



A Z U M A
Design

TEST REPORT

Performed on: 3 x Panel Glass Balustrade
Client: C.R Laurence



As per applicable clauses of AS1170.1- 2002 & AS1657-1992.

Azuma Design Pty Ltd

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BALUSTRADE TEST REPORT

AZT0266.13

Model No. / Name: 3 x Panel Glass Balustrade (round hand rail)

Customer: C.R Laurence

Address: 9 Shale Place Eastern Creek NSW 2766

Date of Test: 26-9-13



Aim: To test the sample as per loads specified in 'Clause 3.6 of AS1170.1- 2002' and as per loads specified in 'Appendix C of AS1657-1992'.

Reference standards:

- *AS1170.1:2002 Structural design actions- Permanent, imposed and other actions (Section 3.6)*
- *AS1657-1992 Fixed platforms, walkways, stairways and ladders- Design, construction and installation (Appendix 'C')*

Test sample description:

Height: 1035mm **Width:** 4800mm **Post centre's:** 750mm

Infill: 12mm Clear toughened glass panels 950mm H x 1500mm W

Fixing: Spigots core drilled and cemented into concrete, glass secure Via M8 grub screw and plastic insert clamp system.

Test summary:

AS1170.1

Downward 0.6kN load (applied to centre of handrail)	<u>PASS</u>
Vertical 3.6 kN load (applied to centre of handrail)	<u>PASS</u>
Inward 0.6kN load (applied to centre of handrail)	<u>PASS</u>
Outward 0.6kN load (applied to centre of handrail)	<u>PASS</u>
Horizontal 3.6 kN load (applied to centre of handrail)	<u>PASS</u>

AS1657

Vertical 1.584 kN (applied to centre of handrail)	<u>PASS</u>
Horizontal 1.584 kN (applied to centre of handrail)	<u>PASS</u>

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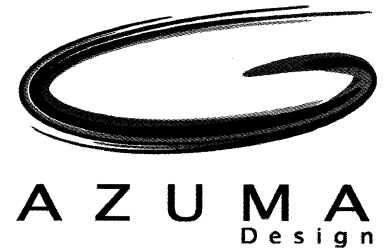
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Test results:

AS1170.1- Section 3.6



Top edge- 0.6kN test: Inward, outward or downward.

Test description:

- (a) Securely fix the balustrade sample as per normal installation.
 - (b) Record a datum measurement.
 - (c) Apply the various loads as per the standard to the sample for period of 1 minute.
 - (d) Remove the load.
 - (e) Measure any permanent deflection sustained by the sample and inspect for structural failure.
- Please see photos for further detail.

Load (in kN)	Datum (in mm)	Deflection under load (in mm)	Reading after load removed (in mm)	Permanent deflection (in mm)	PASS/FAIL
Inward 0.6	-	-	-	-	PASS
Outward 0.6	-	-	-	-	PASS
Downward 0.6	-	-	-	-	PASS

Remarks: Test superceded by forces achieved in AS1657 Test.



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Top edge- Vertical 3.6 kN load (applied to centre of handrail)



Test description:

- (a) Securely fix the balustrade sample as per normal installation.
 - (b) Record a datum measurement
 - (c) Apply the load as per the standard to the sample for period of 1 minute.
 - (d) Remove the load.
 - (e) Measure any permanent deflection sustained by the sample and inspect for structural failure.
- Please see photos for further detail.

Load (in kN) (kN/m x span in m)	Deflection under load (in mm)	Reading after load removed (in mm)	Permanent deflection (in mm)
Datum measurement	-	410	-
0.22 = 1.056	410	410	0
0.35 = 1.68	410	410	0
0.75 = 3.6	410	410	0

Permanent deflection: 0

Structural failure: Nil

Pass/Fail: PASS

Remarks: Nil



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Top edge- Horizontal 3.6 kN load (applied to centre of handrail)

Test description:

- (a) Securely fix the balustrade sample as per normal installation.
- (b) Record a datum measurement
- (c) Apply the various loads as per the standard to the sample for period of 1 minute.
- (d) Remove the load.
- (e) Measure any permanent deflection sustained by the sample and inspect for structural failure.
- (f) Repeat steps (c) to (e) for remaining levels in standard.

Please see photos for further detail.

Load (in kN) (kN/m x span in m)	Deflection under load (in mm)	Reading after load removed (in mm)	Permanent deflection (in mm)
Datum measurement	-	430	-
0.22 = 1.056	452	432	2
0.35 = 1.68	462	432	2
0.75 = 3.6	508	438	8

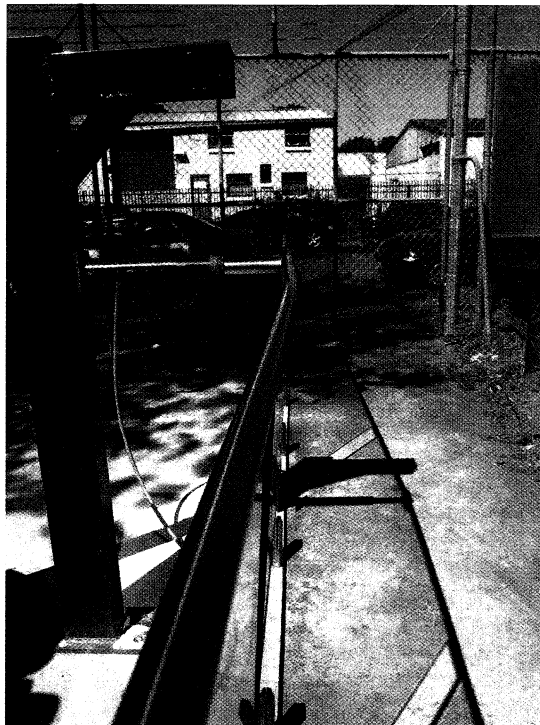
Permanent deflection: 8mm

Max allowable (h/60 + 1/240): 37mm

Structural failure: Nil

Pass/Fail: PASS

Remarks: Nil



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Designation:

As per AS1170.1- Section 3.6

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

- **C3- Areas without obstacles for moving people and not susceptible to over crowding –**
Stairs, landings, external balconies, edges of roof, etc

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

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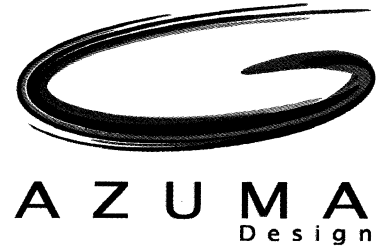
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AS1657- Appendix 'C'



TESTING OF GUARDRAILS- *As per Appendix C of AS1657-1992*

Top edge- Vertical 1.584 kN (applied to centre of handrail)

Test description:

- (a) Securely fix the balustrade sample as per normal installation.
- (b) Record a datum measurement
- (c) Apply the load as per the standard to the sample for period of 1 minute.
- (d) Remove the load.
- (e) Measure any permanent deflection sustained by the sample.

Load applied: 1.584kN

Datum Measurement: 409mm

Time applied: 1 minute

Reading after load removed: 409mm

Permanent deflection: 0mm

Max allowable (1/90 span between supports): 53mm

Structural failure: Nil

Pass/Fail: PASS



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Top edge- Horizontal 1.584 kN (applied to centre of handrail)



Test description:

- (a) Securely fix the balustrade sample as per normal installation.
- (b) Record a datum measurement
- (c) Apply the load as per the standard to the sample for period of 1 minute.
- (d) Remove the load.
- (e) Measure any permanent deflection sustained by the sample.

Load applied: 1.584kN

Datum Measurement: 430mm

Time applied: 1 minute

Reading after load removed: 431mm

Permanent deflection: 1mm

Max allowable (1/90 span between supports): 53mm

Structural failure: Nil

Pass/Fail: PASS



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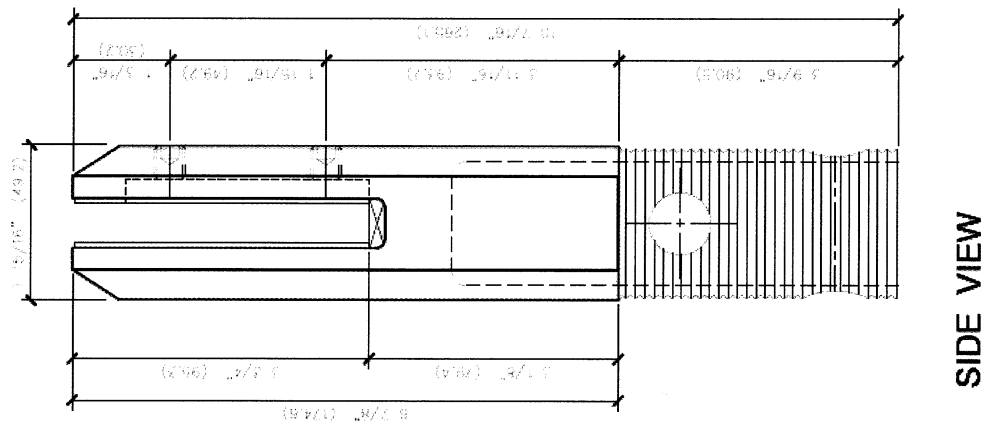
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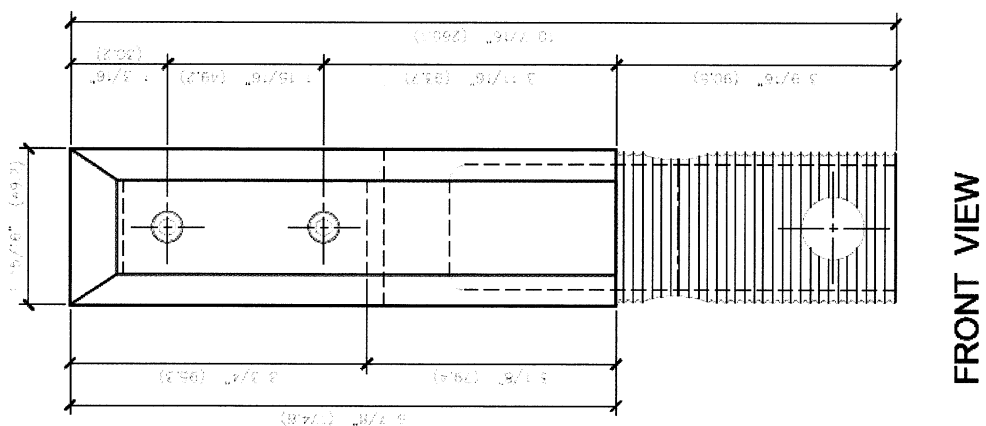


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FWCS10 SPIGGOT DETAIL DRAWINGS



NO GLASS FABRICATION
REQUIRED



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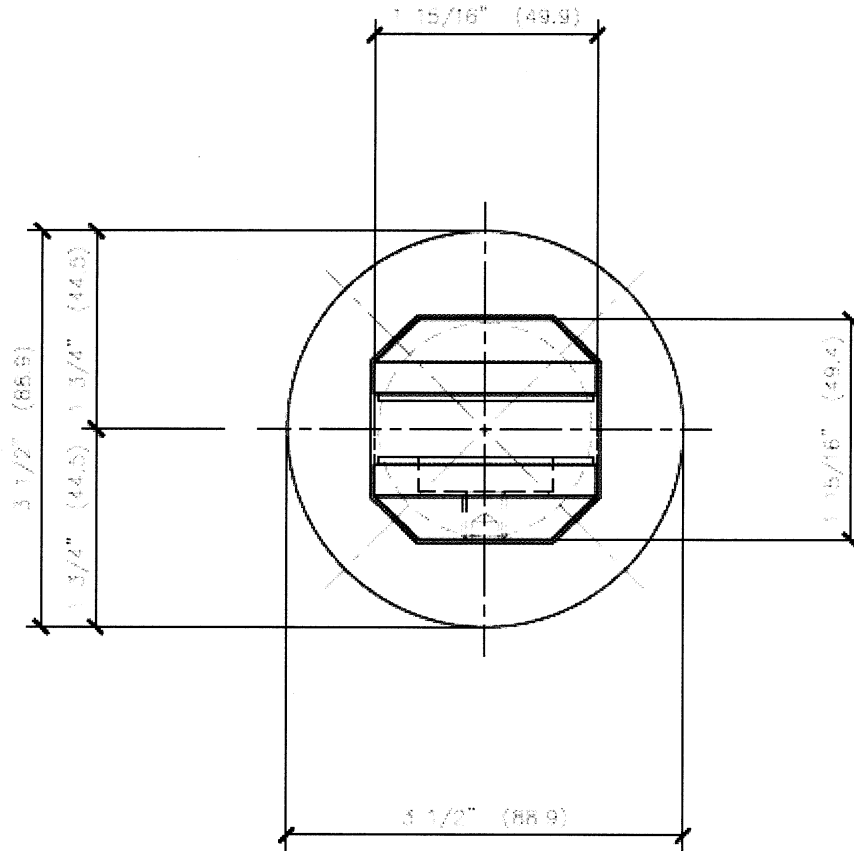
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TOP VIEW

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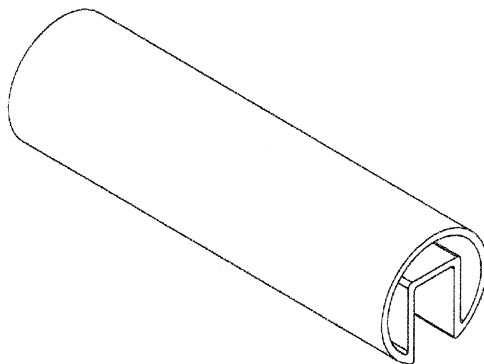
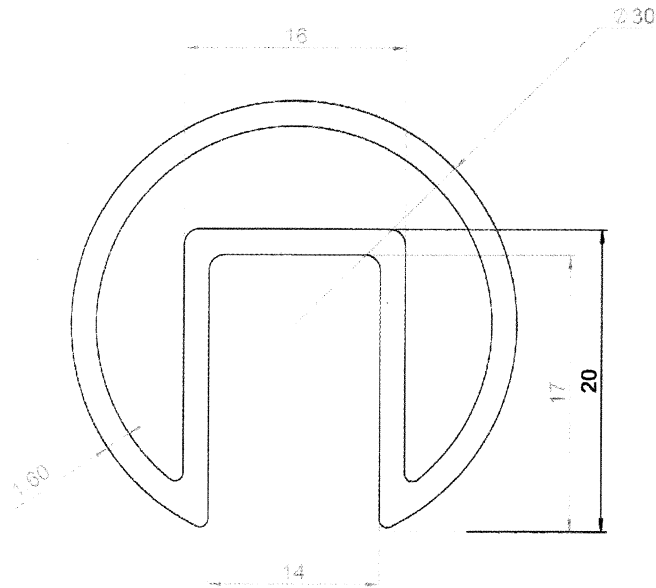
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CROSS SECTION OF Ø30mm TOP RAIL



TOP RAIL

AUS METAL SHOPFITTINGS

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Drawn By: EDDIE Drawing Name:

Rev: A

Date: 15/10/08

Scale: SCALE

Sheet: 1 OF 1

Job No:

NAME

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Conclusion: From the results achieved it is evident that the sample tested complies with the loading requirements of both 'AS1170.1-Section 3.6' and 'AS1657 Appendix 'C'.

Tested by: Nathan Olsen

Signatory Name: Nathan Olsen

Signatory Signature: 

Date: 3-10-13

END OF REPORT

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