

Test report

REPORT NUMBER:
0301/810143r1-TT

r1: Appendix 1 revised



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INSTITUTE**

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Page 1 of 9
Appendices: 2
Init.: MFRI/MJLD

SPECIMEN: Door height Tilt-Turn Window made of the system Futura+i, further details can be found on page 2.

SAMPLING: The test specimen was tested on the client's equipment. The test specimen was labelled 810143-TT.

TEST PERIOD: The testing was carried out on 2018-04-30.

METHOD: EN 14351-1:2006 Windows and doors – Product standard, performance characteristics -
+A2:2016: Part 1: Windows and external pedestrian doorsets.
EN 1026:2016: Windows and doors – Air permeability – Test method
EN 1027:2016: Windows and doors – Watertightness – Test method
EN 12211:2016 Windows and doors – Resistance to wind load – Test method

RESULTS: Classification of the test specimen according to EN 14351-1 4.2, 4.5 and 4.14 and the standards mentioned below:
Air permeability: **Class 4** (± 600 Pa)
EN 12207 - Windows and doors Air permeability - Classification
Watertightness: **Class E1800** (1800 Pa)
EN 12208 - Windows and doors - Watertightness - Classification
Wind load: **Class C4** (P1= ± 1600 Pa; P2 = ± 800 Pa; P3 = ± 2400 Pa)
EN 12210 - Windows and doors – Resistance to wind load - Classification

The results of the test are given on page 4-9.

STORAGE: The specimen will be available for 2 months if nothing else has been agreed in writing.

TERMS: The test has been performed according to the conditions laid down by DANAK (The Danish Accreditation), cf. www.danak.dk, and the general terms and conditions of The Danish Technological Institute. The results from DTI's work in this report, i.e. analyses, assessments and instructions may only be used or reported in their entirety. The customer may not mention or refer to DTI or DTI's employees for advertising or marketing purposes unless the DTI has granted its written consent in each case.

LOCATION: 2018-05-17, Danish Technological Institute, Glass and Windows, Aarhus.

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 **DANAK**
Test Reg. No. 2
CPR NB 1235

Description of special test conditions

It is hereby declared; that it was witnessed by the Technological Institute at a test carried out in the manufacturer's testing facilities, that the following conditions were observed:

- The facilities were inspected and found suitable for the planned test;
- The equipment was marked with the current calibration status;
- The equipment was calibrated;
- The equipment was controlled and no deviations from the test standard were found;
- The maintenance condition of the equipment and surroundings was found satisfactory;
- Recordings of the test data, to allow possible reproductions of the test, were found sufficient;
- Inspection of the test specimen showed no deviations from the product description;
- During the tests, no deviations from the prescribed methods in the standards, were observed;
- The test sequence was:
 - Air permeability at ± 600 Pa;
 - Watertightness at 1800 Pa;
 - Measurement of deflection at ± 1600 Pa (P1);
 - Cyclic test at ± 800 Pa (P2);
 - Air permeability at ± 600 Pa;
 - Safety test at ± 2400 Pa (P3).

All the above satisfies the test conductor from Danish Technological Institute that the conditions described in article 46 of CPR is fulfilled.



Test equipment

Description of test specimen

The test specimen consists of an inward opening door height tilt turn window, made of wood and aluminium with 12 locking points and 2 hinges, see drawings in Appendix 1.

Before test a subframe was prepared and mounted around the element by the client. The subframe does not hinder the normal functioning of the element. The test conditions and the dimensions of the test specimen are measured by the laboratory and are given in the table below.

Closing condition, according to EN 12519 Windows and pedestrian doors - Terminology, during test:
Locked

Width [mm]	Height [mm]	Area [m ²]	Length of joint [m]	Temperature [°C]	Relative humidity [%]	Atmospheric pressure [hPa]
1150	2600	2,99	7,42	22	50	995

The client has provided the following information about the construction of the test specimen:

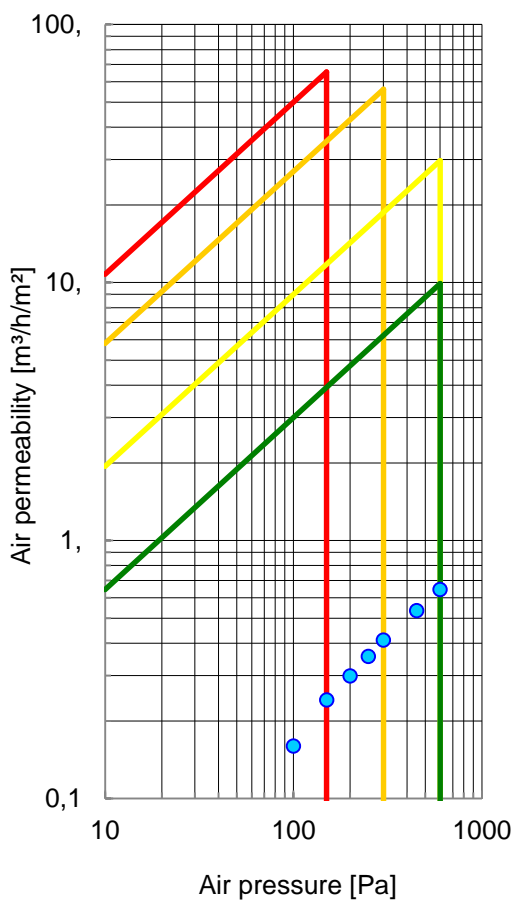
Product name	Futura+i
Width x height	1150 x 2600
Gaskets	See appendix 1
Hardware	See appendix 1
IGU	See appendix 1



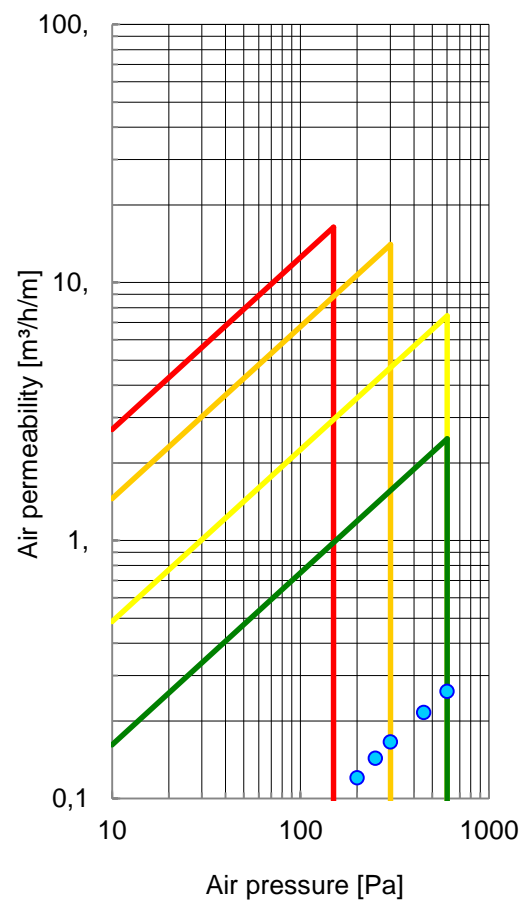
Test specimen during testing

Test results – Air permeability – Positive air pressure

Air pressure [Pa]	Air flow Total [m ³ /h]	Air flow Area [m ³ /h/m ²]	Air flow Length of joint [m ³ /h/m]	Class Area [-]	Class Length of joint [-]
50	0,00	0,00	0,00	4	4
100	0,49	0,16	0,06	4	4
150	0,74	0,24	0,10	4	4
200	0,92	0,30	0,12	4	4
250	1,09	0,36	0,14	4	4
300	1,26	0,41	0,17	4	4
450	1,64	0,54	0,22	4	4
600	1,98	0,65	0,26	4	4



Air permeability related to area.

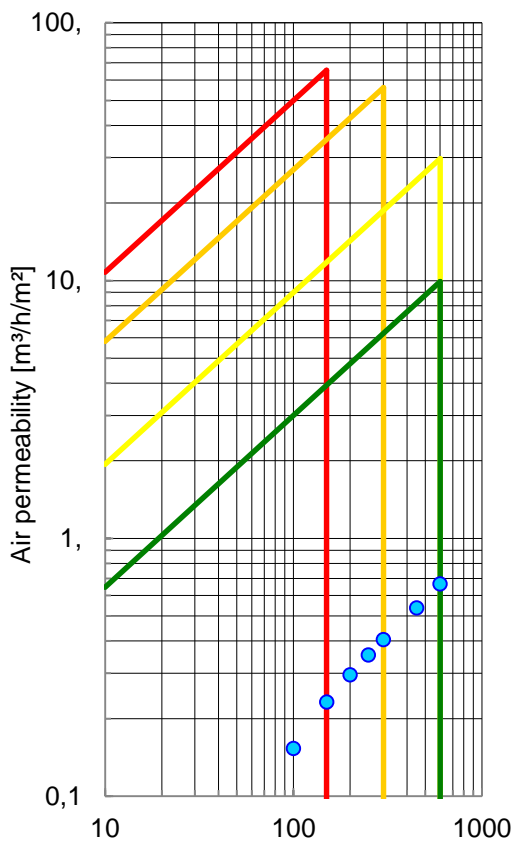


Air permeability related to length of joint.

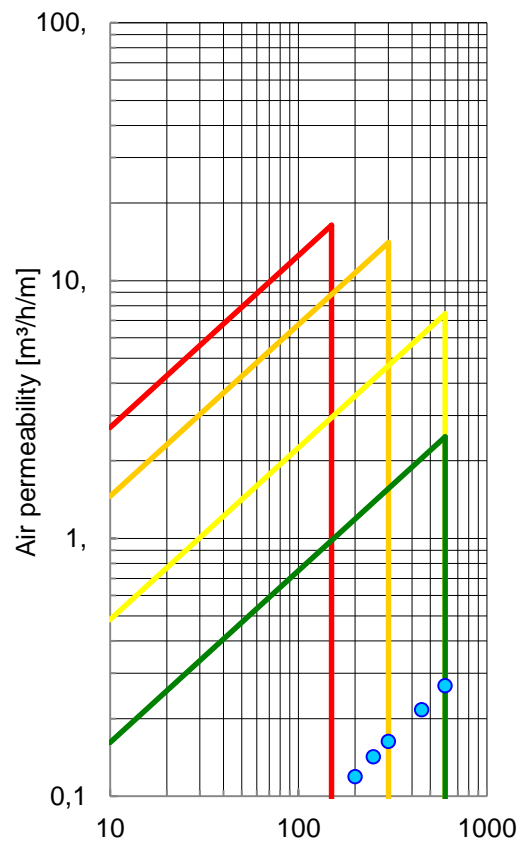
The graphs show the classification in relation to the area and the length of joint.
Classes 1-4 are indicated by red, orange, yellow and green fields respectively.

Test results – Air permeability – Negative air pressure

Air pressure [Pa]	Air flow Total [m ³ /h]	Air flow Area [m ³ /h/m ²]	Air flow Length of joint [m ³ /h/m]	Class Area [-]	Class Length of joint [-]
50	0,00	0,00	0,00	4	4
100	0,47	0,15	0,06	4	4
150	0,71	0,23	0,09	4	4
200	0,91	0,30	0,12	4	4
250	1,08	0,35	0,14	4	4
300	1,24	0,41	0,16	4	4
450	1,65	0,54	0,22	4	4
600	2,04	0,67	0,27	4	4



Air pressure [Pa]
Air permeability related to area.

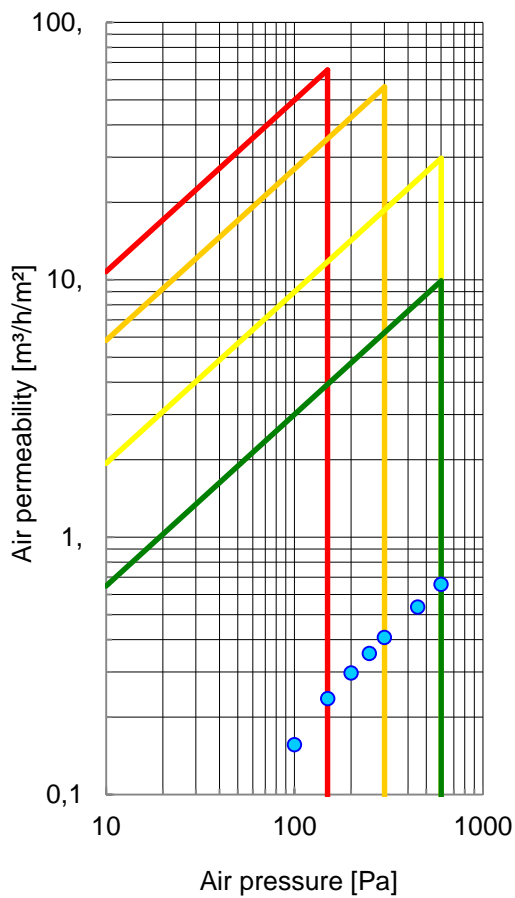


Air pressure [Pa]
Air permeability related to length of joint.

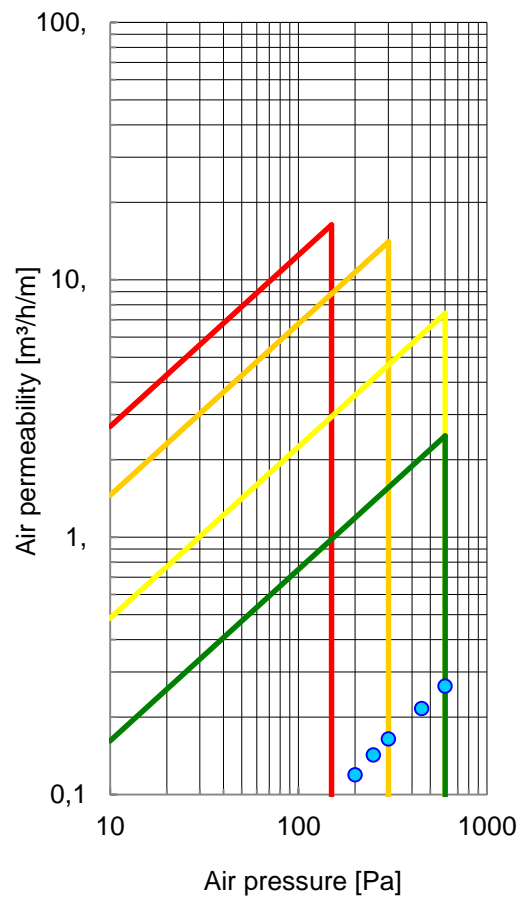
*The graphs show the classification in relation to the area and the length of joint.
Classes 1-4 are indicated by red, orange, yellow and green fields respectively.*

Test results – Average air permeability

Air pressure [Pa]	Air flow Total [m ³ /h]	Air flow Area [m ³ /h/m ²]	Air flow Length of joint [m ³ /h/m]	Class Area [-]	Class Length of joint [-]
50	0,00	0,00	0,00	4	4
100	0,48	0,16	0,06	4	4
150	0,73	0,24	0,10	4	4
200	0,91	0,30	0,12	4	4
250	1,09	0,35	0,14	4	4
300	1,25	0,41	0,16	4	4
450	1,64	0,54	0,22	4	4
600	2,01	0,66	0,26	4	4



Air permeability related to area.



Air permeability related to length of joint.

*The graphs show the classification in relation to the area and the length of joint.
Classes 1-4 are indicated by red. orange. yellow and green fields respectively.*

Test results – Watertightness

Air pressure [Pa]	Duration [min]	Observations [-]	Class [-]
0	15	No water penetration	1A
50	5	No water penetration	2A
100	5	No water penetration	3A
150	5	No water penetration	4A
200	5	No water penetration	5A
250	5	No water penetration	6A
300	5	No water penetration	7A
450	5	No water penetration	8A
600	5	No water penetration	9A
750	5	No water penetration	E750
900	5	No water penetration	E900
1050	5	No water penetration	E1050
1200	5	No water penetration	E1200
1350	5	No water penetration	E1350
1500	5	No water penetration	E1500
1650	5	No water penetration	E1650
1800	5	No water penetration	E1800



Test specimen during testing

Test results – Wind load

Deflection test

Air pressure - P1	Displacement		Relative frontal deflection		Class
	Positive pressure	Negative pressure	Positive pressure	Negative pressure	
[Pa]	[mm]	[mm]	[-]	[-]	[-]
±1600 Pa	0,5	0,7	1/4929	1/3297	C4



The red circles indicate the displacement measuring points

Pulsating air pressure test

Air pressure - P2 [Pa]	Observations during testing [-]
±800 Pa	The specimen remained closed and no damage or operating defects were observed.

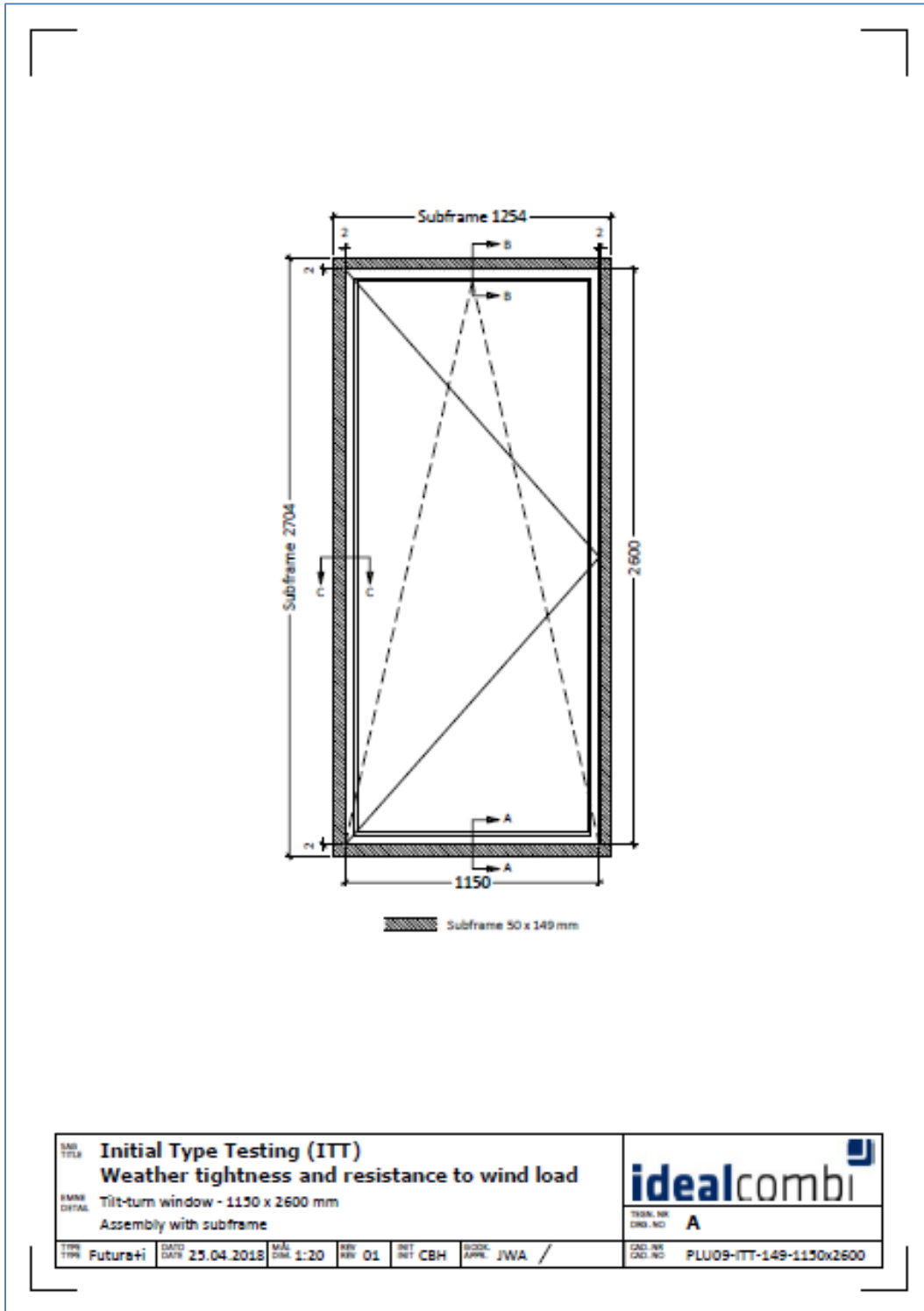
Air permeability test

Air pressure [Pa]	Classification					
	Positive pressure		Negative pressure		Average	
	Area [-]	Length of joint [-]	Area [-]	Length of joint [-]	Area [-]	Length of joint [-]
50	4	4	4	4	4	4
100	4	4	4	4	4	4
150	4	4	4	4	4	4
200	4	4	4	4	4	4
250	4	4	4	4	4	4
300	4	4	4	4	4	4
450	4	4	4	4	4	4
600	4	4	4	4	4	4

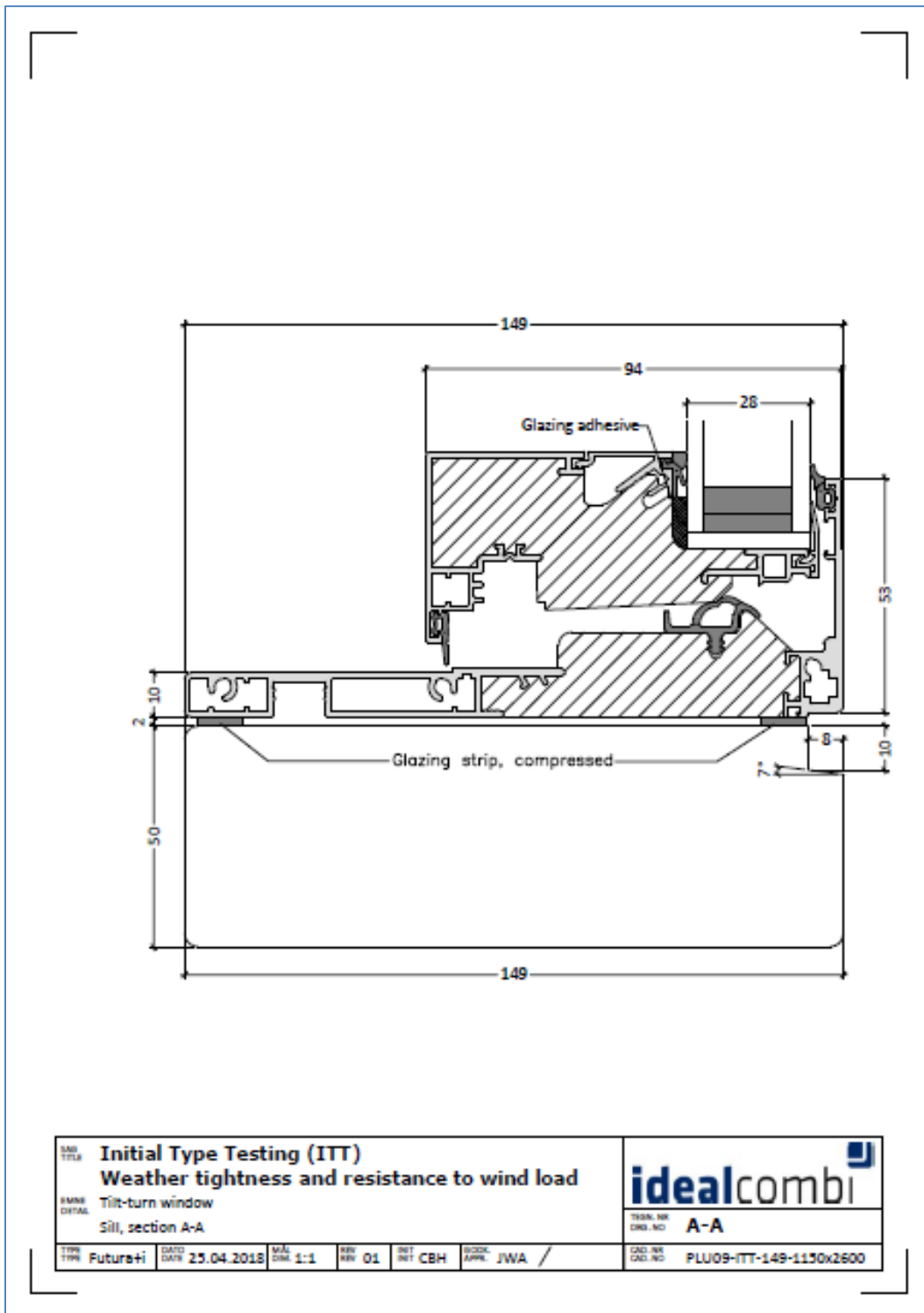
Safety test

Air pressure - P3 [Pa]	Observations during testing [-]
±2400 Pa	The specimen remained closed and no damage or operating defects were observed.

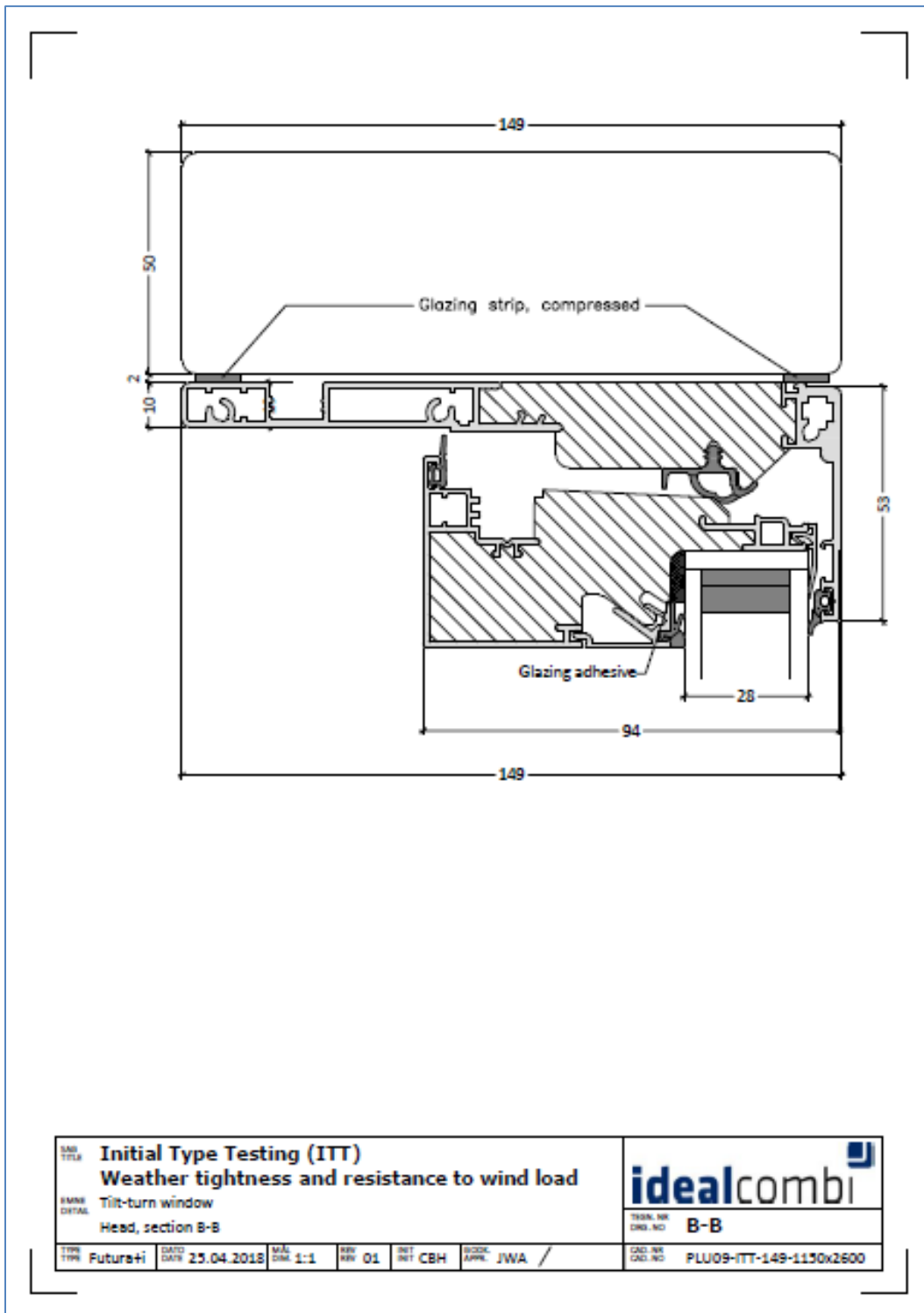
Appendix 1: Drawings and description



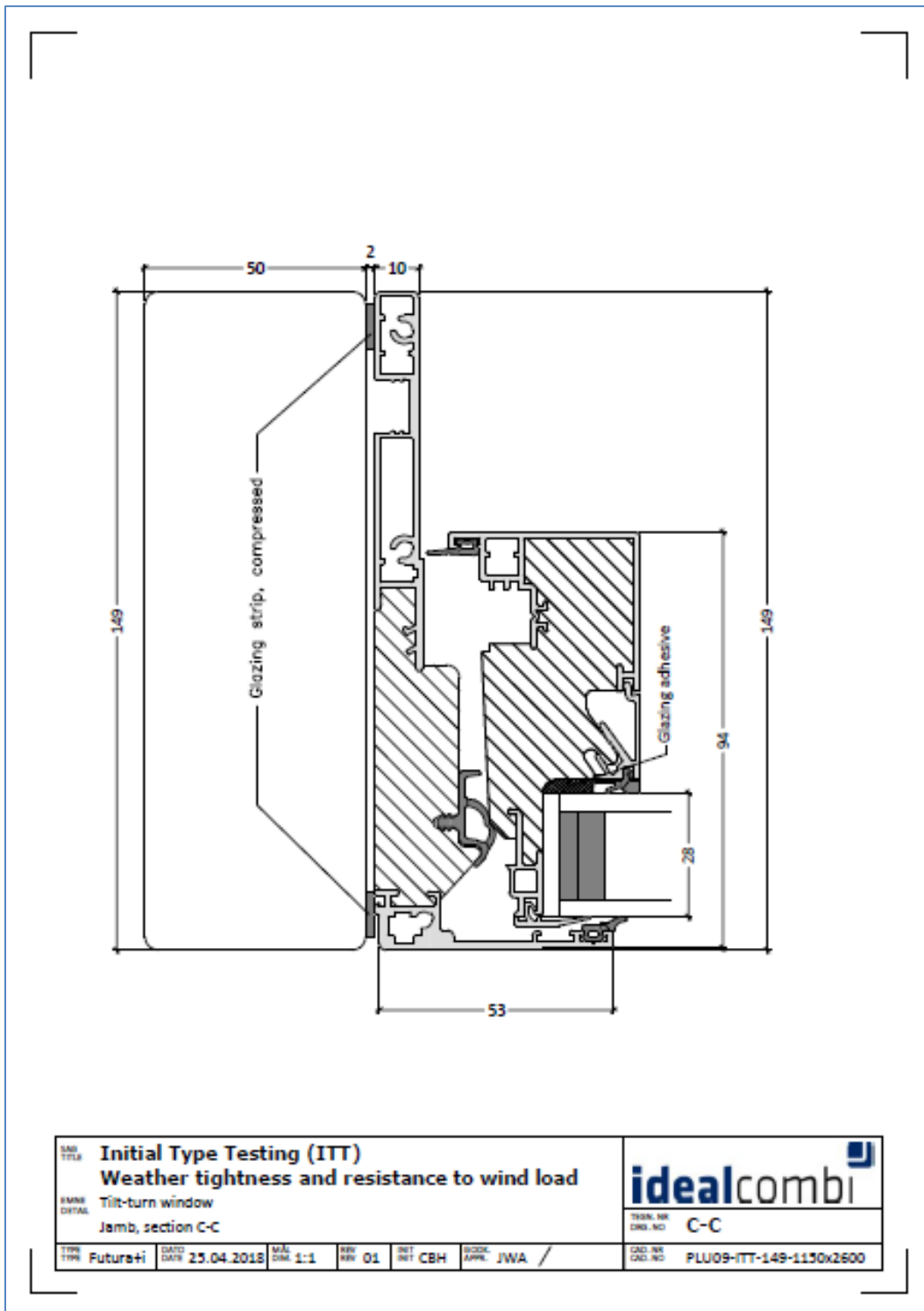
Drawing of elevation of window including subframe



Drawing of bottom section including subframe



Drawing of top section including subframe



Drawing of side section including subframe



Hurup – date: 25.04.2018/CBH
CAD no. PLU09-ITT-149-1150x2600
Page 1/4

Datasheet

Manufacturer:	Idealcombi A/S, Nørre Allé 51, 7760 Hurup Thy, Denmark
Product name:	Future+
Type:	Tilt-turn window Frame/casement dimension 149 mm.
Materials:	Aluminium/Polyurethane (PUR)/Aluminium
Order no.:	620127-1, pos. 1.
Dimensions:	Element width (ext. frame) = 1150 mm Element height (ext. frame) = 2600 mm Casement width = 1116 mm Casement height = 2566 mm Element width (incl. subframe) = 1254 mm Element height (incl. subframe) = 2704 mm
Drawings:	CAD no.: PLU09-ITT-149-1150x2600 Drawings: A. Section A-A, B-B and C-C
Frame:	Dimension = 54 x 149 mm Aluminium: HYDRO, extruded aluminium profiles. Aluminium alloy EN-AW 6060 according to EN 573-3. Density: 2700 kg/m ³ . Powder coating for surface treatment: IGP-DURA [®] face 3B. Mitred corners: A flat angle is placed and three other aluminium angles are glued into the cavity of the aluminium profiles with SIKA Denmark A/S (Ref. Sikaflex 521-FC). One-component adhesive and sealant based on MS-polymer. The corners are crimped. Surface of external aluminium and part of inside aluminium is glued with SIKA Denmark A/S (Ref. Sikaflex 521-FC). PUR: Idealcombi casting. Nominal density 300 kg/m ³ . Mitred corners: Surface partly glued with SIKA Denmark A/S (Ref. Sikaflex 521-FC).



Hurup – date: 25.04.2018/CBH
CAD no. PLU09-ITT-149-1150x2600
Page 2/4

Caseiment:	Dimension: 43 x 87 mm Aluminium: HYDRO, extruded aluminium profiles: Aluminium alloy EN-AW 6060 according to EN 573-3. Density: 2700 kg/m ³ . Powder coating for surface treatment: IGP-DURA [®] face 58. Mitred corners: Two aluminium angles are glued into the cavity of the aluminium profiles with SIKA Danmark A/S (Ref. Sikaflex 521-FC). The corners are crimped. Surface of outside aluminium is partly glued SIKA Danmark A/S (Ref. Sikaflex 521-FC). PUR: Nominal density 300 kg/m ³ . Mitred corners: Surface partly glued with SIKA Danmark A/S (Ref. Sikaflex 521-FC).
Glazing gasket (internal): Gasket (external): Gasket (middle): Gasket (internal):	Savatech 2503-1030. EPDM. Savatech 2503-1041. EPDM. Savatech 2503-1011. EPDM. Savatech 2503-1020. EPDM.
Hardware:	ROTO (Designo II) tilt-turn system med 12 mushroom lock pins: Espagnolette corner: ROTO 260272 Espagnolette extension 400 mm – ROTO 337710 Espagnolette incl. sash support: ROTO 631397 Espagnolette extension 600 mm – ROTO 337711 Espagnolette extension 400 mm – ROTO 337710 Espagnolette corner: ROTO 260272 Sash part for top hinge: ROTO 450374 Top hinge: ROTO 600805 Espagnolette corner: ROTO 260286 Espagnolette extension 600 mm – ROTO 337711 Espagnolette extension 600 mm – ROTO 337711 Espagnolette extension 600 mm – ROTO 337711 Bottom hinge: ROTO 631512 Sash part for bottom hinge: ROTO 634705 Restrictor - sash part: ROTO 485591 Restrictor - frame part: ROTO 598412 and Würth 63PU0701A2 Espagnolette extension 400 mm – ROTO 337710 Sash wedge: ROTO 350403
Sash support:	Sash support – frame part: ROTO 632134



Hurup – date: 25.04.2018/CBH
CAD no. PLU09-ITT-149-1150x2600
Page 3/4

Handle:	Handle matt chrome - right: ROTO 631555H
Receiver:	Receiver - right (11 no.): ROTO 632129 Tilt receiver - right (1 no.): ROTO 632133
Screws:	ROTO tilt-turn system: 3,9x22 mm screw into sash (49 no.) 3,9x32 mm screw into sash (1 no.) 3,9x22 mm screw into sash (6 no.) 5,3x10,3 mm screw into frame (10 no.) Sash support – frame part: 5,3x6,5 mm screw (2 no.) Handle: M5x23 mm screw (2 no.) Receiver (per unit): 4x15 mm screw (2 no.) Tilt receiver: 4x15 mm screw (2 no.)
Glazing:	28 mm (6T-16-6T) Double glazed with Low E on the inner glass. Overall size = 1066 X 2516 mm Weight per m ² pane = 30 kg/m ² Weight pane = 80,5 kg Supplier: Pilkington IGP Sp. Z.o.o. – Szczecin Branch 53 Pomorska Str. 70-812 Szczecin – Polen
Glazing bead:	Lynddahl Plast A/S, 14PUL001, PVC bead, clicked in casement.
Glazing adhesive:	Pane glued with DOW CORNING No. 799. One-Component Silicone Sealant.
Tests:	Initial Type Testing (ITT) Air permeability according to EN 14351-1:2006+A2:2016 (pkt. 4.14) Water tightness according to EN 14351-1:2006+A2:2016 (pkt. 4.5) Resistance to wind load according to EN 14351-1:2006+A2:2016 (pkt. 4.2) Target: Air permeability: Class 4 (600 Pa) Water tightness: Class E1800 Resistance to wind load: Class 4C (1600 Pa)

idealcombi 
Enhancing windows

Hurup – date: 25.04.2018/CBH
CAD no. PLU09-ITT-149-1150x2600
Page 4/4

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The general conditions pertaining to assignments accepted by Danish Technological Institute shall apply in full to the technical testing or calibration at Danish Technological Institute and to the completion of test reports or calibration certificates within the relevant field.

Construction Product Regulation:

The Danish Technological Institute guarantees that employees carrying out tests to be used together with harmonized standards under notification no. 1235 according to EU regulation 305/2011. article 43. satisfy all the requirements made for capability. integrity and impartiality. You find the CPR here: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:088:0005:0043:EN:PDF>

September 2017