing limits might be to accept a premise that single annealed glass supported on all four edges is deflection acceptable. *Table 1* lists center deflections of ⅛ inch and ¼ inch glass based on sizes selected for a design factor of 2.5.

For thicker glasses, the deflection decreases in relation to the lesser dimension.

A deflection limit of L/175 for the center of the glass would be clearly prohibitive. In many cases the glass would be capable of withstanding roughly four times the design windload if this criteria were specified. Practical experience shows this is not needed.

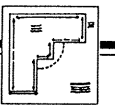
For ¼ inch tempered glass, the center deflections would be excessive for glass selected for a design factor of 2.5. The deflections for aspect ratios of 1:2 are as follows:

Windload	Deflection*	
20 psf	3.1 inch	L/39
40 psf	2.6 inch	L/34
60 psf	2.1 inch	L/34
80 psf	1.9 inch	L/34

*Deflection related to lesser dimension.

The following deflection guidelines might be considered. In all cases the glass should also comply with the structural requirements:

Are they really necessary?



- Impose no deflection limits on single annealed glass supported on all edges; designing for windload resistance inherently limits the deflection to an acceptable level.
- Use heat-treated glasses to resist regional thermal stresses, thermal shock, and for added impact resistance; use tempered glass where required by safety glazing regulations (human impact and fire); for added windload resistance select heat-treated glasses as outlined in the next item.
- Use heat-treated glasses supported on all edges for added windload resistance in cases where the center deflection for the design wind pressure does not exceed L/50 (based on the lesser dimension) or 1 inch, whichever is less.
- For other types of glass supported on all edges limit the deflection to L/50 (based on the lesser dimension) or 1 inch, whichever is less, at the design wind pressure.
- For all types of glass supported on two opposite edges only, limit the deflection to 1/50 times the unsupported span or 1½ inch, whichever is less, for the design wind pressure. Insulating glass should only be glazed with all edges supported. **G/D**

CENTER DEFLECTIONS

Windload	Aspect Ratio	Glass Thickness ⅛ Inch Deflection*	Glass Thickness ¼ Inch Deflection*
20 psf	1:1	L/72	L/78
	1:2	L/52	L/58
40 psf	1:1	L/57	L/74
	1:2	L/55	L/58
60 psf	1:1	L/48	L/72
	1:2	L/45	L/73
80 psf	1:1	L/63	L/73
	1:2	L/49	L/63

*Deflection related to lesser dimension; L/72, for example, means the deflection is equal to the lesser dimension divided by 72.

Table 1