

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties



Test Report

No. 12-003653-PR01

(PB-A01-02-en-02)

Client	Uniform S.p.A. Via dell Agricoltura 36 37046 Minerbe VR Italy
Product	Double combined side hung & turn tilt window with opening meeting style
Designation	System designation: Termoscudo Easy Line
Performance-relevant product details	Wood (KI) with XPS and Aluminium cover profile
Overall dimensions (WxH)	1,500 mm x 1,500 mm
Special features	Ensure compatibility of materials used. Ensure durability of seal between XPS profile and frame member at drainage level.

Basis

EN 14351-1:2006+A1:2010

Test standards:

EN 1026:2000-06
EN 1027:2000-06
EN 12046-1:2003-11
EN 12211:2000-06
EN 14608:2004-06
EN 14609:2004-06
Test Report 12-003653-PR01 (PB-A01-02-de-02) dated 11 April 2013

Corresponds to the national versions (e. g. DIN EN)

Representation



Instruction 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.

Contents

The report contains a total of 37 pages.

Results

Air permeability according to EN 12207:1999-11



Class 4

Watertightness according to EN 12208:1999-11



Class E1350

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



Class C5 / B5

Operating forces according to EN 13115:2001-07



Class 1

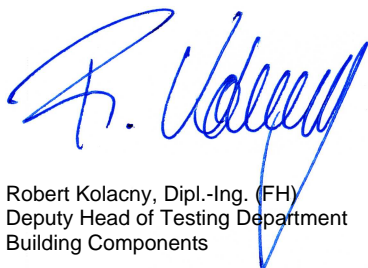
Mechanical properties according to EN 13115:2001-07

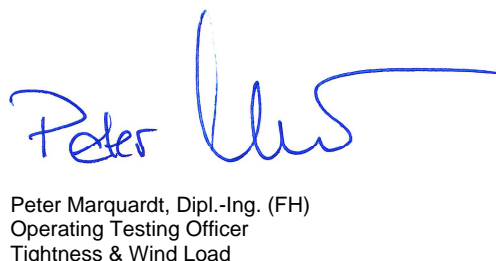


Class 4

ift Rosenheim

21.06.2013


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DAP-ZE-2288.00
DGA-IS-4285-00



Deutsche
Akkreditierungsstelle
D-PL-11349-01-00
D-ZM-11349-01-00

1 Object

1.1 Description of test specimen

Double combined side hung & turn tilt window with opening meeting style

Manufacturer	Uniform SpA, Minerbe VR
System designation	Termoscudo Easy Line
Material	wood (KI) with XPS and aluminium cover profile
Type of opening	Turn / tilt and turn
Opening directions	Active casement DIN right inward opening Inactive casement DIN left inward opening

Frame member

Designation / Type / Item No.	65 x 68
Profile section, width in mm	68
Profile section, thickness in mm	65
Overall dimensions in mm	1,500 x 1,500
Type of joint	doweled
Additives/Additional parts	XPS-profiles TS200.1
Corner design XPS	mitred and bonded
Type of joint	Via XPS profile with frame profile bolted. At bottom horizontal continuous and laterally on both sides about 4 cm sealed with pourable sealant
Sealing XPS / frame	At bottom horizontal continuous and laterally (approx. 4 cm) sealed with pourable sealant

Insulation panel frame

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	LA866c (at bottom), LA866 (lateral and at top)
Material	Aluminium
Fixing method	clamped
Type of joint	mitred and welded
Additives/Additional parts	retaining clip LC62
Fixing retaining clip	retaining clip snapped into ABS panel of XPS profile

Casement (AC)

Designation / Type / Item No.	68 x 81
Profile section, width in mm	81
Profile section, thickness in mm	68
Overall dimensions in mm	Active casement: 721 x 1,416
Type of joint	doweled
Weight in kg	37
Additives/Additional parts	XPS-profiles TS100.0

Corner design	mitred and bonded
Type of joint	Via XPS profile with casement profile bolted
Insulation panel (AC)	
Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	LA175
Material	Aluminium
Fixing method	clamped
Type of joint	mitred and welded
Additives/Additional parts	retaining clip LC81
Fixing retaining clip	with XPS profile bolted
Casement (IC)	
Designation / Type / Item No.	68 x 81
Profile section, width in mm	81
Profile section, thickness in mm	68
Overall dimensions in mm	Inactive casement: 691 x 1,416
Type of joint	doweled
Weight in kg	36.5
Additives/Additional parts	XPS-profile TS100.0 (on hinge side, at bottom and top) XPS-profile TS101.0 and TS100.1 (overlap)
Corner design	TS100.0 and TS100.1 mitred and bonded. TS101.0 butt-jointed
Type of joint	Via XPS profile with casement profile bolted
Insulation panel (IC)	
Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	LA175 four-sided LA858 overlap
Material	Aluminium
Fixing method	clamped
Type of joint	LA175 mitred and welded LA858 butt-jointed to overlap end caps
Other	LA858 in joint between to LA175 sealed with pourable sealant, included overlap end caps
Additives/Additional parts	retaining clip LC81 retaining clip LC50/3
Fixing retaining clip	with XPS profile bolted
Overlap end caps	
Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	LC858
Material	ABS
Fixing method	fitted and screwed in place

Rebate design

Rebate drainage	In insulation panel 8 slots 4 mm x 30 mm
Pressure equalization casement	no pressure equalization existent

Seals / Gaskets**Rebate seal external insulation panel**

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	DE125
Material	EPDM
Corner design	4-sided, corners notched, at top centre butt-jointed and bonded

Centre seal frame

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	Triplex 12/4
Material	TPE
Corner design	4-sided, corners notched, at top centre butt-jointed

Sealing insulation panel frame for XPS-profile

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	DE117
Material	EPDM
Corner design	continuous, at top centre butt-jointed

Double casement gasket external

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	DE125
Material	EPDM
Corner design	butt-jointed and bonded to overlap end caps

Double casement gasket centre

Manufacturer	Uniform SpA, Minerbe VR
Designation / Type / Item No.	Triplex 12/4
Material	TPE
Corner design	butt-jointed to fin
Designation / Type / Item No.	TR4S/11-12
	manufacturer: Uniform, Material: Gummi

IGU triple

Thickness in mm	48
Configuration in mm	Float 4 / SZR 18 / Float 4 / SZR 18 / Float 4

Incorporation of infill panel

Vapour pressure equalization continuous slot between XPS profile and insulation panel (three- or four-sided)

Glazing gasket external

Manufacturer Uniform SpA, Minerbe VR
 Designation / Type / Item No. DE34
 Material EPDM
 Corner design Active casement: continuous, at bottom centre butt-jointed
 Inactive casement: continuous, at top centre butt-jointed

Other

Glazing gasket internal

Manufacturer Uniform SpA, Minerbe VR
 Designation / Type / Item No. DE39
 Material EPDM
 Corner design continuous, at top centre butt-jointed

Other

Tilt and turn hardware

Manufacturer Maico
 Designation / Type / Item No. Multi-Matic (burglary resistance tilt and turn hardware)
 Type of opening Turn / tilt and turn
 Opening directions Active casement DIN right inward opening
 Inactive casement DIN left inward opening
 Number of locks Active casement: at bottom 1, at top 1, on hinge side 1, on lock side. 2
 Inactive casement: at bottom 1, at top 1, on hinge side 1
 Locking distance, max. in mm 730
 Scissors length in mm 340
 Position of locks 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: Uniform S.p.A., 37046 Minerbe VR (Italy), Marco Zanardi

Date: 19.03.2013

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

Delivered on: 14.02.2013

ift-sp-Number: 12-003653-PK01 / WE: 34084-001

2 Procedure

2.1 Basis *) referring to test 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 14608:2004-06

Windows - Determination of the resistance to racking

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 13115:2001-07

Windows - Classification of mechanical properties - Racking, torsion and operating forces

*) 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.

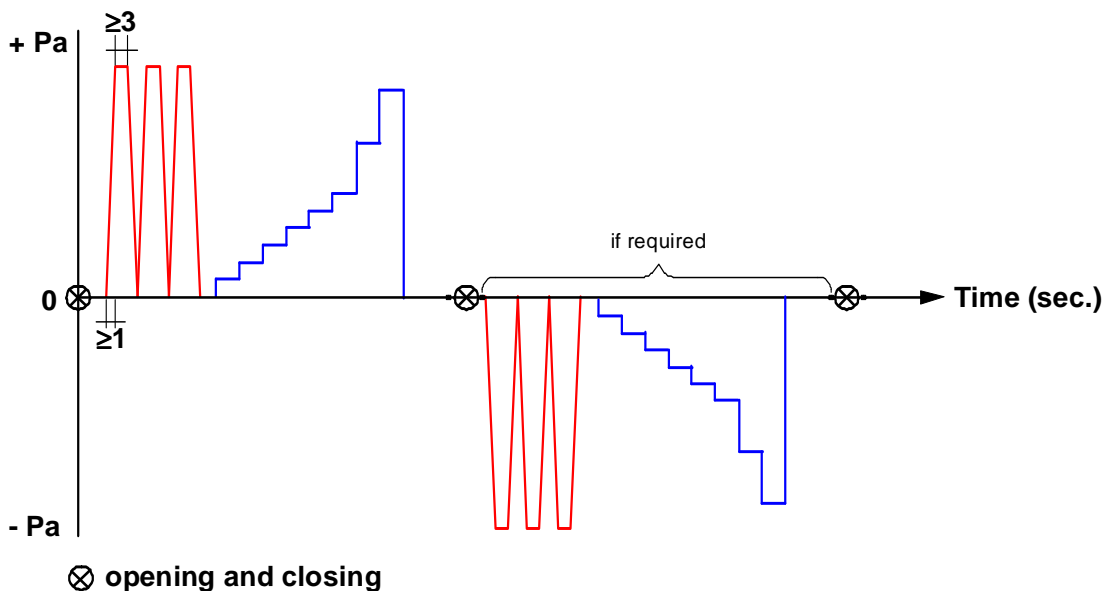


Illustration Test sequence for air permeability

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 $\pm \Delta p_2 = \Delta p_1 - 50\%$.

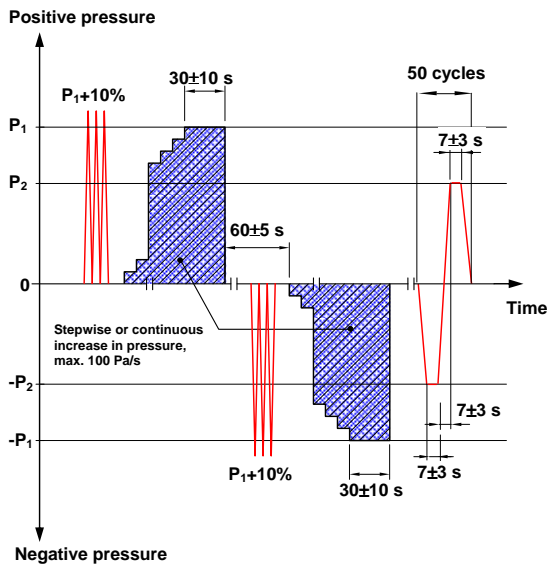


Illustration Test sequence for resistance to wind load

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

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.

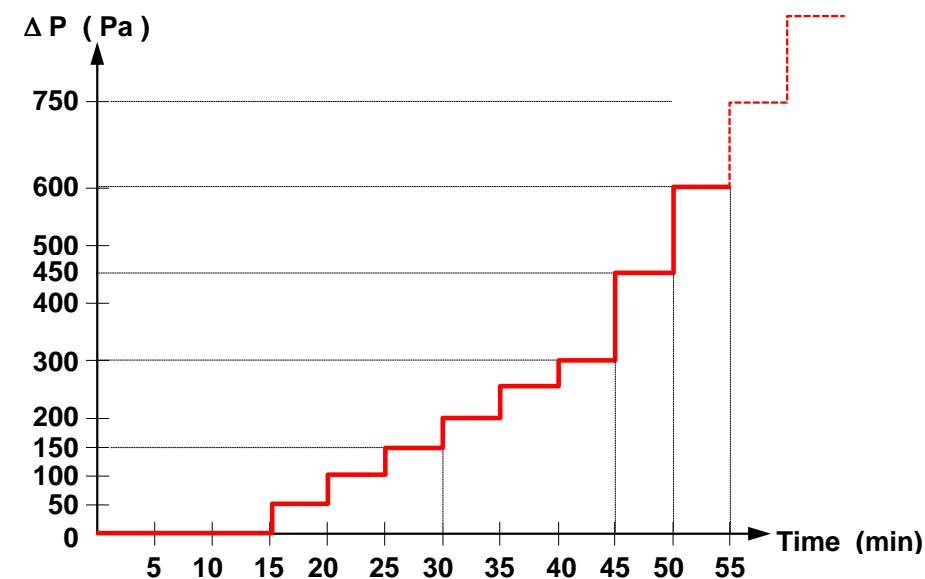


Illustration Test sequence for watertightness

Resistance to wind load – Safety test - EN 12211

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

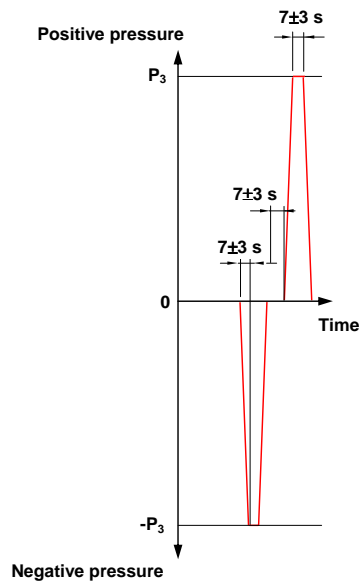


Illustration Test sequence for safety test

Operating forces - EN 12046-1

The operating forces are determined in accordance with EN 12046-1 for release / locking operation of the hardware, the forces required for opening and for complete closing

Resistance to racking in casement plane - EN 14608

Resistance to racking is determined in accordance with EN 14608. Following a pre-load of 10% of the maximum test load or at least 20 N, deformation is measured after removal of the pre-load. This is followed by applying a static test load in increments to the test specimen and measuring the deformation under the test load and after removal of the test load. The test serves to determine the resistance of an open casement/sash to loads applied in the direction of the casement/sash plane and the resulting maximum and permanent deformations.

Resistance to static torsion - EN 14609

Resistance to static torsion is determined in accordance with EN 14609. Following a pre-load of 10% of the maximum test load or at least 20 N, deformation is measured after removal of the pre-load. This is followed by applying a static test load in increments to the test specimen and measuring the deformation under the test load and after removal of the test load. The test serves to determine the static torsion of an open casement resulting from horizontal loads applied perpendicular to the casement plane and the resulting maximum and permanent deformations.

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.

3 Detailed results

Air permeability - Test according to EN 1026

Project-No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
	EN 1026:2000-06		
Basis	Windows and doors - Air permeability - Test method		
Test equipment	Pst/022200 - LWW-Prüfstand Fensterprüfstand 1		
Specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Specimen No.	34084-001		
Date of test	14.02.2013		
Responsible test engineer	Peter Marquardt		
Test engineer	Thomas Krichbaumer		

Information to test configuration / Test method

Test method Thera are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 37 % Air pressure 971 hPa

The ambient conditions are in accordance with the standard requirements.

Testing

Size of window frame	1500 mm	x	1500 mm
Size of active casement	721 mm	x	1416 mm
Size of inactive casement	691 mm	x	1416 mm
Area of test specimen	2,25 m ²		
Length of opening joints	7,07 m		

Table: Measurement of operating forces

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

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	1,1	1,7	2,3	2,9	3,5	4,1	6,2	9,0
	Joint length-related m ³ /hm	0,15	0,24	0,33	0,41	0,49	0,58	0,88	1,28
	Overall area-related m ³ /hm ²	0,47	0,76	1,04	1,30	1,56	1,82	2,76	4,01

Table: Air permeability at negative wind pressure


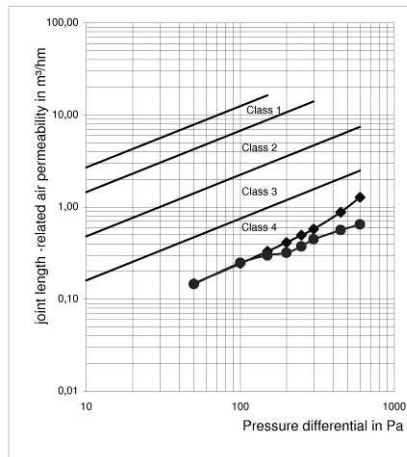
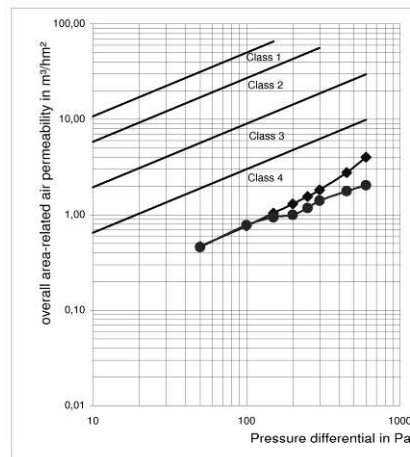
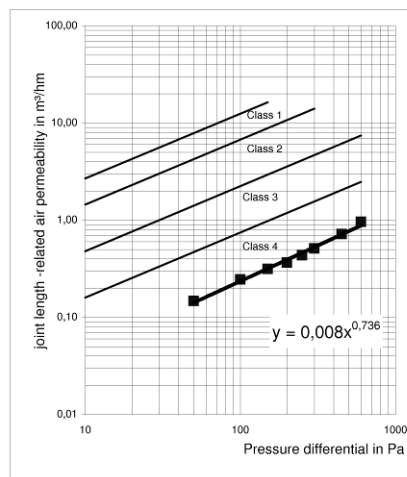
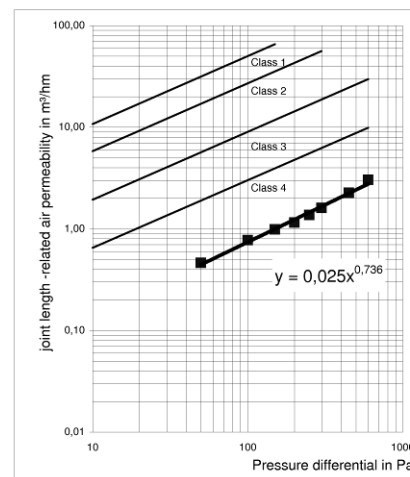
Measured results at negative wind pressure	Pressure differential in Pa	50	100	150	200	250	300	450	600
	Flow rate (volume) m ³ /h	1,0	1,8	2,1	2,3	2,6	3,2	4,0	4,6
	Joint length-related m ³ /hm	0,15	0,25	0,30	0,32	0,37	0,45	0,56	0,65
	Overall area-related m ³ /hm ²	0,46	0,78	0,94	1,00	1,17	1,40	1,77	2,04

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	1,7	2,2	2,6	3,1	3,6	5,1	6,8
Joint length-related m ³ /hm		0,15	0,25	0,31	0,37	0,43	0,51	0,72	0,96
Overall area-related m ³ /hm ²		0,46	0,77	0,99	1,15	1,36	1,61	2,27	3,02

**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 = 0,24 m ³ /hm
Reference air permeability related to overall area	Q100 = 0,74 m ³ /hm ²

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

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 12211:2000-06 Windows and doors - Resistance to wind load - Test method		
Used test equipment	Pst/022200 - LWW-Prüfstand Fensterprüfstand 1		
Test specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	14.02.2013		
Testing personnel in charge	Peter Marquardt		
Test engineer	Thomas Krichbaumer		

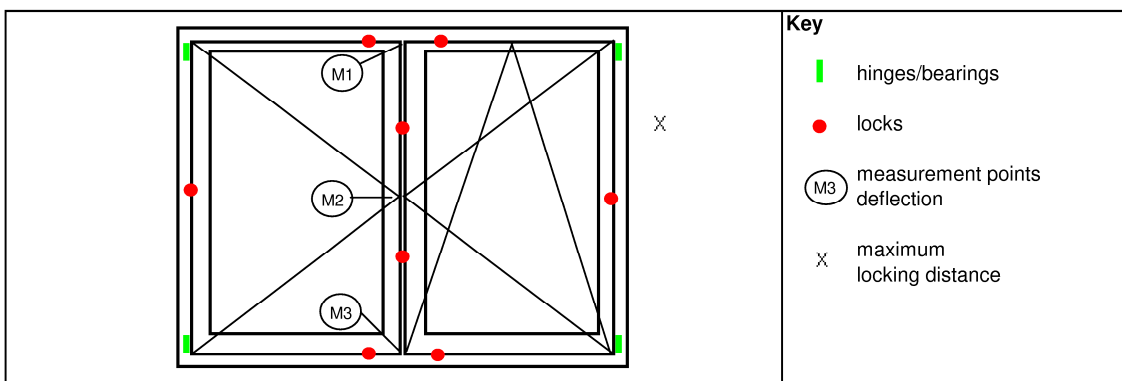
Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 37 % Air pressure 971 hPa

The ambient conditions are in accordance with the standard requirements

Testing



Maximum test pressure: ± 2000 Pa 3 pressure pulses of 2200 Pa

Table: Maximum deflection for classification at effective span $l = 1416$ mm

Class		maximum permissible relative deflection in mm
A	($l/150$)	9,4
B	($l/200$)	7,1
C	($l/300$)	4,7

Table: Measured results of frontal deflection in mm at negative / positive wind pressure

Measured results of frontal deflection in mm		Positive wind pressure					Negative wind pressure				
	p_1 in Pa	400	800	1200	1600	2000	-400	-800	-1200	-1600	-2000
	M1 in mm				2,6	3,1				2,3	2,6
	M2 in mm				3,1	3,8				3,3	3,9
	M3 in mm				1,6	2,0				2,3	2,5
	f_{rel} in mm				1,0	1,2				1,0	1,3
	l/f_{rel}				1467	1161				1388	1081

Table: Permanent deformation measured at 0 Pa after 60 seconds

Permanent deformation		Pos.pr.	Neg.pr.
	M1 in mm	0,2	0,0
	M2 in mm	0,2	0,0
	M3 in mm	0,1	0,1
	f_{rel} in mm	0,1	-0,1

Key

p_1 Test pressure
M1, M2, M3 frontal dislodgement at measurement points M1, M2, M3
 f frontal deflection

Dynamit wind load (negative / positive pressures)

Table: pressure pulses

p_2 in Pa	200	400	600	800	1000
passed					✓

50 cycles at $p_2 \pm 1000$ Pa

No malfunctions were detected.

Repeat test of air permeability - Test according to EN 1026

Project-No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis	EN 1026:2000-06 Windows and doors - Air permeability - Test method		
Test equipment	Pst/022200 - LWW-Prüfstand Fensterprüfstand 1		
Specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Specimen No.	34084-001		
Date of test	14.02.2013		
Responsible test engineer	Peter Marquardt		
Test engineer	Thomas Krichbaumer		

Information to test configuration / Test method

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

Ambient conditions Temperature 18 °C Air humidity 37 % Air pressure 971 hPa

The ambient conditions are in accordance with the standard requirements.

Testing

Size of window frame	1500 mm	x	1500 mm
Size of active casemen	721 mm	x	1416 mm
Size of inactive caseme	691 mm	x	1416 mm
Area of test specimen	2,25 m ²		
Length of opening joint	7,07 m		

Subsequent to the test of resistance to wind load by application of test pressures $p_{1\text{and}} p_2$, 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, Operating forces, Mechanical properties

Test Report 12-003653-PR01 (PB-A01-02-en-02) dated 21. Juni 2013

Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Watertightness - Test according to EN 1027

Project-No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis	EN 1027:2000-06		
	Windows and doors - Watertightness - Test method		
Test equipment	Pst/022200 - LWW-Prüfstand Fensterprüfstand 1		
Specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Specimen No.	34084-001		
Date of test	14.02.2013		
Responsible test engineer	Peter Marquardt		
Test engineer	Thomas Krichbaumer		

Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 37 % Air pressure 971 hPa

The ambient conditions are in accordance with the standard requirements.

Testing

Size of window frame 1500 mm x 1500 mm

Number of spray nozzles	6	Lower nozzle line	0
Water amount	720 l/h	Water amount	0 l/h
	0,72 m³/h		0 m³/h

Spray method A

No water penetration at up to 1350 Pa detected.

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

Project-No. 12-003653-PR01 **Task No.** 12-003653
Client Uniform S.p.A.
Basis EN 12211:2000-06
 Windows and doors - Resistance to wind load - Test method
Test equipment Pst/022200 - LWW-Prüfstand Fensterprüfstand 1
Specimen Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line
Specimen No. 34084-001
Date of test 14.02.2013
Responsible test engineer Peter Marquardt
Test engineer Thomas Krichbaumer

Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 37 % Air pressure 971 hPa

The ambient conditions are in accordance with the 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 ± 3000 Pa.

Operating forces - Test according to 12046-1

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 12046-1:2003-11		
	Operating forces - Test method - Part 1: Windows		
Used test equipment	KM/022960 - Digitales Kraftmessgerät 200N		
Test specimen	DM/022852 - Drehmomentanzeigergerät TT1		
	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Test engineer	Darius Janikowski		

Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambient conditions are in accordance with the standard requirements.

Testing

Pivot arm 0,115 m

Grip height 0,52 m

Table: Measurement operating forces for the release / locking operating

Measured values	1	2	3	Average value M
in Nm	2,6	2,6	2,5	2,6

Table: Measurement of force required for opening (turn)

Measured values	1	2	3	Average value M
in N	6,5	5,8	6,3	6,2

Table: Measurement of force required for opening (tilt)

Measured values	1	2	3	Average value M
in N	46,5	44,9	43,5	45,0

Table: Measurement of force for complete closing (turn)

Measured values	1	2	3	Average value M
in N	<30	<30	<30	<30

Table: Measurement of force for complete closing (tilt)

Measured values	1	2	3	Average value M
in N	45,6	44,9	51,0	47,2

Malfunctions at test specimen

At the test specimen were no malfunctions detected.

Resistance to racking in the casement section - Test according to EN 14608

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 14608:2004-06 Windows - Determination of the resistance to racking		
Used test equipment	W/020155 - Hängewaage HCB200K100 WM/022196 - Digita Meßuhr, 1/100 Abl, 0-25mm Pst/020823 - Einheit zur Einleitung von Kräften bei Fenstern		
Test specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Tester	Darius Janikowski		

Information to test configuration / Test method

Test method There are no deviations to the test method according standards/basis

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambient conditions are in accordance with the standard requirements

Testing**Tilted position (bottom hung)**

A pre-load of 80 N was applied

A load was applied to the casement in tilted position, for a period of 5 minutes

Weight at casement corner: 800 N

The test specimen must not exhibit any malfunctions, damage permanent deformations loosening of fittings and detachment of joint and sealing systems.

The intended use after test must be ensured.

Upon completion of the test, the test specimen must remain fully operable in terms of its operating forces

		Deformation in mm			
		200 N	400 N	600 N	800 N
Tilted position	maximum deformation ($a_1 - a_0$)			2,34	2,83
	permanent deformation ($a_2 - a_0$)			0,34	0,26

Permanent damage at test specimen

At the test specimen were no malfunctions detected.

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Turn position (side hung)

A pre-load of 80 N was applied

The load was applied to the casement opened at a 90° opening angle, for a duration of 5 minutes.

Weight at casement corner: 800 N

The test specimen must not exhibit any malfunctions, damage, permanent deformations
loosening of fittings and detachment of joint and sealing systems

The intended use must be ensured

Upon completion of the test, the test specimen must remain fully operable in terms of its operating forces

		Deformation in mm			
		200 N	400 N	600 N	800 N
Turn position	maximum deformation ($a_1 - a_0$)			2,45	2,73
	permanent deformation ($a_2 - a_0$)			0,52	0,32

Permanent damage at test specimen

There are no permanent damages at test specimen detected.

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

Test Report 12-003653-PR01 (PB-A01-02-en-02) dated 21. Juni 2013

Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Operating forces - Test according to 12046-1

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 12046-1:2003-11 Operating forces - Test method - Part 1: Windows		
Used test equipment	KM/022960 - Digitales Kraftmessgerät 200N DM/022852 - Drehmomentanzeigergerät TT1		
Test specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Test engineer	Darius Janikowski		

Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambient conditions are in accordance with the standard requirements.

Testing

Pivot arm m

Grip height m

Table: Measurement operating forces for the release / locking operating

Measured values	1	2	3	Average value M
in Nm	2,8	2,6	2,5	2,6

Table: Measurement of force required for opening (turn)

Measured values	1	2	3	Average value M
in N	6,5	6,4	6,2	6,4

Table: Measurement of force required for opening (tilt)

Measured values	1	2	3	Average value M
in N	43,8	45,4	45,7	45,0

Table: Measurement of force for complete closing (turn)

Measured values	1	2	3	Average value M
in N	<30	<30	<30	<30

Table: Measurement of force for complete closing (tilt)

Measured values	1	2	3	Average value M
in N	47,8	49,0	48,5	48,4

Malfunctions at test specimen

At the test specimen were no malfunctions detected.

Resistance to static torsion - Test according to EN 14609

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 14609:2004-06 Windows - Determination of the resistance to static torsion W/020155 - Hängewaage HCB200K100 Pst/020823 - Einheit zur Einleitung von Kräften bei Fenstern WM/020573 - Maßband 5m		
Used test equipment			
Test specimen	Double combined side hung & turn tilt casement door - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Tester	Darius Janikowski		

Information to test configuration / Test method

Test method There are no deviations to the test method according standards/basis

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambient conditions are in accordance with the standard requirements

Testing

Tilted position (bottom hung)

A pre-load of 35 N was applied

The top hinge-side corner of the casement in tilted position was blocked, and a load was applied to the other top corner in horizontal direction for a period of 5 minutes

Weight at casement corner: 350 N

The test specimen must not exhibit any malfunctions, damage permanent deformations loosening of fittings and detachment of joint and sealing systems.

The intended use after test must be ensured.

Upon completion of the test, the test specimen must remain fully operable in terms of its operating forces

		Deformation in mm			
		200 N	250 N	300 N	350 N
Tilted position	maximum deformation ($a_1 - a_0$)		28	36	42
	permanent deformation ($a_2 - a_0$)		0	1	1

Permanent damage at test specimen

There are no permanent damages at test specimen detected.

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Turn position (side hung)

A pre-load of 35 N was applied

The bottom corner of the casement opened at a 90° opening angle was blocked and a load was applied to the top corner in horizontal direction for a period of 5 minutes

Weight at casement corner: 350 N

The test specimen must not exhibit any malfunctions, damage, permanent deformations loosening of fittings and detachment of joint and sealing systems

The intended use must be ensured

Der Probekörper muss nach der Prüfung hinsichtlich seiner Bedienkräfte funktionstüchtig bleiben.

		Deformation in mm			
		200 N	250 N	300 N	350 N
Turn position	maximum deformation ($a_1 - a_0$)		39	45	51
	permanent deformation ($a_2 - a_0$)		2	1	0

Permanent damage at test specimen

There are no permanent damages at test specimen detected.

Operating forces - Test according to 12046-1

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 12046-1:2003-11 Operating forces - Test method - Part 1: Windows		
Used test equipment	KM/022960 - Digitales Kraftmessgerät 200N DM/022852 - Drehmomentanzeigergerät TT1		
Test specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Test engineer	Darius Janikowski		

Information to test configuration / Test method

Test method There are no deviations to the test method according standard/basis.

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambient conditions are in accordance with the standard requirements.

Testing

Pivot arm m

Grip height m

Table: Measurement operating forces for the release / locking operating

Measured values	1	2	3	Average value M
in Nm	2,8	2,7	2,7	2,7

Table: Measurement of force required for opening (turn)

Measured values	1	2	3	Average value M
in N	6,6	6,3	6,8	6,6

Table: Measurement of force required for opening (tilt)

Measured values	1	2	3	Average value M
in N	46,4	45,7	45,2	45,8

Table: Measurement of force for complete closing (turn)

Measured values	1	2	3	Average value M
in N	<30	<30	<30	<30

Table: Measurement of force for complete closing (tilt)

Measured values	1	2	3	Average value M
in N	49,3	49,4	48,9	49,2

Funktionsstörungen am Probekörper

At the test specimen were no malfunctions detected.

Load-bearing capacity of safety devices - according to EN 14609

Project No.	12-003653-PR01	Task No.	12-003653
Client	Uniform S.p.A.		
Basis of test	EN 14609:2004-06		
	Windows - Determination of the resistance to static torsion		
	W/020155 - Hängewaage HCB200K100		
Used test equipment	Pst/020823 - Einheit zur Einleitung von Kräften bei Fenstern		
Test specimen	Double combined side hung & turn tilt window with opening meeting style - Thermoscudo Easy Line		
Test specimen No.	34084-001		
Date of test	21.02.2013		
Testing personnel in charge	Peter Marquardt		
Test engineer	Darius Janikowski		

Information to test configuration / Test method

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

Ambient conditions Temperature 18 °C Air humidity 46 %

The ambience conditions are as specified by standard requirements.

Testing

The testing of the safety device is carried out with a load of 350N for 60s at casement in the friction stay area
No damages or malfunctions should occur at the test specimen

Malfunctions at test specimen

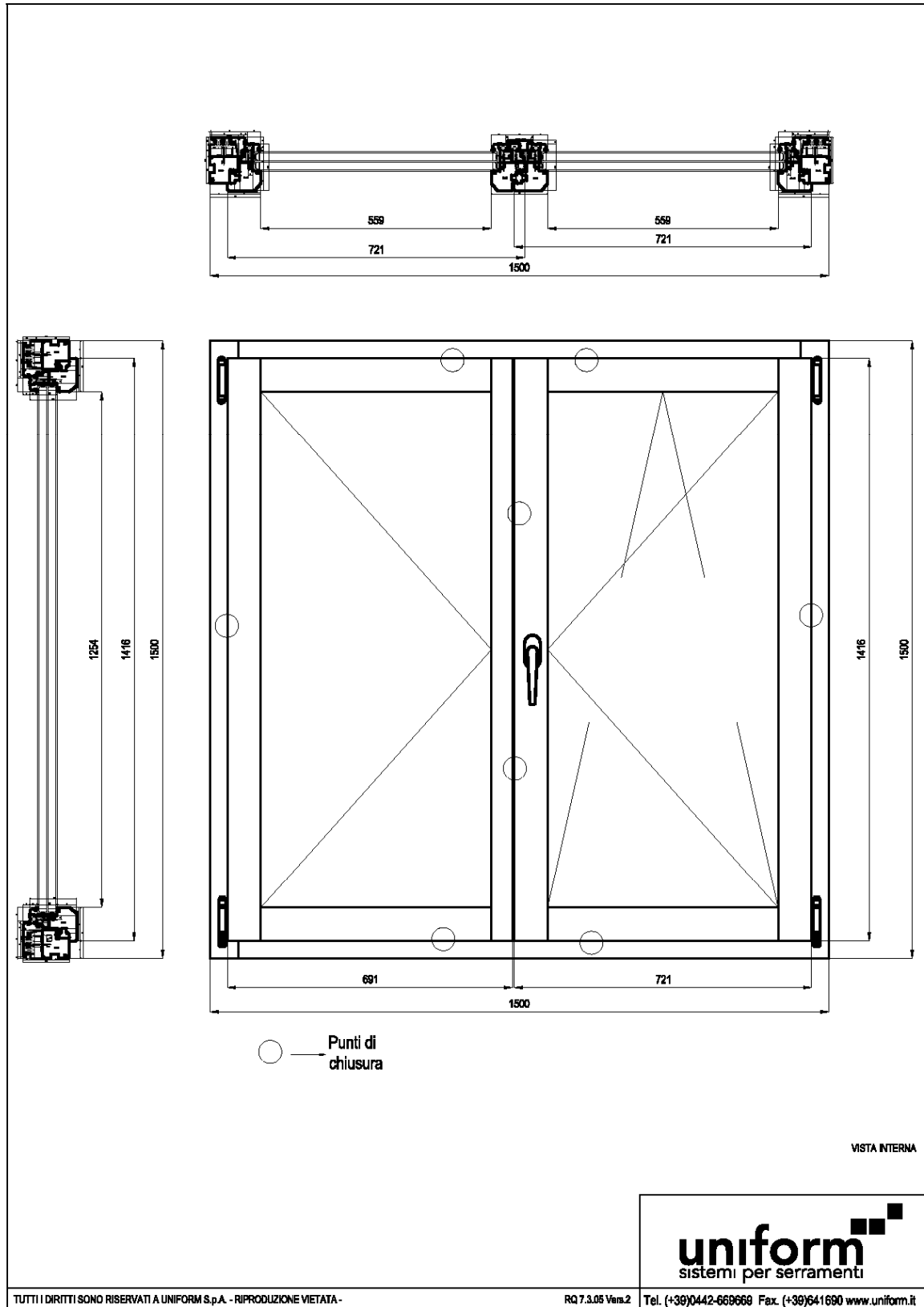
At the test specimen were no malfunctions detected.

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

Test Report 12-003653-PR01 (PB-A01-02-en-02) dated 21. Juni 2013

Client Uniform S.p.A., 37046 Minerbe VR (Italy)



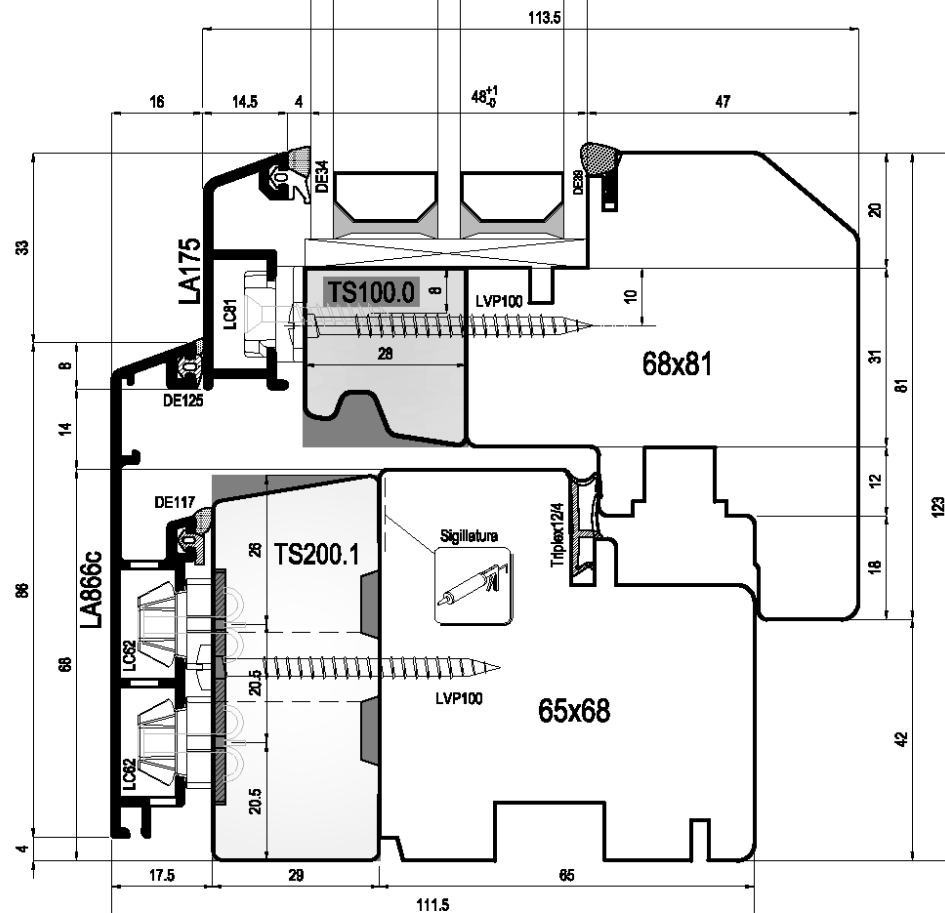
Drawing 1
Test specimen

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

Test Report 12-003653-PR01 (PB-A01-02-en-02) dated 21. Juni 2013

Client Uniform S.p.A., 37046 Minerbe VR (Italy)



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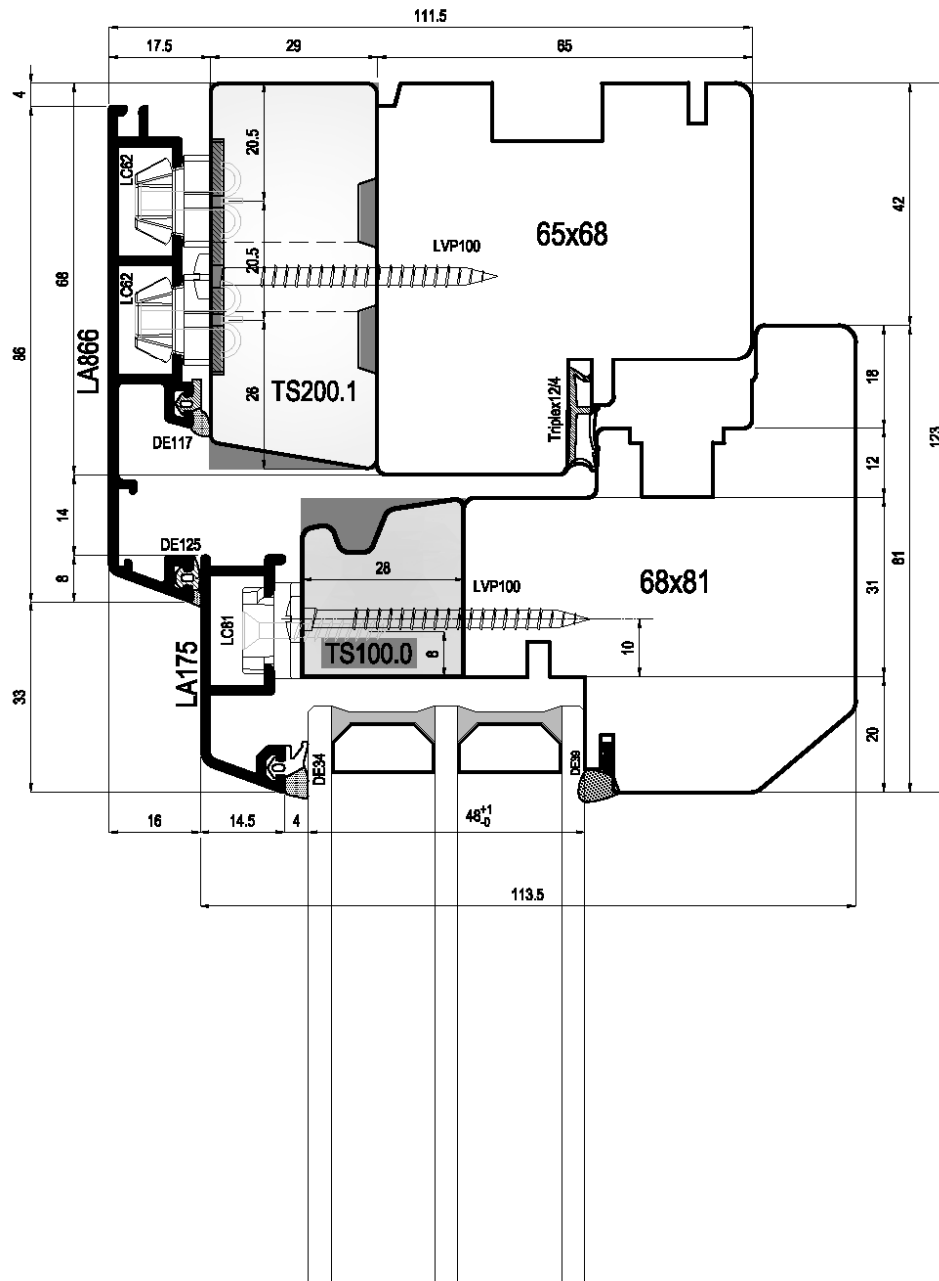
Drawing 2
Vertical section bottom

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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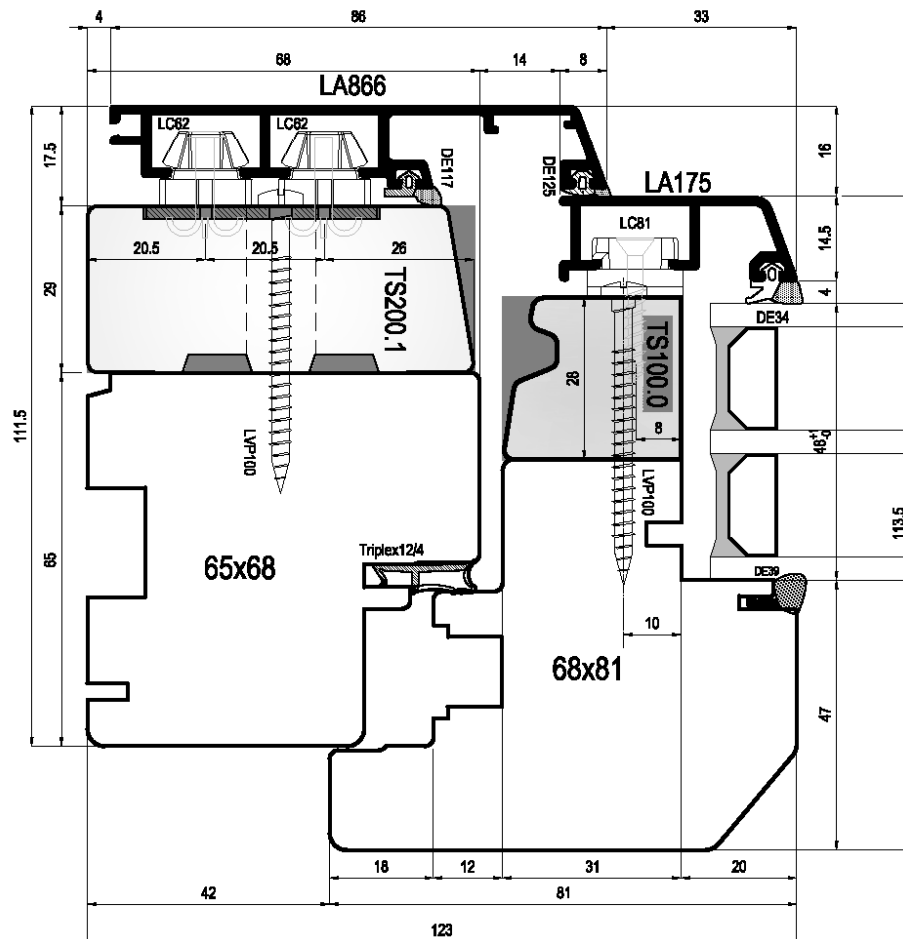
Zeichnung 3
Vertical section at top

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Drawing 4

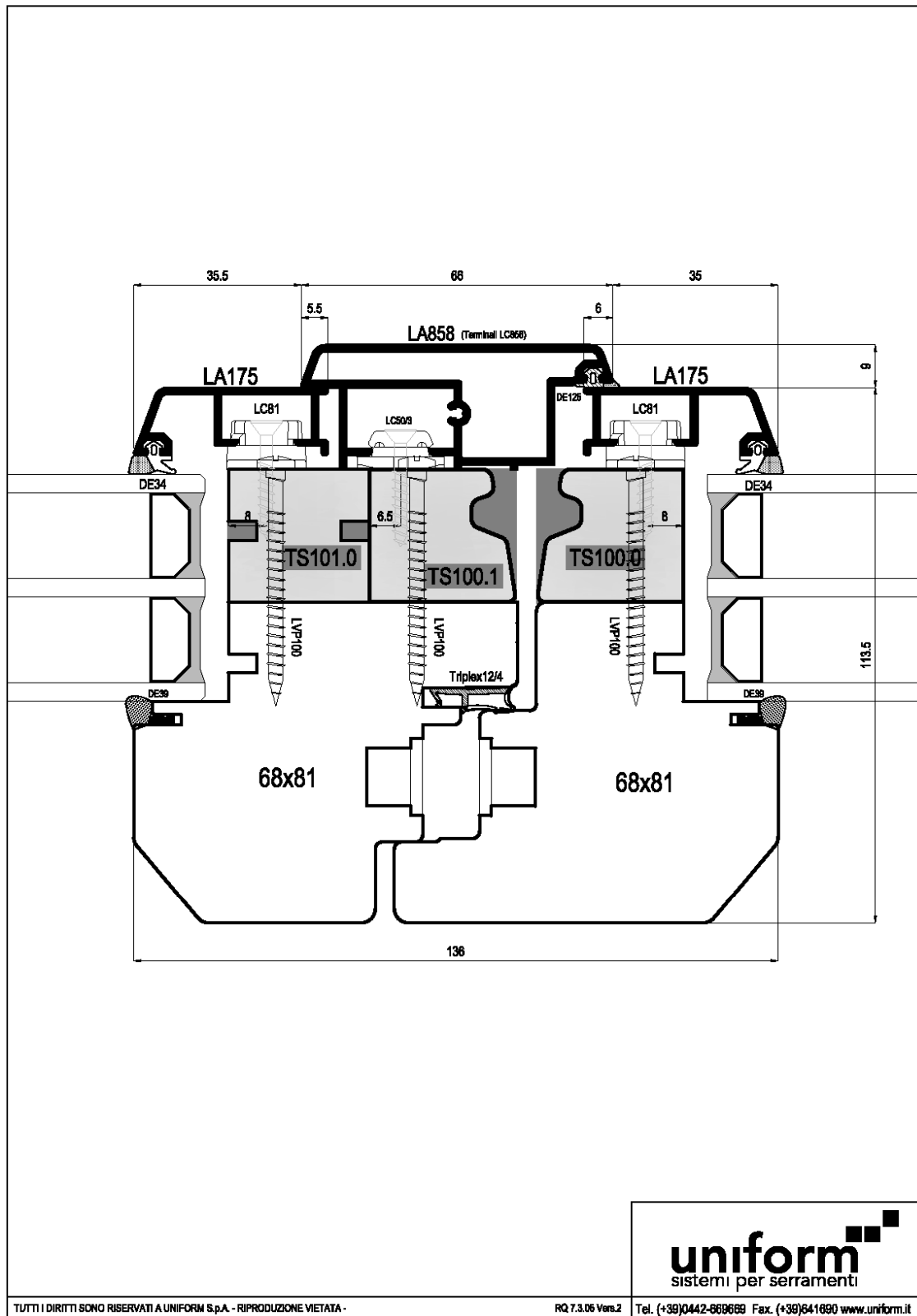
Horizontal section inactive casement

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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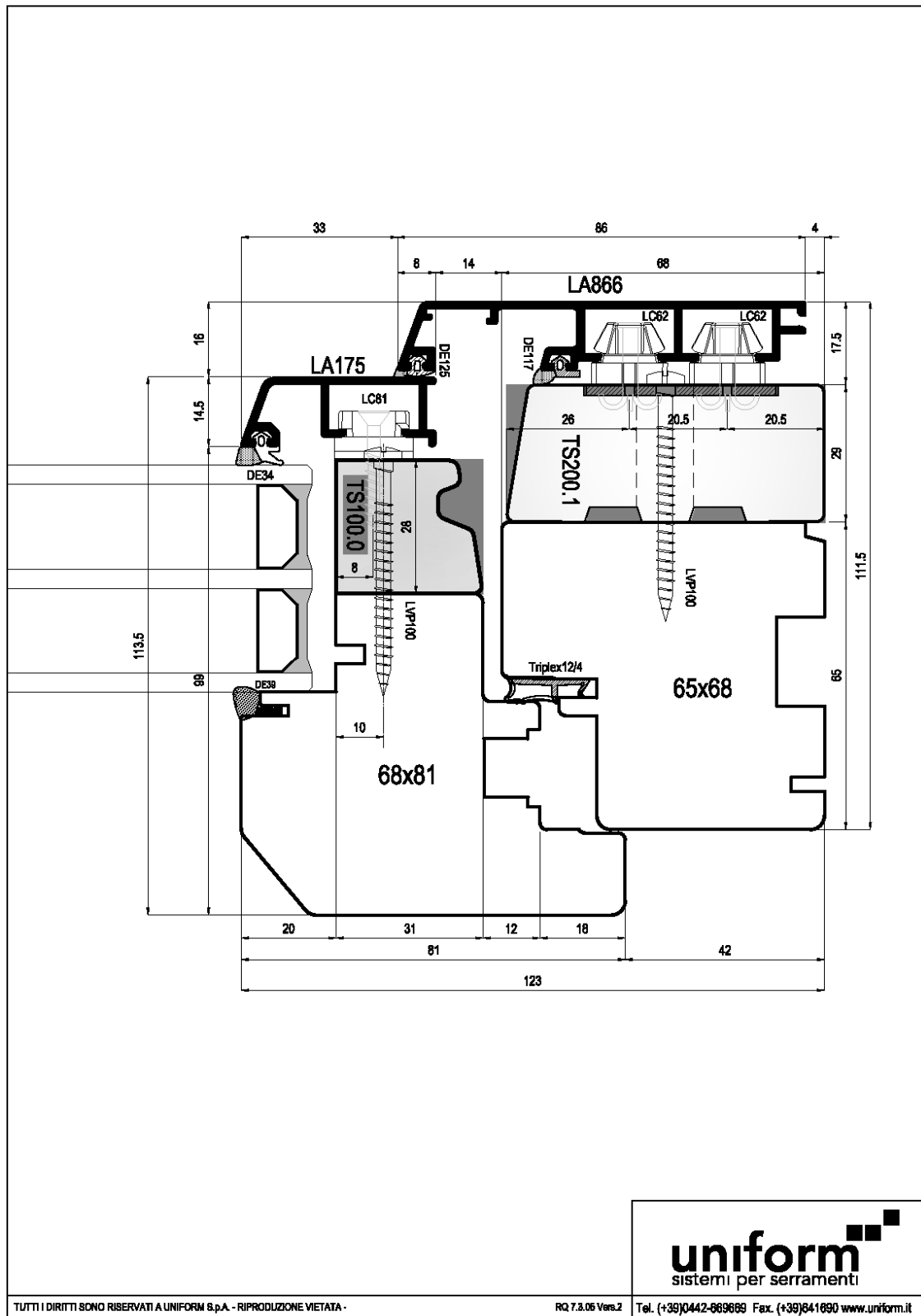
Drawing 5
Horizontal section lock case

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)

**Drawing 6**

Horizontal section active casement

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Fig. 1
Test specimen on test rig
window closed



Fig. 2
Rebate and centre seal, corner design



Fig. 3
Rebate view inactive casement



Fig. 4
Rebate view active casement

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Fig. 5
Overlap end caps at top



Fig. 6
Overlap end caps at bottom



Fig. 7
Scissor length (IC), seen from rebate



Fig. 8
Scissor length (AC), seen from rebate

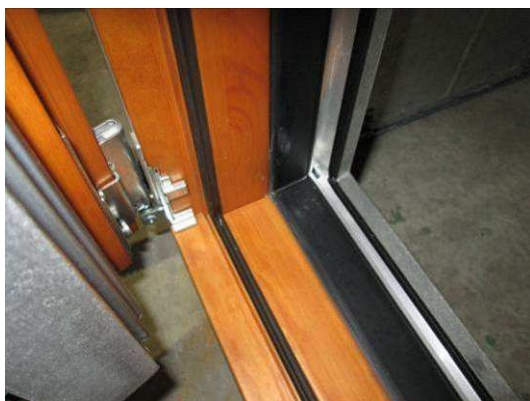


Fig. 9
Corner pivot, (IC) seen from rebate



Fig. 10
Corner pivot, (AC) seen from rebate

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Fig. 11
Rebate view, inactive casement



Fig. 12
Rebate view, active casement



Fig. 13
Rebate view, frame

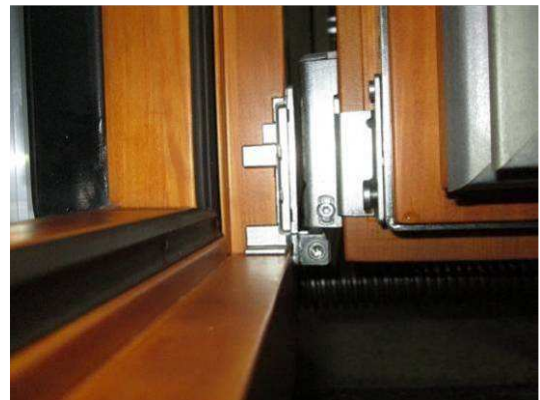


Fig. 14
Rebate view, frame



Fig. 15
Detail glass connection internal



Fig. 16
Detail glass connection external

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Fig. 17
Locking situation 1 frame and casement



Fig. 18
Locking situation 2 casement



Fig. 19
Locking situation 2 frame



Fig. 20
Locking situation 3 casement



Fig. 21
Locking situation 3 frame

Evidence of Performance

Air permeability, Watertightness, Resistance to wind load, Operating forces, Mechanical properties

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Client Uniform S.p.A., 37046 Minerbe VR (Italy)



Fig. 22
Locking situation 4 (lock case AC)



Fig. 23
Locking situation 4 (lock case IC)

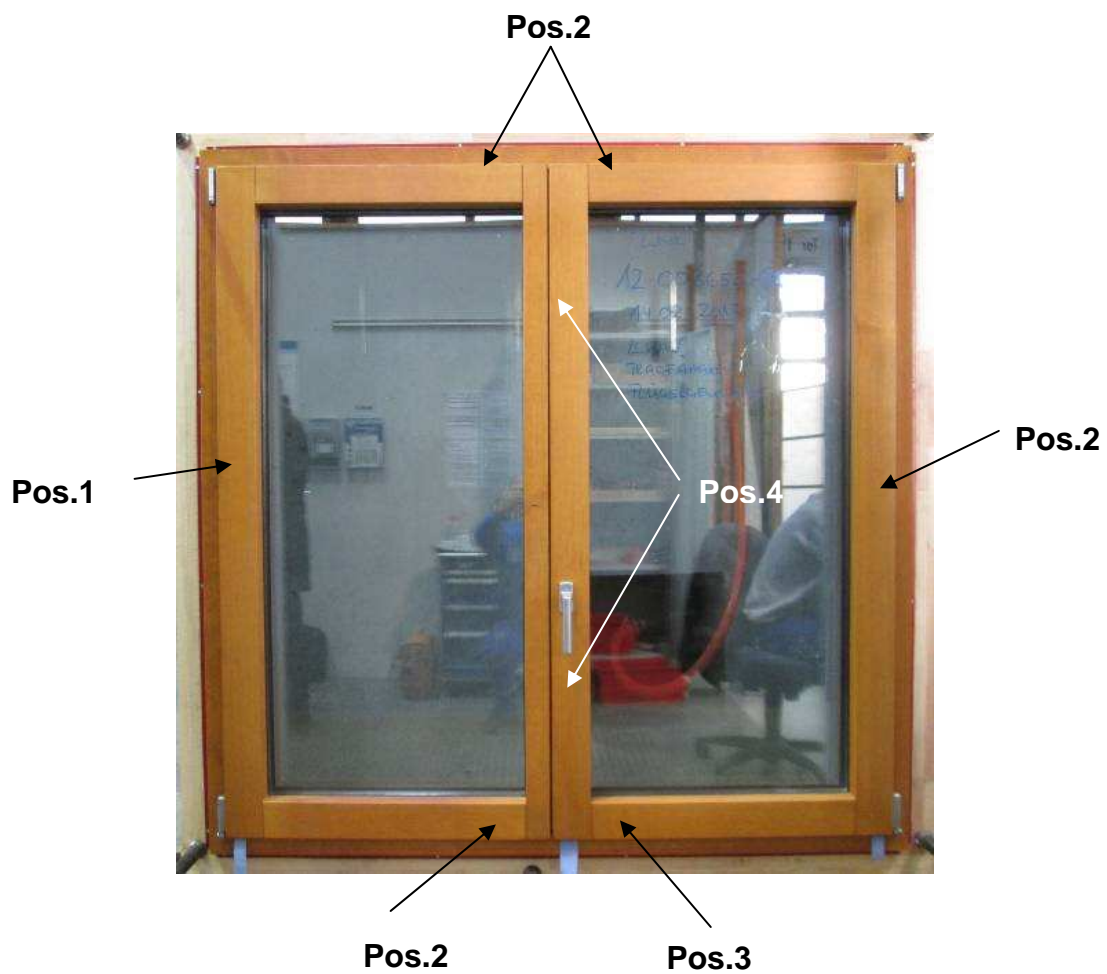


Fig. 24
Position plan of locks