

Test Report



Number	19-002077-PR01 (PB-A03-05-en-01)
Owner (Client)	ALUMIL S.A. Industrial Area 61100 Kilkis Greece
Product	Glass Railing
Designation	Shipping name: M8200
Details	Manufacturer ALUMIL S.A., - Kilkis; Material Laminated safety glass (LSG)
Special features	Deviations to the test method as shown in the detailed results, according to customers request.
Order	Resistance to wind load
Contents	The test report contains a total of 7 pages and annexes (7 pages).
Note	The test report shall only be published in its unabbreviated form. The "Guidance Sheet for the Use of ift Test Documents" applies.

Ve-PB0-4390-er/ (01.12.2017

Resistance to wind load

1 Execution

1.1 Sampling and product description

The following details have been presented to ift:

Sampler: ALUMIL S.A., 61100 Kilkis (Greece)
Sampling date: 16.04.2019
Evidence: A sampling report has been presented to ift.
Date of delivery: 19.04.2019
Description: For product identification the specimen tested is described/represented in the Annex. Material specifications, item numbers and other company-specific descriptions are details provided by the client and will be checked for plausibility by ift.

Test specimen no.: 19-002077-PK01 / WE: 48144-001

1.2 Basic documents *) of the procedures

EN 12211:2016 - 03

Windows and doors - Resistance to wind load - Test method

*) and the relevant national versions, e.g. DIN EN

1.3 Short description of the procedures

The tests were performed according to the following sequence:

- Resistance to wind load
- Resistance to wind load - Safety test

Resistance to wind load according to EN 12211:2016-03

Resistance to wind load was tested in accordance with the standard and conducted in steps at positive pressure and negative pressure up to the test pressure p_1 . The test specimen was exposed to three pressure pulses $\Delta p_1 + 10\%$. This was followed by determination of the frontal deflection of test specimen for each pressure step when exposed to positive test pressure Δp_1 . Then the test specimen was subjected to 50 cycles at positive pressures of $+ \Delta p_2 = \Delta p_1 - 50\%$.

Resistance to wind load

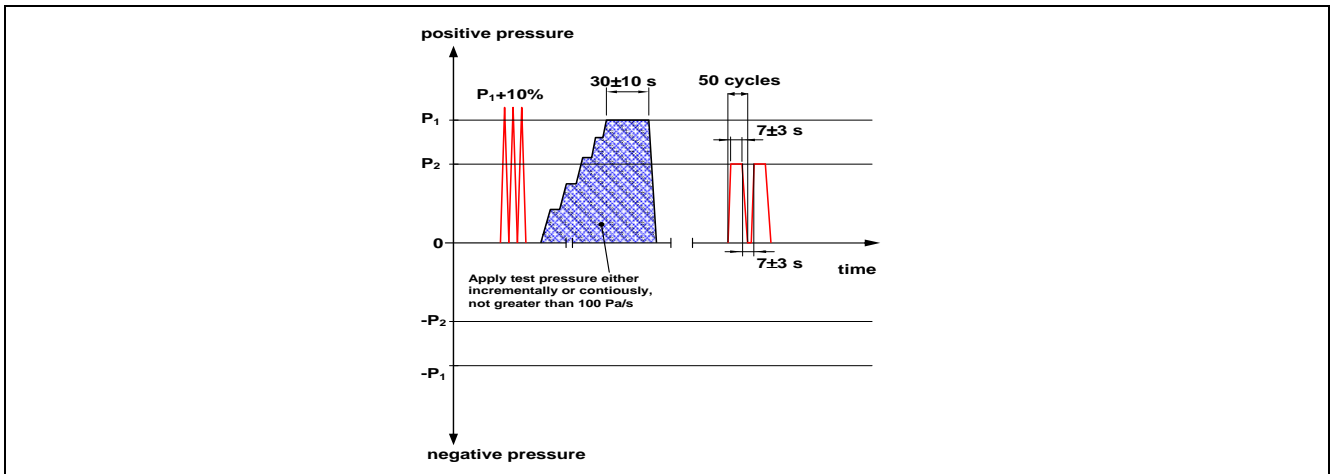


Illustration Test sequence for resistance to wind load - Deflection and alternating positive pressures

Resistance to wind load - Safety test according to EN 12211:2016-03

The wind resistance test (safety test) was conducted at positive pressure in accordance with EN 12211 up to test pressure $\Delta p = +4000$ Pa.

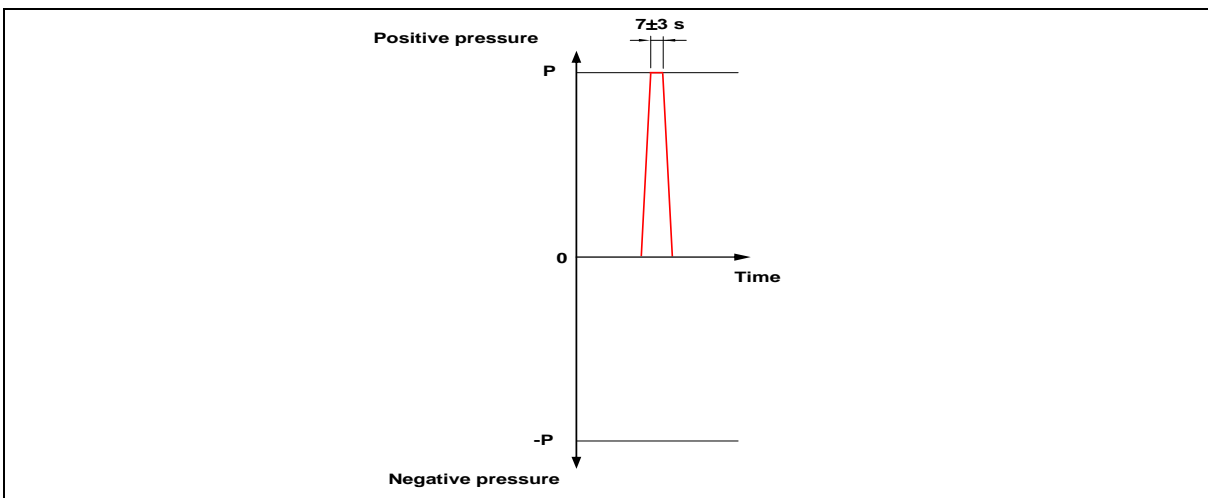


Illustration Test sequence for resistance to wind load - safety test

Resistance to wind load

2 Detailed results

Resistance to wind load according to EN 12211:2016-03

Project-No.	19-002077-PR01
Basis	EN 12211:2016-03 Windows and doors - Resistance to wind load - Test method
Test equipment	EPst/026348 - Window and facade test rig
Test specimen	Glass Railing
Test specimen No.	48144-001
Date of test	19.04.2019
Test engineer in charge	Dimitrios Moustakidis
Test engineer	Dimitrios Moustakidis

Implementation of tests

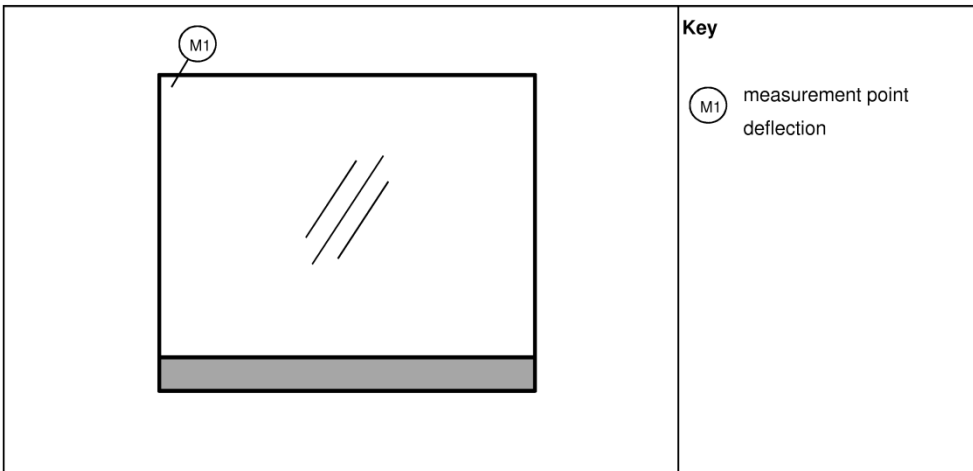
Deviations

There have been the following deviations from the test method specified in the standard/basis:
Only Positive Wind Pressure have been tested in accordance with clients request

Ambient conditions

Temperature 21 °C Air humidity 31 % Air pressure 998 hPa
The ambient conditions are in accordance with the standard/basis requirements.

Measurement data/Results



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Resistance to wind load

Maximum test pressure: ± 3000 Pa 3 pressure pulses of 3300 Pa

Table: Measured results of frontal deflection in mm at negative / positive wind pressures

Measured results of frontal deflection in mm		Positive wind pressure	Negative wind pressure
	Pa		3000
M1 in mm		181.0	-/-

Table: Permanent deformation measured at 0 Pa after 60 seconds

		Positive pressure	Negative pressure
Permanent deflection	M1 in mm	0.0	-/-

Key

p_1, p_2 Test pressure
 M1, M2, M3 Frontal dislodgement at measurement points M1, M2, M3
 f_{rel} Frontal deflection
 l Effective span

Dynamic wind loads (negative / positive pressures)**Table:** pressure pulses

p_2 in Pa	1500	-1500
passed	✓	-/-

50 cycles at + 1500 Pa

50 cycles at - -/- Pa

Malfunctions at test specimen

At the test specimen were no malfunctions detected.

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Resistance to wind load

Resistance to wind load - Safety test according to EN 12211:2016-03

Project-No. 19-002077-PR01
 Basis EN 12211:2016-03
 Windows and doors - Resistance to wind load - Test method
 Test equipment EPst/026348 - Window and facade test rig
 Test specimen Glass Railing
 Test specimen No. 48144-001
 Date of test 19.04.2019
 Test engineer in charge Dimitrios Moustakidis
 Test engineer Dimitrios Moustakidis

Implementation of tests
 Deviations

There have been the following deviations from the test method specified in the standard/basis:
 According to clients request the Safety Test were tested at 4000 Pa and only in positive direction

Ambient conditions Temperature 21 °C Air humidity 32 % Atmospheric pressure 998 hPa
 The ambient conditions are in accordance with the standard/basis requirements.

Measurement data/Results**Safety test****Table:** Pressure steps

		Positive wind pressure	Negative wind pressure
p ₃	Pa	4000	-4000
passed		✓	-/-

Safety test passed at up to + 4000 Pa.

Malfunctions at test specimen

At the test specimen were no malfunctions detected.

Comments

Upon customer request, the pressure was further increased to + 4500 Pa after passing the + 4000 Pa.
 Fracture of the outer glass pane at + 4400 Pa.

Resistance to wind load

3 Summary

3.1 Result

All measured values and findings during the test were recorded in the measuring data sheet, see item "Detailed results".

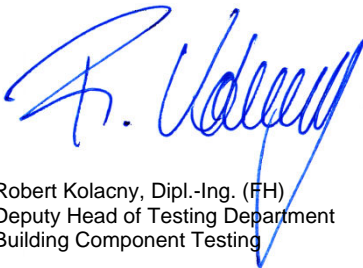
3.2 Instructions for use

This test/evaluation does not allow any statement to be made on further characteristics of the present structure regarding performance and quality, in particular the effects of weathering and ageing.

The test was performed according to standard with the deviations shown in the "Detailed results" and the details for identification of the test specimen are complete.

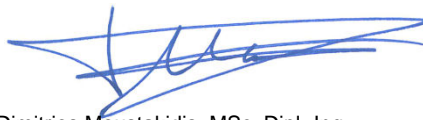
ift Rosenheim

03.05.2019



A blue ink signature of Robert Kolacny, written in a cursive style.

Robert Kolacny, Dipl.-Ing. (FH)
Deputy Head of Testing Department
Building Component Testing



A blue ink signature of Dimitrios Moustakidis, written in a cursive style.

Dimitrios Moustakidis, MSc, Dipl.-Ing.
Operating Testing Officer
Building Component Testing

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Die Beschreibung des geprüften Probekörpers dient der normkonformen Identifizierung des Produkttyps, für den die festgestellten Werte gelten. Alternativ zur vorgegebenen tabellarischen Datenerfassung kann die Beschreibung auch in Form von technischen Zeichnungen, Verarbeitungsrichtlinien, Stücklisten etc. erfolgen. Zusätzliche Produktdetails bitte ergänzen. Die Angaben sind Voraussetzung für die Erstellung eines ift-Nachweises. Nur bei Angabe aller in diesem Dokument angeforderten Daten ist ggf. eine nachträgliche Gutachtliche Stellungnahme möglich. Alle Angaben des Auftraggebers werden vom ift auf Plausibilität geprüft; ggf. festgestellte Abweichungen und/oder ergänzende Feststellungen werden dokumentiert.

The description of the specimen to be tested serves to identify, in conformity with the standards, the product type, for which the values determined will apply. Alternatively to the specified tabulated data collection, the description may also be made by technical drawings, processing instructions, parts lists, etc. Please supplement additional product details.

The details are the precondition for issuing the "ift-Nachweis". Only upon provision of all requested data subsequently requested Expert Statements may be issued. All details provided by the client will be checked for plausibility by ift, any deviations observed and/or additional findings will be documented.

Wareneingang-Nr.: 48144-001
 ID of goods received :

Alle Maßangaben in mm
 All dimensions in mm

Nicht Zutreffendes bitte löschen.
 Please delete non-appropriate.

ift Mitarbeiter: Dimitrios Moustakidis
 ift staff member :

Eigenschaft Characteristic	Angaben des Auftraggebers (unverändert) Information provided by client (unchanged)
Produkt / Bauart / Komponente Product / design / component	Glass Railings
Hersteller Manufacturer	Alumil S.A.
Bezeichnung / Typ / Art.-Nr. Designation / type / item no.	M8200
Außenmaß Overall dimensions	1,490 mm x 1,510.5 mm
Material Material	Aluminium Profile, Laminated safety glass
Leiste Skirting	
Bezeichnung / Typ / Art.-Nr. Designation / type / item no.	M8200
Hersteller Manufacturer	Alumil S.A.
Material Material	Aluminium
Abmessung (B x H) Dimensions (W x H)	90 mm x 113 mm
Besonderheit Special feature	830.00005.03 – Glazing locking block, Polyamid 830.00001.03 – Bottom glass protection profile, EPDM
Verglasung Glazing	
Hersteller Manufacturer	Pap safety glass

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Eigenschaft Characteristic	Angaben des Auftraggebers (unverändert) Information provided by client (unchanged)
Lieferbezeichnung / Typ / Art.-Nr. Designation / type / item no.	Laminated safety glass
Abmessung (B x H) Dimensions (W x H)	1,490 mm x 1,500 mm
Gesamtdicke Thickness	21.52 mm
Aufbau Configuration	10 mm / 4 PVB / 10 mm
Glaseinstand Edge cover	105 mm
Folie (VSG) Film (LSG)	
Hersteller Manufacturer	Kuraray, Trosifol
Material Material	PVB
Gesamtdicke Total thickness	1.52 mm
Aufbau Configuration	4PVB
Verglasungsdichtung außen External glazing gasket	
Hersteller Manufacturer	Alumil S.A.
Lieferbezeichnung / Typ / Art.-Nr. Designation / type / item no.	200.08200.03
Material Material	EPDM
Verglasungsdichtung innen Internal glazing gasket	
Hersteller Manufacturer	Alumil S.A.
Lieferbezeichnung / Typ / Art.-Nr. Designation / type / item no.	200.08004.01
Material Material	EPDM
Anschluss an die Tragkonstruktion Fixing to the support structure	Bolted to surrounding frame
Lieferbezeichnung / Typ / Art.-Nr. Designation / type / item no.	Metal Blocks 10 mm with M12 nuts

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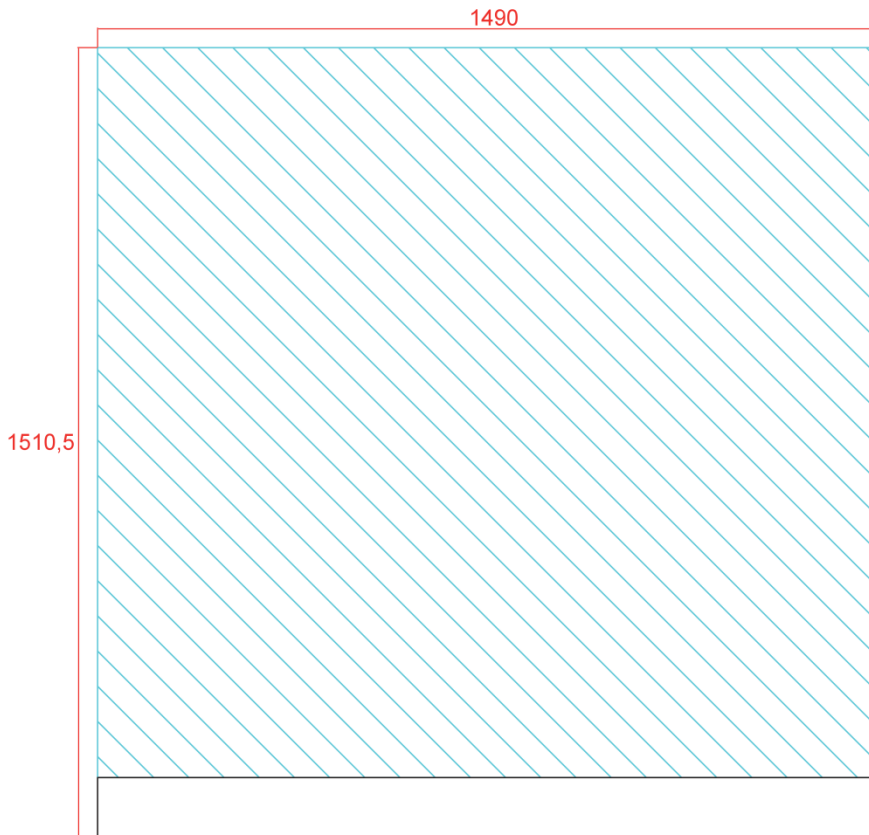


Eigenschaft Characteristic	Angaben des Auftraggebers (unverändert) Information provided by client (unchanged)
Hersteller Manufacturer	-/-
Material Material	Steel
Abmessung (B x H) Dimensions (W x H)	100 mm x 80 mm
Anzahl Number	6
Schraubenanzahl / -typ / - dimension Number of screws / type / dimensions	Countersunk allen screws M12 x 40 mm
Anzahl Number	6

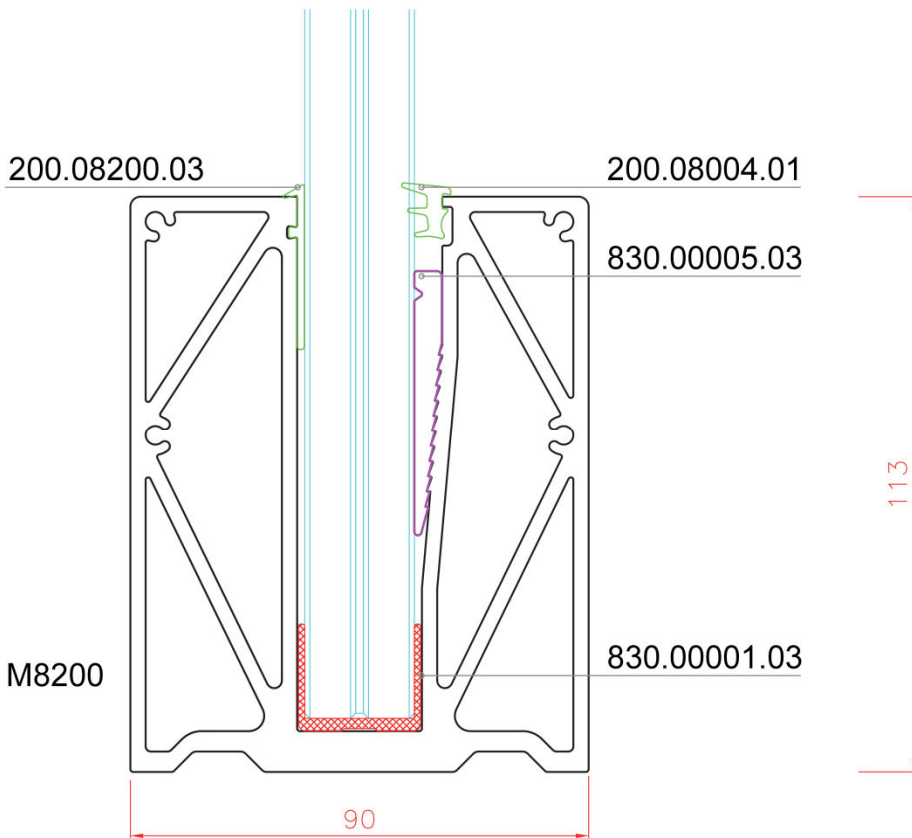
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Picture 1 View

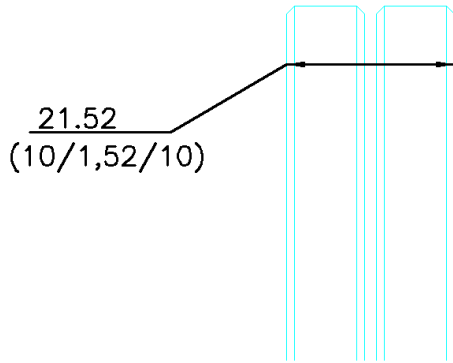


Picture 2 Vertical section

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Picture 3 Glazing configuration

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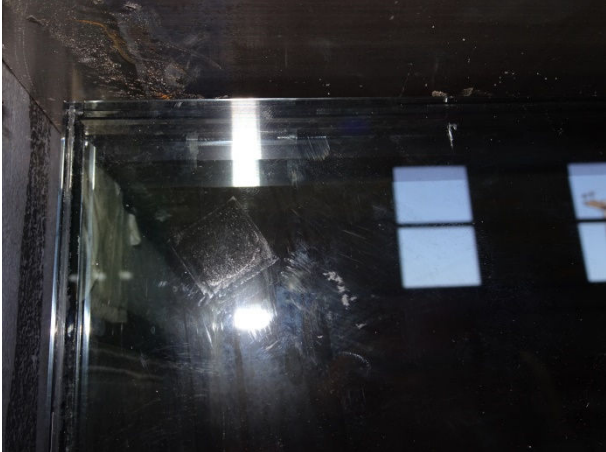
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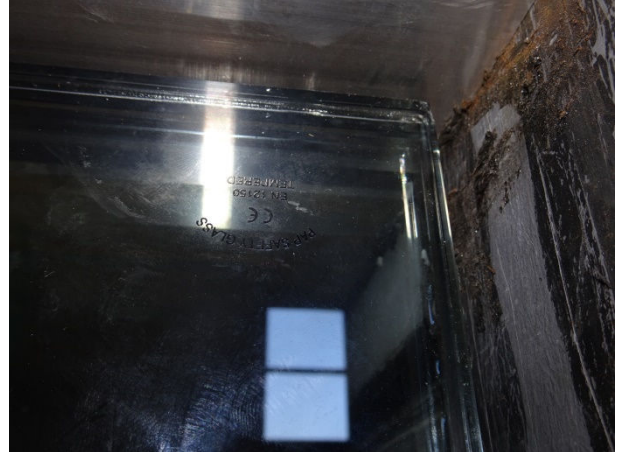
Picture 1 View of test specimen, internal view



Picture 2 View of test specimen, external view



Picture 3 Corner of test specimen, at top



Picture 4 Corner of test specimen, at top



Picture 5 Corner of test specimen, at bottom

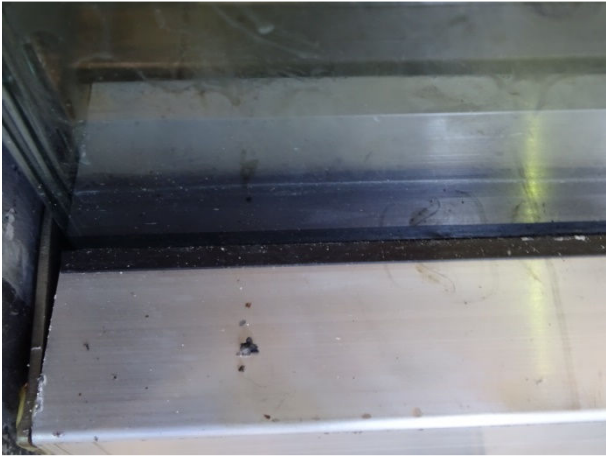


Picture 6 Corner of test specimen, at bottom

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Picture 7 Corner of test specimen, at bottom



Picture 8 Corner of test specimen, at bottom



Picture 9 Fracture of the outer glass sheet at +4400 Pa



Picture 10 Fracture of the outer glass sheet at +4400 Pa