TEST REPORT

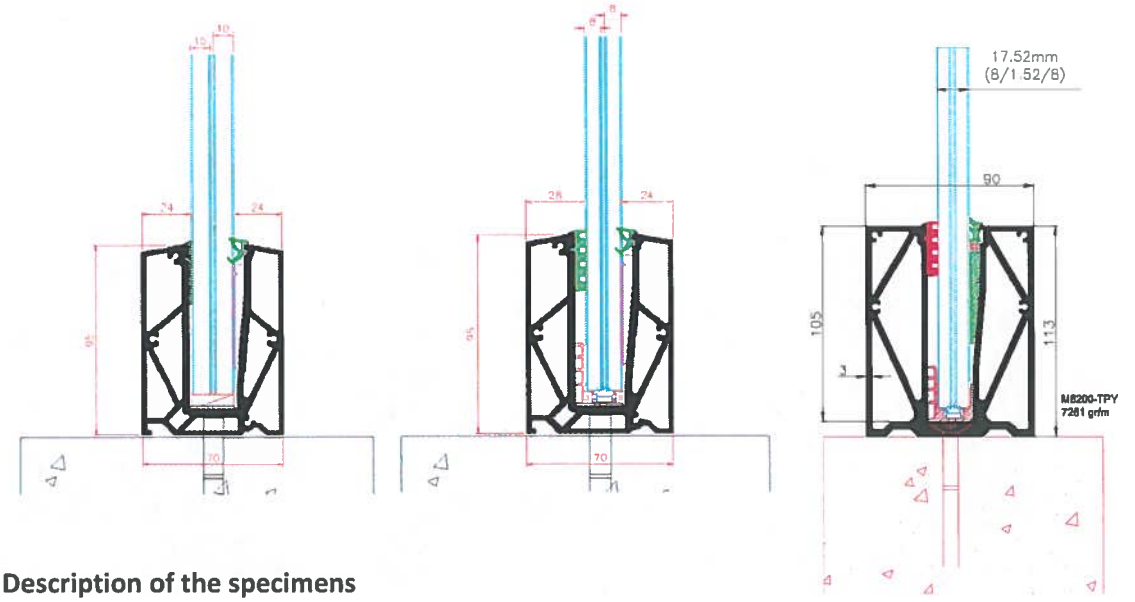
Company: ALUMIL S.A.
Test site: ALUMIL Test Laboratory, Kilkis, Ind. Area
Test Date: 13-06-2016

Purpose of test

Resistance to horizontal linear static loading in accordance with Ministry of Infrastructure Decree dated 14/01/2008 and resistance to dynamic loading in accordance with DIN 18008-4. The tests related 3 different specimens with different glass thickness and height.

Specimen names

1) M8207 - (L) 1500 x (H) 1075mm, 10+10mm and with quadruple membrane (total 21.52mm)
2) M8207 - (L) 1500 x (H) 1175mm, 8+8mm and with quadruple membrane (total 17.52mm)
3) M8200 - (L) 1500 x (H) 1075mm, 8+8mm and with quadruple membrane (total 17.52mm)



Description of the specimens

1) M8207 - (L) 1500 x (H) 1075mm, 10+10mm and with quadruple membrane (total 21.52mm) **static/dynamic**
2) M8207 - (L) 1500 x (H) 1175mm, 8+8mm and with quadruple membrane (total 17.52mm) **static**
3) M8200 - (L) 1500 x (H) 1075mm, 8+8mm and with quadruple membrane (total 17.52mm) **static**

The first two structures were with M8207 base profile, which is the new light profile for the top-mounted typology, and the third one was with the existing base profile M8200.

Each specimen length was 1.5m. The glass thickness was either 8+8 or 10+10mm, and the total height was either 1075 or 1175mm, as described in the "Specimen name".

The glass used was laminate tempered with quadruple 1.52mm thick.

For the fixation, M8x80 anchorage screws were used, provided by the company with the code EX-8305212200. The rest accessories are described in the table below.

Code	Description	Quantity	Unit
EX-8305212200	Base profile anchorage screw M8x80	6	pcs
EX-2000820003	Gasket for base profile and for 10+10mm glass thickness	1,5	m
EX-2000820203	Gasket for base profile and for 8+8mm glass thickness	1,5	m
EX-8300000502	Plastic wedge	6	pcs
EX-8300000103	Rubber pad "U" shape for 10+10mm glass thickness	4	pcs
EX-8300000200	Plastic pad "U" shape for 8+8mm glass thickness	4	pcs
EX-2000800601	Glass wedge gasket	1,5	m

Test construction description

Each structure was fixed sturdily on an iron beam, which is part of our Impact Test Construction.

For the dynamic load an impactor if total 50Kg mass was used, made of rubber and steel.

For the horizontal linear static loading test a hydraulic piston was used with a measuring device (KN) supplied by IFT Rosenheim. For the linear loading a steel beam integrated with a wooden one was used, so as the force would be the same all along the top part of the glass panel.

Test method

Dynamic load

The dynamic load test was undertaken in accordance DIN 18008-4 standard according which the 50Kg impactor was released from specific heights (900, 700 and 450mm) hitting the glass in various points, i.e. at the middle of the glass as well as at the top part of it. Without initial velocity and without allowing the impactor to hit the specimen for a second time.

Static load

The linear static load test was undertaken according to clause 3.1.4. "Variable loads" of Ministry of Infrastructures Decree dated 14/01/2008 "Norme Techniche per construzioni", which is the method followed by Giordano Institute and noted down in one of our existing M8200 certificates.

The static load was applied gradually to reach 1.0, 2.0 and 3.0KN/m. Every time the respective load was applied for 2 min and then the "total" deflection was measured (elastic+plastic). After that, the railing structure was left to rest for 1 min and then the permanent (plastic) deflection was measured.

Measurements were taken firstly at the top part of the railing structure, and secondly, at the top edge of the profile itself, so as to check how little the base profile is being deformed.

Test results

4) M8207 - (L) 1500 x (H) 1075mm, 10+10mm and with quadruple membrane (total 21.52mm) **static/dynamic**
5) M8207 - (L) 1500 x (H) 1175mm, 8+8mm and with quadruple membrane (total 17.52mm) **static**
6) M8200 - (L) 1500 x (H) 1075mm, 8+8mm and with quadruple membrane (total 17.52mm) **static**

The dynamic load test was undertaken once and with the first specimen M8207 10+10mm 1075mm).

"Total" refers to the measurement while loading and the "Permanent" refers to the elastic deformation remained after 1 min structure rest.

M8207 8+8mm 1175mm

	PROFILE EDGE DEFLECTION		STRUCTURE DEFLECTION	
	Total	Permanent	Total	Permanent
1 KN/m	1,21	0,14	97	11
2 KN/m	3,06	0,36	190	15

M8207 10+10mm 1075mm

	PROFILE EDGE DEFLECTION		STRUCTURE DEFLECTION	
	Total	Permanent	Total	Permanent
1 KN/m	1,76	0,2	71	5
2 KN/m	3,16	0,56	154	21

M8200 8+8mm 1075mm

	PROFILE EDGE DEFLECTION		STRUCTURE DEFLECTION	
	Total	Permanent	Total	Permanent
1 KN/m	0,91	0,01	75	6
2 KN/m	1,52	0,33	146	11
3 KN/m	2,00	0,37	214	10
3,85 KN/m				

*at 3.85KN/m the glass just broke, which means that the base profile could hold much longer.

Findings

Dynamic load

The dynamic load test with M8207 profile, glass 10+10mm and structure 1075mm high was undertaken with complete success. Compliant with DIN 18008-4 standard requirements and no damage observed that impairs normal operation of the specimen. No glass crack and all system elements remained in place.

Static load

This part of the test proved that the two base profiles, new (M8207) and existing (M8200), are extremely sturdy.

The edge deflection during the load was quite low, and most significant, the permanent deflection of the profiles, even at high static load for 2 min, stayed below 0.5mm, almost zero.

M8207 at 2KN/m had 0.36/0.56mm deflection at the edge and M8200 had 0.37 at 3.0KN/m.

What was also a real surprise was that the glass structure, e.g. 1175mm high, after the whole test, did not almost dangle at all. This particular fact shows that this railing model holds the glass tightly

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