
BALUSTRADE - GLASS



A Z U M A
Design



A TECH AUSTRALIA / SLOANE ACCESSORIES

FULLY FRAMED ALUMINIUM POST SYSTEM

TESTED BY
AZUMA DESIGN PTY LTD

AZT0378.16

NATA ACCREDITED LABORATORY No. 15147

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The results of the tests, calibrations and/or measurements included
in this document are traceable to Australian/national standards.

1 Test Standards

The product is tested to the following standard only

- *AS/NZS 1170.1 - 2002 Structural design actions - Permanent, imposed and other actions*

2 Test Sample Description

2.1 General

Model No./Name	Aluminium Post Fully Framed System
Customer	A Tech Australia / Sloane Accessories
Address	258 Milperra Road, Milperra NSW 2168 88 Stoney Creek Road, Bexley NSW 2207
Azuma Testing Number	AZT 0378.16
Date of Test	18/10/2016

2.2 Barrier

Glass Material	Laminated
Glass Thickness	8.36 mm
Glass Panel Size	Height = 925 mm Width = 830 mm
Overall Size	Height = 1040 mm Width = 2700 mm
Glass Installation Type	Structural balustrades — Two-edge support with handrail
Gap between bottom of barrier and ground level	88 mm
Complies with AS 2208	Yes
Handrail Used	Yes, Fixed off to wall with brackets, clip on cap
Spacing Between Fixed Points	850 mm

2.3 Posts

Material	Aluminium
Overall Size	50 mm (D) x 50 mm (W) x 1000 mm (H)
Base Plate (if applicable)	N/A
Drawing supplied	Yes
Fixing Method	120 mm Engagement Core Drilled, Quick Set Concrete



Figure 1: Posts

3 Minimum Imposed Actions for Barriers

3.1 Concentrated Load

3.1.1 Procedure

From AS 1170.1 - 2002 - Subsection 3.6 Barriers - Table 3.3 Minimum imposed actions for Barriers.

1. Set the hydraulic ram to push on the handrail at the centerline between the two fixed points.
2. Record a datum from the center of the push area to a fixed point.
3. Smoothly increase the force acting on the side of the rail until the test force is equal to 600 N.
4. Hold the test force for 1 minute.
5. Record the deflection.
6. Remove the test force and after 2 minutes record the permanent deflection reading.

3.1.2 Results

Direction	Load Applied	Datum (mm)	Reading after load removed (mm)	Permanent Deflection (mm)
Outwards	600 N	456 mm	456 mm	0 mm
Downwards	600 N	707 mm	708 mm	1 mm

3.1.3 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{900}{60} = 15mm \quad (1)$$

This value is only applicable while it remains less than 30 mm, otherwise 30 mm is maximum allowable deflection.

Criteria	Observation	Result
Outwards		
Deflection no more than 15 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
Downwards		
Deflection no more than 15 mm after load is removed	1 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		

3.1.4 Pictures



Figure 2: Outwards Push



Figure 3: Downwards Push

3.2 Uniformly Distributed Load - VERTICAL

3.2.1 Procedure

From AS 1170.1 - 2002 - Subsection 3.6 Barriers - Table 3.3 Minimum imposed actions for Barriers.

1. Set the hydraulic ram to push on the handrail at the centerline between the two fixed points.
2. Record a datum from the center of the push area to a fixed point.
3. Smoothly increase the force acting on the side of the rail until the test force is equal to 600 N.
4. Hold the test force for 1 minute.
5. Record the deflection.
6. Remove the test force and after 2 minutes record the permanent deflection reading.

3.2.2 Calculation

The required uniformly distributed load for the glass panel is the imposed action multiplied by the width of the product:

$$RequiredForce(N) = ImposedAction(N/m) * WidthofthePanel(m) \quad (2)$$

Note: Width used in the above equation was 900 mm.

3.2.3 Results

Uniformly Distributed Load	Load Applied	Datum (mm)	Reading after load removed (mm)	Permanent Deflection (mm)
350 N/m	315 N	N/A	N/A	N/A
750 N/m	675 N	708 mm	708 mm	0 mm

3.2.4 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{900}{60} = 15mm \quad (3)$$

This value is only applicable while it remains less than 30 mm, otherwise 30 mm is maximum allowable deflection.

Criteria	Result	Pass/Fail
350 N/m (315 N)		
Deflection no more than 15 mm after load is removed	N/A	N/A
Any damage, signs of breakage or fracture observed	N/A	N/A
Notes: Force exceeded threshold due to manner of pump		
750 N/m (675 N)		
Deflection no more than 15 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
Total Deflection	0 mm	Pass



Figure 4: Vertical Uniform Distributed Load

3.3 Uniformly Distributed Load - HORIZONTAL

3.3.1 Procedure

From AS 1170.1 - 2002 - Subsection 3.6 Barriers - Table 3.3 Minimum imposed actions for Barriers.

1. Set the hydraulic ram to push on the handrail at the centerline between the two fixed points.
2. Record a datum from the center of the push area to a fixed point.
3. Smoothly increase the force acting on the side of the rail until the test force is equal to 600 N.
4. Hold the test force for 1 minute.
5. Record the deflection.
6. Remove the test force and after 2 minutes record the permanent deflection reading.

3.3.2 Calculation

The required uniformly distributed load for the glass panel is the imposed action multiplied by the width of the product:

$$\text{Required Force}(N) = \text{Imposed Action}(N/m) * \text{Width of the Panel}(m) \quad (4)$$

Note: Width used in the above equation was 900 mm.

3.3.3 Results

Uniformly Distributed Load	Load Applied	Datum (mm)	Reading after load removed (mm)	Permanent Deflection (mm)
350 N/m	315 N	456 mm	456 mm	0 mm
750 N/m	675 N	456 mm	456 mm	0 mm
1500 N/m	1350 N	456 mm	457 mm	1 mm
3000 N/m	2700 N	457 mm	459 mm	2 mm

3.3.4 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{900}{60} = 15mm \quad (5)$$

This value is only applicable while it remains less than 30 mm, otherwise 30 mm is maximum allowable deflection.

Criteria	Result	Pass/Fail
350 N/m (315 N)		
Deflection no more than 15 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
750 N/m (675 N)		
Deflection no more than 15 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
1500 N/m (1350 N)		
Deflection no more than 15 mm after load is removed	1 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
3000 N/m (2700 N)		
Deflection no more than 15 mm after load is removed	2 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
Total Deflection at 3000 N/m Rating	3 mm	Pass

3.3.5 Pictures



Figure 5: Horizontal Uniform Load - 750 N/m



Figure 6: Horizontal Uniform Load - 3000 N/m

4 Conclusion and Signatories

4.1 Conclusion

From the results achieved the sample is deemed to satisfy the loading requirements as per table 3.3 of AS1170.1- 2002 for the following classification:

- for a Category 'A' Domestic and residential activities - All areas within or serving exclusively one dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs;
- for a Category 'B, E' Offices and work areas not included elsewhere including storage areas - Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings
- for a Category 'C5' Areas susceptible to over-crowding - Theatres, cinemas, grandstands, discotheques, bars, auditoria, shopping malls (see also D), assembly areas, studios, etc.
- for a Category 'D' Retail Areas - All retail areas including public areas of banks/building societies, (see C5 for areas where overcrowding may occur)
- for a Category 'F/G' Vehicular - Pedestrian areas in car parks including stairs, landings, ramps, edges of internal floors, foot-ways, edges of roofs

NOTE: All classifications with equal or lower load specifications may be applied to this sample. For more information as to their specific use please see table 3.3 of AS1170.1 - 2002.

NOTE 2: This usage (under B,E) is for access to and safe working places normally used by operating, inspection, maintenance and servicing personnel.

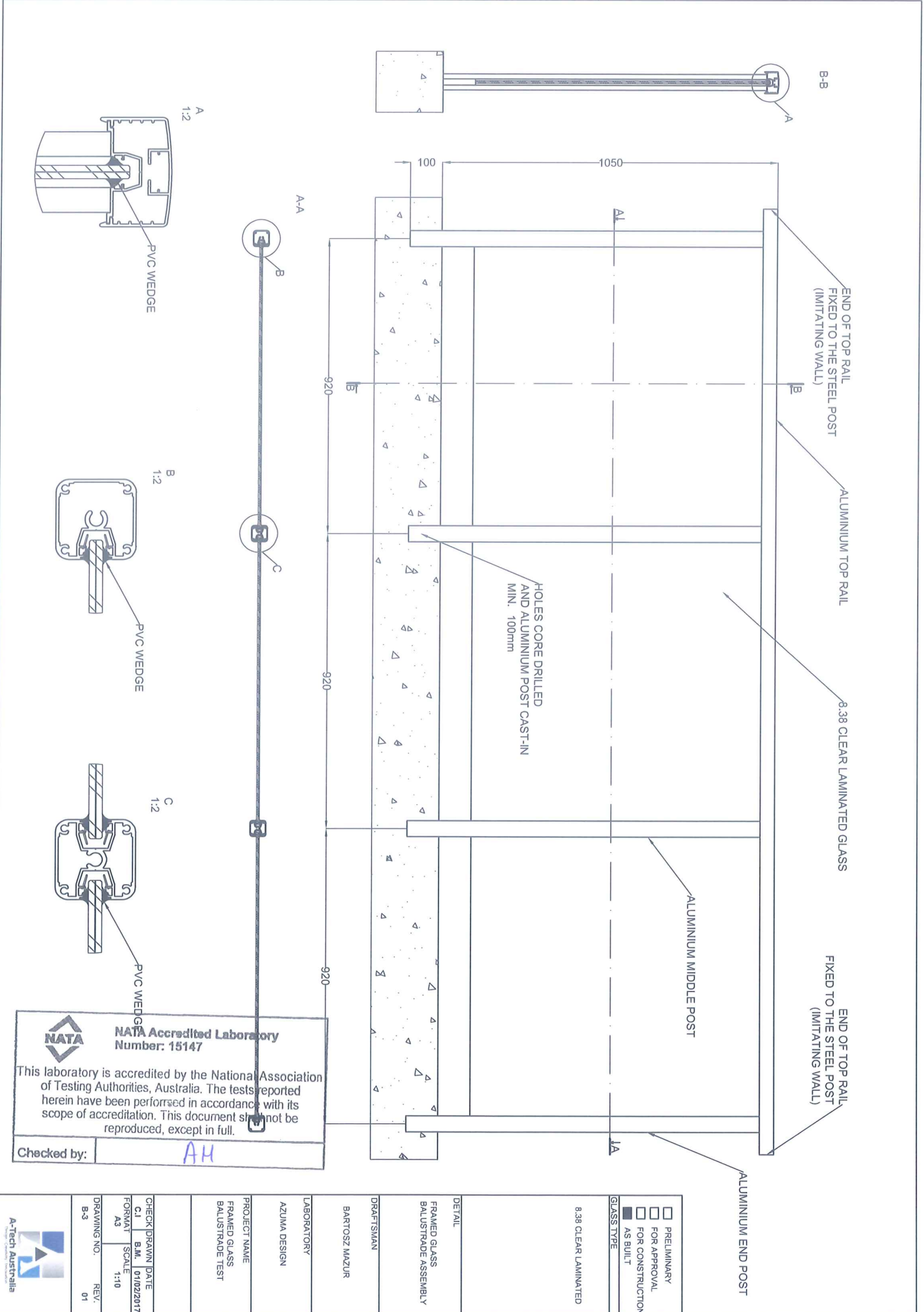
4.2 Signatories

Tested By: Ash Horne

Signatory Name: Ash Horne

Signatory Signature: AHorne

Date: 18/10/2016



B-B
END OF TOP RAIL
FIXED TO THE STEEL POST
(IMITATING WALL)

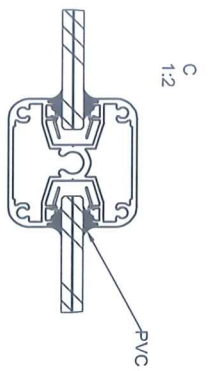
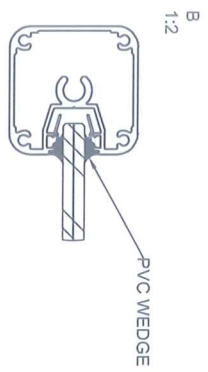
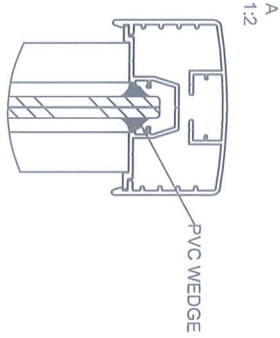
ALUMINIUM TOP RAIL
8.38 CLEAR LAMINATED GLASS

FIXED TO THE STEEL POST
(IMITATING WALL)
ALUMINIUM END POST

Holes core drilled
and aluminium post cast-in
min. 100mm

ALUMINIUM MIDDLE POST

ALUMINIUM END POST



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<input type="checkbox"/>	PRELIMINARY
<input type="checkbox"/>	FOR APPROVAL
<input type="checkbox"/>	FOR CONSTRUCTION
<input checked="" type="checkbox"/>	AS BUILT

GLASS TYPE

8.38 CLEAR LAMINATED

DETAIL

FRAMED GLASS
BALUSTRADE ASSEMBLY

DRAFTSMAN

BARTOSZ MAZUR

LABORATORY

AZUMA DESIGN

PROJECT NAME
FRAMED GLASS
BALUSTRADE TEST

CHECK DRAWN DATE	C1	B.M.L.	01/10/2017
FORMAT	A3	SCALE	1:10
DRAWING NO.	B-3	REV.	01





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Paul Simpson
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