BALUSTRADE - GLASS

A TECH AUSTRALIA / SLOANE ACCESSORIES

FRAMELESS SPIGOT SYSTEM

TESTED BY
AZUMA DESIGN PTY LTD

AZT0377.16

NATA ACCREDITED LABORATORY NO. 15147

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	Square Spigot Frameless 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 0377.16
Date of Test	18/10/2016

2.2 Barrier

Glass Material	Toughened
Glass Thickness	12 mm
Glass Panel Size	Height = 1000 mm Width = 1500 mm
Overall Size	Height = 1570 mm Width = 1170 mm
Glass Installation Type	Spigot Clamp, 2 x Grub Screws on a Plate
Gap between bottom of barrier and ground level	62 mm
Complies with AS 2208	Yes
Handrail Used	Yes 25 x 25 mm stainless steel, Fixed off to 'wall' with brackets. Wall is simulated as two steel box sections anchored to the concrete using quick set concrete
Spacing Between Fixed Points	800 mm

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2.3 Spigots

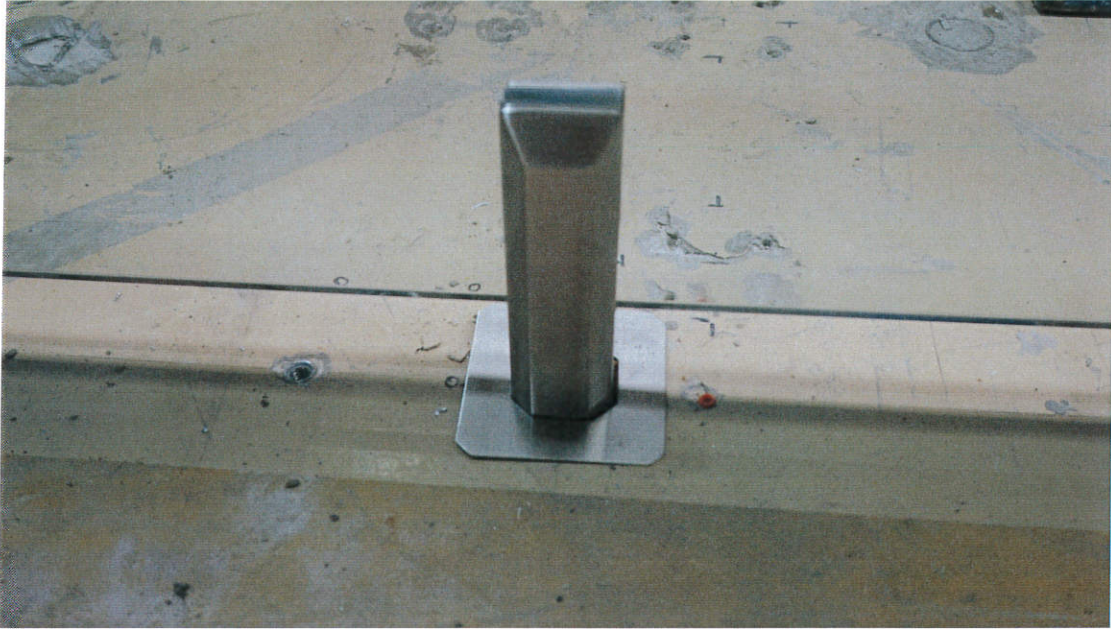| Material	316 Stainless Steel
Overall Size	50 mm (D) x 50 mm (H)
Base Plate (if applicable)	N/A
Drawing supplied	Yes
Fixing Method	100 mm engaged Core Drilled, Quick Set Concrete

Figure 1: Spigot

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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	482 mm	483 mm	1 mm
Downwards	600 N	681 mm	681 mm	0 mm

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3.1.3 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{1500}{60} = 25mm \tag{1}$$

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

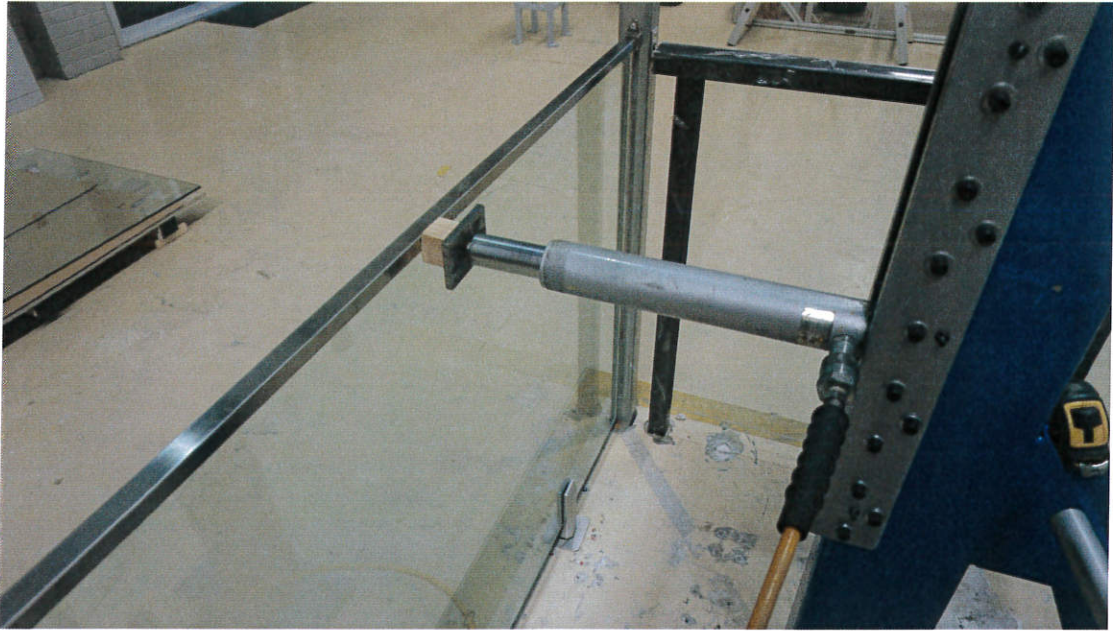| Criteria	Observation	Result
Outwards		
Deflection no more than 25 mm after load is removed	1 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
Downwards		
Deflection no more than 25 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		

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3.1.4 Pictures

Figure 2: Outwards Push

Figure 3: Outwards Push - Bend

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Figure 4: Downwards Push

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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:

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

Note: Width used is the above equation was 1500 mm.

3.2.3 Results

Uniformly Distributed Load	Load Applied	Datum (mm)	Reading after load removed (mm)	Permanent Deflection (mm)
350 N/m	525 N	N/A	N/A	N/A
750 N/m	1125 N	681 mm	681 mm	0 mm

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3.2.4 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{1500}{60} = 25mm \tag{3}$$

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 (525 N)		
Deflection no more than 25 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 (1125 N)		
Deflection no more than 25 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

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Figure 5: Vertical Uniform Distributed Load

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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:

$$RequiredForce(N) = ImposedAction(N/m) * WidthofthePanel(m) \qquad (4)$$

Note: Width used is the above equation was 1500 mm.

3.3.3 Results

Uniformly Distributed Load	Load Applied	Datum (mm)	Reading after load removed (mm)	Permanent Deflection (mm)
350 N/m	525 N	483 mm	483 mm	0 mm
750 N/m	1125 N	483 mm	484 mm	1 mm
1500 N/m	2250 N	484 mm	486 mm	2 mm
3000 N/m	4500 N	N/A	N/A	N/A

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3.3.4 Pass/Fail Criteria

The following maximum deflection limits apply to this product:

$$\frac{Span}{60} = \frac{1500}{60} = 25mm \tag{5}$$

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 (525 N)		
Deflection no more than 25 mm after load is removed	0 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
750 N/m (1125 N)		
Deflection no more than 25 mm after load is removed	1 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
1500 N/m (2250 N)		
Deflection no more than 25 mm after load is removed	2 mm	Pass
Any damage, signs of breakage or fracture observed	Nil	Pass
Notes: Nil		
3000 N/m (4500 N)		
Deflection no more than 25 mm after load is removed	N/A	Not Tested
Any damage, signs of breakage or fracture observed	N/A	Not Tested
Notes: Nil		
Total Deflection at 1500 N/m Rating	3 mm	Pass

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3.3.5 Pictures

Figure 6: Horizontal Uniform Load - 750 N/m

Figure 7: Horizontal Uniform Load - 1500 N/m

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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 'C1/C2' Areas with tables or fixed seating - Areas with fixed seating adjacent to a balustrade, restaurants, bars, 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.
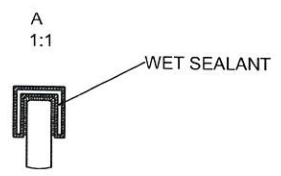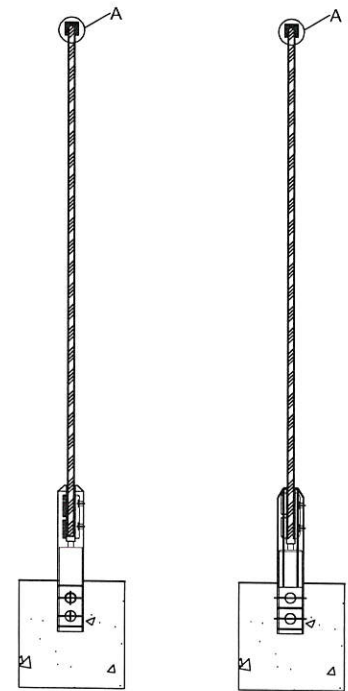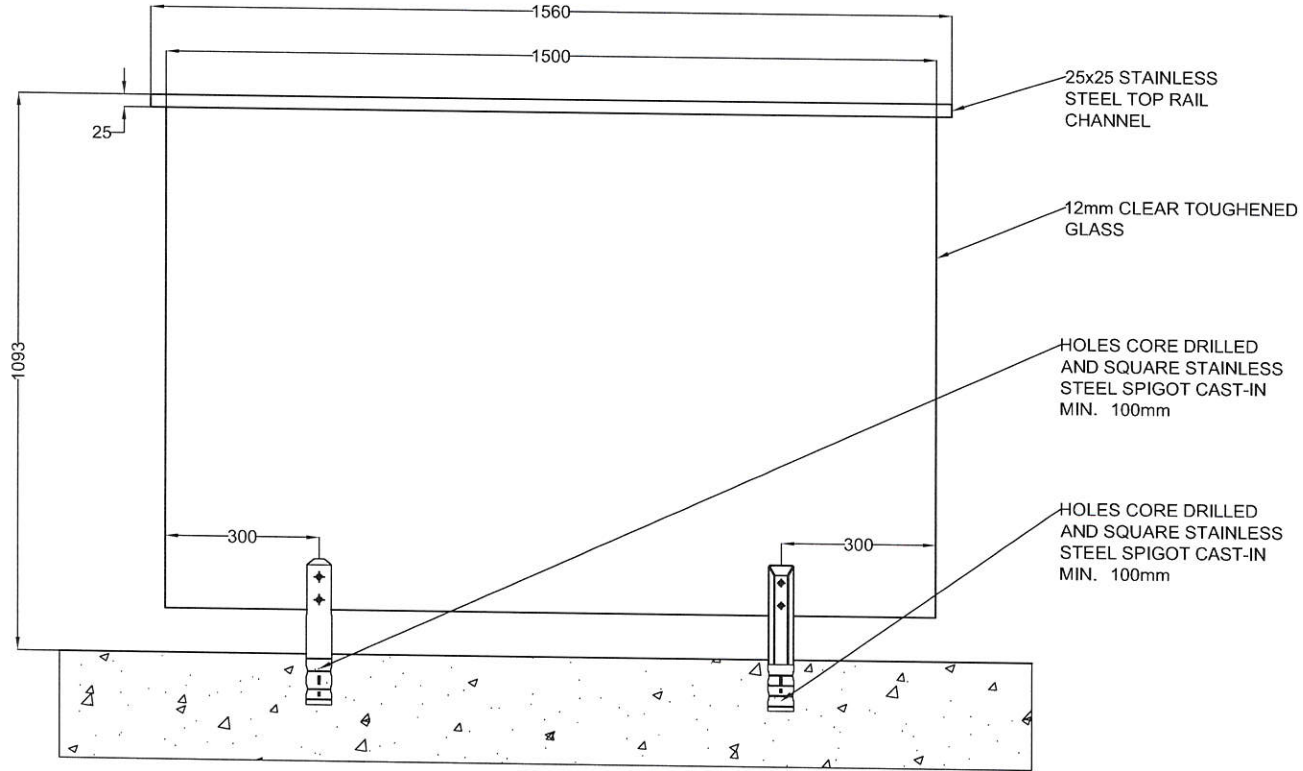
4.2 Signatories

Tested By: _____Ash Horne_____

Signatory Name: _____Ash Horne_____

Signatory Signature: _____Horne_____

Date: _____18/10/16_____

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1560

1500

25

25x25 STAINLESS STEEL TOP RAIL CHANNEL

12mm CLEAR TOUGHENED GLASS

1093

HOLES CORE DRILLED AND SQUARE STAINLESS STEEL SPIGOT CAST-IN MIN. 100mm

HOLES CORE DRILLED AND SQUARE STAINLESS STEEL SPIGOT CAST-IN MIN. 100mm

300

300

A

A

A
1:1

WET SEALANT

	PRELIMINARY
	FOR APPROVAL
	FOR CONSTRUCTION
■	AS BUILT

GLASS TYPE

12MM CLEAR TOUGHENED

DETAIL

FRAMELESS BALUSTRADE WITH SQUARE AND ROUND CAST-IN STAINLESS STEEL SPIGOTS AND SQUARE TOP RAIL

DRAFTSMAN

BARTOSZ MAZUR

LABORATORY

AZUMA DESIGN

PROJECT NAME

FRAMELESS BALUSTRADE TEST

CHECK	DRAWN	DATE
C.I	B.M.	30/01/2017
FORMAT	SCALE	
A3	1:10	

DRAWING NO.	REV.
B-2	01

A-Tech Australia

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