Evidence of Performance

Air permeability
Watertightness static / dynamic
Resistance to wind load
Impact resistance

Test Report 108 31168/1e

This is a translation of test report 108 31168/1 dated 11 june 2006.

Client	EXALCO S.A. 5th Km of National Road Larissa-Athensns 41110 Larissa Greece
Product	Curtain walling
Designation	Albio 102
Overall dimensions (W x H)	4070 mm x 4012 mm
Frame material	Aluminium

Test		Classification	
		Facade construction	Window
EN 12152	Air permeability	AE	4
EN 12154	Water-tightness static	RE_{1500}	E 1500
ENV 13050	Water-tightness dynamic	188 Pa/563 Pa	npd
EN 13116	Resistance to wind load	Design load ± 1,5 kN/m² Safety load ± 2,25 kN/m²	npd
EN 14019	Impact resistance	I5 / E5	npd

npd = no performance determined

ift Rosenheim
12. October 2006

Jörn Peter Lass, Dipl.-Ing. (FH)
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Basis

Test sequence according to EN 13830 : 2003-09, Curtain walling – Product standard

Test standards
EN 12153
EN 12155
EN 12179
EN 14019
ENV 13050
EN 1026
EN 1027

Representation

Instruction vor use

The present test report serves to demonstrate the above characteristics for curtain walling.

The present test report does not cover all the performance characteristics listed in the product standard.

Validity

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

This test 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 aging.

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 abstract.

Contents

The report contains a total of 41 pages

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DAP-PL-0808.01
DAP-ZE-2288.00
TGA-ZM-16-93-00
TGA-ZM-16-93-60

1 Object

1.1 Description of test specimen

Test element	Curtain wall
Manufacturer	EXALCO S.A.
System	Albio 102
Frame material	Aluminium
Overall dimensions	4070 mm x 4012 mm
Field grid dimensions	1099 mm x 1313 mm or 912 mm x 1313 mm Subdivision see Page 4, drawing 1

Mullion / transom profiles

Profile material	EN AW-6060, EN 574 (as specified by manufacturer)
Mullion	Profile No. 102-006, insert profile 102-061
Side cover	Profile No. 102-040
Transom	Profile No. 102-036
Top cover	Profile No. 102-018, between member and transom sealed with elastic sealant
Bottom cover	Profile No. 102-017
T-Connection	Connection, Item No. 001, sealing piece 102001
Frame member	Profile No. 102-007, with clip profile No. 102-008 (fixed light) or No. 102-009 (window casements), see Fig. 5 in Annex 1
Corner design	mitre-cut, with corner brackets Item No. 102 A (Code No. 5379 and 5641) and Item No. 102, screw-fixed or compressed and bonded
Frame seals	
exterior	Item No. 107, mitre-cut and bonded
center	Item No. 106, mitre-cut and bonded
interior	Item No. 109, mitre-cut and bonded

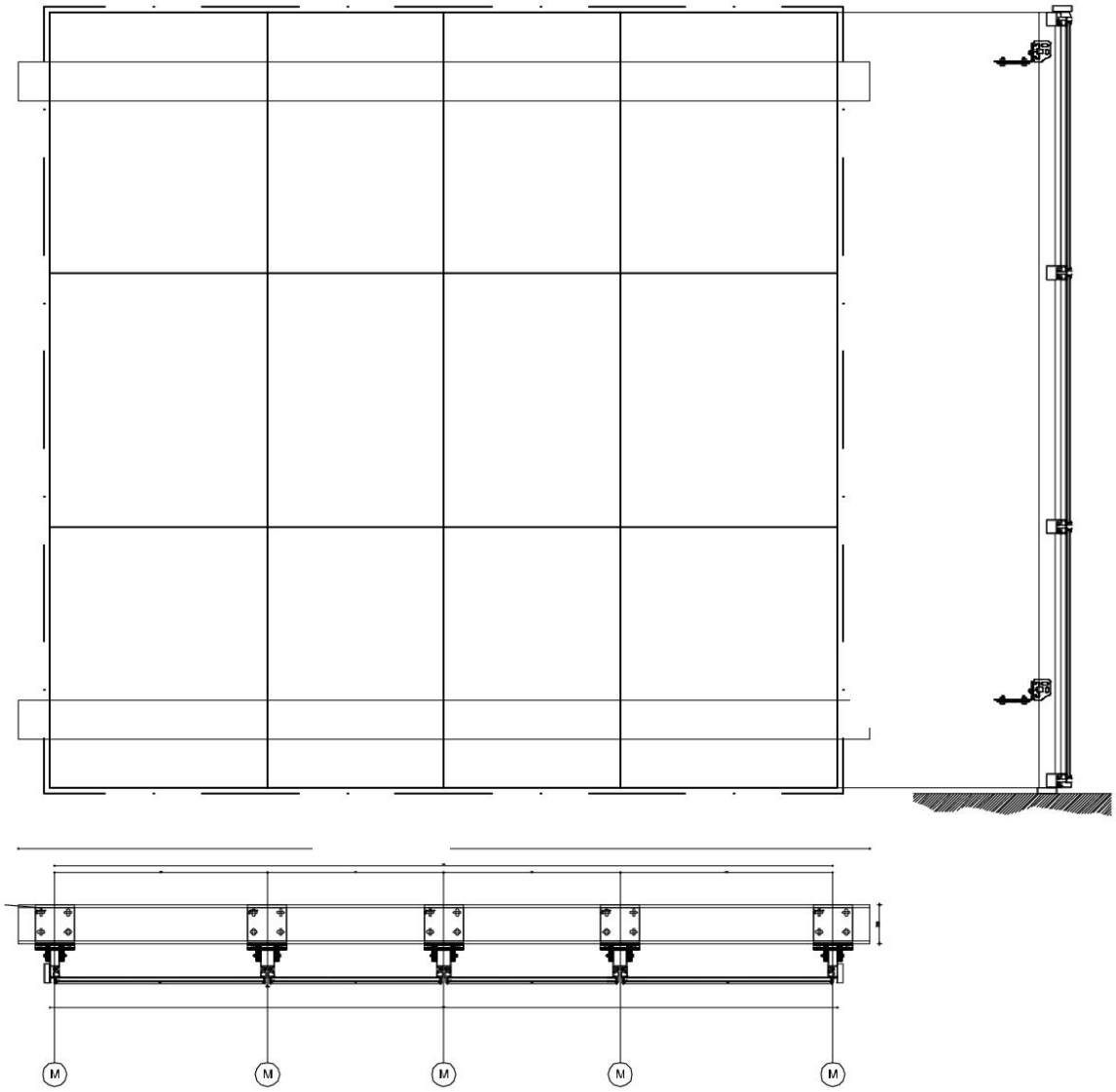
Glazing

Thickness/configuration	20 mm, 5 / 10 / 5
Seals	preformed glazing gaskets
exterior	Item No. 43, mitre-cut and bonded
interior	Item No. 42, mitre-cut and bonded
Vapour pressure equalization	per field 2 slots 5 mm x 20 mm at bottom, 5 cm from frame corner

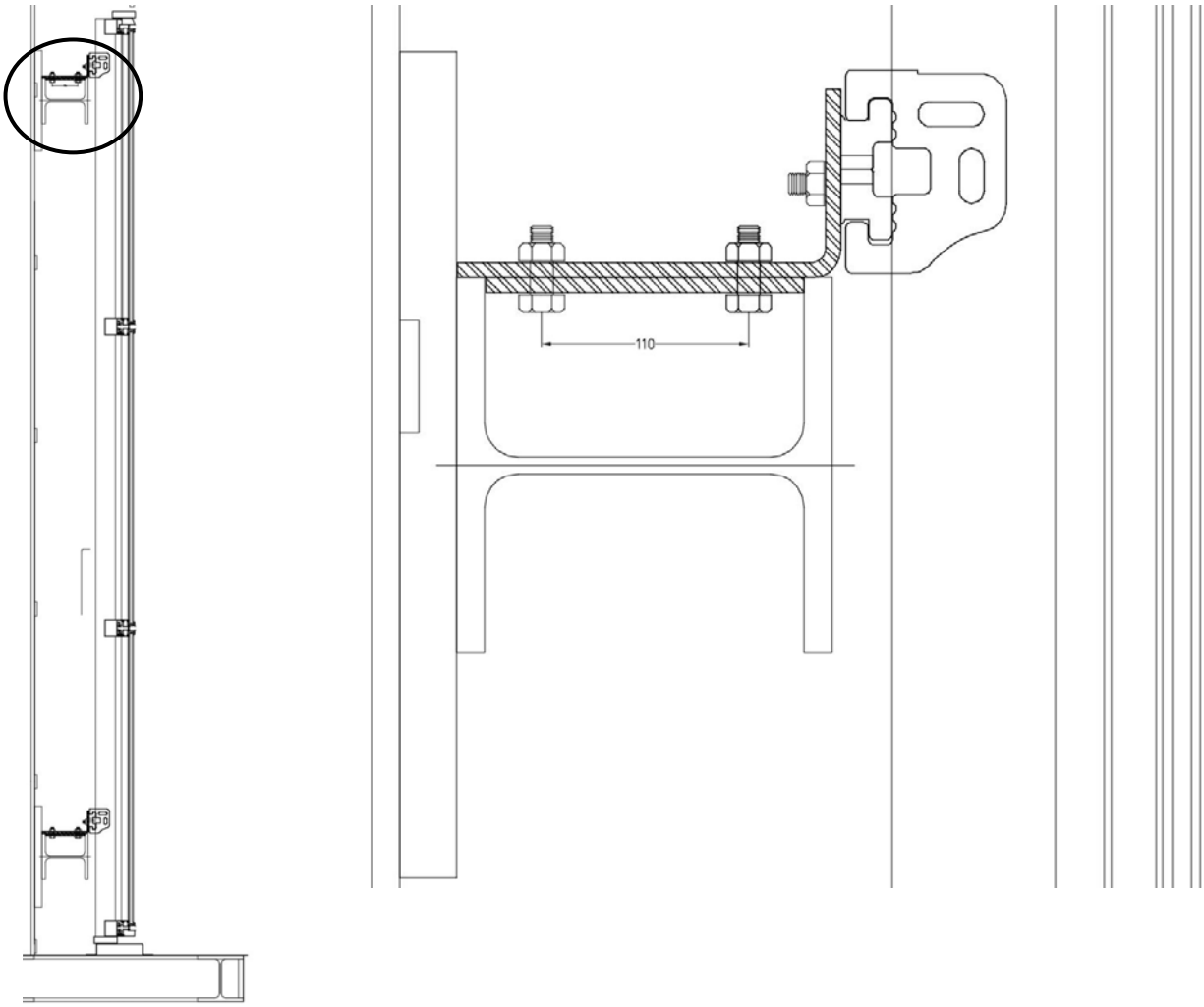
Drainage	Bottom flashing notched over 2 cm length spaced at 80 cm
Insert unit	**Turn tilt window**
Frame member	Profile No. 102-007, with clip profile No. 102-009 (window casement)
Insert piece	friction bearing for casement profile (see Fig. 9)
Hinges	integrated into casement profile
Locks	2 handles, see drawing 11
Vapour pressure equalization	per field 2 slots 5 mm x 20 mm at bottom, 10 cm from frame corner

1.2 Representation of test specimen

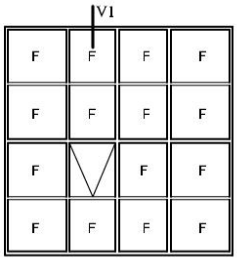
The drawings are based on unchanged documentation provided by the client and have not been checked fully and in detail for technical correctness.

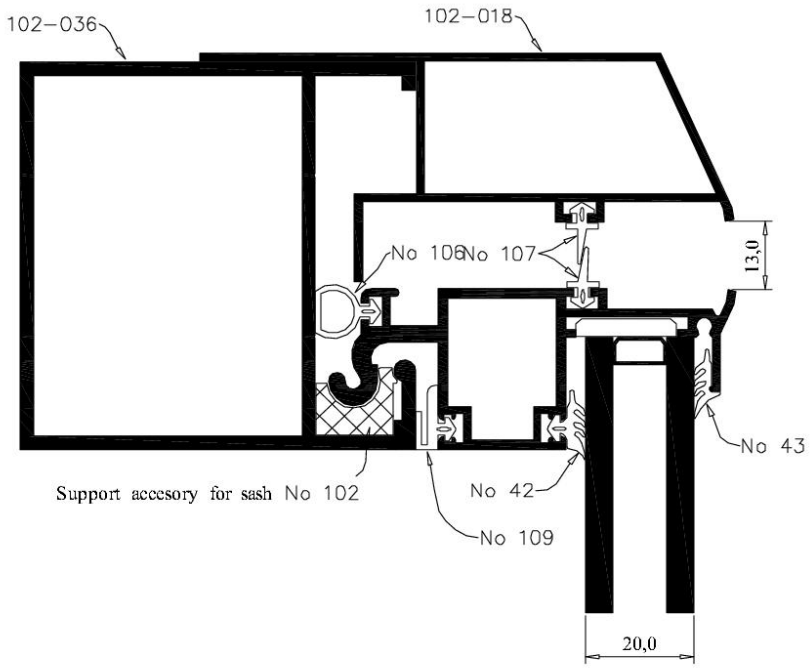


Drawing 1 Seen from outside

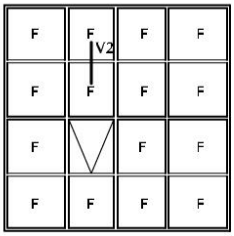


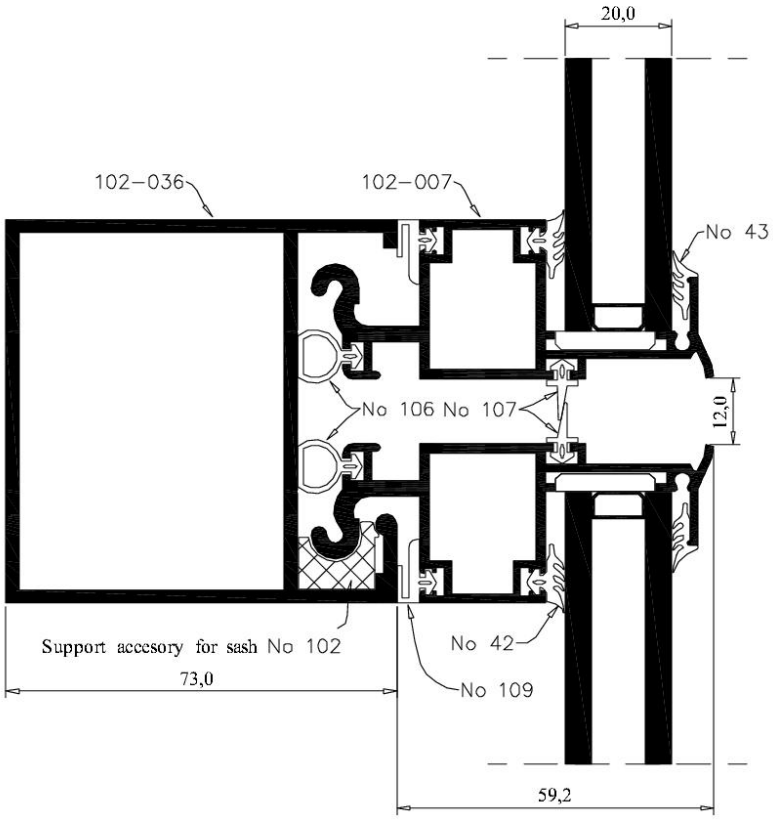
Drawing 2 Vertical section, atattachment at top



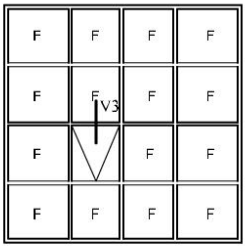


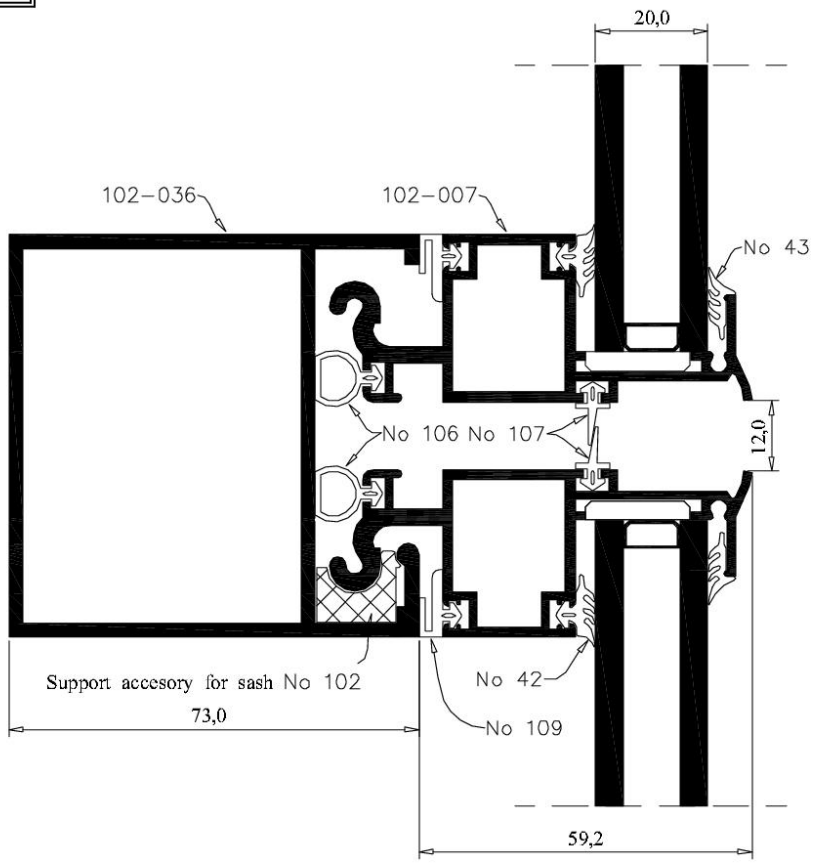
Drawing 3 Vertical section, head point



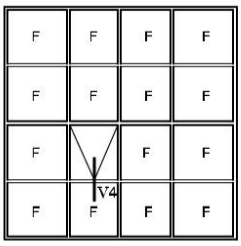


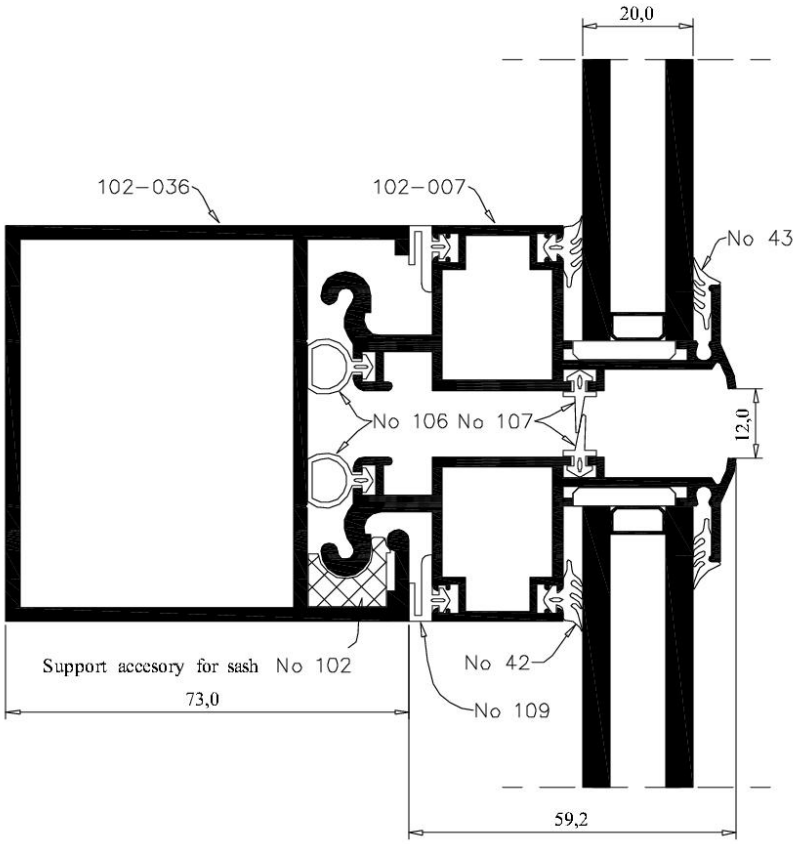
Drawing 4 Vertical section, transom with 2 fixed lights



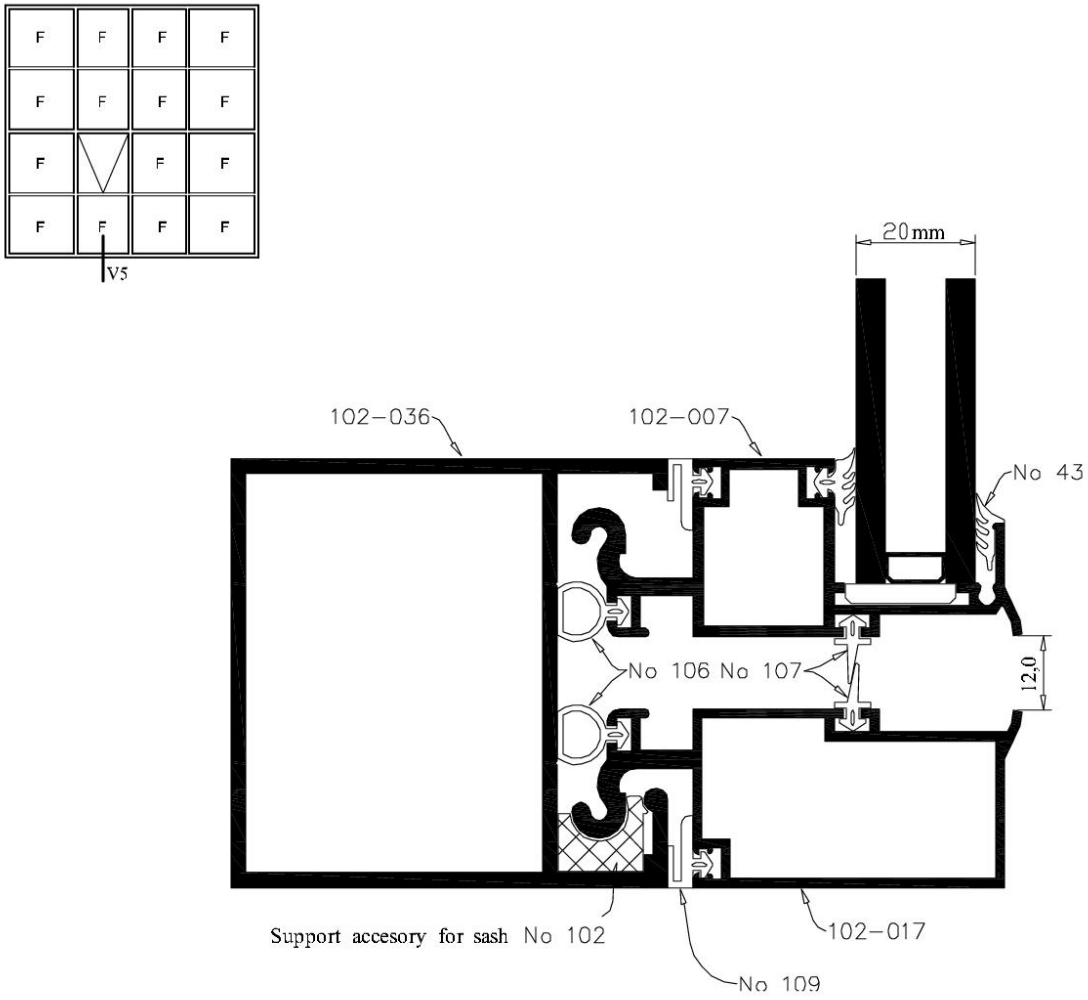


Drawing 5 Vertical section, transom: fixed light at top, casement at bottom

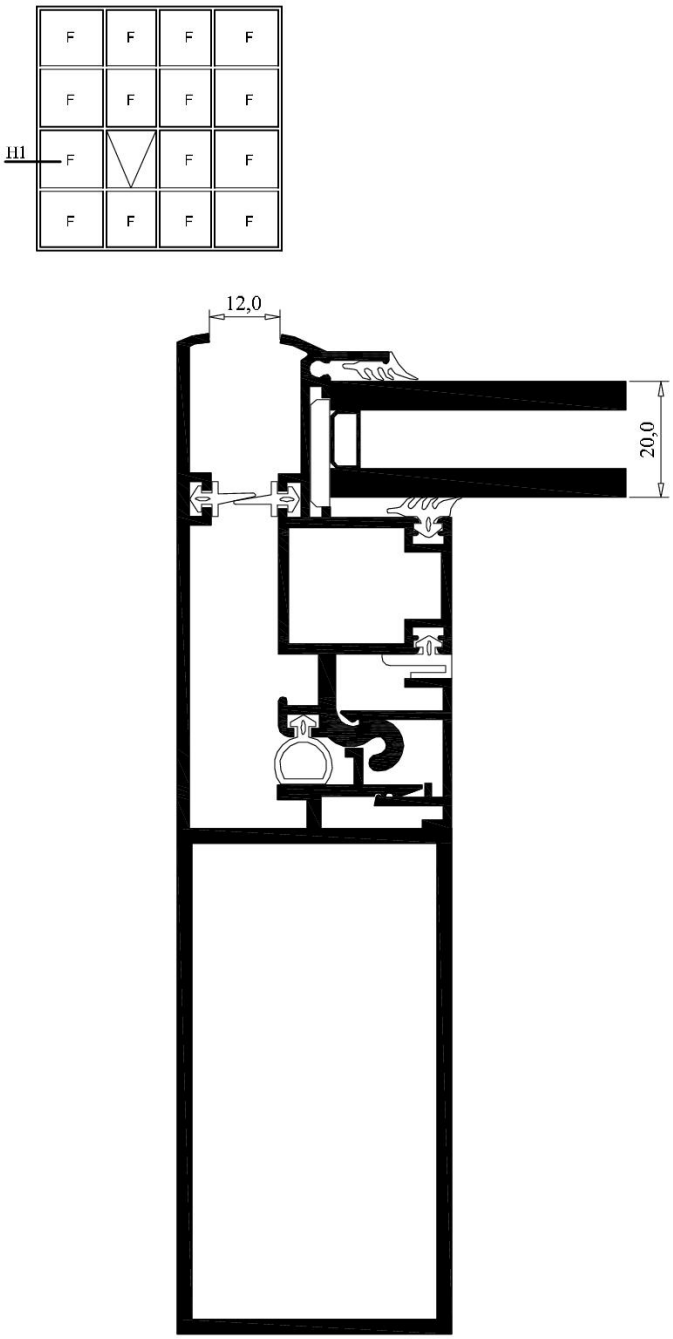




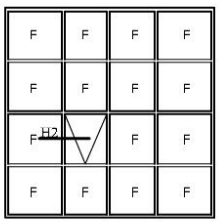
Drawing 6 Vertical section, transom: fixed light at bottom, casement at top

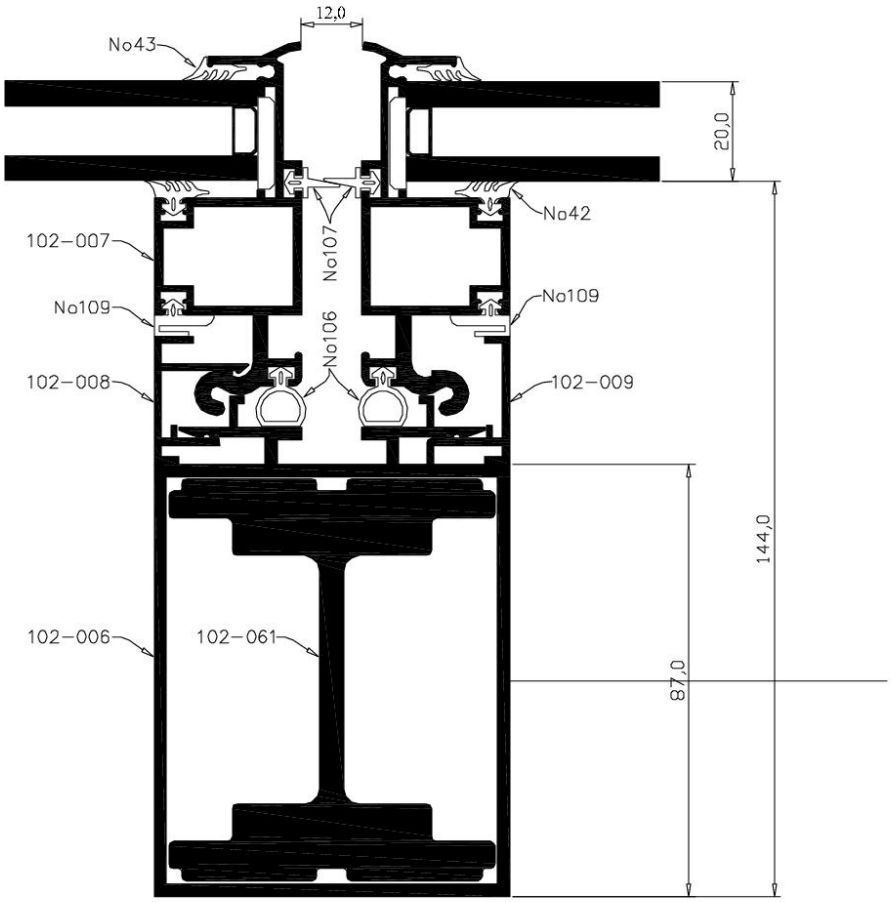


Drawing 7 Vertical section, base point

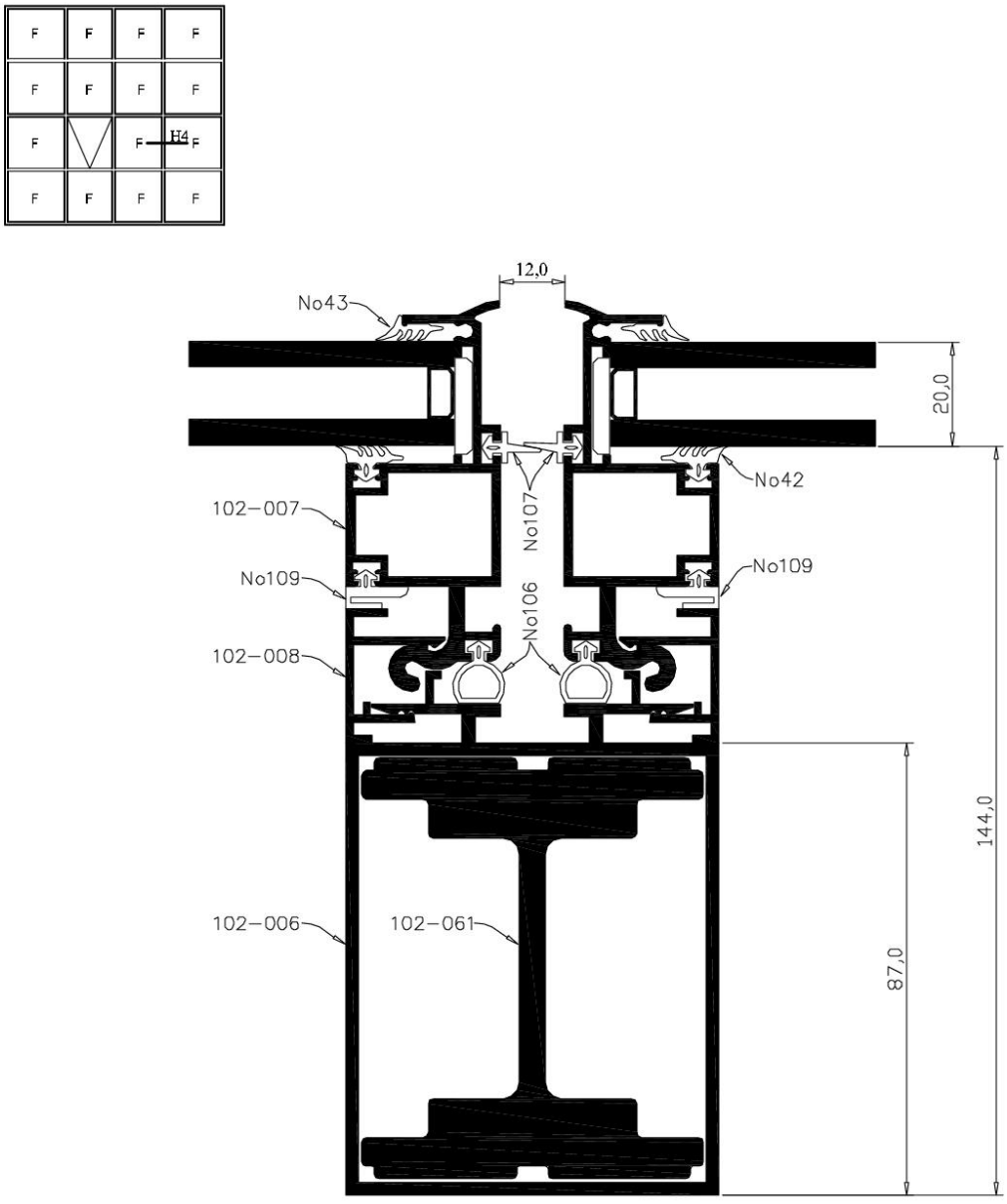


Drawing 8 Horizontal section, side connection

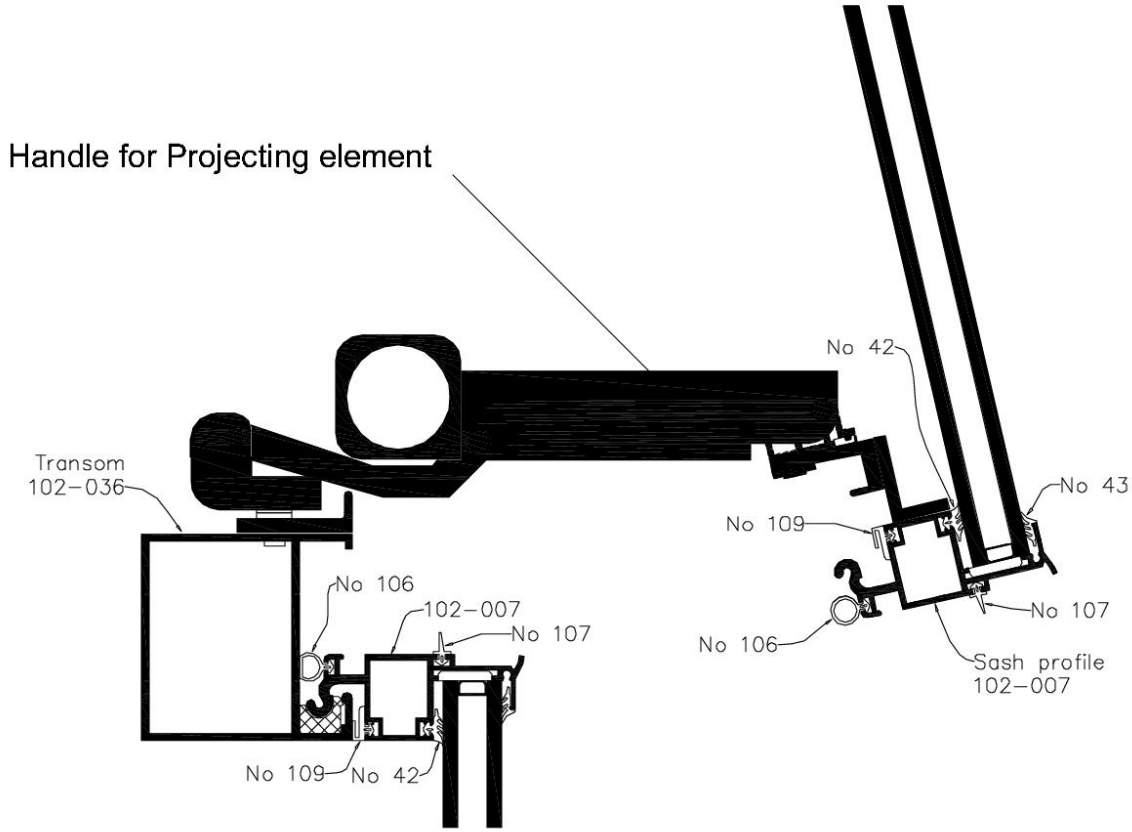




Drawing 9 Horizontal section mullion: at left - fixed light, at right - casement



Drawing 10 Horizontal section mullion: at left - fixed light, at right - casement



Drawing 11 Handle lto operate window

2 Procedure

The tests were carried out on the facade test rig in Deggendorf, Germany. The **ift** Rosenheim operates this facade test rig. The instruments of the test rig and additional equipment are calibrated annually.

2.1 Methods

Basis of test sequence	
EN 13830 : 2003 – 09	Curtain walling – Product standard
Test standards	
EN 12153 : 2000-06	Curtain walling – Air permeability – Test method,
EN 1026 : 2000-06	Windows and doors – Air permeability – Test method,
EN 12155 : 2000-06	Curtain walling – Watertightness – Laboratory test under static pressure,
EN 1027 : 2000-06	Windows and doors – Watertightness – Test method
EN 12179 : 2000-06	Curtain walling – Resistance to wind load – Test method,
EN 14019 : 2004-06	Curtain walling – Impact resistance – Performance requirements,
ENV 13050 : 2000-11	Curtain walling – Watertightness – Laboratory test under dynamic condition of air pressure and water spray.
Classification standards	
EN 12152 : 2002-02	Curtain walling – Air permeability – Performance requirements and classification,
EN 12154 : 1999-12	Curtain walling – Watertightness – Performance requirements and classification,
EN 13116 : 2001-07	Curtain walling – Resistance to wind load – Performance requirements,
EN 12207 : 1999-11	Windows and doors – Air permeability – Classification,
EN 12208 : 1999-11	Windows and doors – Watertightness – Classification

Boundary conditions	As specified by the standards. There are following deviations from the test methods: In deviation from EN 1027, a water spray rate of 2 l/m² min and a different nozzle arrangement were used for testing the watertightness of the insert window unit (corresponds to the watertightness test of curtain walling as per EN 12155). Pressure step 250 Pa was not applied.

Test sequence according to product standard EN 13830 – Clause 5.3.2

1) Air permeability at up to 750 Pa
2) Watertightness under static pressure at up to 600 Pa
3) Deflection under wind load (design load according to EN 1991-1-4 ± 1500 Pa ≙ ± 1,5 kN/m²)
4) Repeat test of air permeability at up to 750 Pa
5) Repeat test of watertightness under static pressure at up to 1500 Pa [1])
6) Dynamic watertightness test (188 Pa/563 Pa)
7) Safety test at up to ± 2250 Pa ≙ ± 2,25 kN/m²)
8) Impact resistance
9) Disassembly and inspection

[1)] Classification included the repeat test.

2.2 Testing

Sampling	by the client
Manufacturer	Exalco model shop
Delivery of specimen	Manufacture and assembly of facade by the client in calendar weeks 26 and 27 / 2006
Date of test	12 July 2006

The test was attended by:

Mr Dimitris Pianas	EXALCO
Mr Grigoris Kostandopoulos	EXALCO
Mr Sideris Degoudis	EXALCO
Mr Giannis Christokostas	EXALCO
Mr Kostas Dimou	EXALCO
Testing personnel: Mr Egli, Mr Reichelt	**ift** Rosenheim

2.3 Test equipment

Test rig	Inventory-No. 22822

3 Detailed results

3.1 Summary of results

Table 1 Summary of results

Test	Type of test	Classification standard	Classification
1.	Air permeability – facade	EN 12152	AE
2.	Air permeability – window	EN 12207	4
3.	Watertightness under static pressure facade	EN 12154	R7
4.	Watertightness under static pressure window	EN 12208[1]	9A
5.	Deflection under wind load	EN 13116	< l / 200 or 15 mm at ± 1,5 kN/m²
6.	Repeat test of air permeability	EN 12152	AE
7.	Repeat test – Watertightness under static pressure: facade	EN 12154	RE_{1500}
8.	Repeat test – Watertightness under static pressure: window	EN 12208[1]	E 1500
9.	Dynamic watertightness test	ENV 13050	no water penetration 188 Pa/ 563 Pa
10.	Safety test	EN 13116	± 2,25 kN/m²
11.	Impact resistance	EN 14019	I5 / E5
12.	Disassembly and inspection		Corresponds to drawings, no unallowed water penetration into the construction

[1] Classification was possible only on the basis of EN 12208 : 1999-11, because testing deviated from EN 1027 : 2000-06 (water spray rate of 2 l/m² min,, different spray nozzle arrangement and without pressure step 250 Pa)

3.2 Comments on test

3.2.1 Air permeability

Prior to testing, the mounted facade element was covered with a film to eliminate all leakages of the facade. The leakages of the test rig system were determined by zero measurement.

Thereafter the film was removed, three pressure pulses were applied to the facade and released as set out by the standard, followed by air permeability measurements.

Air permeability was tested at up to a test pressure differential of 750 Pa. The measured values are listed in the test record, Annex 2, page 2. The values were obtained by the difference method, where the measured air permeability of the facade element is deducted from the air permeability obtained from zero measurement

The values obtained were below the permitted Class A4 limit curve., at a test pressure differential of 750 Pa below the maximum permitted air permeability of 1,5 m³/(h m²) related to overall area or 0,5 m³/(h m) related to fixed joint length. For this measurement of the facade the casement was covered with tape. For determining the air permeability of the functional joint of the insert window, the tape was removed and the window tested again. Air permeability of the insert window was determined from the differences obtained from the two measurements. The insert window can be classified according to EN 12207 : 1999 – 11, “Windows and doors – Air permeability – Classification” , and is rated Class 4 related to joint-length.

3.2.2 Watertightness under static pressure

Watertightness under static pressure was tested at up to a test pressure differential of 600 Pa. No water penetration into the facade was detected.

3.2.3 Deflection under wind load

Deflection was tested by application of positive and negative wind pressures up to + 1500 Pa and – 1500 Pa respectively. As per EN 13116 the frontal deflection of the profiles between the structural support points must be determined. Layout and description of the measurement points are given in Fig. 1.

Page 6 of Annex 2 shows the deformations obtained. Furthermore, the effective deflections are presented. As set out by EN 1991-1-4, the effective deflections were below l/200 and 15 mm, respectively, when exposed to the specified design load of ± 1,5 kN/m².

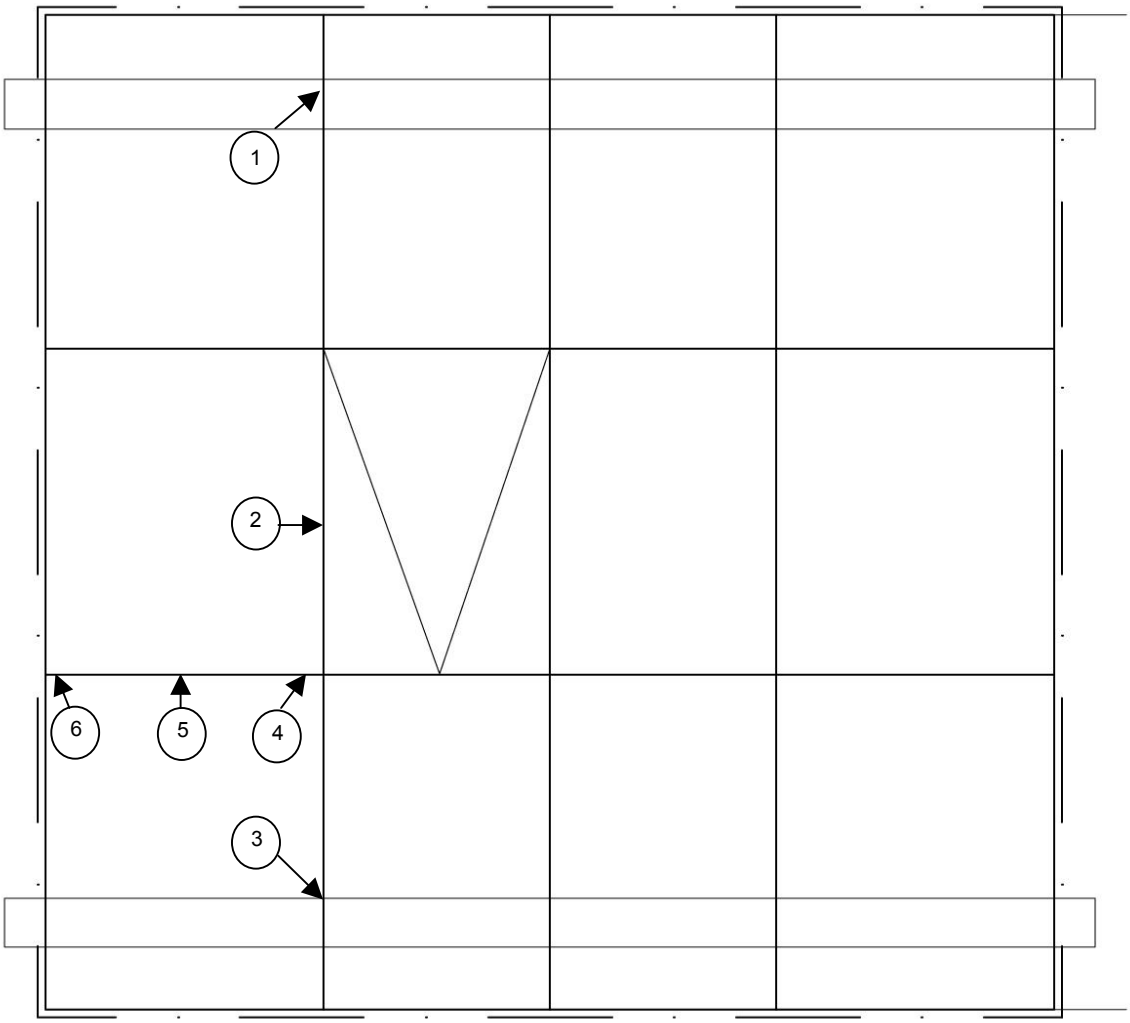


Fig. 1 Layout of measurement points

Measurement point 1: Mullion, top connection
Measurement point 2: Mullion, field centre
Measurement point 3: Mullion, bottom connection
Measurement point 4: Transom, side connection
Measurement point 5: Transom, field centre
Measurement point 6: Transom, side connection

3.2.4 Repeat test of air permeability

The results of the first test were confirmed. The values obtained were below the maximum permitted air permeability of 1,5 m³/(h m²) related to the overall area or 0,5 m³/(h m) related to fixed joint length at a test pressure differential of 750 Pa. The facade construction is rated class AE.

3.2.5 Repeat test of watertightness

The test was performed at up to a test pressure differential of 1500 Pa.
No water penetration through the facade construction was detected.

3.2.6 Watertightness under dynamic air pressure

Using a movable wind generator located at approx. 65 cm distance from the test specimen, all areas of the facade are exposed to a regulated turbulent air flow and simultaneously to a water spray operation at a rate of 2 l/min m^2. The velocity of the air flow at a distance of approx. 20 mm from the end of the air channel is approx. 20 m/sec. At the same time, negative pressures alternating between – 188 Pa / – 563 Pa every 5 ±1 sec. are generated in the test chamber. The time required by the test to cover all joints was approx. 20 minutes.

No water penetration was detected

3.2.7 Safety test

The test element was exposed to positive and negative wind loads applying 150% of the design wind loads of ± 2,25 kN/m² for more than 15 sec. each, as set out by EN 1991-1-4.

No breakages or any other visible changes were detected.

3.2.8 Impact resistance

Impact resistance was tested in accordance with EN 14019 using an impact body as set out by DIN EN 12600 : 2003 – 04, composed of a twin tyre of a pressure of 0,35 ± 0,02 MPa and a total weight of 50 kg. The impact load positions are illustrated on Fig. 2 (P1 to P4). The drop height was 950 mm and had been agreed previously with the client..

No damage of the curtain walling construction was detected.
Thus the facade construction is rated Class I5 and. E5, as set out by EN 14019.

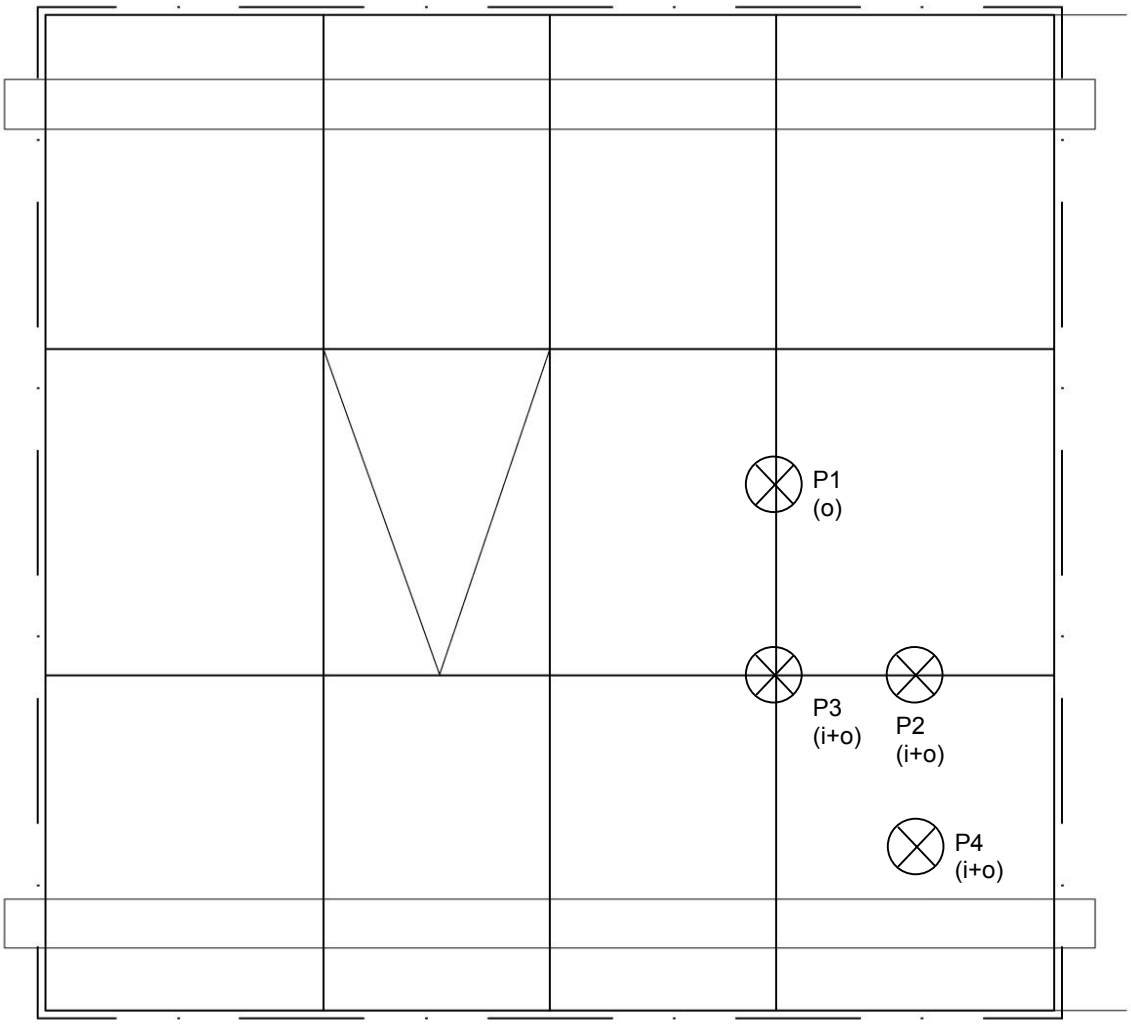


Fig. 2 Impact load positions

3.2.9 Disassembly and inspection

After conclusion of the test, several glazed fields were deglazed.

No unallowed traces of water were detected in the rebate platform.

Completion and workmanship of the construction were in conformity with the requirements of the system description and the drawings submitted (Annex 3).

Fig. 1 Facede mounted to test rig

Fig. 2 Facade with film suspended in front for zero measurement

Fig. 3 Facade with spray grid suspended in front for watertightness test, at left fan for dynamic watertightness test

Fig. 4 Impact resistance test

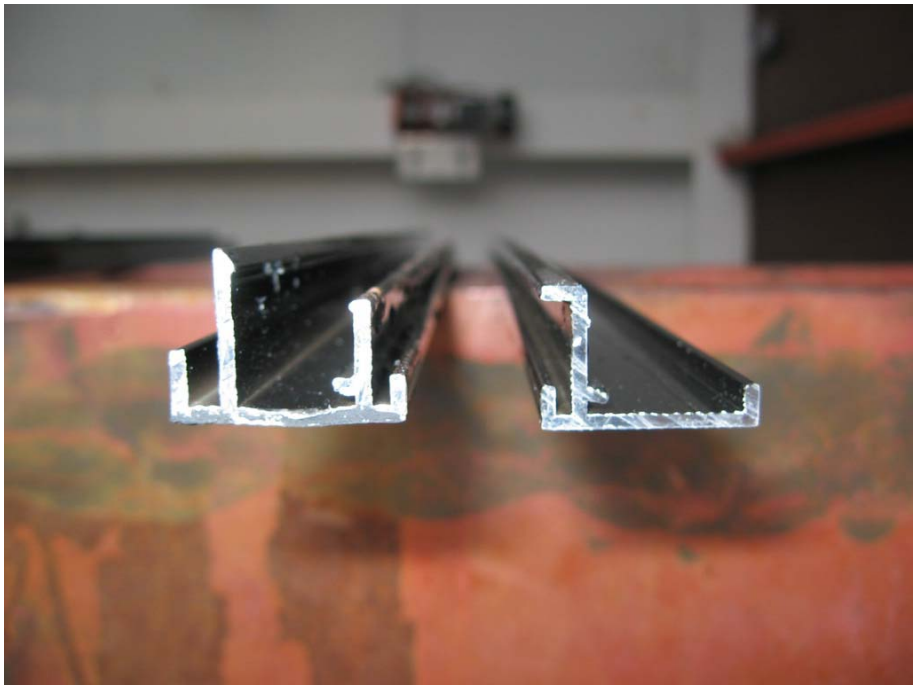


Fig. 5 Clip profile

Fig, 6 Intersection seen from outside

Fig. 7 Frame members seen from top, mullion at bottom of photo

Fig. 8 Frame member mounted to facade, mullion-transom-connection at right

Fig. 9 Supports for casement member

Fig. 10 Notching of bottom cover profile

Test records

Specimen	Facade element
Order No.	108 31168
Place of test	Deggendorf
Company	EXALCO
Date of test	12.7.06
Test engineer	Egli/Reichelt
System	Albio 102
Frame material	Aluminium
Date of manufacture	KW 26/27 2006
Insert window unit	Top-hung casement
Attended by	see list in the test report

	K	R	A	
Temperature	23,3	25	26	° C
Air humidity	65,5	65	63	%
Air pressure	977	977	977	hPa

K = test chamber
R = test room
A = outside

Calculation of fixed joints
Dimensions in mm

Width	Height	Number	Length/mm
1062	1263	6	27900
862	1263	6	25500
4070	0	4	32560
4012	0	5	40120
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
		Sum	126080

Calculation of overall area
Dimensions in mm

Width	Height		area/m²
4070	4012		16,33

1 Air permeability

Test method: EN 12153 : 2000 - 06
Classification: EN 12152 : 2002 - 02

The opening casement of the insert window was covered by tape for the test.

overall area of test specimen: 16,33 m² Joint length of fixed joints: 126,08 m

Table 1 Zero Measurement	Pressure differential in Pa	50	100	150	200	250	300	450	600	750
	Flow rate (Volume)									
	Absolute m³/h	3,1	4,6	6,6	7,8	8,9	9,9	13,2	16,9	19,0
	joint length m³/hm	0,02	0,04	0,05	0,06	0,07	0,08	0,10	0,13	0,15
	overall area m³/hm²	0,19	0,28	0,40	0,48	0,55	0,61	0,81	1,03	1,16

Table 2 Measured values at positive wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600	750
	Flow rate (Volume)									
	Absolute m³/h	6,5	8,9	13,1	16,4	19,1	21,9	29,7	35,2	40,7
	joint length m³/hm	0,05	0,07	0,10	0,13	0,15	0,17	0,24	0,28	0,32
	overall area m³/hm²	0,40	0,55	0,80	1,00	1,17	1,34	1,82	2,16	2,49

Table 3 Difference measurement –Zero measurement	Pressure differential in Pa	50	100	150	200	250	300	450	600	750
	Flow rate (Volume)									
	Absolute m³/h	3,4	4,3	6,5	8,6	10,2	12,0	16,5	18,3	21,7
	joint length m³/hm	0,03	0,03	0,05	0,07	0,08	0,10	0,13	0,15	0,17
	overall area m³/hm²	0,21	0,26	0,40	0,53	0,62	0,73	1,01	1,12	1,33

Table 4 Measured values at negative wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600	750
	Flow rate (Volume)									
	Absolute m³/h	4,7	8,9	11,7	14,9	17,1	19,4	26,9	34,1	41,1
	joint length m³/hm	0,04	0,07	0,09	0,12	0,14	0,15	0,21	0,27	0,33
	overall area m³/hm²	0,29	0,55	0,72	0,91	1,05	1,19	1,65	2,09	2,52

Table 5 Difference measurement –Zero measurement	Pressure differential in Pa	50	100	150	200	250	300	450	600	750
	Flow rate (Volume)									
	Absolute m³/h	1,6	4,3	5,1	7,1	8,2	9,5	13,7	17,2	22,1
	Linear m³/hm	0,01	0,03	0,04	0,06	0,07	0,08	0,11	0,14	0,18
	Surface m³/hm²	0,10	0,26	0,31	0,43	0,50	0,58	0,84	1,05	1,35

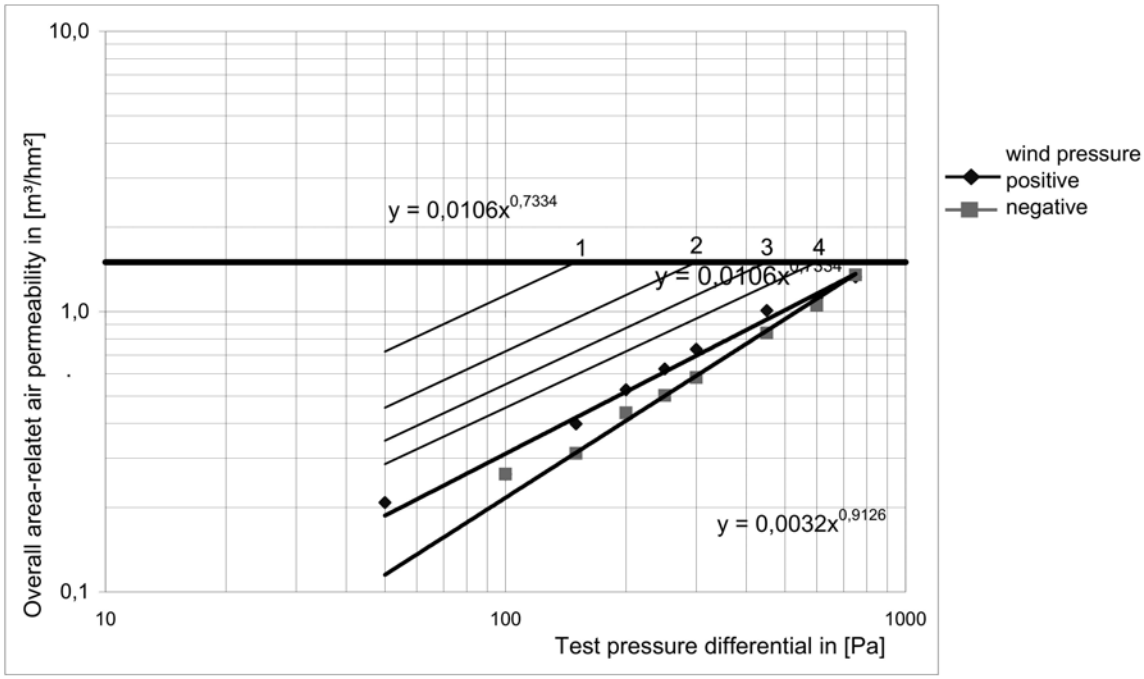


Diagram 1 Overall area-related air permeability

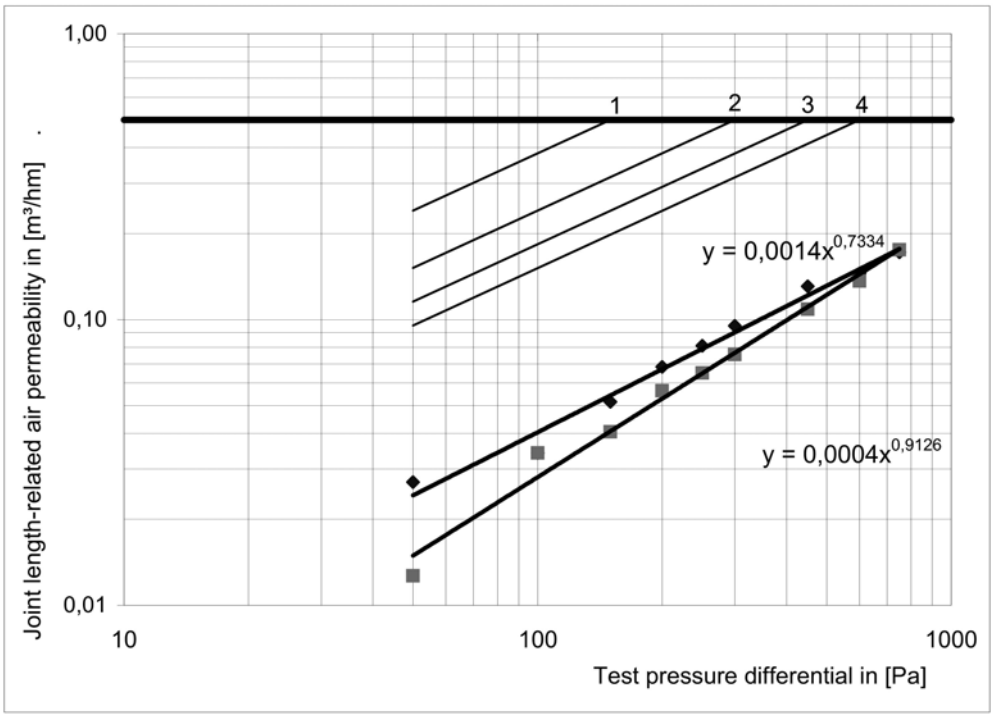


Diagram 2 joint length-related air permeability

Reference air permeability related to overall area positive wind pressure	Q100 =	0,31	m³/hm²
Reference air permeability related to joint length positive wind pressure	Q100 <	0,10	m³/hm
Reference air permeability related to overall area negative wind pressure	Q100 =	0,21	m³/hm²
Reference air permeability related to joint length negative wind pressure	Q100 <	0,10	m³/hm
Total classification of air permeability	**Class**	**AE**	

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2 Air permeability of the inserted window

Test method EN 1026 : 2000 - 06
Classification EN 12207 : 1999 - 11

frame size 862 mm x 1263 mm
casement size 862 mm x 1263 mm

joint length: 4,25 m overall area 1,09 m²

Table 6 Measured values at positive wind pressure	pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (Volume)								
	Absolute m³/h	7,1	9,0	13,2	17,4	19,7	21,9	30,0	35,5
	joint length m³/hm	1,67	2,12	3,11	4,09	4,64	5,16	7,06	8,35
	overall area m³/hm²	6,52	8,27	12,12	15,98	18,09	20,12	27,56	32,61

Table 7 difference = casement	pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (Volume)								
	Absolute m³/h	0,6	0,1	0,1	1,0	0,6	0,0	0,3	0,3
	joint length m³/hm	0,14	0,02	0,02	0,24	0,14	0,00	0,07	0,07
	overall area m³/hm²	0,55	0,09	0,09	0,92	0,55	0,01	0,28	0,28

Table 8 Measured values at negative wind pressure	pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (Volume)								
	Absolute m³/h	5,5	9,7	13,4	16,6	19,1	21,7	29,3	37,9
	joint length m³/hm	1,29	2,28	3,15	3,91	4,49	5,11	6,89	8,92
	overall area m³/hm²	5,05	8,91	12,31	15,25	17,54	19,93	26,91	34,81

Table 9 difference = casement	pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (Volume)								
	Absolute m³/h	0,8	0,8	1,7	1,7	2,0	2,3	2,4	3,8
	joint length m³/hm	0,19	0,19	0,40	0,40	0,47	0,54	0,56	0,89
	overall area m³/hm²	0,73	0,73	1,56	1,56	1,84	2,11	2,20	3,49

Table 10 Measured values at negative wind pressure	pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (Volume)								
	Absolute m³/h	0,7	0,4	0,9	1,4	1,3	1,2	1,4	2,1
	joint length m³/hm	0,2	0,1	0,2	0,3	0,3	0,3	0,3	0,5
	overall area m³/hm²	0,64	0,41	0,83	1,24	1,19	1,06	1,24	1,88

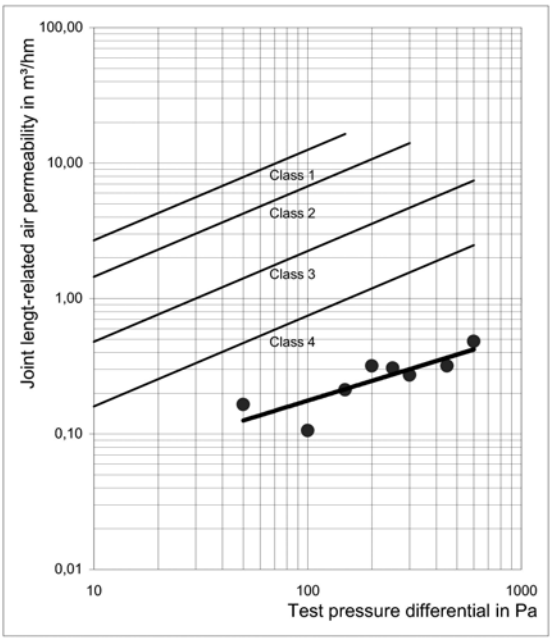

Diagram 3 Joint length-related air permeability average value from positive and negative wind pressures)

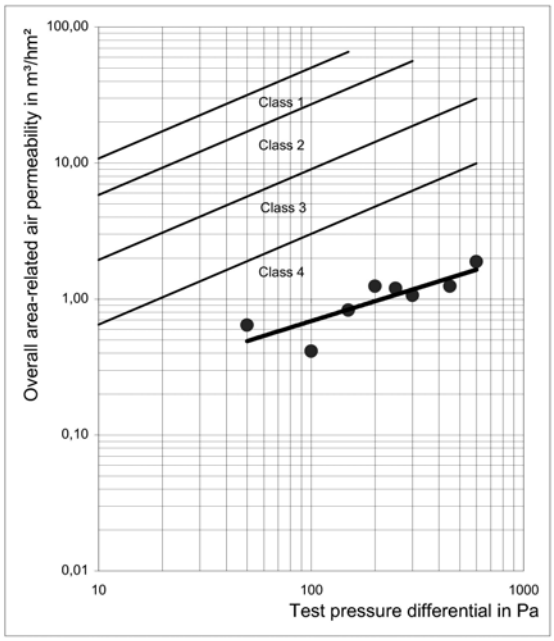

Diagram 4 Overall area-related air permeabiilty average value from positive and negative wind pressures)

Tabelle 11 results

Reference air permeability of joint length	Q100 <	0,10	m³/hm
Reference air permeability of overall area	Q100 =	0,26	m³/hm²
Air permeability of joint length	Klasse	4	
Air permeability of overall area	Klasse	4	
Classification according to EN 12207	**Klasse**	**4**	

Classification according to the numerical average of table 10.

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3 Watertightness

Test method: EN 12155 : 2000 - 06
Classification: EN 12154 : 1999 - 12

No water penetration at up to 600 Pa

Classification according to	**Class R7**

4 Resistance to wind load

Maximum wind load p_{max}	**1500 Pa**	**positive wind pressure**
(Design load)	**-1500 Pa**	**negative wind pressure**

Fig.1 of the test report shows the layout of the measurement points.

Table 12 Maximum permitted deflection for classification

Profile	**Mullion**	**Transoms**
Displacement transducer No.	**M1 to M3**	**M4 to M6**
Effective span	**3300 mm**	**1062 mm**
Permitted deflection l/200	**15 mm**	**5,3 mm**

Positive wind pressure

Table 13 Measured results of frontal deflection in mm	% von p_{max}	25	50	75	100
	p_1 in Pa	375	750	1125	1500
	M1 in mm	0	0,1	0,2	0,3
	M2 in mm	-1,5	-3	-4,8	-6,9
	M3 in mm	-0,1	-0,2	-0,4	-0,6
	f in mm	-1,45	-2,95	-4,7	-6,75
	1/	-2276	-1119	-702	-489

Table 14 Measured results of frontal deflection in mm	% von p_{max}	25	50	75	100
	p_1 in Pa	375	750	1125	1500
	M4 in mm	-1	-2	-3,3	-4,8
	M5 in mm	-0,8	-1,6	-2,6	-3,7
	M6 in mm	-0,4	-0,9	-1,5	-2,1
	f in mm	-0,1	-0,15	-0,2	-0,25
	1/	-10620	-7080	-5310	-4248

Negative wind pressure

Table 15 Measured results of frontal deflection in mm	% von p_{max}	25	50	75	100
	p_1 in Pa	-375	-750	-1125	-1500
	M1 in mm	0	-0,1	-0,3	-0,4
	M2 in mm	1,4	3	4,9	7,2
	M3 in mm	0,2	0,4	0,5	0,8
	f in mm	1,3	2,85	4,8	7
	1/	2538	1158	688	471

Table 16 Measured results of frontal deflection in mm	% von p_{max}	25	50	75	100
	p_1 in Pa	-375	-750	-1125	-1500
	M4 in mm	1,1	2,2	3,5	5,1
	M5 in mm	0,9	1,8	2,8	3,9
	M6 in mm	0,4	1,1	1,7	2,2
	f in mm	0,15	0,15	0,2	0,25
	1/	7080	7080	5310	4248

Key
p_1 Test pressure
M1, M2, M3, ... Frontal dislodgement at measurement points M1, M2, M3,…
f Frontal deflection

Classification of resistance to wind load	**Requirement fulfilled**

5 Repeat test of air permeability

As set out by EN 13116 the positive difference between the values obtained during the first and second tests for air permeability at the highest pressure must not exceed 0.3m³/hm² and 0.1m³/hm, respectively. The requirement was fulfilled.

Total classification of air permeability	**Class AE**

6 Repeat test of watertightness

Test method: EN 12155 : 2000 - 06
Classification: EN 12154 : 1999 - 12

No water penetration at up to 1500 Pa

Classification as per EN 12154	**Class RE_{1500}**

7 Dynamic watertightness test

Test method: ENV 13050 : 2000 - 11

Pressure in Pa		Comment
Pmin = Pmax / 3	188	No water penetration
Pmax =0,375 x P1*	563	

*P1 is maximum wind load p_{max} from test of resistance to wind load

8 Resistance to wind load – Safety test

Test method: EN 12179 : 2000 - 06
Classification: EN 13116 : 2001 - 07

Safety test at 2250 Pa / -2250 Pa	
Total classification *) Resistance to wind load	**Requirement fulfilled**

*) Total classification results from 3 and 8

9 Impact resistance

Test method: EN 14019 : 2004 - 06
Classification: EN 14019 : 2004 - 06

All impact load positions without damage. Drop height 950 mm
Layout of impact load positions see Fig. 2 of test report.

Classification according to EN 14019	**Class I5 / E5**

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12.7.06

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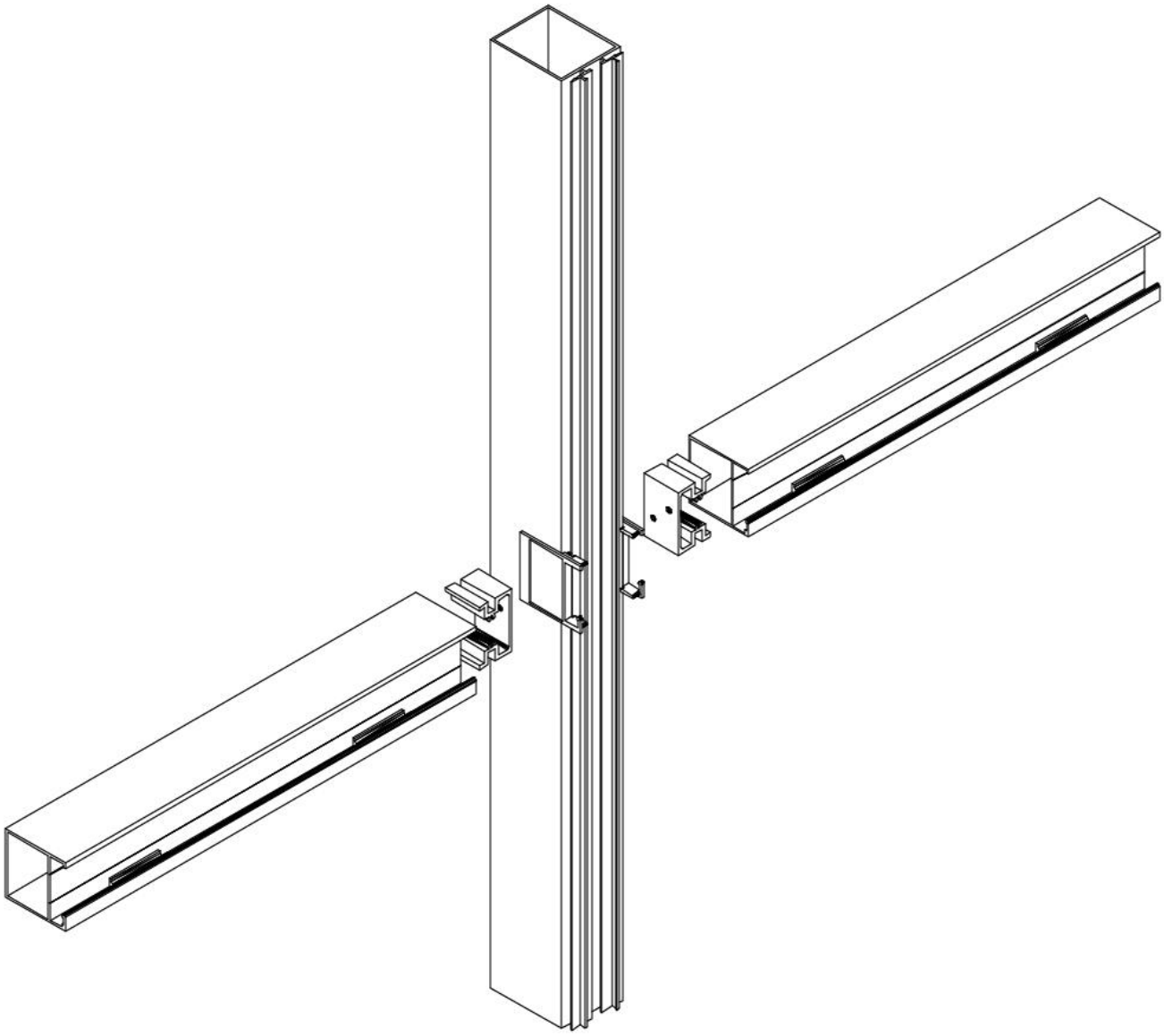
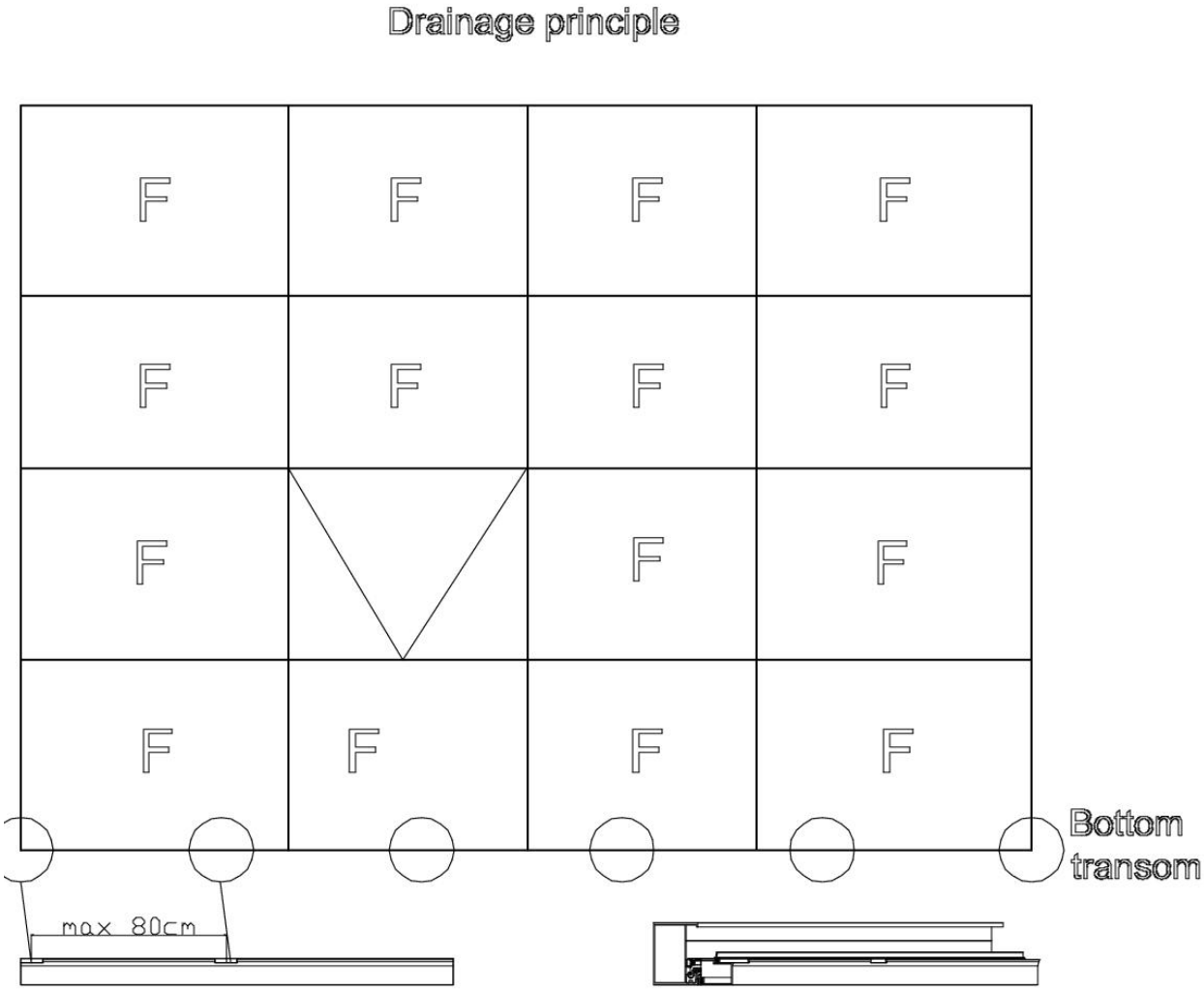
Mechanical mullion-transom-connection



Note:
The representations are based on unchanged documentation provided by the client and have not been checked fully and in detail for technical correctness.

Drainage



Note:
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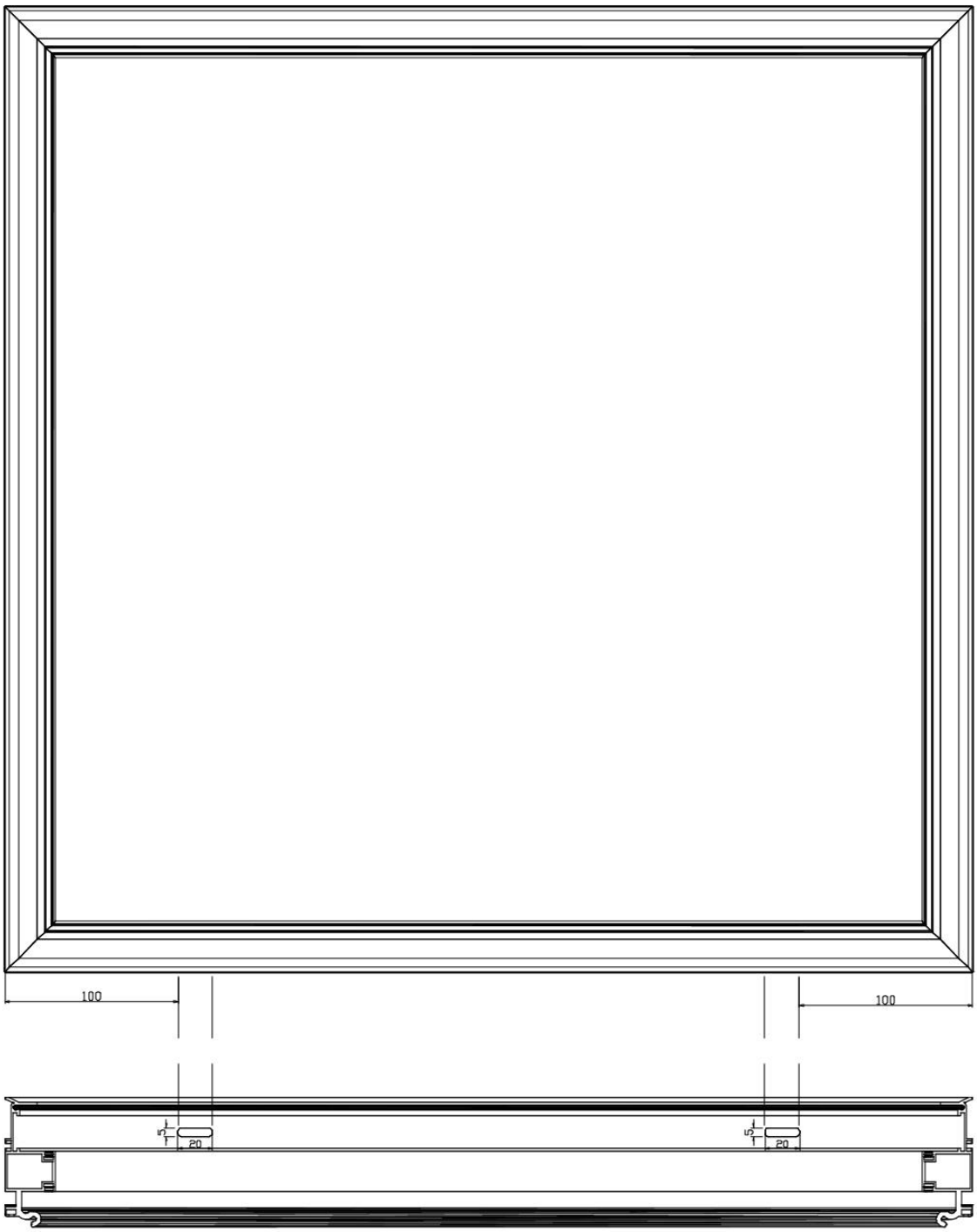
Vapour pressure equalization

Drainage holes for profile 102-007



Note:
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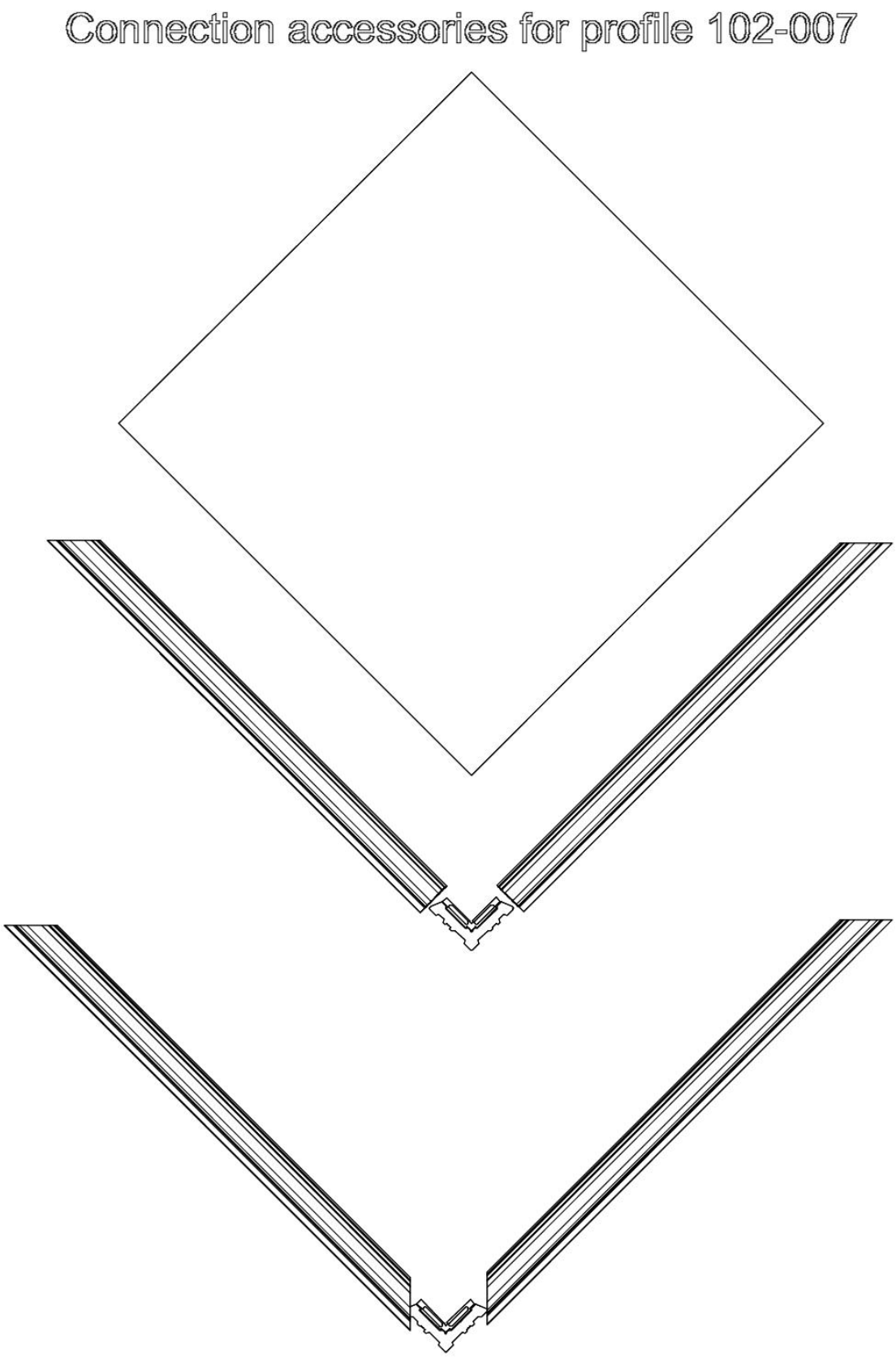
Frame joint



Note:
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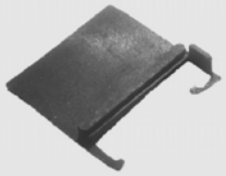
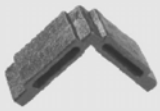
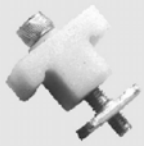
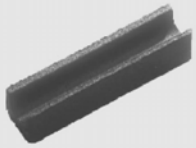
ΕΞΑΡΤΗΜΑΤΑ / ACCESSORIES

ΚΩΔΙΚΟΣ CODE	ΠΕΡΙΓΡΑΦΗ	DESCRIPTION	ΣΧΗΜΑ FIGURE
	ΣΥΝΔΕΣΜΟΣ ΣΤΗΡΙΞΗΣ	Mullion connector	
5107	No 001	No 001	
5114	No 002	No 002	
5144	No 003	No 003	
	ΦΛΑΝΤΖΑ ΥΑΛΟΠΕΤΑΣΜΑΤΟΣ	Flange between mullion and transom	
5123	102001	102001	
5216	102002	102002	
5148	102003	102003	
5379	ΓΩΝΙΑ ΣΥΝΔΕΣΕΩΣ No 102Α΄	Steel joint corner No 102 A΄	
5641	ΠΡΟΣΘΗΚΗ ΓΩΝΙΑΣ No 102Α΄	Additional part for joint corner 102A΄	
5817	ΕΞΑΡΤΗΜΑ ΣΤΗΡΙΞΗΣ ΤΥΦΛΩΝ ΣΗΜΕΙΩΝ No 102	Support accessory for inaccessible spots	
5102	ΕΞΑΡΤΗΜΑ ΣΤΗΡΙΞΗΣ ΦΥΛΛΟΥ No 102	Support accessory for sash profiles	

Note:
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ΕΞΑΡΤΗΜΑΤΑ / ACCESSORIES

ΚΩΔΙΚΟΣ CODE	ΠΕΡΙΓΡΑΦΗ	DESCRIPTION	ΣΧΗΜΑ FIGURE
5680	ΓΩΝΙΑ ΕΥΘΥΓΡΑΜΜΙΣΕΩΣ No 102	Alignment square 102	
5004	ΛΑΣΤΙΧΟ No 42	Gasket Nr.42	
5004	ΛΑΣΤΙΧΟ No 43	Gasket Nr.43	
5645	ΛΑΣΤΙΧΟ ΣΥΡΤΑΡΩΤΟ No 109	Sliding gasket Nr.109	
5645	ΛΑΣΤΙΧΟ ΣΥΡΤΑΡΩΤΟ No 106	Sliding gasket Nr.106	
5646	ΛΑΣΤΙΧΟ ΣΥΡΤΑΡΩΤΟ No 107	Sliding gasket Nr.107	

Note:
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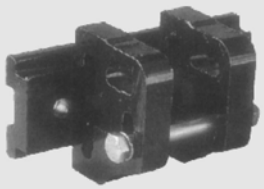
ΕΞΑΡΤΗΜΑΤΑ / ACCESSORIES

ΚΩΔΙΚΟΣ CODE	ΠΕΡΙΓΡΑΦΗ	DESCRIPTION	ΣΧΗΜΑ FIGURE
5744	ΡΥΘΜΙΖΟΜΕΝΗ ΒΑΣΗ ΥΑΛΟΠΕΤΑΣΜΑΤΟΣ	Adjustable structural bracket	
5609	ΕΞΑΡΤΗΜΑ ΒΑΣΗΣ ΥΑΛΟΠΕΤΑΣΜΑΤΟΣ	Accessory for structural bracket	
	ΛΑΒΗ ΥΑΛΟΠΕΤΑΣΜΑΤΟΣ	Cremone Bolt	
5202	ΜΙΚΡΗ	Small	
5215	ΜΕΓΑΛΗ	Large	

Note:
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