

 GLASS MARKET	147 McLeod Rd Te Atatu South, Auckland, 0610, New Zealand. Standards: AS/NZS 2208, ISO 9001 Compliance with: CSI Product Assessment Scheme.	Doc ID: SP-01 Revision: 0 Revision Date: 6/03/2018 Effective Date: 6/03/2018 Page: 1 of 5
<b>SPECIFICATION LAMINATED BUILDING GLASS</b>		

## 1.0 Product Name

Glass Market , Laminated Safety Glass for use in buildings.

## 2.0 General Description

Laminated safety glass is a type of safety glass that holds together when shattered. In the event of breaking, it is held in place by an interlayer of polyvinyl butyral (PVB), between its two or more layers of glass. The interlayer keeps the layers of glass bonded even when broken, and its high strength prevents the glass from breaking up into large sharp pieces. This produces a characteristic "spider web" cracking pattern when the impact is not enough to completely pierce the glass.

Laminated safety glass is normally used when there is a possibility of human impact or where the glass could fall if shattered in architectural applications. In geographical areas requiring cyclone-resistant construction, laminated safety glass is often used in the exterior glazing of storefronts, curtain walls and windows.

Laminated safety glass is also used to increase the sound insulation rating of a window, where it significantly improves sound attenuation compared to unlaminated safety glass panes of the same thickness. For this purpose a special "acoustic PVB" compound is used for the interlayer. An additional property of laminated glass for windows is that a PVB can block essentially most ultraviolet radiation.

## 3.0 Intended Applications

Glass Market Laminated Safety Glass is used in architectural applications where safety is important against impact.

## 4.0 Raw Material Specification

### 4.1 Input Glass

Pre-Laminated glass is supplied by leading float manufacturers to minimum internationally recognised specifications clear and tinted float, reflective and figured rolled glass.

## 5.0 Physical Characteristics

### 5.1 Tolerances

#### 5.1.1 Size Limitations

The limitations on size on the laminating line are:

Maximum Size	3660 x 2440 mm
Minimum Size	900 x 600 mm

For sizes outside these limitations, technical approval is required, refer to General Manager.

#### 5.1.2 Dimension Tolerances

All dimensions  $\pm 2\text{mm}$  unless otherwise specified. The thickness of glass substrate shall be within  $\pm 0.2\text{mm}$  of nominal for 4mm, 5mm and 6mm float glass,  $\pm 0.3\text{mm}$  of nominal for 8mm, 10mm and 12mm glass,  $\pm 0.5\text{mm}$  of nominal for 15mm glass and  $\pm 1.0\text{mm}$  of nominal for 19mm glass, unless otherwise specified. Size tolerance dimensions are given in Table 2.2 of AS/NZS 2208

The thickness of interlayer shall be within  $\pm 0.03\text{mm}$  per 0.38mm interlayer.

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### 5.1.3 Squareness

Difference in diagonals of panel to be no more than 4mm. The overall shape of the glass must fit within a box  $\pm 2$ mm of the true nominal size. Size tolerance dimensions are given in Table 2 of AS/NZS 2208.

### 5.1.4 Overall Bow

The following standards for flatness limits (Bow and Warpage) are in accordance with Table 2.3 of AS/NZS2208. Flatness limits (Bow and Warpage) shall be checked on the long edge using a straight edge with the panel standing within 5° of vertical.

Substance Thickness	Standard Laminating	Laminated For Multi Glazing	Laminated Toughened Glass
5 & 6mm	1 in 350, 6mm maximum	1 in 400, 5mm maximum	1 in 400, 5mm maximum
8, 10 & 12mm	1 in 400, 5mm maximum	1 in 450, 4mm maximum	1 in 450, 4mm maximum
15, 19mm	1 in 500, 5mm maximum	1 in 600, 4mm maximum	1 in 600, 4mm maximum

### 5.1.5 Edge Quality

Laminated glass shall have a minimum standard of edgework such that:-

- (a) Flared or splayed edges are not acceptable - except for the end of score up to a maximum size of 3mm.
- (b) Scallops, flakes, shells and chips are permitted up to a maximum of 3mm.
- (c) 'Shark's teeth' are not to extend to more than 50% of the thickness of the glass substrate.
- (d) Shells are not acceptable on Flat Polish, Flat Smoothed or Mitred processed edges.
- (e) Broken corners and corners on/off are not permitted
- (f) Vented edges are not permitted

### 5.1.6 Localised Warp

Localised bow or kinks is not to exceed 1mm in 200mm for nominal thickness 5mm and 6mm and 1mm in 300mm for substances greater than 6mm.

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### 5.1.7 Misalignment

Edge misalignment between panels shall be no more than 2mm. Misalignment in holes shall be no more than 2mm for float, heat strengthened or toughened laminates.

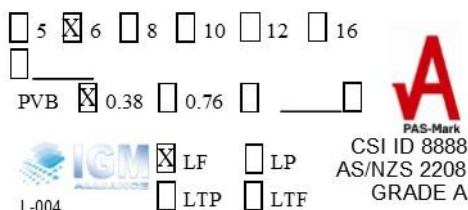
### 5.2 Standards Requirements

Laminated Safety Glass for Buildings is tested in accordance with AS/NZS 2208 the Australian / New Zealand Standard for Safety Glazing Materials in Buildings. Every production run of laminated glass is sampled to Appendix A, and each new roll of PVB is tested to clause 3.2 (one sample for impact testing) & 3.4 (three samples for boil testing), using the procedure outlined in Appendix D & F of AS/NZS 2208.

Laminated Safety Glass is supplied to conform to AS/NZS 4667:2000, the Australian / New Zealand Standard for Quality Requirements for Cut-to-Size and Processed Glass.

#### 5.2.1 Traceability and Standards Markings

Laminated Safety Glass is marked with a removable label. This removable label contains information necessary for conforming to the marking requirements stated in Clause 1.7 Marking of AS/NZS 2208, as follows:



### 5.3 Performance Characteristics

#### 5.3.1 Visual Distortion and Surface Quality

The standard for laminated safety glass is based on the faults being not readily visible at 3 meters when viewed perpendicular to the surface and as the glass would normally be viewed. The following guide-lines assist in the inspection of the glass when it cannot be viewed from 3 meters. Further information on defects is available in AS/NZS 4667.

##### 5.3.1.1 Digs

Digs are not permitted.

##### 5.3.1.2 Scratches

Scratches less than 75mm in length and less than 0.5mm in width are allowable.

Heavy scratches less than 75mm in length and less than 0.75mm in width are permissible if within 100 mm of the glass edge.

##### 5.3.1.3 Stones

No stones greater than 2mm is permitted.

Stones 1mm to 2mm in size, one stone allowed in 4m<sup>2</sup>.

Up to 3 stones below 1mm in diameter are allowed in 4m<sup>2</sup>.

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Where the glass is coated, a different set of guide-lines apply.

#### 5.3.1.4 Linear Distortion

linear distortion are not permitted.

#### 5.3.1.5 Surface Vent and Blisters

Surface vent and blisters are not permitted.

#### 5.3.1.6 Stains

Stains are not permitted.

### 5.3.2 Spot Defects in the Vision Area

Inspect the laminated safety glass held in a perpendicular position and in front of and parallel to a matt grey screen, lit by diffuse daylight or equivalent at a distance of 2m from the glass. The spot defects in the vision area when viewed from 2m shall not exceed the number of the permissible defects in table below.

Defects less than 0.5mm are not considered and defects greater than 3mm are not permitted.

Size of defect d in mm		0.5 < d ≤ 1.0	1.0 < d ≤ 3.0			
Size of pane A in m <sup>2</sup>		for all sizes	A ≤ 1	1 < A ≤ 2	2 < A ≤ 8	A > 8
Number of permissible defects	2 panes	No limitation, however no accumulation of defects	1	2	1/m <sup>2</sup>	1.2/m <sup>2</sup>
	3 panes		2	3	1.5/m <sup>2</sup>	1.8/m <sup>2</sup>
	4 panes		3	4	2/m <sup>2</sup>	2.4/m <sup>2</sup>
	≥ 5 panes		4	5	2.5/m <sup>2</sup>	3/m <sup>2</sup>

Note: An accumulation of defects occurs if four or more defects are at a distance of < 200mm from each other. This distance is reduced to 180mm laminated safety glass consisting of three panes, to 150mm laminated glass consisting of 4 panes and to 100mm laminated glass consisting of five or more panes.

### 5.3.3 Defects in the edge area of Laminated Safety Glass

Inspect the laminated safety glass according to Section 5.3.2, defects which do not exceed 5mm in diameter are permitted in the edge area. For panes sizes ≤ 5m<sup>2</sup> and > 5m<sup>2</sup> the width of the edge area is 13mm. If bubbles are present beyond 13mm from the edge or a crack in the laminate the sheet is deemed to not comply with the requirements of AS/NZS 2208, Clause 3.4.

Interlayer defects and retractions are permissible if they are not readily visible at 2m when viewed according to Section 5.3.2.

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