IonoGlass™
Structural Laminated glass

MAXIMUM SIZE: 72” X180”

Topics

Impact Strength

Edge Stability

Strength, Deflection

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Impact Strength

Laminate: 3mm annealed glass	Pendulum Impact in Rigid Window Frame Tear length (cm)			
Impact Energy (ft-lbs) -->	31.50	47.25	63.00	73.50
IonoGlass™ Interlayer (35 mil)	0.00	1.15	6.90	8.75
PVB (Architectural)	0.4	1.05	4.75	10.1

Notes:

IonoGlass™ 35 mil interlayer when properly laminated will meet Safety Glazing Codes (ANSI Z-97.1 and CPSC).

Typical Physical Properties of IonoGlass™ Interlayer

Property	Units Metric (English)	Value	ASTM Test
Young's Modulus	MPa (kpsi)	300 (43.5)	D5026
Tensile Strength	MPa (kpsi)	34.5 (5.0)	D638
Elongation	%	400	D638
Density	g/cm3 (lb/in3)	0.95 (0.0343)	D792
Flex Modulus 23°C (78°F)	MPa (kpsi)	345 (50)	D790
Heat Deflection Temperature at 0.46 MPa	°C (°F)	43 (110)	D648
Coefficient of Thermal Expansion (–20°C to 32°C)	—	10–15 x 10–5/C°	D696

Edge Stability

Zero defects for IonoGlass™ after 84-month Florida weathering
From tropical heat and storm zones to northern climate extremes, IonoGlass™ interlayers enable designers to create stronger, larger expanses of safety glazing including open-edged, structural, and butt-glazed installations.

The Edge Stability Number (ESN) calculation is as follows:
- ESN = 1•(PCT1) + 4•(PCT2) + 9•(PCT3) + 16•(PCT4) + 25•(PCT5)

PCT1 = % defect length with depth <1/16 in. (<1.6 mm)
PCT2 = % defect length with depth 1/16 in. – <1/8 in. (1.6 – <3.2 mm)
PCT3 = % defect length with depth 1/8 in. – <3/16 in. (3.2 – <4.7 mm)
PCT4 = % defect length with depth 1/16 in. – <1/4 in. (4.7 – <6.4 mm)
PCT5 = % defect length with depth >1/4 in. (>6.4 mm)

Zero defects for open edges and silicone contact
ESN data in Table 1 includes samples with open-edge exposure, as well as samples butt-joined using silicone. ESN numbers recorded are zero (0) for samples laminated using IonoGlass™ .

		Defect Length (mm)					
Sample ID	Laminate Perimeter (mm)	<1.6	1.6–3.1	3.2–4.6	4.7–6.3	>6.4	ESN
824-63-1	3912	0	0	0	0	0	0
824-64-2	3912	0	0	0	0	0	0
824-48-3	3912	0	0	0	0	0	0
824-46-4	3912	0	0	0	0	0	0
824-47-5	3912	0	0	0	0	0	0
824-44-6	3912	0	0	0	0	0	0
824-34-7	3912	0	0	0	0	0	0
824-27-8	3912	0	0	0	0	0	0
824-16-9	3912	0	0	0	0	0	0
824-71-10	3912	0	0	0	0	0	0
824-56-11	3912	0	0	0	0	0	0
824-75-12	3912	0	0	0	0	0	0
824-74-13	3912	0	0	0	0	0	0

Strength

Glass laminates made with the IonoGlass™ interlayer provide superior strength compared to monolithic and some other laminated glass products that can be used in a multitude of ways. Increased strength can open up the possibilities for many structural design features, such as greater load bearing, thinner constructions, and less deflection. Another added bonus is reflected in the post-glass breakage performance.

Load Bearing
In some applications, laminates prepared with IonoGlass™ show the ability to withstand larger loads than other laminated glass products.

Thinner Constructions
Glass constructions can often be designed with thinner glass when using the IonoGlass™ interlayer. In some cases a specified effective thickness is achieved by a thinner IonoGlass™ laminate (Figure 1).

Post-Glass Breakage Performance
IonoGlass™ laminates show excellent post-glass breakage performance, due to the strength of the unique properties of the IonoGlass™ interlayer.

Figure 2 shows the results of creep-load tests done on IonoGlass™ and PVB laminates. Each laminate was loaded with 727 pounds (330 kg) of sand bags and then the glass was fractured. The measured deflection was recorded over time. Deflection of the PVB laminate was much greater compared to the IonoGlass™ laminate. The PVB laminate tore after approximately 7 minutes.

Decreased Deflection
Curvature in panes of glass can be detrimental in many constructions. IonoGlass™ laminates show less deflection for many different types of supported glass configurations. Figure 3 shows less deflection of a IonoGlass™ laminate relative to PVB with many different nominal laminate thicknesses. This specific case is for a bending dominated case, but similar calculations for other cases show a decreased deflection.

Figure 1: Thickness

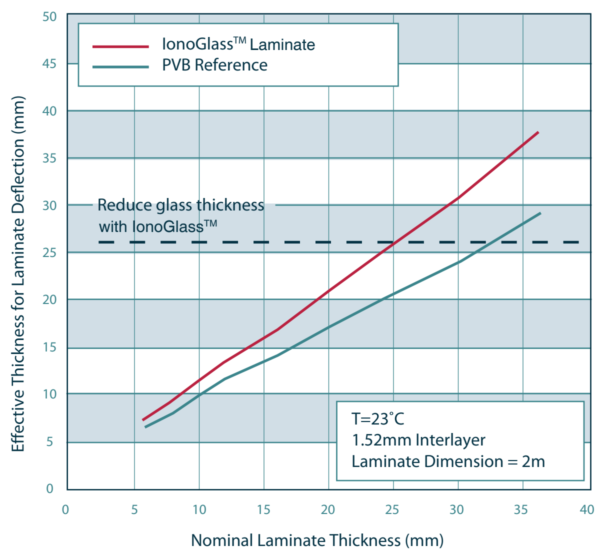


Figure 2: Creep Load

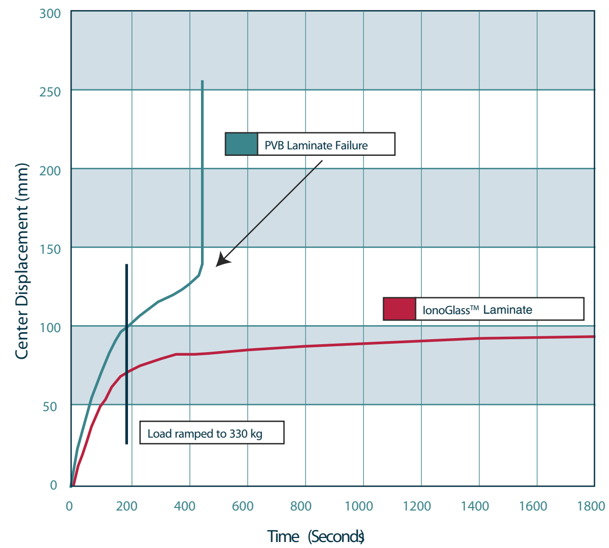
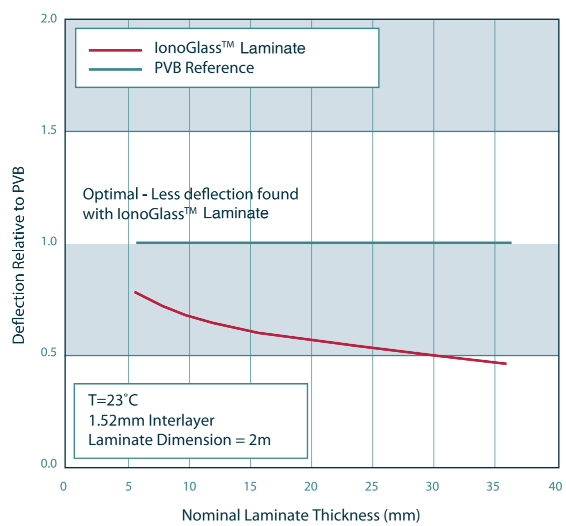


Figure 3: Deflection



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