NATIONAL GLASS DISTRIBUTION

EAGLE ALUMINIUM

Bohle Glass Equipment South Africa
Unit 3 Graphite Industrial Park
Fabriek Street
Strydom Park
2125

13th November 2019

Dear Gavin, David and Sebastian

DESIGN CONSULTATION REPORT (NMK#01 1119)

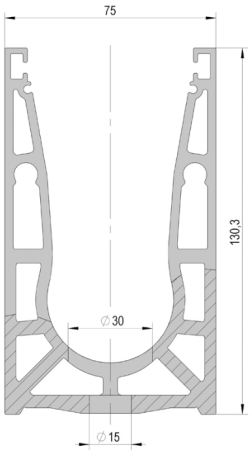
IMPACT TESTING OF 12mm CLEAR TOUGHENED SAFETY GLASS INTO VETROMOUNT SURFACE MOUNTED CHANNEL SYSTEM

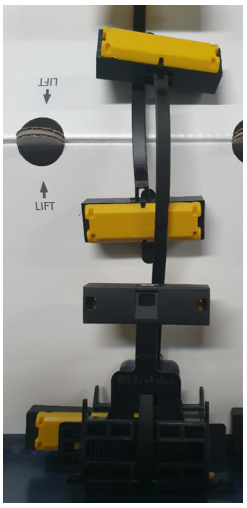
The test took place at Bohle's factory, situated at Unit 2 Graphite Industrial Park, Fabriek Street, Strydom Park on the 12th November 2019. Present at the test was Gavin Francey, David Flury and Sebastian Till from Bohle Glass Equipment, and Belinda Louw MSAGI – Candidate, Jason Fijac MSAGI - Candidate and myself from National Glass Distribution.

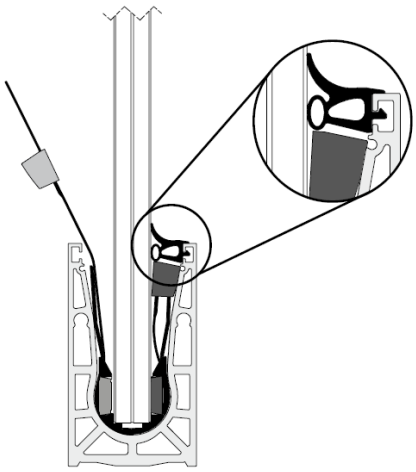
The glass panel tested was 12mm Clear Toughened Safety Glass, 1250(w) x 1100(h), supplied by National Glass Distribution, glazed into the Bohle VetroMount surface mounted aluminium channel system. The glass was secured to the channel every 250mm with Bohle's plastic mounting elements supplied and a rubber gasket to seal the system. The channel was secured to the slab using 10mm x 100mm Hilti HUS3 anchors at 400mm centres. No handrail was present on the test specimen.

Tel: +27(0)10 593 8440 | Cell: +27(0)83 225 9924 | Email: nkruger@natglass.co.za | www.natglass.co.za
Natglass Distributors (PTY) Ltd t/a National Glass Distribution | Head Office: 164 Russell Road, Central, Port Elizabeth, 6001

CHANNEL & MOUNTING ELEMENTS DETAILS







SWING BAG TEST

The swing bag impactor consisted of a bag containing 30Kg of dry sand. The centre of the bag was aligned with the centre of the glass panel and with the impact zone being 800mm from finished floor level. To replicate 400J impact, the drop height was calculated at a height of 1360mm resulting in an overall drop height of 2160 mm from finished floor level. The bag was released, and the impactor struck the glass with no breakage. The system deflected 5mm after the first impact. The test was repeated a second time again with no glass breakage. The system deflected a further 5mm, which resulted in overall deflection of 10mm after two impacts. Please note that no remedial work was done to the system between impacts. A further test was conducted 250mm in from the left edge of the glass again with no breakage.

Tel: +27(0)10 593 8440 | Cell: +27(0)83 225 9924 | Email: nkruger@natglass.co.za | www.natglass.co.za
Natglass Distributors (PTY) Ltd t/a National Glass Distribution | Head Office: 164 Russell Road, Central, Port Elizabeth, 6001

LINE LOAD

BALUSTRADES - LINE LOADS

NATIONAL GLASS DISTRIBUTION

Load = KN	0.500
Width = m	1.250
Vertical Height to support = m	1.100

Customer	Bhole Glass Systems
Project	12mm TSG VetroMount Channel
Date	12-Nov-19
Inspected by	Nic, Belinda and Jason
Result	Pass

Load	0.5	Kn
Width	1.250	meter
Height to Support	1.100	Meter
Safety Factor	50%	%
Design Stress	50	Mpa
Glass Thickness	11.7	mm

Moment Line Load = kN/m	0.6875

Moment Line Load = kN/m	0.6875

Modulus of Rapture = Safety Factor x Design Stress x Panel Width x (Glass Thickness sqrd)/6

Safety Factor = %	50%	50%	50%	50%	50%	50%
Design strength = pa	50000000	55000000	60000000	50000000	55000000	60000000
Panel Width = m	1.25	1.25	1.25	1.25	1.25	1.25
Glass thickness = mm	11.7	11.7	11.7	14.5	14.5	14.5
Modulus Rapture = kN/m	0.71296875	0.784266	0.855563	1.095052	1.204557292	1.3140625
Line Load vs Modulus Rapture	YES	YES	YES	YES	YES	YES
Glass Thickness	0.011489125	0.010954	0.010488	0.011489	0.010954451	0.010488088
mm	11.48912529	10.95445	10.48809	11.48913	10.95445115	10.48808848

Safety Factor = %	50%
Design strength = pa	50000000
Panel Width = m	1.25
Glass thickness = mm	11.7
Modulus Rapture = kN/m	0.712969
Line Load vs Modulus Rapture	YES
Min Glass Thickness	0.011489
mm	11.48913

BALUSTRADES - On Site Impact Test

Impact	400 Joules	Panel Width	1.25 m	PASSED
Bag Weight	30 Kg	Panel Height	1 m	
Drop Height required	1.360 Meters	1st Impact Point	0.8 m	
	1st Impact Point	2nd Impact Point	0.8 m	
Overall Bag Drop Height	2.160 Meters	2.160 Metters		

CONCLUSION

Based on the impact tests conducted and calculations on the glass pane, the glazing element of the test specimen **conforms** with the **impact** requirement for a **domestic residential application** of SANS 10137 and SANS 10160 – 2.

Please take note the following:

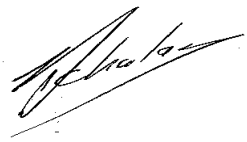
- This design consultation report is not an installation certificate as there could be several variables with a site installation.
- This design consultation report is not transferable and is limited only to the glazing element of the panels tested; and all other components, fixing details and structural work will need to be covered by the relevant Competent Persons in their respective fields.
- For Commercial or Escape Route applications, further physical testing or engineering reports may be required as the line load on these applications would increase to 1,5kN and 3,0kN respectively.

Tel: +27(0)10 593 8440 | Cell: +27(0)83 225 9924 | Email: nkruger@natglass.co.za | www.natglass.co.za
Natglass Distributors (PTY) Ltd t/a National Glass Distribution | Head Office: 164 Russell Road, Central, Port Elizabeth, 6001

- When Toughened Safety Glass breaks from whatever reason, the glass shatters into 1000's of small particles and will not remain in its original position, hence we would recommend a handrail on all Toughened Safety Glass installations as an additional safety support and feature.
- Regular maintenance should be carried out to ensure that product remains fit for purpose, as gaskets and fixing details can loosen over a period of time resulting in possible product failure.
- All installed balustrades fall under the responsibility of the project Pr Engineer (Struc), and require their approval and final sign off as a complete system with regards to SANS 10400 – A Form 4.

Should a glazing element installation certificate be required, please contact your installer to arrange a suitable date for the required tests to be conducted at site.

Kind Regards



Nic Kruger MSAGI CP(G)
Competent Person (Glazing)

Belinda Louw MSAGI - Candidate
Managing Director

Jason Fijac M Arch (Prof); MSAGI - Candidate
National Glass - Architect

Tel: +27(0)10 593 8440 | Cell: +27(0)83 225 9924 | Email: nkruger@natglass.co.za | www.natglass.co.za
Natglass Distributors (PTY) Ltd t/a National Glass Distribution | Head Office: 164 Russell Road, Central, Port Elizabeth, 6001