

# Evidence of Performance

Resistance to wind load  
Watertightness  
Air permeability

Test report 11-000111-PB01-A01-02-en-01



Client **UNIDAS d.o.o.**  
**Duje i Dragoljuba 1b**  
  
**11090 Beograd**  
**Serbia**

Product	Tilt and turn window
System	UNILUX 2001
Overall dimensions (W x H)	1,230 mm x 1,480 mm
Frame material	Wood-Aluminium
Special features	-/-

## Basis

EN 14351-1:2006+A1:2010

Test standards:

EN 1026 : 2000-06

EN 1027 : 2000-06

EN 12211 : 2000-06

EN 12046-1 : 2003-11

EN 14609 : 2004-03

Corresponds to the national standard. (DIN EN)

## Representation



## Instruction for use

The present test report serves to demonstrate the above characteristics of windows according to EN 14351. The results obtained can be used by the manufacturer as the basis for the manufacturer ITT test report summary. The conditions and requirements set out by EN 14351-1 shall be observed.

## Validity

The data and results refer solely to the tested and described specimen.

The test results can be extrapolated as per EN 14351-1, under observance of Annex E 1., under the manufacturer's own responsibility.

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

## Notes on publication

The ift-Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies.

The cover sheet can be used as an abstract.

## Contents

The report contains a total of 11 pages.

## Resistance to wind load – EN 12210



**Class C4**

## Watertightness – EN 12208




**Class E750**

## Air permeability – EN 12207



**Class 3**

ift Rosenheim  
18 March 2011

  
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 DAP-PL-0908 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	UNIDAS d.o.o.
Date of manufacture	02.2011.
System	UNILUX 2001
Type of opening / Opening directions	Tilt and turn, DIN left, inward opening
Frame material	Wood-Aluminium
Overall frame dimensions (W x H)	1,230 mm x 1,480 mm
Overall casement dimensions (W x H)	1,140mm x 1,390 mm
Casement weight	37.9 kg
<b>Frame member</b>	Wood profile DP1 63/70, further details are given in drawings mitred and bonded, with mechanical connection Hoffman W3, 2 in each corner
Frame joint	
Additional profile / Frame joint	Aluminium profile DL 87, clipped on 24 PVC spacers SP5 connected with frame with screws 3,5x35 mm, mitred and bonded, with angle connector AUS 1, manufacturer Profilati, code 96-9026 and angle connector PS1
<b>Casement member</b>	Wood profile DP2 68/81, further details are given in drawings mitred and bonded, with mechanical connection Hoffman W3, 2 in each corner, 8 pieces
Frame joint	
Additional profile / Frame joint	Aluminium profile KL 42 clipped on 22 PVC spacers SP5 connected with frame with screws 3,5x35 mm, mitred and bonded, with angle connector AUS 1, manufacturer Profilati, code 96-9026 and angle connector PS1
Additional profile / Frame joint	Weather bar OL1, screwed on aluminium profile, sealed with elastic sealant
<b>Rebate design</b>	
Rebate drainage	2 slots of 6 mm x 34 mm inside rebate, to outside, drainage through the aluminium profile, with cover caps DP1
Rebate seal	
External	
Frame member/ Additional profile	
Material	Sealing material – EPDM, black
Manufacturer	Derventer
Item No.	GZD10.25
Corner configuration	mitred and bonded
External	
Frame member	
material	Sealing material – EPDM, black



Manufacturer	Derverter
Item No.	GZ12.00
Corner configuration	continuous, notched in corners, at top left corner mitred and bonded
<b>Centre</b>	
Frame member	
Material	Sealing material – EPDM, brown
Manufacturer	Derverter
Item No.	GZD10.55
Corner configuration	mitred and bonded
<b>Internal</b>	
Casement member	
Material	Sealing material – EPDM, black
Manufacturer	Derverter
Item No.	GZ10.40
Corner configuration	mitred and welded
Pressure equalisation	External rebate seal, 55 mm notched at top centre
<b>Infill</b>	Insulating glass unit, configuration 4 / 16 / 4
<b>Installation of infills</b>	
Glazing gasket	
<b>External</b>	
Material	Sealing material - EPDM
Manufacturer	Derverter
Item No.	GZD10.40
Corner configuration	continuous, notched in corners, at top corner mitred and welded
<b>Internal</b>	
Material	Sealing material - EPDM
Manufacturer	Derverter
Article number	GZD10.85
Item No.	continuous, notched in corners, at top corner mitred and welded
Vapour pressure equalisation	Along the outer edge of the glass.
<b>Hardware</b>	
Type / Manufacturer	Tilt and turn hardware, Roto Frank AG, ROTO NT E5
Hinges / Bearings	1 Tilt mechanism pivot 1 Turn mechanism pivot
Number of locks	at bottom 1, at top 2, on hinge side 1, on lock side 4
Maximum locking distance	730 mm
Position of locks	neutral

## 1.2 Representation of test specimen

The constructional details were checked solely for the characteristics to be classified. The drawings are based on unchanged documentation provided by the client.

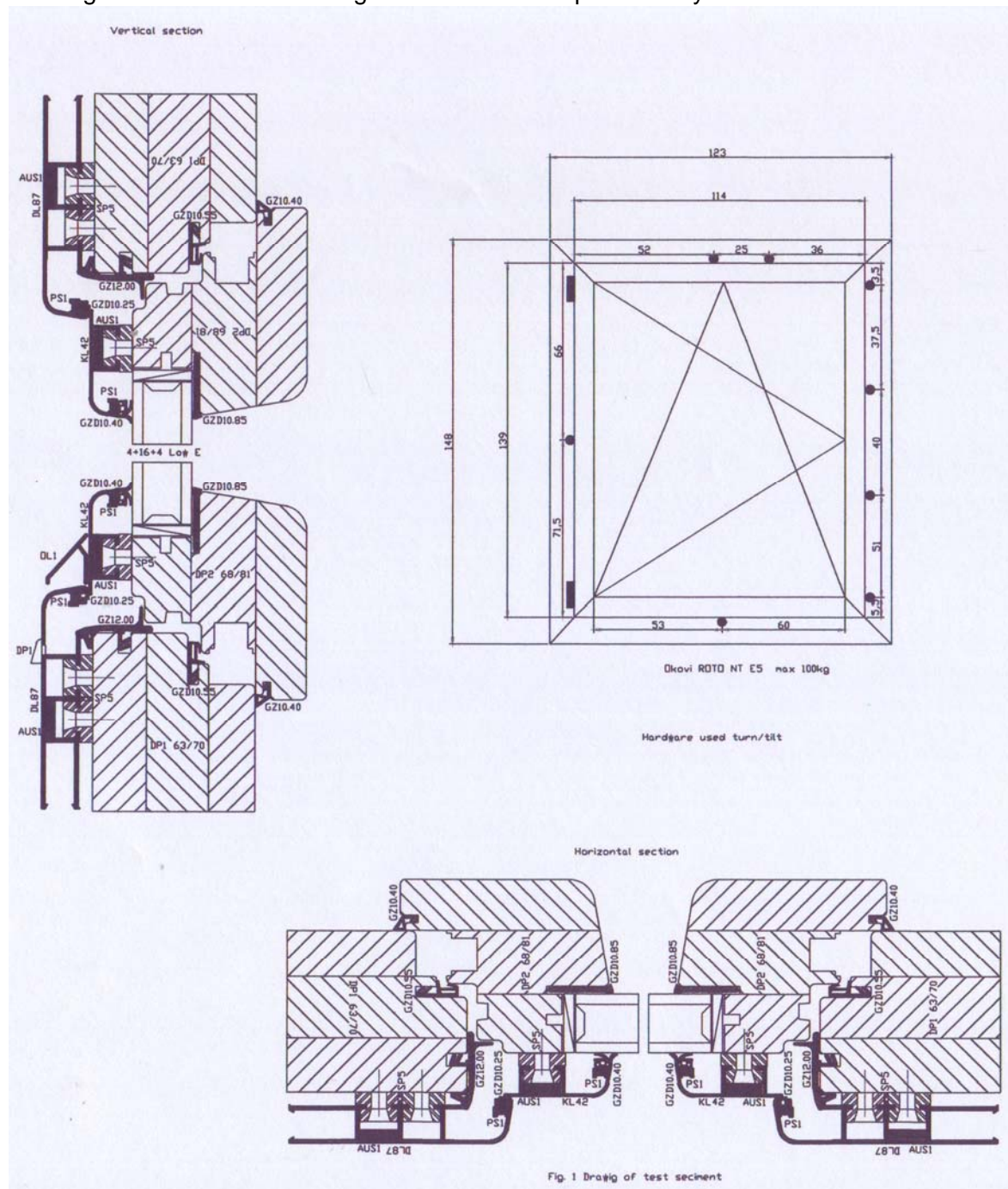


Fig. 1 Drawing of test specimen



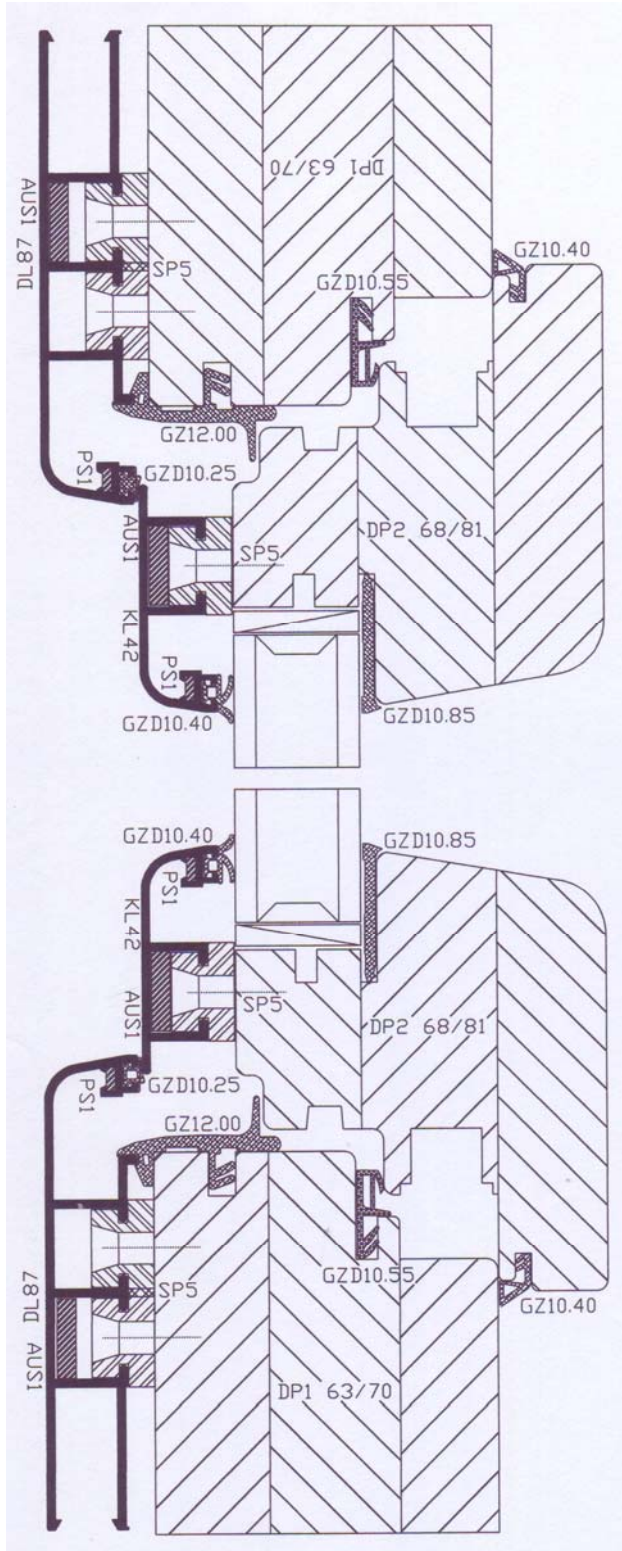


Fig. 2 Horizontal section

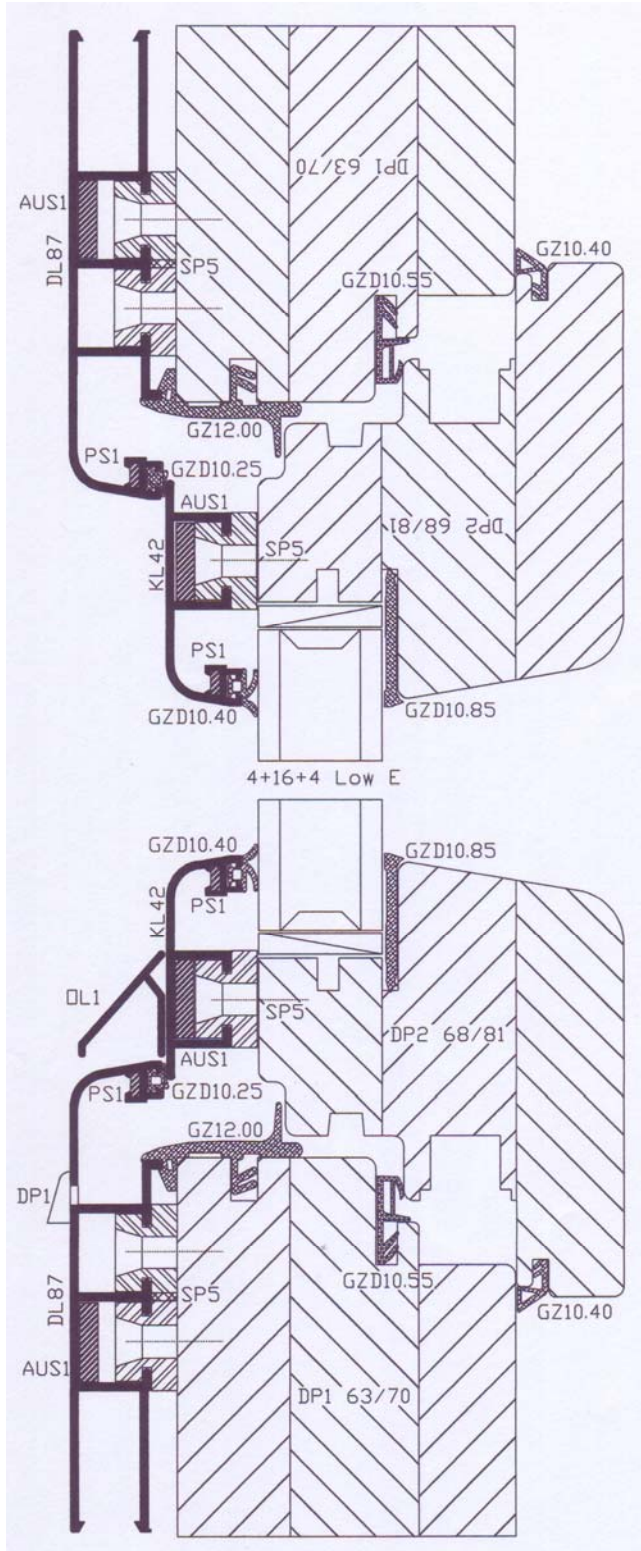


Fig. 3 Vertical section



## 2 Procedure

### 2.1 Sampling

The test specimens were selected by the client.

The client has not provided to the **ift** a sampling report.

#### Comment:

According to Guidance Paper K the manufacturer shall provide detailed information on sampling as the basis for using this evidence of performance for the issuing of the manufacturer's ITT test report summary.

Number	1
Delivered on	24 February 2011 by the client
Registration No.	29907/002

### 2.2 Methods

#### Basis

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
EN 12046-1: 2003-11	Operating forces – Test method – Part 1: Windows
EN 14609: 2004-06	Windows – Determination of the resistance to static torsion

#### Classification standards

EN 12207: 2000-06	Windows and Doors – Air permeability – Classification
EN 12208: 2000-06	Windows and Doors – Watertightness – Classification
EN 12210: 2002-07	Windows and Doors – Resistance to wind load – Classification
EN 13115: 2001-07	Windows – Classification mechanical properties – Racking, torsion and operating forces

Boundary conditions as specified by the standards requirements

Deviation There were no deviations from the test methods and test conditions.

### 2.3 Test equipment

Window test bench	Device No.: 26026
Displacement transducer	Device No.: 26026
Torque meter	Device No.: 26026



## 2.4 Testing

Date/Period 24 February 2011

Test engineer Mario Simunovic, Dipl.-Ing. (FH) Robert Kolacny

## 2.5 Test sequence

No.	Type of test	Test standard	Classification standard
1.	Operating forces	EN 12046-1	EN 13115
2.	Air permeability	EN 1026	EN 12207
3.	Resistance to wind load 3.1 Deflection 3.2 Repeat test of positive/negative pressures	EN 12211	EN 12210
4.	Repeat test of air permeability	EN 1026	EN 12207
5.	Watertightness	EN 1027	EN 12208
6.	3.3 Resistance to wind load – Safety test	EN 12211	EN 12210
7.	Load-bearing capacity of safety devices	EN 14609	Requirements according to EN 14351-1





### 3 Detailed results

#### Performance data sheet

Specimen	Tilt and turn window		
Project No.	11-000111		
Client	UNIDAS d.o.o.	Size of window frame	1230 x 1480 mm
System	UNILUX 2001	Size of active casement	1140 x 1390 mm
Frame material	Wood-Aluminium	Size of inactive casement	mm
Date of test	24.02.2011	Area of test specimen	1,8 m <sup>2</sup>
Tester	Mario Šimunović	Length of opening joints	5,1 m
Specimen No.	29907/002	Casement weight	37,9 kg
Date of delivery	24.02.2011	Temperature	21,4 ° C
Date of manufacture	15.02.2011	Air humidity	25,8 %
Attended by:	Dragan Bojović, Duško Galić	Air pressure	1017 hPa

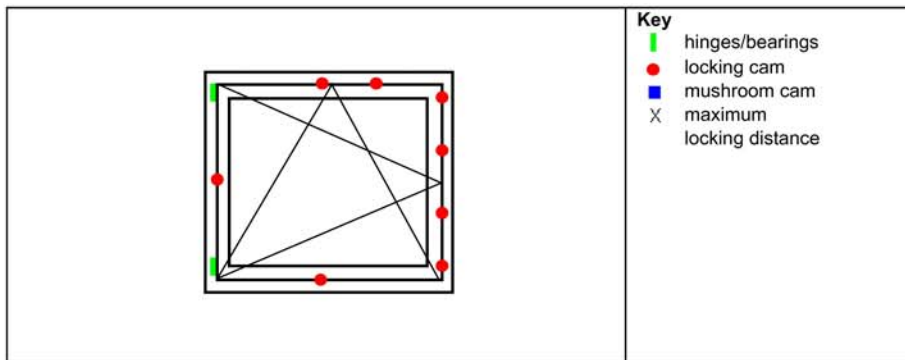


Figure 1 View of specimen

#### 1 Operating forces - Test according to EN 12046

Table: Measurement of operating forces

Individual measured in Nm	1	2	3	Average value
	4,5	4,7	4,5	4,6

#### 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 <sup>3</sup> /h	0,0	0,0	0,0	0,0	0,0	0,0	0,3
Joint length-related m <sup>3</sup> /hm		*)	*)	*)	*)	*)	*)	*)	*)
Overall area-related m <sup>3</sup> /hm <sup>2</sup>		*)	*)	*)	*)	*)	*)	*)	*)

\*) The measured values were below the 0,5m<sup>3</sup>/h leak flow volume of the displacement transducer. The precision of measurements is 0,1m<sup>3</sup>/h.

Table: Air permeability at negative wind pressure

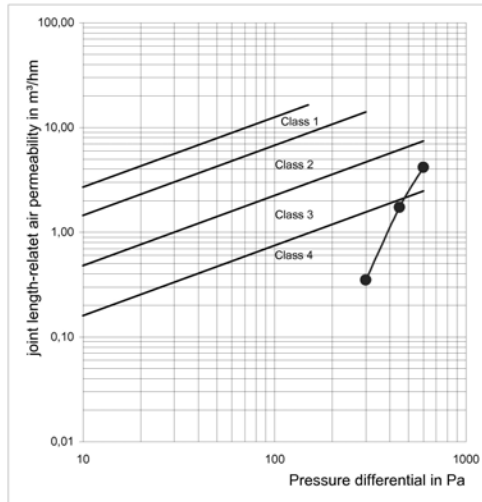
Measured results at negative wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600
		Flow rate (volume) m <sup>3</sup> /h	0,0	0,0	0,0	0,0	0,1	1,8	8,7
Joint length-related m <sup>3</sup> /hm		*)	*)	*)	*)	*)	0,35	1,73	4,16
Overall area-related m <sup>3</sup> /hm <sup>2</sup>		*)	*)	*)	*)	*)	0,97	4,80	11,57

\*) The measured values were below the 0,5m<sup>3</sup>/h leak flow volume of the displacement transducer. The precision of measurements is 0,1m<sup>3</sup>/h.

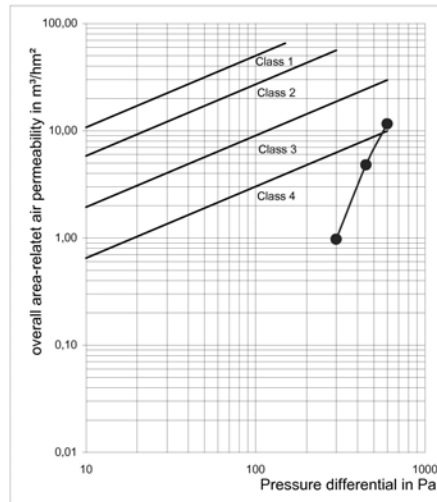
Table: Air permeability from average values from positive and negative wind pressures

Average value from positive and negative wind pressures	Pressure differential in Pa	50	100	150	200	250	300	450	600
		Flow rate (volume) m <sup>3</sup> /h	0,0	0,0	0,0	0,0	0,1	0,9	4,5
Joint length-related m <sup>3</sup> /hm		*)	*)	*)	*)	*)	0,17	0,89	2,11
Overall area-related m <sup>3</sup> /hm <sup>2</sup>		*)	*)	*)	*)	*)	0,49	2,47	5,86

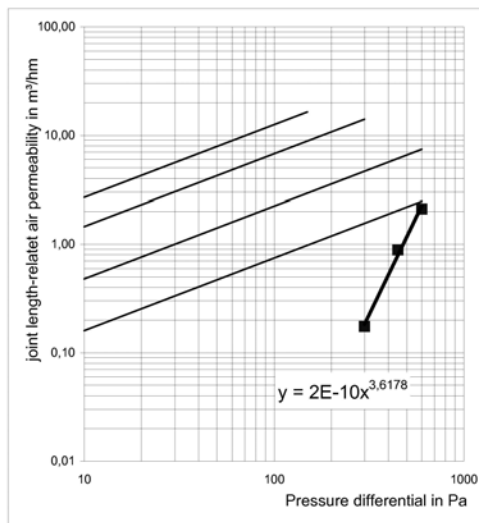
\*) The measured values were below the 0,5m<sup>3</sup>/h leak flow volume of the displacement transducer. The precision of measurements is 0,1m<sup>3</sup>/h.



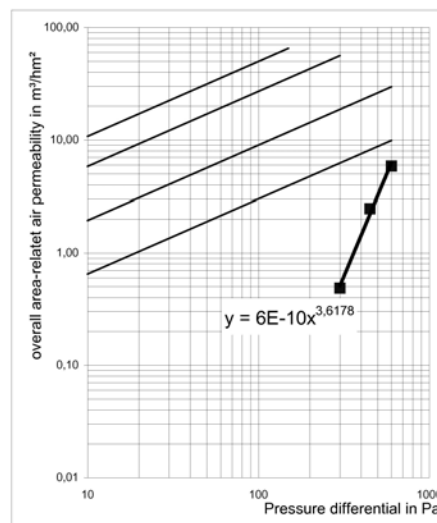
**Diagram:** Joint length-related air permeability (positive and negative wind pressures)



**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 <	0,10 m³/hm
Reference air permeability related to overall area	Q100 <	0,10 m³/hm²

### 3 Resistance to wind load - Test according to EN 12211

#### 3.1 Deflection under wind load

Maximum test pressure:  $\pm$  1600 Pa 3 pressure pulses of 1760 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  $\pm$  1600 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  $p_2 \pm$  800 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 **not fulfilled**.

#### 5 Watertightness - Test according to EN 1027

No water penetration at up to 750 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  $p_3 \pm$  2400 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  
24 February 2011