PILKINGTON

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As you are aware, since we started to operate with the new tempering line we have improved distortion tolerances in our **Planar™** glasses significantly.

If we compare these tolerances with a domestic manufacturers and the ASTM specifications we san see the following.

Type of distortion	**Published Tolerance**		
	Domestic	**Pilkington**	**National Standard**
Overall bow (inches/linear ft.)	0.031	0.024	0.06
Roller wave (peak to trough in inches)	0.003	0.0008	No standard
(peak to trough in mm)	0.076	0.02	
Edge lift (inches) (within 10.5 of leading and trailing edges)	0. 008	0.009	

The main aesthetic concern when using tempered glass is normally central glass position distortion. As can be seen from the above figures the Pilkington Planar product is better with regard to roller wave distortion by a factor of 3.8 and for overall bow by a factor of 1.3 over the domestic producer.

To put this into context. If we were considering a job in which the plates were say 78” x 120”

Overall Bow (domestic supplier) = 0.31”
(Pilkington Planar™) = 0.24”

Pilkington United Kingdom Limited
Pilkington Architectural Alexandra Works Borough Road St. Helens WA10 3WA
Tel : 01744 692511 Fax : 01744 692156

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The roller wave on any job can cause the greatest degree of visual distortion and for this reason it is essential to keep this tolerance to a minimum.
The direction of the roller wave as seen on a façade is also important and should whenever possible be positioned horizontally across the plates as viewed from the outside of the façade. This is achieved by tempering the glass such that the vertical dimension of the façade plates is always at 90 degrees to the rollers in the furnace.

If this is not possible due to the size of the plates and the limitation in width of the tempering furnace it is obviously even more important that the roller wave be as minimal as possible.

Normally the plates in a façade are designed with a portrait style orientation and the horizontal dimension accommodated (Pilkington Architectural can temper plates size 96" x 189") The horizontal module in most facades has a dimension less than 96" and therefore the plate can be tempered with this dimension parallel to the roller direction as recommended.

However sometimes the orientation of the façade plates is landscape style and in these cases the horizontal dimension may be larger than the width the tempering furnace can accommodate. In these cases therefore it is important that the roller wave is again at a minimum.

The effects of the overall bow in the glass and the roller wave become more exaggerated when the tempered or heat strengthened glass is laminated. The lamination process could lead to the roller wave in each glass being coincident and thus producing a small lens effect. If this occurs visual distortion will increase. It is therefore again important that the original tolerances for bow and roller wave are minimised as much as possible.
Additionally from a laminating processing viewpoint the overall bow and roller wave must be minimised to reduce the risks of delamination in service.

Pilkington pay great attention to this type of visual distortion as we are aware that with a **Planar™** or any frameless façade the effects can spoil what would otherwise be a great job.

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