

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load



Test Report

No 16-001817-PR02

(PB-A01-02-en-01)

Client	ALIPLAST Sp. z o.o. ul. Wacława Moritza 3 20-276 Lublin Poland
Product	Tilt and turn window
Designation	System designation: ECO FUTURAL OC
Performance-relevant product details	Material: Aluminium profiles with thermal break
Overall dimensions (W x H)	1,000 mm x 2,500 mm
Special features	IGU bonded to casement profile locally (see description) Material compatibility must be taken into account Concealed sash The test sequence was changed due to client's requirement

Basis

EN 14351-1:2006+A1:2010

Test standard/s:
EN 1026:2000-06
EN 1027:2000-06
EN 12211:2000-06

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 E900

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



Class C3/B3

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 19 pages.

ift Rosenheim

05.10.2016

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1 Object

1.1 Description of test specimen

Single tilt and turn window 1,000 x 2,500 mm

Manufacturer	ALIPLAST Sp. z o.o. 20-276 Lublin, Poland
Designation / Type / Item No.	ECO FUTURAL OC
Material	Aluminium profiles with thermal break
Special features	concealed sash
Type of opening	tilt and turn
Opening directions	DIN right, inward opening

Frame member

Designation / Type / Item No.	EF214
Overall dimensions in mm	1000 x 2500
Type of joint	mitred, pressed and bonded using Cosmofen Duo
Optional components	aluminium corners
Designation / Type / Item No.	ACIP921A, ACTL010B

Sash member

Designation / Type / Item No.	EF1220
Overall dimensions in mm	956 x 2,456
Type of joint	mitred, pressed and bonded using Cosmofen Duo
Optional components	aluminium corners
Designation / Type / Item No.	ACEF1220B
Weight in kg	60

Rebate design

Rebate drainage	semi trapezoidal, 20/25 mm x 13.5 mm
Drainage caps	ACVG45Z

Rebate seal internal

Designation / Type / Item No.	ACVL031N
Material	EPDM
Type of joint	corners mitred and bonded
Additional measures	sealed using pourable sealant

IGU double

Thickness in mm	26
Configuration in mm	float 4 / cavity 16 / SSG 6

Incorporation of infill panel

Vapour pressure equalisation	none pressure equalisation
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Glazing gasket external

Material	PCV-P, coextruded with glazing bead EF260
Type of joint	corner mitred and bonded



Glazing gasket internal

Designation / Type / Item No.	ACVG231N
Material	EPDM
Type of joint	continuous, at top centre butt-joined and bonded
Additional measurement	sealed using pourable sealant

Glazing bead

Designation / Type / Item No.	EF261
Type of joint	mitred
Fixing method/fasteners	clamped and bonded in corners with sealant ACSIL04

Fixing glass in casements

Designation / Type / Item No.	DC 776 Instant Fix WB
Material	one-component silicon
Configuration	150 mm segments every 300 mm on sides; continuous at top and bottom

Tilt and turn hardware

Manufacturer	GU
Designation / Type / Item No.	UNI JET
Hinges / Bearing	1 corner pivot, 1 tilt mechanism pivot
Number of locking devices	at bottom 2, at top 1, on hinge side 3, at lock side 6
Locking distance, max. in mm	600
Positions of locking devices	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: Aliplast sp. z o.o., ul Waclawa Moritz 3, 20-276 Lublin, Poland

Date: 28.07.2016

Verification: A sampling report has been provided to the ift.

Delivered on: 4.08.2016

ift specimen No: 41928-003



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 12211:2000-06

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 12210:1999-11/AC:2002-08

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.

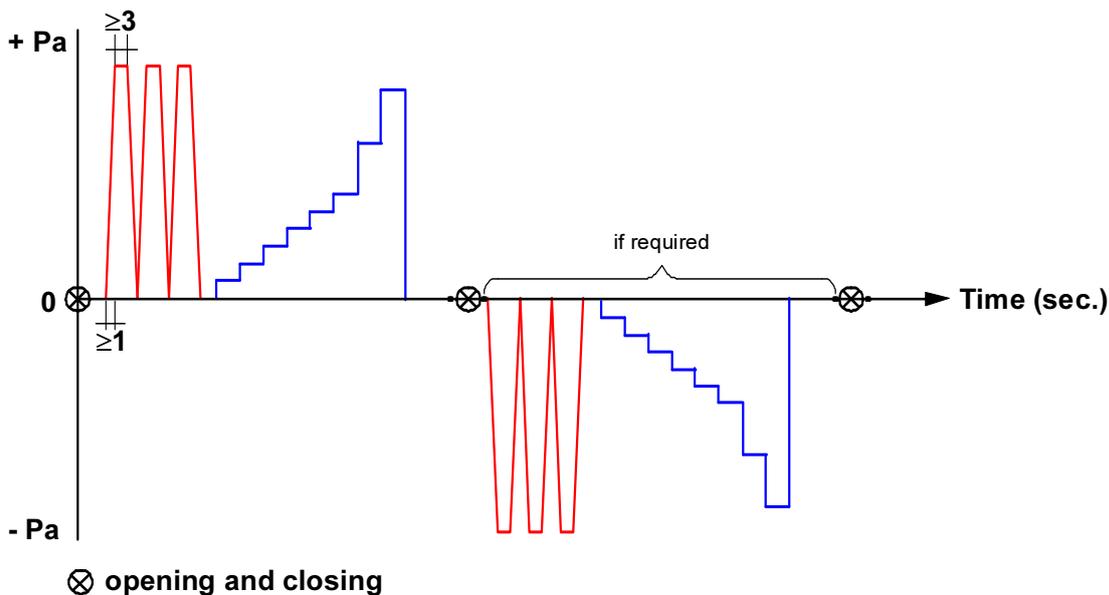


Illustration Test sequence for air permeability

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.

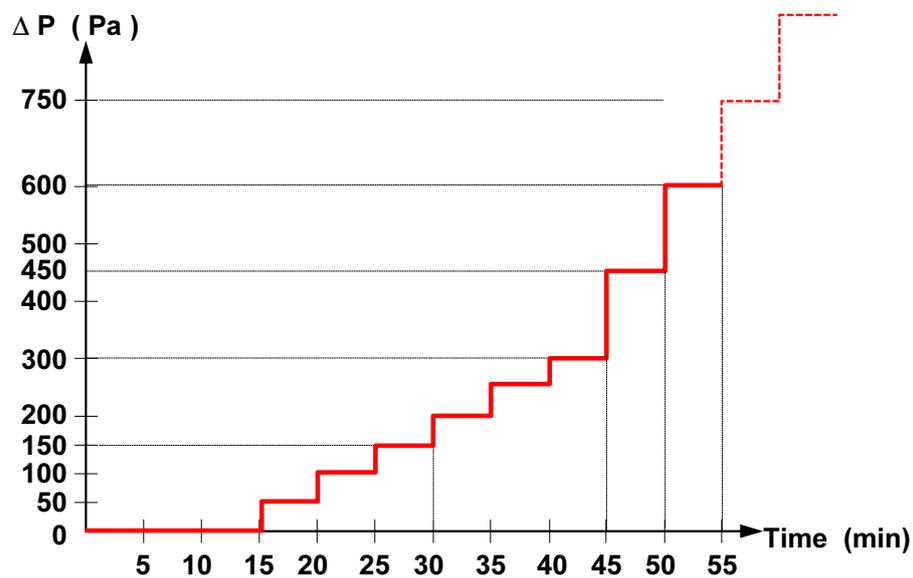


Illustration Test sequence for watertightness

Resistance to wind load - 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 $\pm \Delta p_2 = \Delta p_1 - 50\%$.

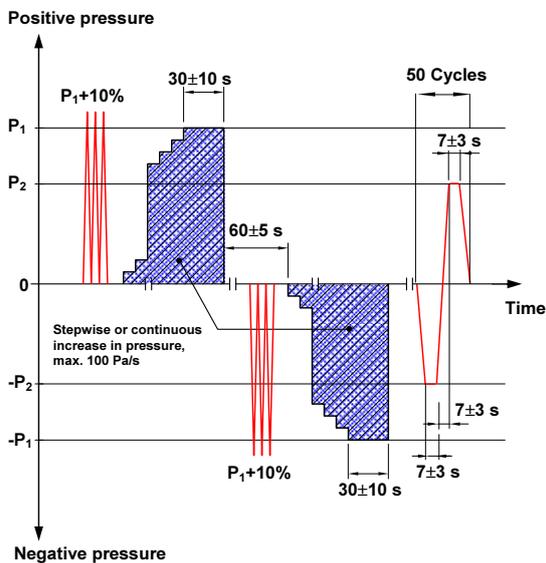


Illustration Test sequence for resistance to wind load

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.

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 $\Delta p_3 = p_1 + 50\%$.

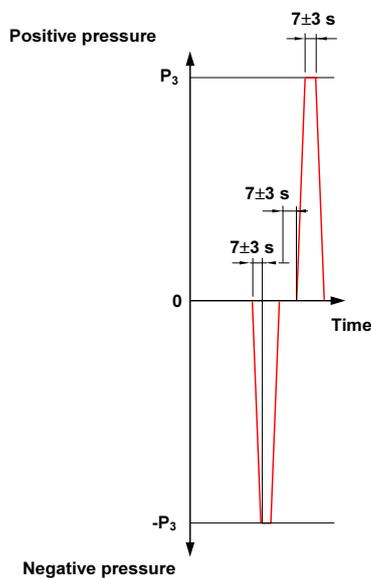


Illustration Test sequence for safety test

3 Detailed results

Air permeability - Test according to EN 1026

Project-No.	16-001817- PR02	Task No.	16-001817
Client	Aliplast sp. z o.o., ul. W.Moritz 3, 20-276 Lublin		
Basis of test	EN 1026:2000-06 Windows and doors - Air permeability - Test method		
Used test equipment	EPst/026377-LWW Prüfstand -Aliplast sp. z o.o.,-Lublin (Polen) "Umbau Schulten"		
Test specimen	Tilt and turn window		
Test specimen No.	41928-003		
Date of test	10.08.2016		
Responsible test engineer	Thomas Stefan		
Tester	Andrzej Wicha		

Information to test assembly and testing method

Testing method	There were no deviations from test method or test conditions.					
Ambience conditions	Temperature	17 °C	Air humidity	58 %	Atmospheric pressure	1017 hPa
	The ambience conditions are as specified by standard requirements.					

Testing procedure

Size of window frame	1000 mm	x	2500 mm
Size of active leaf	956 mm	x	2456 mm
Area of test specimen	2,50 m ²		
Length of opening joints	6,82 m		

Table: Measurement of operating forces

Individual measured result	1	2	3	Average value
in Nm	9,5	10,0	9,5	9,7

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	1,00	1,73	2,63	3,75	4,63	5,38	7,42	9,24
	Joint length-related m ³ /hm	0,15	0,25	0,39	0,55	0,68	0,79	1,09	1,35
	Overall area-related m ³ /hm ²	0,40	0,69	1,05	1,50	1,85	2,15	2,97	3,70

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	0,90	1,24	2,11	2,78	3,51	4,21	6,68	9,41
	Joint length-related m ³ /hm	0,13	0,18	0,31	0,41	0,51	0,62	0,98	1,38
	Overall area-related m ³ /hm ²	0,36	0,50	0,84	1,11	1,40	1,68	2,67	3,76



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		1,0	1,5	2,4	3,3	4,1	4,8	7,1	9,3
Joint length-related m ³ /hm		0,14	0,22	0,35	0,48	0,60	0,70	1,03	1,37
Overall area-related m ³ /hm ²		0,38	0,59	0,95	1,31	1,63	1,92	2,82	3,73

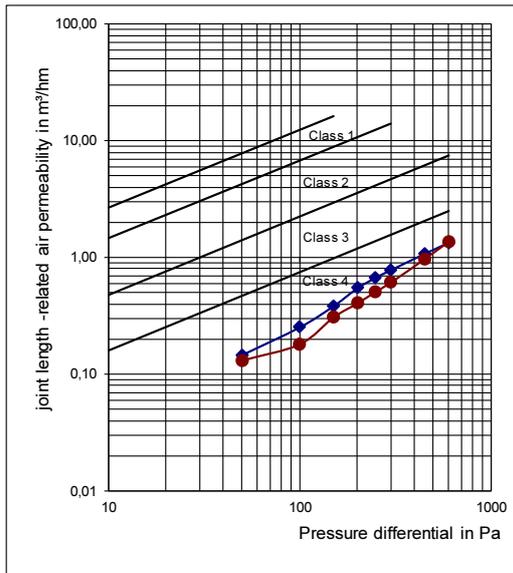


Diagram: Joint length-related air permeability (positive and negative wind pressures)

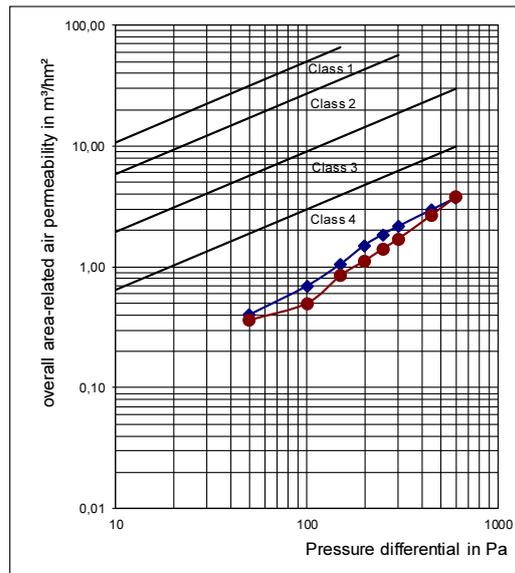


Diagram: Overall area-related air permeability (positive and negative wind pressures)

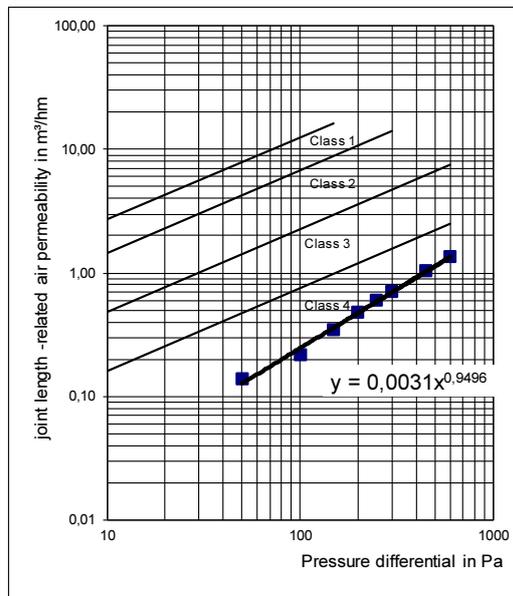


Diagram: Joint length-related air permeability (average value from positive and negative wind pressures)

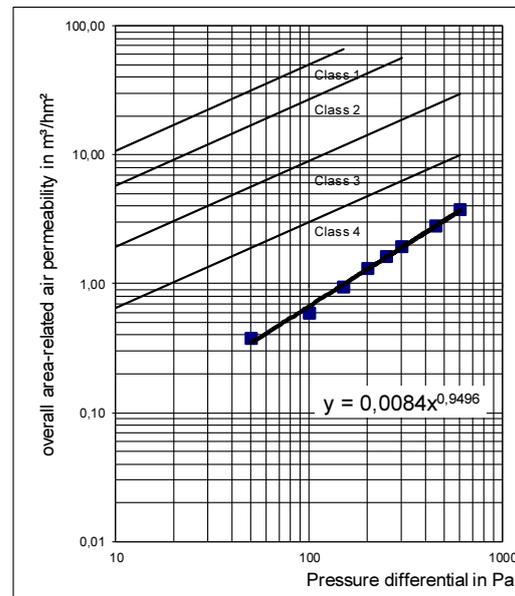


Diagram: Overall area-related air permeability (average value from positive and negative wind pressures)

Table: Measured results

Reference air permeability related to joint length	Q100 =	0,25 m ³ /hm
Reference air permeability related to overall area	Q100 =	0,67 m ³ /hm ²



Watertightness - Test according to EN 1027

Project-No.	16-001817-PR03	Task No.	16-001817
Client	16-001817- PR02		3, 20-276 Lublin
Basis of test	Windows and doors - Watertightness - Test method		
Used test equipment	EPst/026377-LWW Prüfstand -Aliplast sp. z o.o.,-Lublin (Polen) "Umbau Schulten"		
Test specimen	Tilt and turn window		
Test specimen No.	41928-003		
Date of test	10.08.2016		
Responsible test engineer	Thomas Stefan		
Tester	Andrzej Wicha		

Information to test assembly and testing method

Testing method	There were no deviations from test method or test conditions.				
Ambience conditions	Temperature	17 °C	Air humidity	58 %	Atmospheric pressure 1017 hPa
	The ambience conditions are as specified by standard requirements.				

Testing procedure

Size of window frame	1000 mm	x	2500 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				
No water penetration at up to			900 Pa detected.		

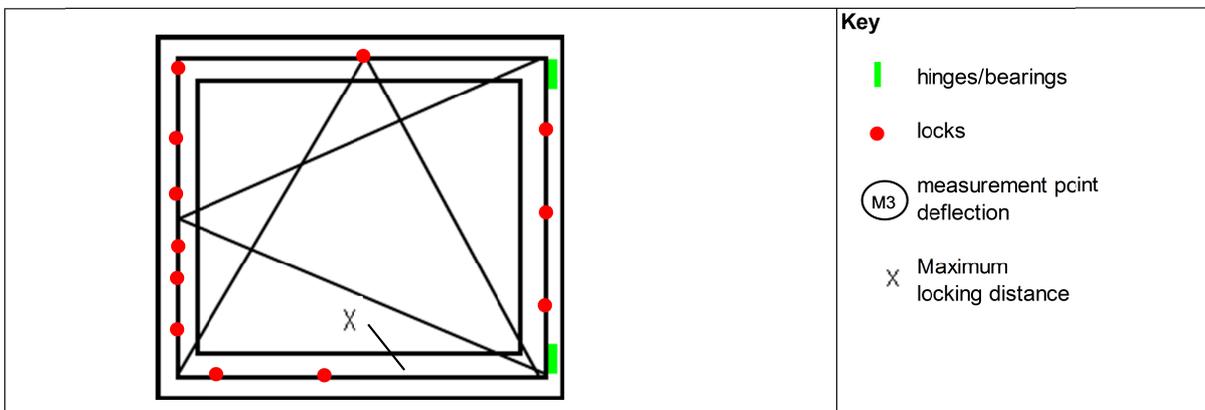
Resistance to wind load, deflection and dynamic wind load - Test according to EN 12211

Project-No. 16-001817- PR02 **Task No.** 16-001817
Client Aliplast sp. z o.o., ul. W.Moritzza 3, 20-276 Lublin
Basis of test EN 12211:2000-06
 Windows and doors - Resistance to wind load - Test method
Used test equipment EPst/026377-LWW Prüfstand -Aliplast sp. z o.o.,-Lublin (Polen) "Umbau Schulten"
Test specimen Tilt and turn window
Test specimen No. 41928-003
Date of test 10.08.2016
Responsible test engineer Thomas Stefan
Tester Andrzej Wicha

Information to test configuration / Test method

Test method There were no deviations from test method or test conditions.
Ambient conditions Temperature 17 °C Air humidity 58 % Atmospheric 1017 hPa
 The ambience conditions are as specified by standard requirements.

Testing procedure



Maximum test pressure: ± 1200 Pa 3 pressure pulses of 1320 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 > l/300 is likely to occur at the specified wind loads.

The test specimen was exposed to a load ± 1200 Pa as specified by EN 12211.

Dynamic wind loads (negative / positive pressures)

Table: pressure pulses

p ₂	Pa	200	400	600	800	1000
passed				✓		

50 Zcycles at p₂ ± 600 Pa

No malfunctions were detected.

Repeat test of air permeability - Test according to EN 1026

Project-No.	16-001817- PR02	Task No.	16-001817
Client	Aliplast sp. z o.o., ul. W.Moritz 3, 20-276 Lublin		
Basis of test	EN 1026:2000-06 Windows and doors - Air permeability - Test method		
Used test equipment	EPst/026377-LWW Prüfstand -Aliplast sp. z o.o.,-Lublin (Polen) "Umbau Schulten"		
Test specimen	Tilt and turn window		
Test specimen No.	41928-003		
Date of test	10.08.2016		
Responsible test engineer	Thomas Stefan		
Tester	Andrzej Wicha		

Information to test configuration / Test method

Test method	There were no deviations from test method or test conditions.					
Ambient conditions	Temperature	17 °C	Air humidity	58 %	Atmospheric	1017 hPa
	The ambience conditions are as specified by standard requirements.					

Testing procedure

Size of window frame	1000 mm	x	2500 mm
Size of active leaf	956 mm	x	2456 mm
Size of inactive leaf	0 mm	x	0 mm
Area of test specimen	2,50 m ²		
Length of opening	6,82 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.



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

Project-No.	16-001817- PR02	Task No.	16-001817
Client	Aliplast sp. z o.o., ul. W.Moritza 3, 20-276 Lublin		
Basis of test	EN 12211:2000-06 Windows and doors - Resistance to wind load - Test method		
Used test equipment	EPst/026377-LWW Prüfstand -Aliplast sp. z o.o.,-Lublin (Polen) "Umbau Schulten"		
Test specimen	Tilt and turn window		
Test specimen No.	41928-003		
Date of test	10.08.2016		
Responsible test engineer	Thomas Stefan		
Tester	Andrzej Wicha		

Information to test assembly and testing method

Testing method	There were no deviations from test method or test conditions.					
Ambience conditions	Temperature	17 °C	Air humidity	57 %	Atmospheric pressure	1017 hPa
	The ambience conditions are as specified by standard requirements.					

Safety test

Table: Pressure steps

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

Safety test passed at up to p₃ ± 1800 Pa.



Photo 1
Test specimen on test rig
window closed



Photo 2
External rebate, corner design



Photo 3
Internal rebate seal, corner design



Photo 4
Glazing bead with glazing gasket in concealed sash (view from outside, sash opened)



Photo 5
Internal glazing gasket



Photo 6
Corner pivot, seen from rebate



Photo 7
Tilt mechanism pivot, seen from top



Photo 8
Sash in tilted position



Photo 9
Seen from rebate, sash



Photo 10
Seen from rebate, frame

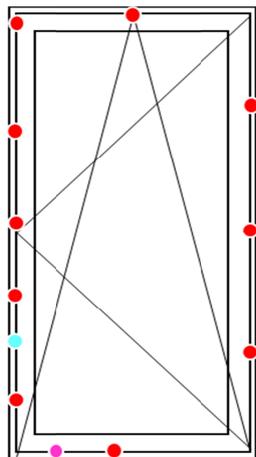


Fig. 1
Position plan of interlocking devices

Pos. 1	●
Pos. 2	●
Pos. 3	●

Fig. 2
Key position plan



Photo 11
Locking situation frame 1



Photo 12
Locking situation sash 1



Photo 13
Locking situation frame 2



Photo 14
Locking situation sash 2



Photo 15
Locking situation frame 3



Photo 16
Locking situation sash 3