

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load



Test Report

No 17-000146-PR01

(PB-A01-02-en-02)

Client	Selectron Elektrokimya San. ve Tic. Ltd. Sti. Atatürk Bulvarı Köstemir yolu No:74 34570 Silivri - İstanbul Turkey
Product	Single side hung casement door
Designation	System designation: 68f
Performance-relevant product details	Material: Wood with aluminium cover profile
Overall dimensions (W x H)	1,100 mm x 2,300 mm
Special features	Material compatibility must be taken into account.

Basis

EN 14351-1:2006+A2:2016
Test standard/s:
EN 1026:2016-03
EN 1027:2016-03
EN 12211:2016-03
Correspond/s to the national standard/s (e.g. DIN EN)
replaces ift-test report No 17-000146-PR01 (PB-A01-02-en-01) dated 17.02.2017

Representation



Instructions for use

The manufacturer is allowed to use the results obtained for preparing a Declaration of Performance in accordance with the Construction Products Regulation 305/2011/EC. Observe the specifications set out by the applicable product standard.

Validity

The data and results refer solely to the tested and described specimen. Classification remains valid as long as the product and the above basis remain unchanged. The results can be extrapolated under the manufacturer's own liability subject to observance of the relevant specifications set out by the applicable product standard. This test/evaluation does not allow any statement to be made on any further characteristics regarding performance and quality of the construction presented; in particular the effects of weathering and ageing were not taken into account.

Notes on publication

The ift-Guidance Sheet "Advertising with ift test documents" applies. The cover sheet can be used as an abstract.

The report contains a total of 27 pages.

Results

Air permeability according to EN 12207:1999-11



Class 4

Watertightness according to EN 12208:1999-11



Class 8A

Resistance to wind load according to EN 12210:2016-03



Class C4 / B4

ift Rosenheim

21.02.2017

Dirk Köberle, Dipl.-Ing. (FH)
Deputy Head of Testing Department
Building Components

Herbert Hageneder, Dipl.-Ing. (FH)
Operating Testing Officer
Construction Product Testing



1. Object

1.1 Description of test specimen

Product	Single side hung casement door
Manufacturer	Selectron Elektrokimya San.Ve tic. Ltd ŧti. (Arbor – Fenex Wooden Windows)
Date of manufacture	January 2017
System	68f
Type of opening / Opening directions	Turn, DIN right inward opening
Frame material	Wood with aluminium cover profile
Overall frame dimensions (W x H)	1,100 mm x 2,300 mm
Overall sash dimensions (W x H)	1,012 mm x 2,247 mm
Sash weight	73.5 kg
Frame member	68f 68/70, further details are given in drawings
Frame connection	Tenon and mortice joints
Additional profile / Frame connection	Aluminium cover profile, LA776, aluminium, clipped on plastic items Uniform LC62, mitred, bonded and compressed Uniform LC62, screwed on frame member Threshold 336.106/107, butt-jointed, screwed on frame member, lateral sealed with pourable sealant Threshold cover profile 337.108, sealed with pourable sealant
Sash member	68f 68/80 , further details are given in drawings
Frame connection	Tenon and mortice joints
Additional profile / Frame connection	Aluminium cover profile/ Glazing bar, LA860, aluminium, clipped on plastic items Uniform LC81, mitred, bonded and compressed Uniform LC81, screwed on frame member Wood Adapter 13/44 Weather bar LA837, screwed
Rabate design	
Rebate drainage	Over threshold and 3 slots of 5 mm x 40 mm on threshold rebate channel, to outside 4 slots of 5 mm x 40
Rebate seal	
Frame	
Material	Sealing material – EPDM
Manufacturer	Uniform
Article number	DE 125
Corner configuration	On aluminium cover profile LA776, on three sides, lateral and at top, notched in corners, at bottom butt-jointed at threshold
Material	Sealing material – EPDM
Manufacturer	Uniform
Article number	DE 126
Corner configuration	On Frame member, on three sides, lateral and at top, at top notched in corners, at bottom butt-jointed at threshold

**Threshold**

Material	Threshold gasket, EPDM
Manufacturer	Coşkun Kauçuk
Article number	K4477
Corner configuration	On Threshold horizontal, lateral butt-jointed at frame Additional sealed with pourable sealant horizontal at bottom and lateral

Sash

Material	Brush gasket
Manufacturer	Schlegel
Article number	PB-1018
Corner configuration	On sash member, at bottom, butt-jointed
Material	Sealing material – PE, PU, PP und TPE
Manufacturer	Schlegel
Article number	QL-3053
Corner configuration	On sash member, continuous, notched in corners, at top butt-jointed at centre
Material	Sealing material – PE, PU, PP und TPE
Manufacturer	Schlegel
Article number	QL-3054
Corner configuration	continuous, notched in corners, at top butt-jointed at centre
Pressure equalisation	Over threshold Insulating glass unit, configuration 4 / 20 / 4 / 20 / 4, Low-e Argon filled

Infill**Installation of infills**

Glazing gasket

External

Material	Sealing material – EPDM
Manufacturer	Uniform
Article number	DE34
Corner configuration	on three sides continuous, lateral and at top, at top notched in corners, at bottom butt-jointed at bottom horizontal butt-jointed

Internal

Material	Sealing material – EPDM
Manufacturer	Uniform
Article number	DE 133
Corner configuration	butt-jointed
Vapour pressure equalisation	Without vapour pressure equalisation Glazing rebate additional sealed with pourable sealant at bottom, at top, on hinge side and on lock side further details see picture

Air permeability, Watertightness, Resistance to wind load

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ve Tic. Ltd. Sti.

34570 Silivri - Istanbul (Turkey)



Hardware

Type / Manufacturer	Turn hardware, Maco, Espangnolette – 55951 turn & tilt drive gear BS 15 VHH i.S. Hinges – 42057 Striker Plate – 96561
Hinges / Bearings	2 Turn mechanism pivot 1 Corner pivot
Number of lockings	at bottom 2, at top 2, on lock side 4, hinge side 2
max. locking distance	735 mm
Position of lockings	neutral

The description is based on information provided by the client and inspection of the test specimen at the ift (item designations / numbers as well as material specifications were provided by the client unless stated "*ift-checked*").

Test specimen representations are documented in the Annex "Representation of product/test specimen". The design details were examined solely on the basis of the characteristics / performance to be classified. The drawings are based on unchanged documentation provided by the client unless stated otherwise. The photographs were taken by the ift Rosenheim unless stated otherwise.

1.2 Sampling

The below sampling data were provided to the ift:

Sampling by: Selectron Elektrokimya San.Ve tic. Ltd Őti.

Verification: A sampling report has not been provided to the ift.

ift-Pk-Number: 17-000146-PK01 / WE: 43008-001



2. Procedure

2.1 Basis*) referring to methods

Testing

EN 1026:2016-03

Windows and doors - Air permeability - Test method

EN 1027:2016-03

Windows and doors - Watertightness - Test method

EN 12046-1:2003-11

Operating forces - Test method - Part 1: Windows

EN 12211:2016-03

Windows and doors - Resistance to wind load - Test method

Classification / Evaluation

EN 12207:1999-11

Windows and doors - Air permeability - Classification

EN 12208:1999-11

Windows and doors - Watertightness - Classification

EN 12210:2016-03

Windows and doors - Resistance to wind load - Classification

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

2.2 Brief description of procedure

Air permeability - EN 1026

Prior to testing, the operating forces are determined as per EN 12046-1 for the release / locking operation of the hardware.

Air permeability is tested in accordance with EN 1026 and conducted in steps at negative pressure and positive pressure up to the maximum test pressure difference. Leakages of the test set-up are made visible using artificially generated fog and sealed using permanently resilient sealant. The test specimen is exposed to three pressure pulses $\Delta p_{\max} + 10\%$ or at least 500 Pa. This is followed by measurement of air permeability for the respective pressure steps.

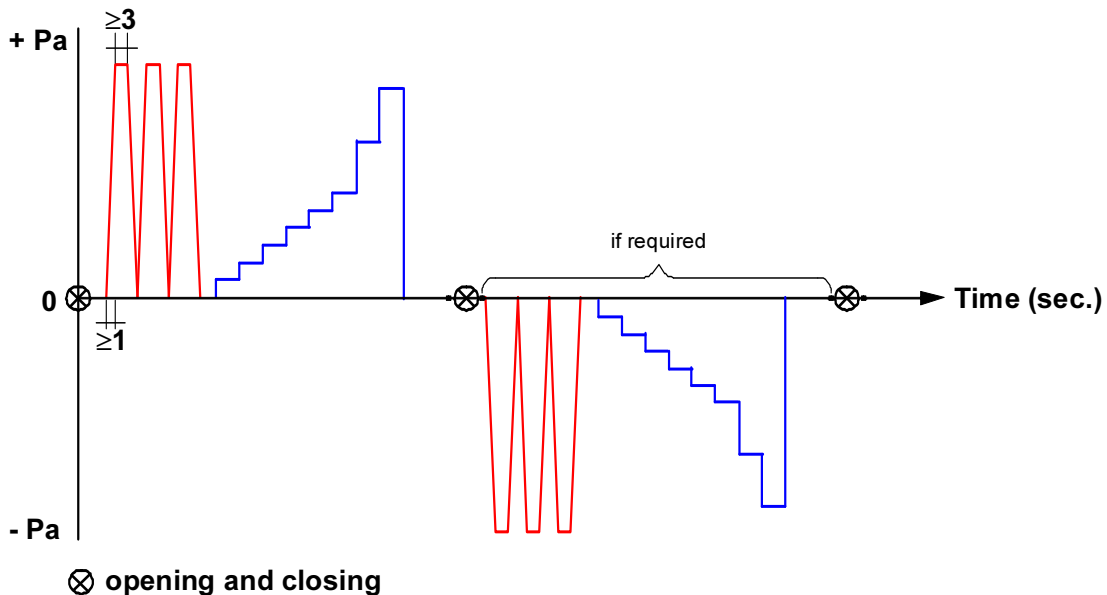


Illustration Test sequence for air permeability

Resistance to wind load - Deflection and alternating negative/positive pressures - EN 12211

Resistance to wind load is tested in accordance with EN 12211 and conducted in steps at negative pressure and positive pressure up to the test pressure p_1 . The test specimen is exposed to three pressure pulses $\Delta p_1 + 10\%$. This is followed by determination of the frontal deflection of test specimen for each pressure step when exposed to positive test pressure Δp_1 and negative test pressure Δp_1 . Then the test specimen is subjected to 50 cycles including negative and positive pressures of $\pm \Delta p_2 = \Delta p_1 - 50\%$.

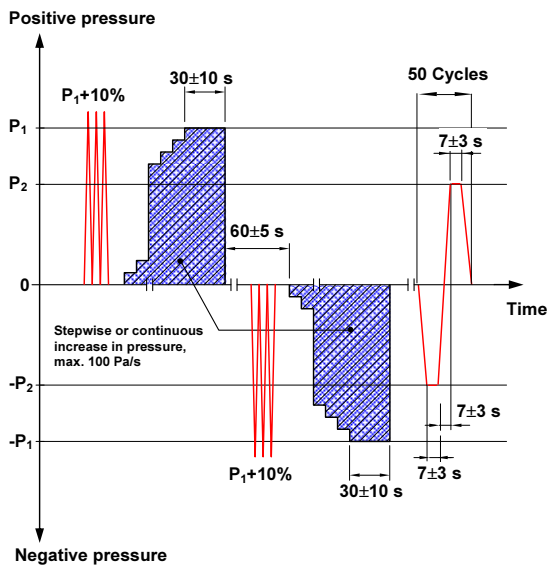


Illustration Test sequence for resistance to wind load



Air permeability – Repeat test - EN 1026

Following resistance to wind load test for p_1 (deflection) and p_2 (alternating positive/negative pressure), air permeability must not exceed by more than 20% the upper limit of the specified class as set out by EN 12207.

Watertightness - EN 1027

Prior to the test, three positive pressure pulses are applied to the test specimen. Subsequently, the external surface of the test specimen is constantly sprayed with water through nozzles, conforming to the standard. After a 15-minute pressureless spraying period an additional overpressure in terms of subsequent pressure steps will be applied. The pressure steps are defined by the standard and are kept for 5 minutes each (see illustration). Watertightness will be tested up to the maximum test pressure difference.

The water volume applied and the angle of spray depend on the intended type of installation of the component (protected / unprotected) and the height of the component (< / > 2.5 m) according to the standard. The required water volume and the angle of spray are documented in the measuring data sheet.

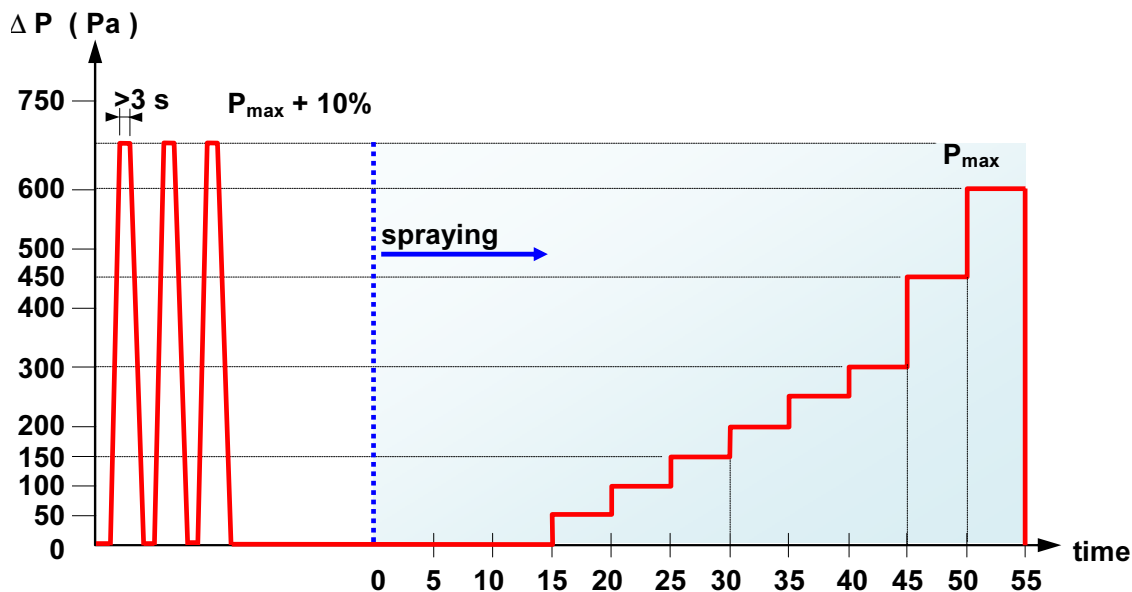


Illustration Test sequence for watertightness



Resistance to wind load – Safety test - EN 12211

The wind resistance test (safety test) is conducted at negative pressure and positive pressure in accordance with EN 12211 up to test pressure $\Delta p_3 = p_1 + 50\%$.

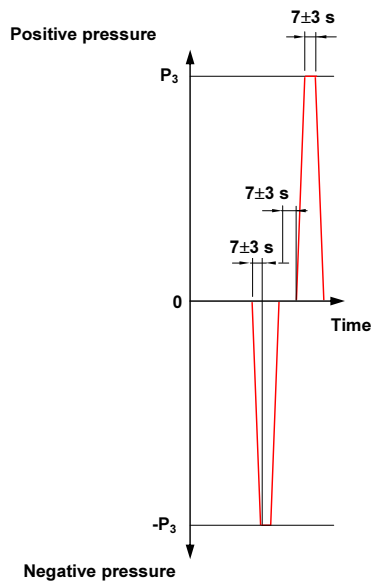


Illustration Test sequence for safety test

Air permeability, Watertightness, Resistance to wind load

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Client: Selectron Elektrokimya San.

ve Tic. Ltd. Sti.

34570 Silivri - Istanbul (Turkey)



3. Detailed results

Air permeability - Test according to EN 1026

Project-No.	17-000146	Task No.	PR01
Client	Selectron Elektrokimya San. Ve tic. Ltd şş. (Arbor Wood Windows)		
Basis of test	EN 1026:2016-03 Windows and doors - Air permeability - Test method		
Used test equipment	Epst/026263 LWW-Prüfstand Fenster u. Fassade		
Test specimen	Single side hung casement door		
Test specimen No.	43006-001		
Date of test	24. Januar 2017		
Responsible test engineer	Stephan Bertagnoli		
Tester	Atilla Oezozelik		

Information to test assembly and testing method

Testing method	There were no deviations from test method or test conditions.					
Ambience conditions	Temperature	14,7 °C	Air humidity	46,5 %	Atmospheric pressure	1000 hPa
	The ambience conditions are as specified by standard requirements.					

Testing procedure

Size of window frame	1100 mm	x	2300 mm
Size of active leaf	1012 mm	x	2247 mm
Area of test specimen	2,53 m ²		
Length of opening joints	6,52 m		

Initial load before positive wind pressure and negative wind pressure respectively: 660 Pa

Table: Air permeability at positive wind pressure

Measured results at positive wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600
		Flow rate (volume) m ³ /h	3,29	5,25	6,76	8,08	9,19	10,28	13,08
Joint length-related m ³ /hm	0,50	0,81	1,04	1,24	1,41	1,58	2,01	2,38	
Overall area-related m ³ /hm ²	1,30	2,08	2,67	3,19	3,63	4,08	5,17	8,13	

Table: Air permeability at negative wind pressure

Measured results at negative wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600
		Flow rate (volume) m ³ /h	3,81	5,56	7,00	8,17	9,22	10,21	12,79
Joint length-related m ³ /hm	0,58	0,85	1,07	1,25	1,41	1,57	1,86	2,33	
Overall area-related m ³ /hm ²	1,51	2,20	2,77	3,23	3,64	4,04	5,06	6,00	



Table: Air permeability from average values from positive and negative wind pressures

Average value from positive and negative wind pressures	Pressure differential in Pa	50	100	150	200	250	300	450	600
Flow rate (volume) m ³ /h		3,6	5,4	6,9	8,1	9,2	10,2	12,9	15,3
Joint length-related m ³ /hm		0,54	0,83	1,06	1,25	1,41	1,57	1,98	2,35
Overall area-related m ³ /hm ²		1,40	2,14	2,72	3,21	3,54	4,05	5,11	6,07

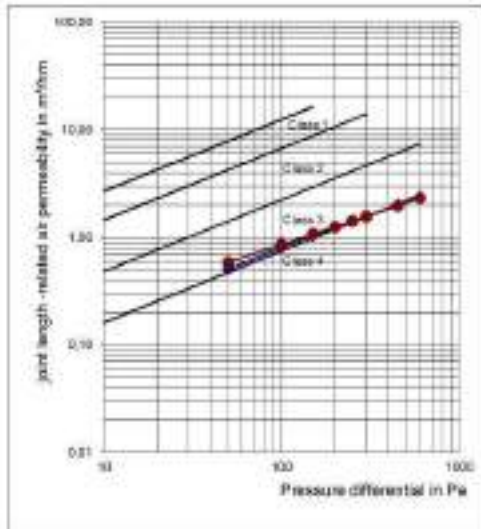


Diagram: Joint length-related air permeability (positive and negative wind pressures)

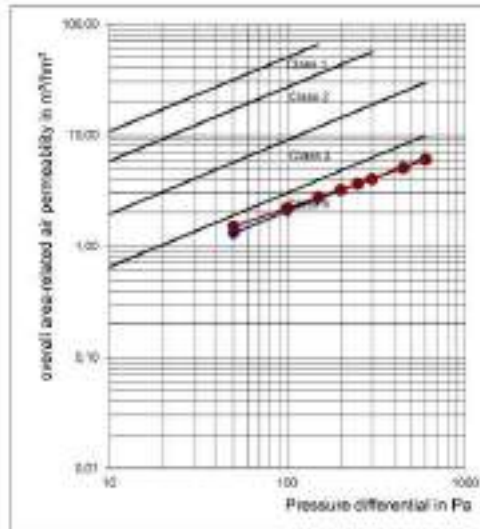


Diagram: Overall area-related air permeability (positive and negative wind pressures)

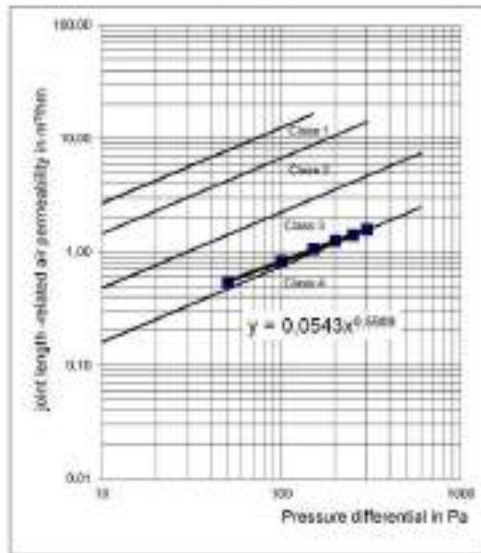


Diagram: Joint length-related air permeability (average value from positive and negative wind pressures)

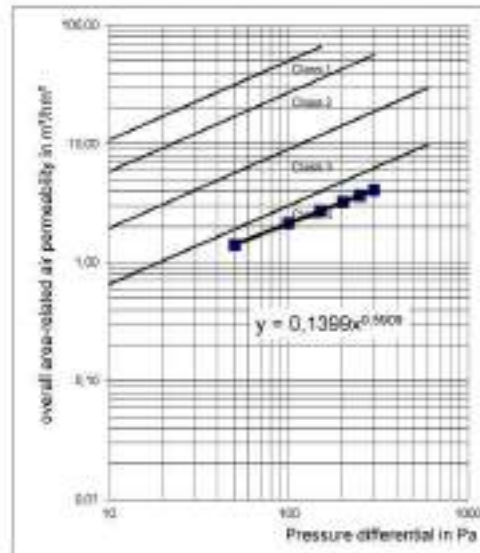


Diagram: Overall area-related air permeability (average value from positive and negative wind pressures)

Table: Measured results

Reference air permeability related to joint length	Q ₁₀₀ =	0,83 m ³ /hm
Reference air permeability related to overall area	Q ₁₀₀ =	2,13 m ³ /hm ²

Resistance to wind load, deflection and dynamic wind load - Test according to EN 12211

Project-No.	17-000146	Task No.	PR01
Client	Selectron Elektrokimya San. Ve tic. Ltd şti. (Arbor Wood Windows)		
Basis of test	EN 12211:2016-03 Windows and doors - Resistance to wind load - Test method		
Used test equipment	Epst026263 LWW-Prüfstand Fenster u. Fassade		
Test specimen	Single side hung casement door		
Test specimen No.	4300B-001		
Date of test	24. Januar 2017		
Responsible test engineer	Stephan Bertagnoli		
Tester	Atilla Özcelik		

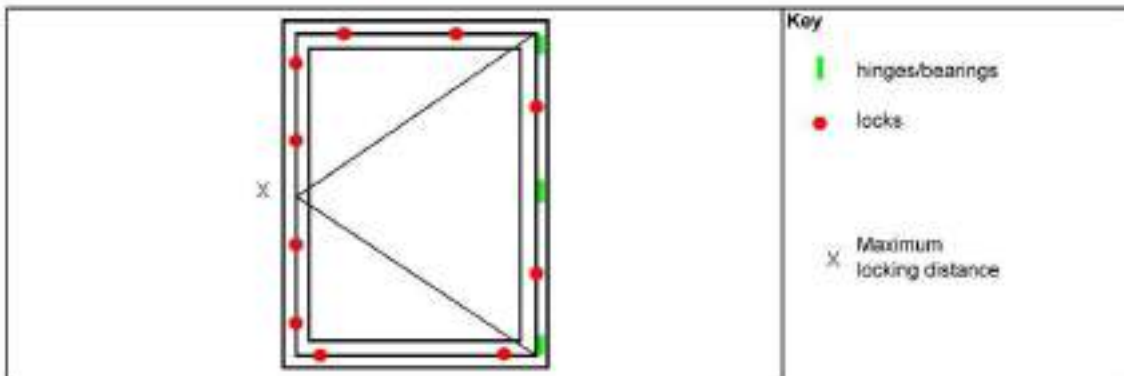
Information to test configuration / Test method

Test method There were no deviations from test method or test conditions.

Ambient conditions Temperature 14,7 °C Air humidity 47 % Atmospheric 1000 hPa

The ambience conditions are as specified by standard requirements.

Testing procedure



Maximum test pressure: ± 1600 Pa 3 pressure pulses of 1760 Pa

The deflection was not measured because, due to the perimeter locking and the existing locking distance at the existing specimen, the loads are directly conducted into the frame and no deformation of the frame members $> 1/300$ is likely to occur at the specified wind loads.

The test specimen was exposed to a load ± 1600 Pa as specified by EN 12211.

Dynamic wind loads (negative / positive pressures)

Table: pressure pulses

p_j	Pa	200	400	600	800	1000
passed					✓	

50 Cycles at $p_j \pm 800$ Pa

No malfunctions were detected.

Air permeability, Watertightness, Resistance to wind load

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Repeat test of air permeability - Test according to EN 1026

Project-No.	17-000146	Task No.	PR01
Client	Selectron Elektrokimya San. Ve tic. Ltd şti. (Arbor Wood Windows)		
Basis of test	EN 1026:2013-03 Windows and doors - Air permeability - Test method		
Used test equipment	Epst026263 LWW-Prüfstand Fenster u. Fassade		
Test specimen	Single side hung casement door		
Test specimen No.	4300B-001		
Date of test	24. Januar 2017		
Responsible test engineer	Stephan Bertagnoli		
Tester	Atilla Özcelik		

Information to test configuration / Test method

Test method	There were no deviations from test method or test conditions.					
Ambient conditions	Temperature	14,7 °C	Air humidity	47 %	Atmospheric	1000 hPa
	The ambience conditions are as specified by standard requirements.					

Testing procedure

Size of window frame	1100 mm	x	2300 mm
Size of active leaf	1012 mm	x	2247 mm
Size of inactive leaf	0 mm	x	0 mm
Area of test specimen	2,53 m ²		
Length of opening	6,52 m		

Subsequent to the test of resistance of wind load by application of test pressure p_1 and p_2 the upper limit of the achieved air permeability class must not be exceeded by more than 20% as set out by EN 12207.

The requirements were fulfilled.

Air permeability, Watertightness, Resistance to wind load

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Watertightness - Test according to EN 1027

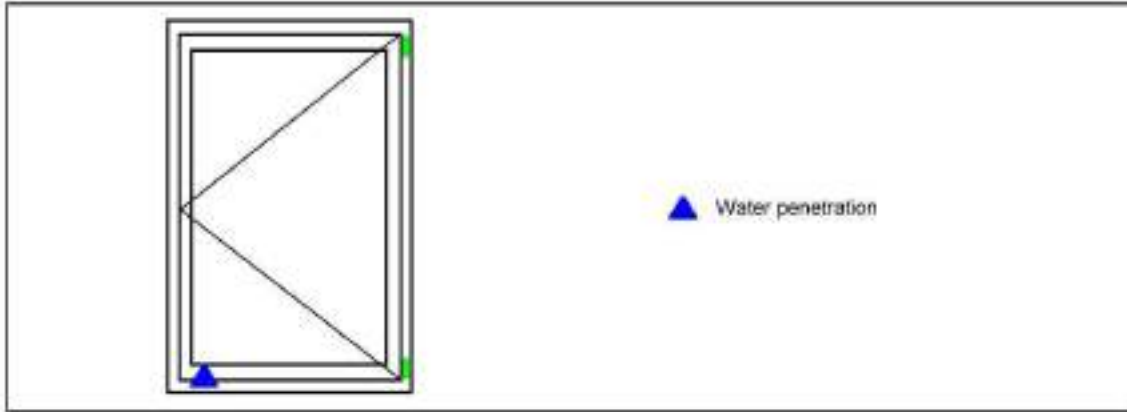
Project-No.	17-000146	Task No.	PR01
Client	Selectron Elektrokimya San. Ve tic. Ltd şti. (Arbor Wood Windows)		
Basis of test	EN 1027:2016-03 Windows and doors - Watertightness - Test method		
Used test equipment	Epst028263 LWW-Prüfstand Fenster u. Fassade		
Test specimen	Single side hung casement door		
Test specimen No.	43008-001		
Date of test	24. Januar 2017		
Responsible test engineer	Stephan Bertagnolli		
Tester	Atilla Oezcelik		

Information to test assembly and testing method

Testing method	There were no deviations from test method or test conditions.					
Ambience conditions	Temperature	14,7 °C	Air humidity	47 %	Atmospheric pressure	1000 hPa
	The ambience conditions are as specified by standard requirements.					

Testing procedure

Size of window frame	1100 mm	x	2300 mm		
Number of spray nozzles	3		Lower nozzle line		
Water amount	360 l/h		Water amount	0 l/h	
	0,36 m³/h			0 m³/h	
Spray method	A				

**Table: Test**

Pressure/Pa	Notice
0	No water penetration
50	No water penetration
100	No water penetration
150	No water penetration
200	No water penetration
250	No water penetration
300	No water penetration
450	No water penetration
600	water penetration

No water penetration at up to 450 Pa detected

Air permeability, Watertightness, Resistance to wind load

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Resistance to wind load, Safety test - Test according to EN 12211

Project-No.	17-000146	Task No.	PR01
Client	Selectron Elektrokimya San.ve tic. Ltd şti. (Arbor Wood Windows)		
Basis of test	EN 12211:2016-03 Windows and doors - Resistance to wind load - Test method		
Used test equipment	Epsb028263 LWW-Prüfstand Fenster u. Fassade		
Test specimen	Single side hung casement door		
Test specimen No.	43008-001		
Date of test	24. Januar 2017		
Responsible test engineer	Stephan Bertagnoli		
Tester	Atilla Oezcelik		

Information to test assembly and testing method

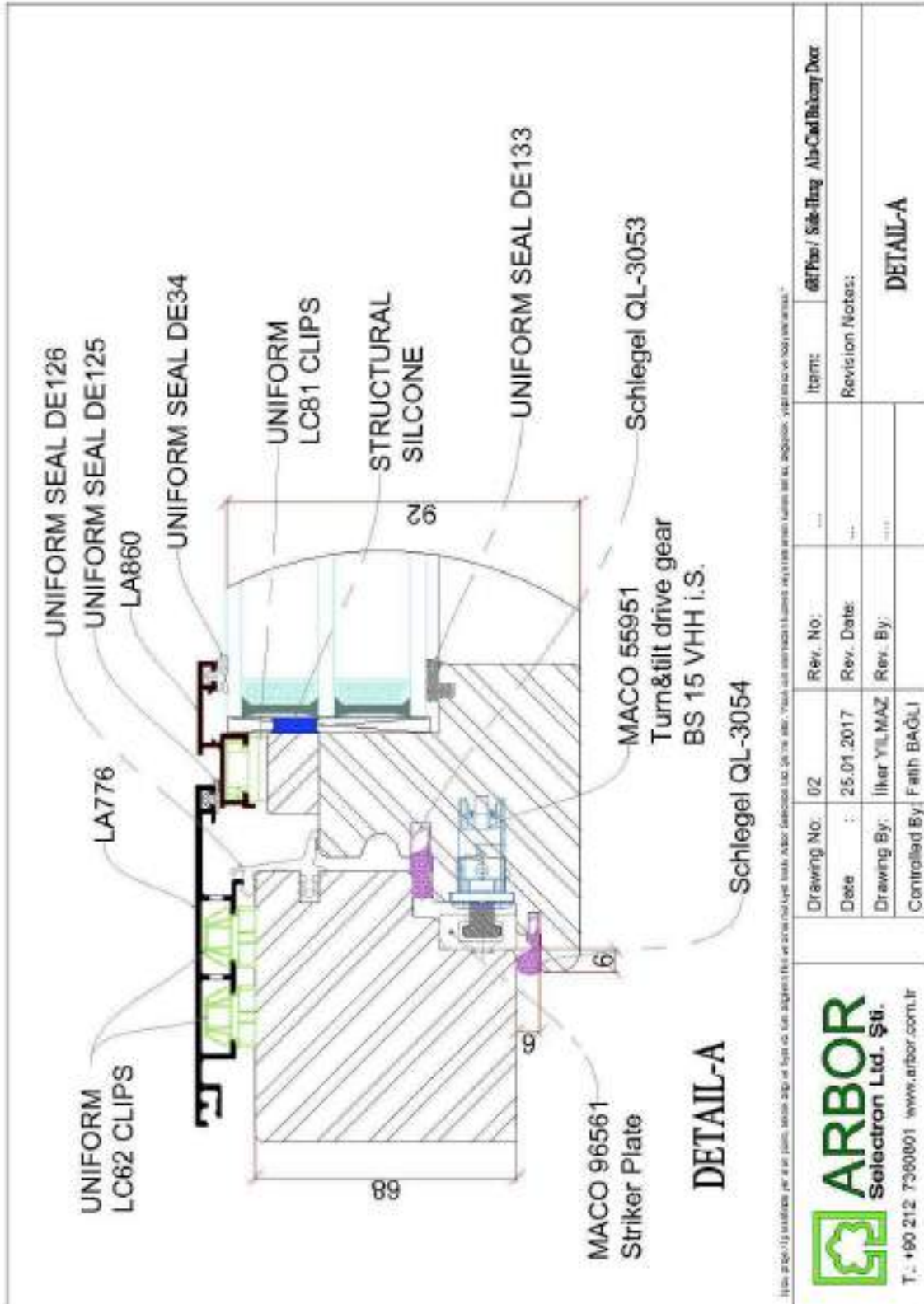
Testing method	There were no deviations from test method or test conditions.					
Ambience conditions	Temperature	14,7 °C	Air humidity	47 %	Atmospheric pressure	1000 hPa
	The ambience conditions are as specified by standard requirements.					

Safety test

Table: Pressure steps

p ₃	Pa	Positive wind pressure					Negative wind pressure				
		600	1200	1800	2400	3000	-600	-1200	-1800	-2400	-3000
passed					✓					✓	

Safety test passed at up to p₃ ± 2400 Pa.



Drawing 2
Detail A

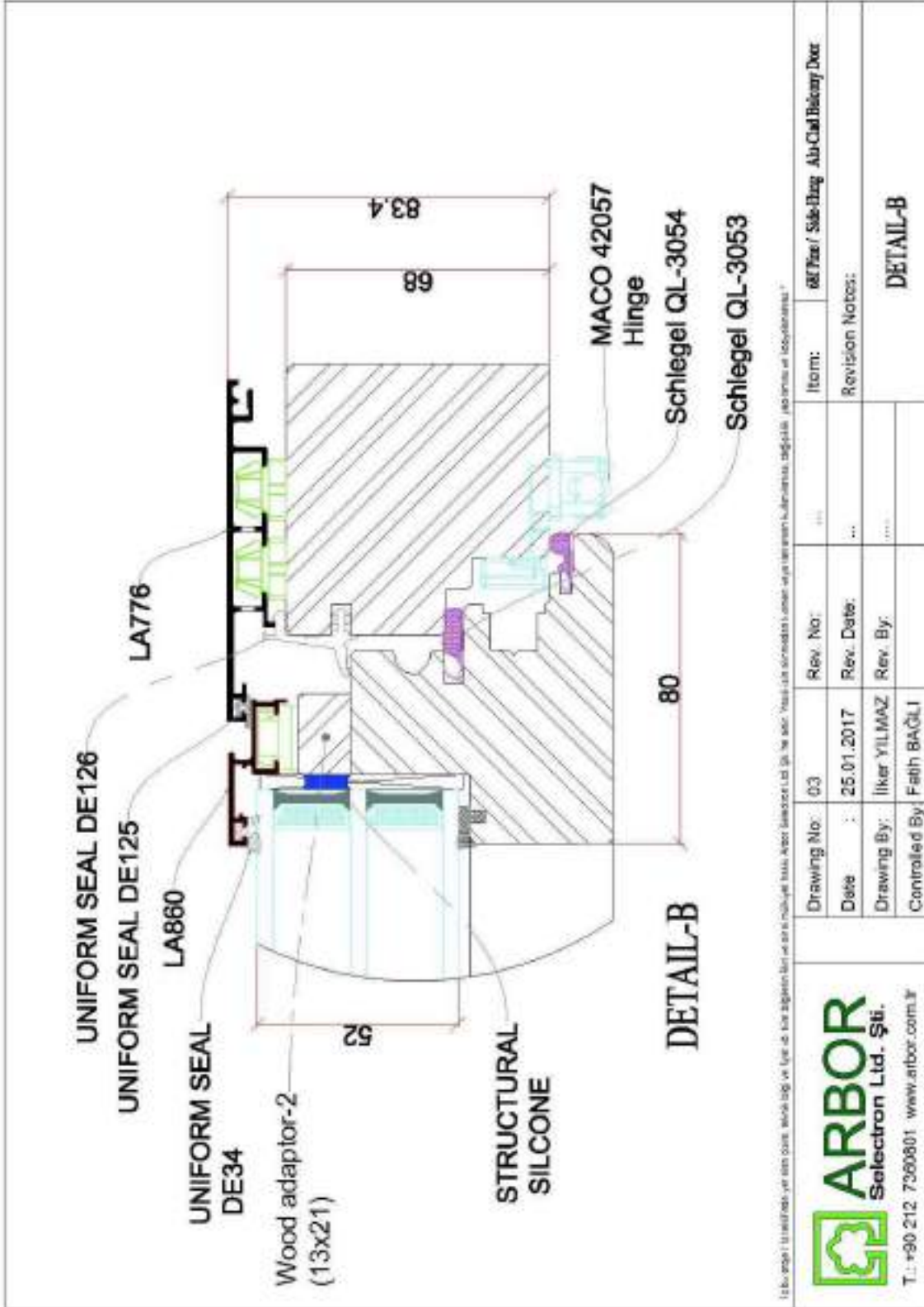
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İstanbul'da faaliyet gösteren bir inşaat firmasıdır. Bu belge, firmamızın inşaat sektöründe faaliyet gösterdiği alanlardaki projeler için hazırlanmıştır.

Drawing No:	03	Rev. No:	...	Item:	681 Pine / Side-Hing. Alu-Clad Heavy Door
Date:	25.01.2017	Rev. Date:	...	Revision Notes:	
Drawing By:	İlker YILMAZ	Rev. By:	DETAIL-B	
Controlled By:	Fatih BAĞLI				

ARBOR
 Selectron Ltd. Şti.
 T. +90 212 7360801 www.arbor.com.tr

Drawing 3
Detail B

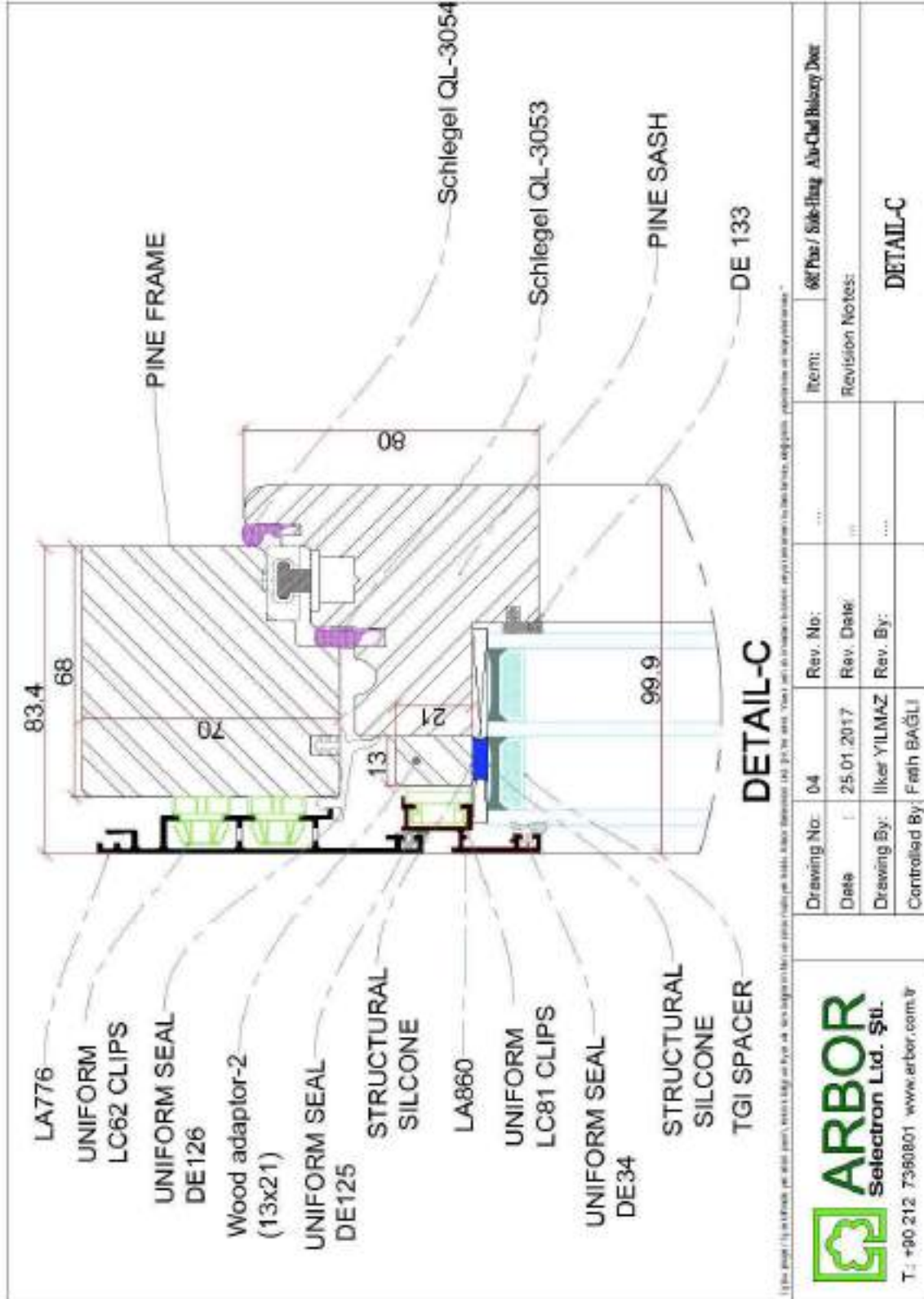
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Drawing 3
Detail C

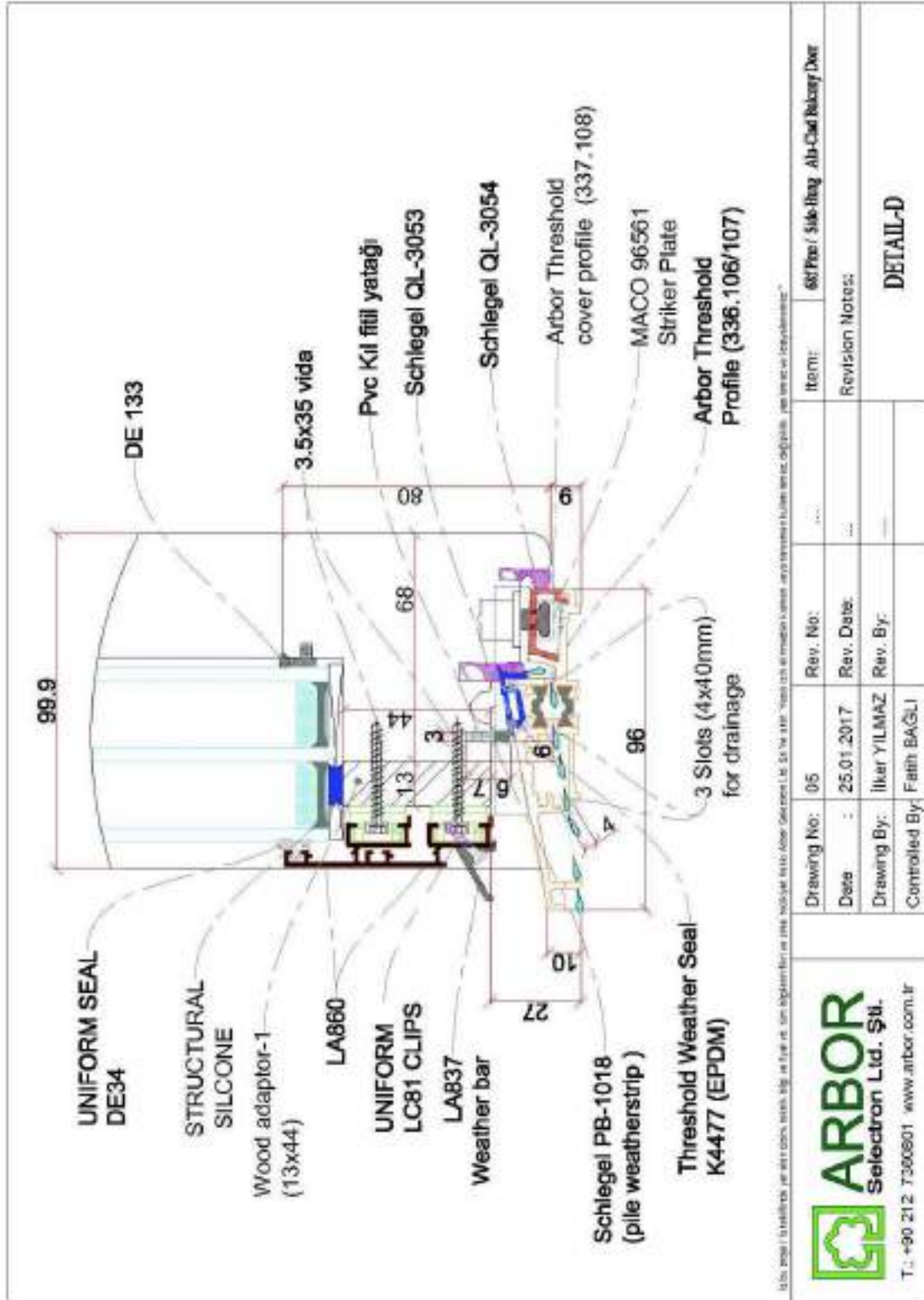
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Drawing 3
Detail D



Photo 1
View of test specimen on window test rig
Window closed



Photo 2
View of test specimen on window test rig
Window open



Photo 3
Rebate drainage on threshold



Photo 4
Rebate drainage to outside



Photo 5
External rebate seal, corner configuration



Photo 6
External rebate seal, sealant joint



Photo 7
Centre seal, corner configuration



Photo 8
Centre seal, sealant joint



Photo 9
Centre seal on sash, brush gasket, corner configuration,



Photo 10
Threshold seal, sealant joint



Photo 11
Threshold seal, additional sealed with pourable sealant horizontal at bottom and lateral



Photo 12
Threshold seal, additional sealed with pourable sealant lateral



Photo 13
Sash seal, corner configuration



Photo 14
Sash seal, sealant joint



Photo 15
Configuration of threshold



Photo 16
Configuration of threshold



Photo 17
Weather bar



Photo 18
Weather bar



Photo 19
External glazing seal, corner configuration



Photo 20
External glazing seal, sealant joint



Photo 21
External glazing seal, sealant joint



Photo 22
Internal glazing seal, corner configuration



Photo 23
View of horizontal glazing rebate, additional sealed with pourable sealant



Photo 24
View of horizontal glazing rebate, additional sealed with pourable sealant



Photo 25
Turn mechanism pivot, internal view



Photo 26
Turn mechanism pivot, rebate view



Photo 27
Corner pivot, internal view



Photo 28
Corner pivot, rebate view



Photo 29
Turn mechanism pivot, rebate view, at top



Photo 30
Locking situation, frame / sash, rear-engaging

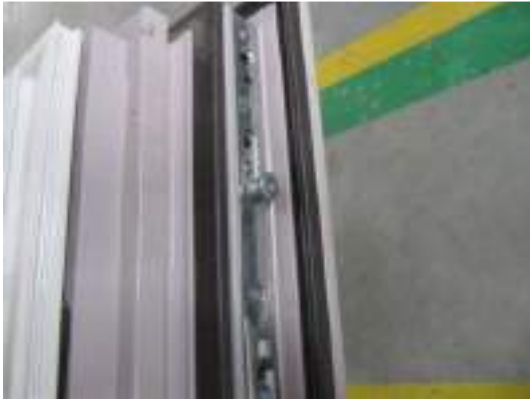


Photo 31
Locking situation, frame member / sash member



Photo 32
Locking situation, frame member / sash member



Photo 33
Locking situation, frame member / sash member



Photo 34
Locking situation, frame member / sash member



Photo 35
Rocker bearing



Photo 36
Water penetration