

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load,
Load-bearing capacity of safety devices

Test Report

No. **11-002464-PR01**

(PB-A01-02-en-01)



Client
ALCAS Aluminium
Profile Systems
Kaya Millenium Is Merkezi Kaya Kat: 7 No:131
34524 Beylikdüzü - Istanbul
Turkey

Product
Tilt and turn window

Designation
System designation: AW 69

Performance-relevant product details
Material: Aluminium profiles with thermal break

Overall dimensions (WxH)
790 mm x 1,190 mm

Special features
Locking point at top on lock side under maximum hold.

Basis

EN 14351-1:2006+A1:2010

Test standard/s:

EN 1026:2000-06

EN 1027:2000-06

EN 12046-1:2003-11

EN 12211:2000-06

EN 14609:2004-06

Correspond/s to the national standard/s (e.g. DIN EN)

Representation



Results

Air permeability according to EN 12207:1999-11



Class 4

Watertightness according to EN 12208:1999-11



Class E 900

Resistance to wind load
according to EN 12210:1999-11/AC:2002-08



Class C3

Instructions for use

The results obtained can be used by the manufacturer as the basis for the manufacturer ITT test report summary. 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 22 pages.

ift Rosenheim
29. August 2011


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DAP-PL-0808 99
DAP-ZE-2288 00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

1. Object

1.1 Description of test specimen

Product	Tilt and turn window
Manufacturer	Alcas Alüminyum San. Ltd. Şti.
Date of manufacture	August 2011
System	AW69
Type of opening / Opening directions	Tilt and turn, DIN left, inward opening
Frame material	Aluminium profiles with thermal break
Overall frame dimensions (W x H)	790 mm x 1,190 mm
Overall casement dimensions (W x H)	711 mm x 1,111 mm
Casement weight	27.2 kg
Frame member	AW69 TF 2002, further details are given in drawings
Frame joint	mitred, compressed and bonded
Casement member	AW69 TV 2004, further details are given in drawings
Frame joint	mitred, compressed and bonded
Rebate design	
Rebate drainage	2 slots of 6 mm x 40 mm inside rebate, to outside front 2 slots 6 mm x 40 mm, with cover caps
Rebate seal	
External	
Material	Sealing material – EPDM
Manufacturer	Coşkun Kauçuk
Article number	01-2034
Corner configuration	mitred and bonded
Centre	
Material	Sealing material – EPDM
Manufacturer	Coşkun Kauçuk
Article number	01-2103
Corner configuration	mitred and bonded, additional sealed with pourable sealant at corners, additional sealed with pourable sealant horizontal at bottom and on hinge side and on lock side 100 mm from corner, further details see picture X
Internal	
Material	Sealing material – EPDM
Manufacturer	Coşkun Kauçuk
Article number	01-2034
Corner configuration	mitred and bonded
Pressure equalisation	At top horizontal without external gasket.
Infill	Insulating glass unit, configuration 6 / 12 / 6
Installation of infills	
Glazing gasket	
External	
Material	Sealing material – EPDM
Manufacturer	Coşkun Kauçuk
Article number	01-2023

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Corner configuration	mitred and bonded, corners additional sealed with pourable sealant
Internal	
Material	Sealing material – EPDM
Manufacturer	Coşkun Kauçuk
Article number	01-2005
Corner configuration	butt-jointed with glazing bead 22 G 06
Vapour pressure equalisation	at bottom 2 slots 5 mm x 23 mm, lateral at top each one drill Ø 5 mm
Hardware	
Type / Manufacturer	Tilt and turn hardware, GU, Jet AKS 8
Hinges / Bearings	1 tilt mechanism pivot 1 corner pivot
Number of locks	on hinge side 1, on lock side 3
Maximum locking distance	835 mm
Position of locks	neutral Locking point at top on lock side under maximum hold.

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: Alcas Alüminyum San. Ltd. Şti.
Ersin Cengiz

Date: 22 August 2011

Delivered on: 24 August 2011

ift-Pk-Number: 28389/024

2. Procedure

2.1 Basis*) referring to methods

Testing

EN 1026:2000-06

Windows and doors - Air permeability - Test method

EN 1027:2000-06

Windows and doors - Watertightness - Test method

EN 12046-1:2003-11

Operating forces - Test method - Part 1: Windows

EN 12211:2000-06

Windows and doors - Resistance to wind load - Test method

EN 14609:2004-06

Windows - Determination of the resistance to static torsion

Classification / Evaluation

EN 12207:1999-11

Windows and doors - Air permeability - Classification

EN 12208:1999-11

Windows and doors - Watertightness - Classification

EN 12210:1999-11/AC:2002-08

Windows and doors - Resistance to wind load - Classification

EN 14351-1:2006+A1:2010

Windows and doors - Product standard, performance characteristics -

Part 1: Windows and external pedestrian doorsets without resistance to fire and/or
smoke leakage characteristics

*) 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.

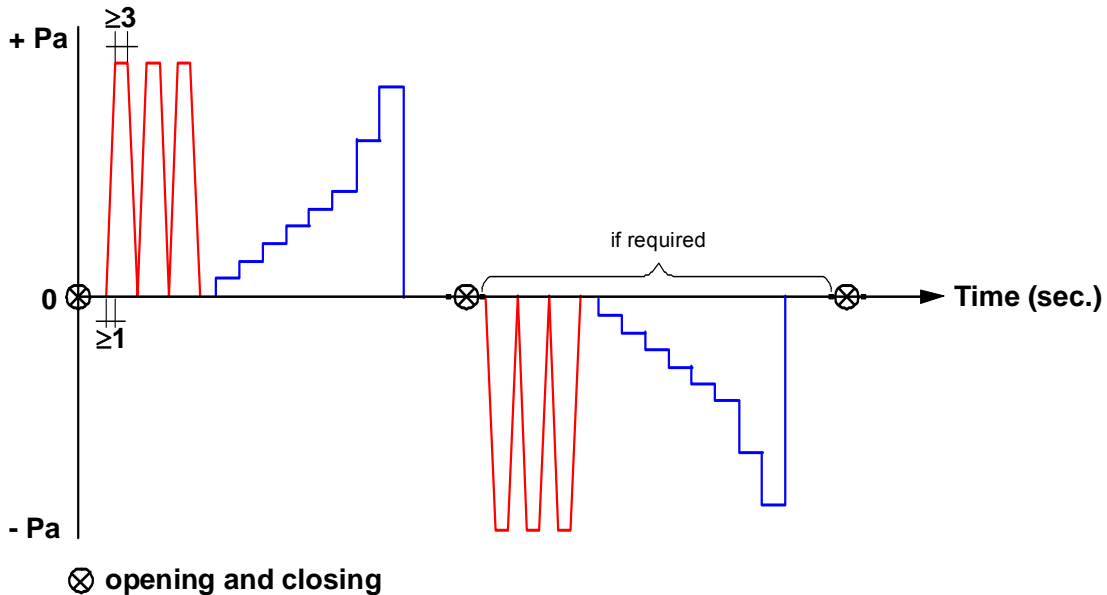


Illustration Test sequence for air permeability

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

Watertightness is tested in accordance with EN 1027 up to the maximum test pressure difference. The external face of the test specimen is subjected to constant spraying of water by an upper row of nozzles at a flow rate of approx. 2 l/min per nozzle while increments of positive test pressure are applied at regular intervals. For test specimen exceeding 2.50 m in overall height, additional rows of nozzles are fixed at vertical intervals at 1.5 m below the top nozzle line. The water flow rate of the additional nozzle rows is approx. 1 l/min per nozzle.

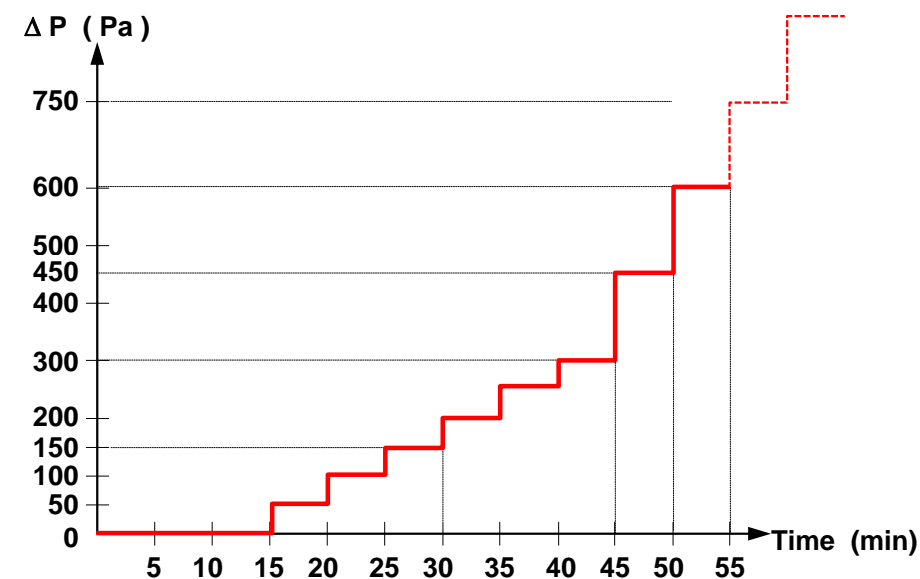


Illustration Test sequence for watertightness

Resistance to wind load – Safety test - EN 1211

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

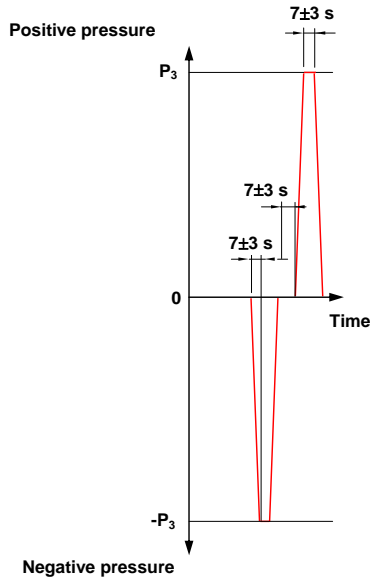


Illustration Test sequence for safety test

Load-bearing capacity of safety devices - EN 14609

Load-bearing capacity of safety devices is tested in accordance with EN 14609. The safety devices are subjected to individual loads of 350 N in the most unfavourable loading direction for 60 seconds. The load is applied pointwise. In deviation from EN 14609 the load can be applied directly to the safety device so as to test the most unfavourable load application to the stay bearing.

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3. Detailed results

Test record

Specimen	Tilt and turn window				
Project No.	11-002464				
Client	Alcas Alüminyum San. Ltd. Şti.	Size of window frame	790	x	1190 mm
System	AW69	Size of casement	710	x	1110 mm
Frame material	Aluminium profiles with thermal break				
Date of test	25. August 2011	Area of test specimen	0,9	m ²	
Tester	A.Özcelik	Length of opening joints	3,6	m	
Specimen No.	28389/024	Casement weight	27,2	kg	
Date of delivery	24. August 2011	Temperature	27	° C	
Date of manufacture	August 2011	Air humidity	56,6	%	
Attended by:	Mr. Ersin Cengiz	Air pressure	1016	hPa	

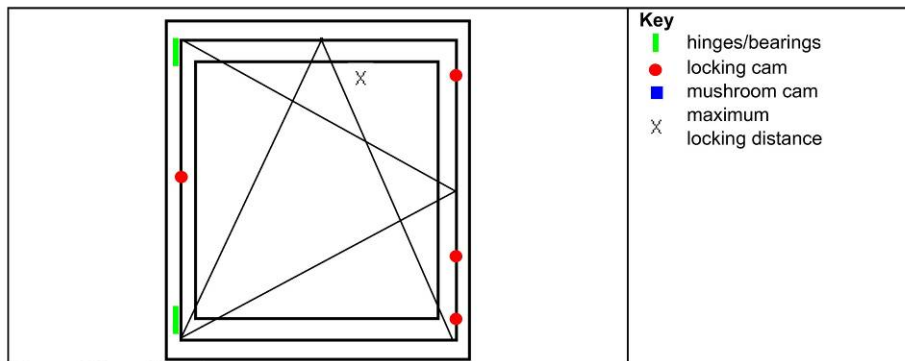


Figure 1 View of specimen

1 Operating forces - Test according to EN 12046

Table: Measurement of operating forces

Individual measured in Nm	1	2	3	Average value
	13,3	13,0	13,1	13,1

2 Air permeability - Test according to EN 1026

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	1,9	3,0	3,8	4,4	4,7	5,0	6,1	6,9
Joint length-related	m ³ /hm	0,52	0,81	1,04	1,21	1,29	1,38	1,68	1,88
Overall area-related	m ³ /hm ²	2,02	3,15	4,01	4,67	4,99	5,33	6,50	7,30

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	1,1	2,2	3,0	3,5	4,1	4,6	5,8	6,8
Joint length-related	m ³ /hm	0,29	0,61	0,82	0,97	1,12	1,26	1,60	1,88
Overall area-related	m ³ /hm ²	1,12	2,36	3,18	3,74	4,34	4,86	6,20	7,28

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	1,5	2,6	3,4	4,0	4,4	4,8	6,0	6,9
Joint length-related	m ³ /hm	0,41	0,71	0,93	1,09	1,20	1,32	1,64	1,88
Overall area-related	m ³ /hm ²	1,57	2,76	3,60	4,21	4,66	5,10	6,35	7,29

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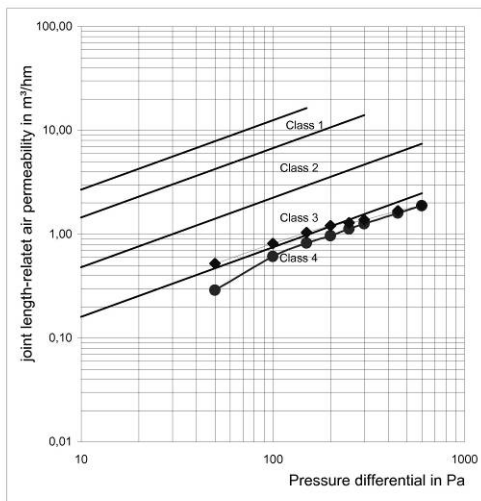


Diagram: Joint length-related air permeability
(positive and negative wind pressures)

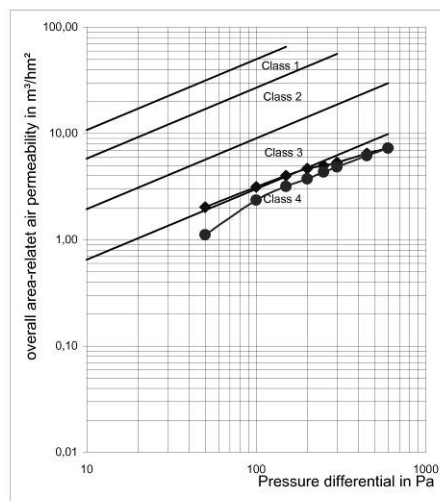


Diagram: Overall area-related air permeability
(positive and negative wind pressures)

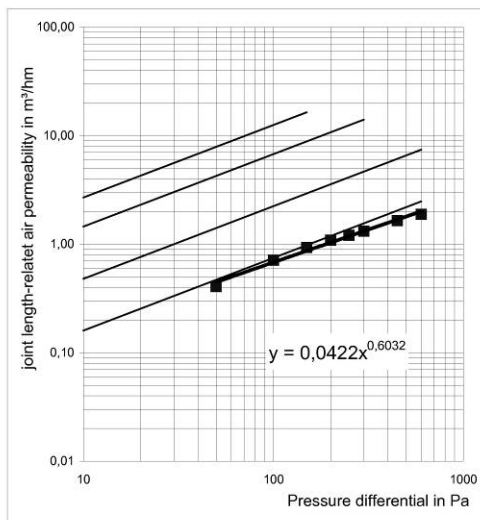


Diagram: Joint length-related air permeability
(average value from positive and negative wind pressures)

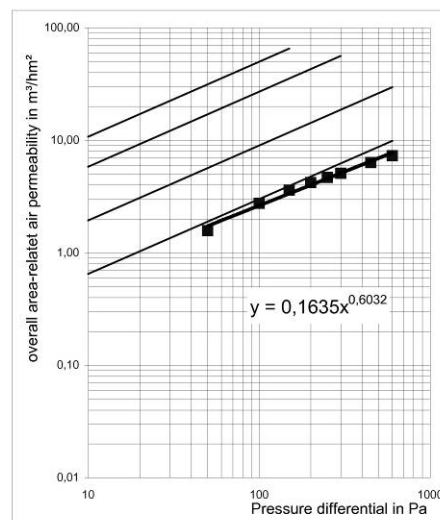


Diagram: Overall area-related air permeability
(average value from positive and negative wind pressures)

Table: Measured results

Reference air permeability related to joint length	Q100 = 0,68 m³/hm
Reference air permeability related to overall area	Q100 = 2,63 m³/hm²

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3 Resistance to wind load - Test according to EN 12211

3.1 Deflection under wind load

Maximum test pressure: \pm 1200 Pa 3 pressure pulses of 1320 Pa

Deflection was not measured because due to the perimeter locking and the existing locking distance no deformation of the frame members $> l/300$ is likely to occur at the specified wind loads.
The test specimen was exposed to a load \pm 1200 Pa as specified by EN 12211.

3.2 Dynamic wind loads (negative / positive pressures)

Table: Pressure steps

p_2	Pa	200	400	600	800	1000
passed				✓		

50 cycles at $p_2 \pm$ 600 Pa

No malfunctions were detected.

4 Repeat test of air permeability - Test according to EN 1026

Subsequent to the test of resistance to wind load by application of test pressures 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 (Clause 2 of this test record).
The requirements were fulfilled.

5 Watertightness - Test according to EN 1027

No water penetration at up to 900 Pa detected.

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

p_2	Pa	positive wind pressure					negative wind pressure				
		600	1200	1800	2400	3000	-600	-1200	-1800	-2400	-3000
passed				✓					✓		

Safety test passed at up to $p_3 \pm$ 1800 Pa passed.

6 Load-bearing capacity of safety devices

The testing of the safety device is carried out with a load of 350N for 60s.
No malfunctions were detected at the test specimen.

ift Rosenheim
25. August 2011

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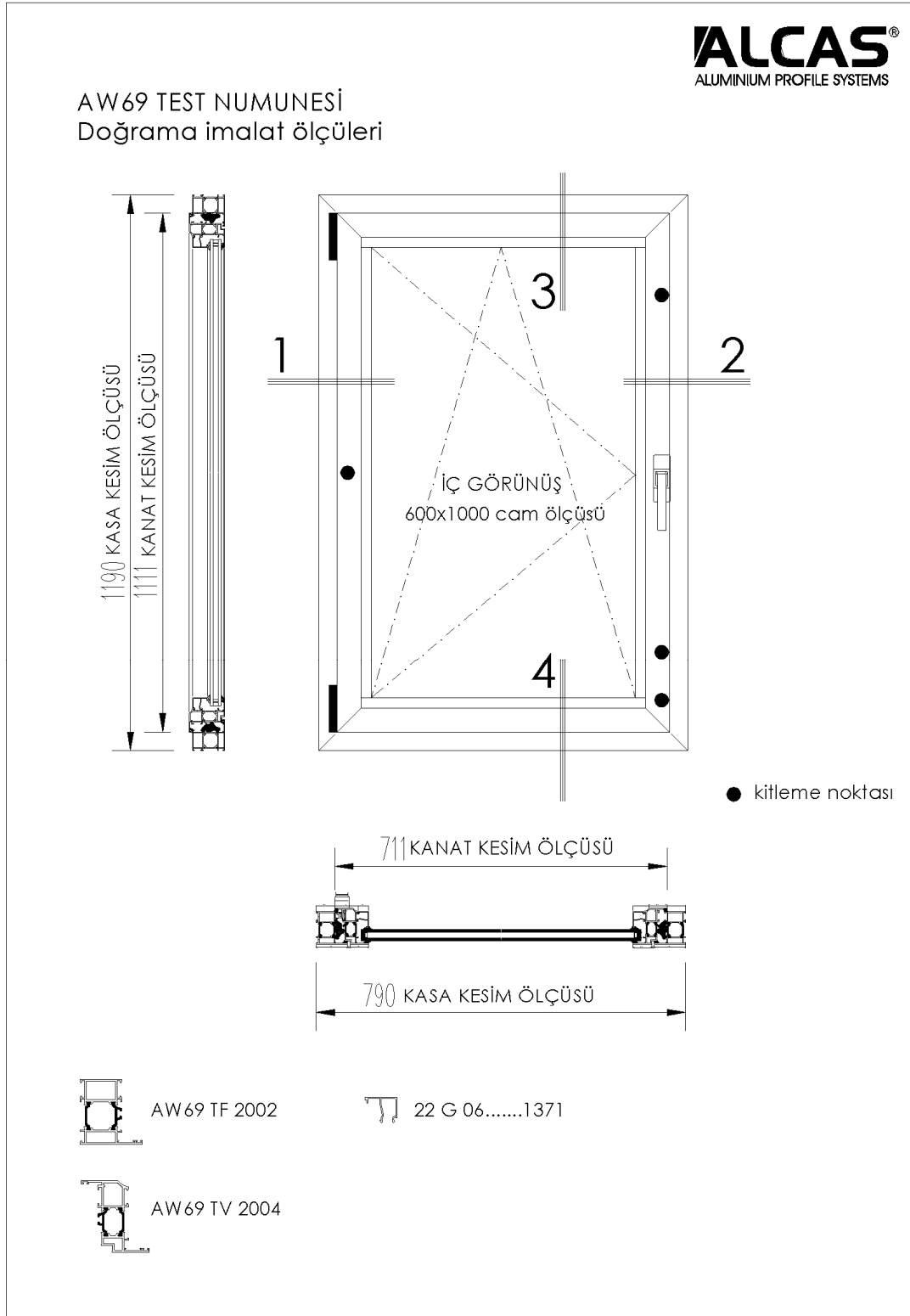


Fig. Drawing of test specimen

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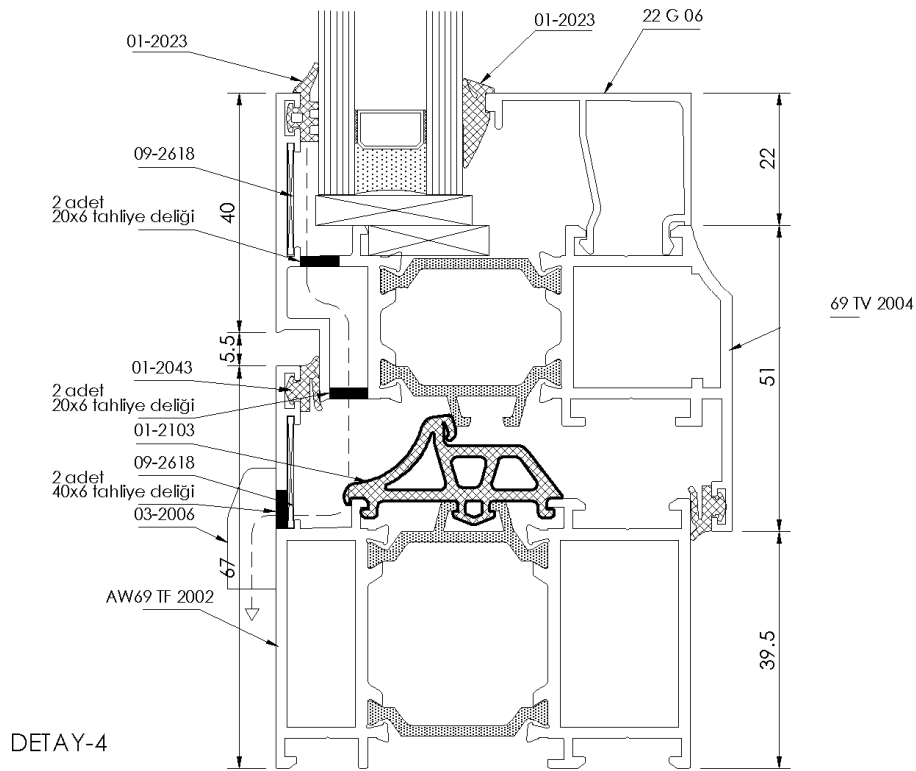
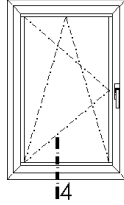


Fig. Vertical section

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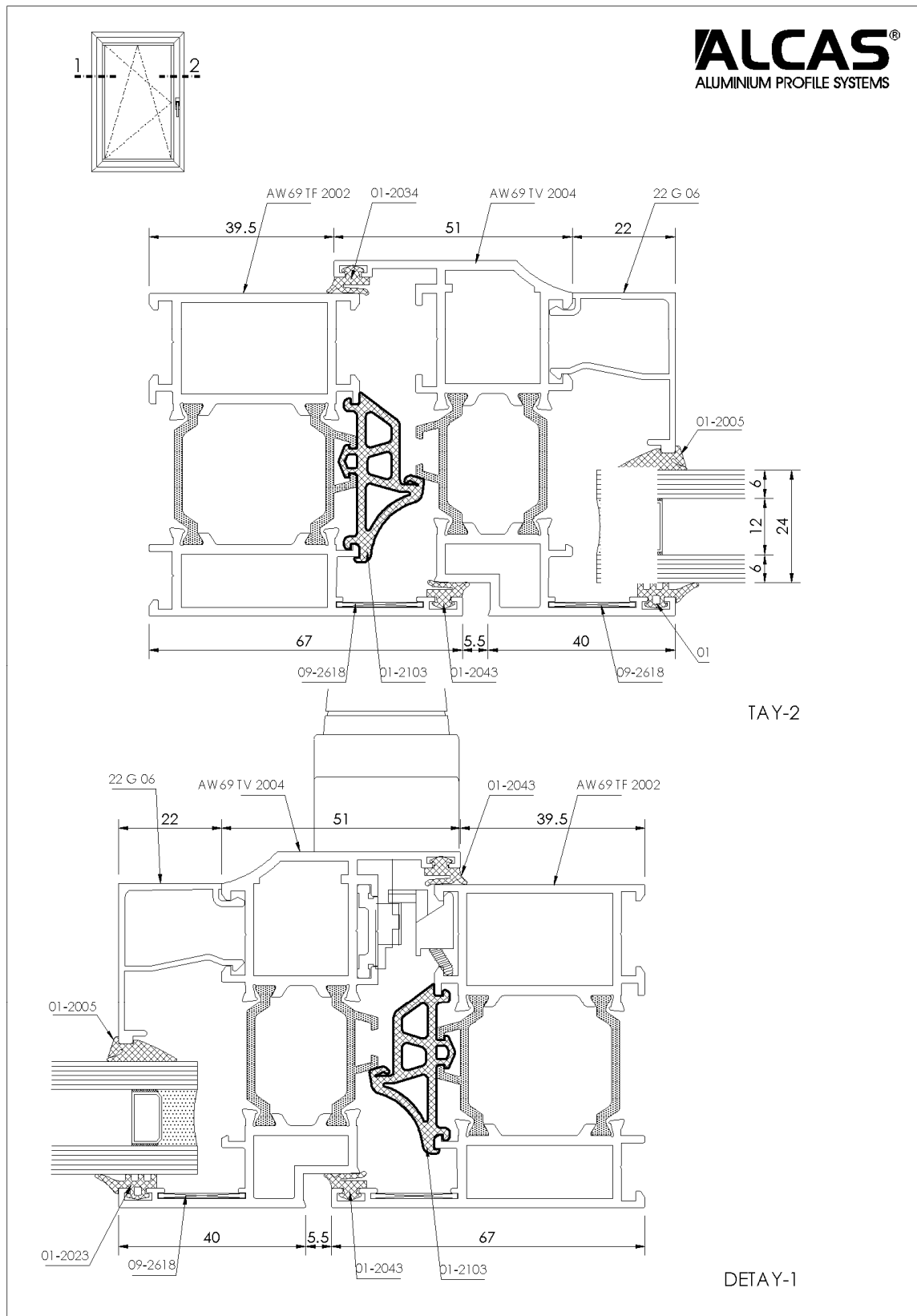


Fig. Horizontal section

Evidence of Performance

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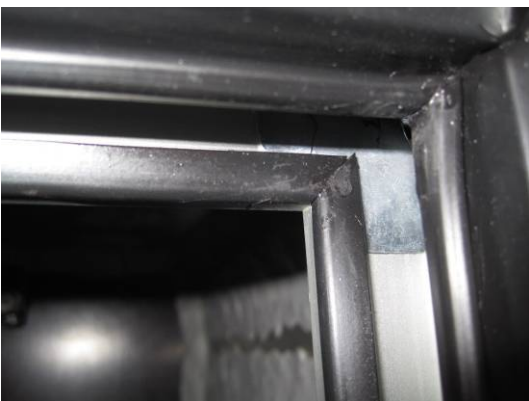
Picture
View of test specimen on window test rig
Window closed



Picture
View of test specimen on window test rig
Window open



Picture
Rebate drainage



Picture
External rebate seal, corner configuration