



Test Report No: WTH1910#5-2

Date: 10/02/2020

Testing of: Single top hung flush casement window

Tested to: BS 6375-1:2015+A1:2016

Prepared for: Nico Manufacturing Ltd

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CONTENTS

	Page No.
Authorisation	3
Test requested by	4
Details of test	5
Details of samples	6
Conclusion of tests	7
Test window drawing	8
Air permeability tables (first test)	9
Air permeability graphs (both tests)	10
Watertightness	11
Resistance to wind load	12
Air permeability tables (second test)	13
Deflection & leakage diagrams	14
Picture of test window	15

Test Report No. WTH1910#5-2	Page 4 of 15
Testing of Single top hung flush casement window	
Testing to BS 6375-1:2015+A1:2016	



TEST REQUESTED BY

Origin of test request

Company Name	Nico Manufacturing Ltd
Company Address	109 Oxford Road Clacton on Sea Essex CO15 3TJ
Contact	Ian Harrison
Contact position	Sales Director

Quotation Details

Quotation No.	WTH1910
Dated:	01/10/2019



DETAILS OF TEST

Description	Single top hung
Model / type	Projecting flush casement window
Make / Brand	Liniar
Any special requirements	

Test Specification	BS 6375-1:2015+A1:2016 Performance of windows & doors. Classification for operation and strength characteristics
Date sample received	31/10/2019
Date testing started	10/02/2020
Date testing finished	11/02/2020
Job No.	WTH1910
Any special requirements	

Air permeability tests in accordance with BS EN 1026: 2016 - A series of positive and negative pressures was applied to the test sample and the air leakage through the sample was measured at each pressure step. Pressure steps applied are defined on the air permeability test sheets in this report.

Watertightness test in accordance with BS EN 1027: 2016 - A specified volume of water was constantly sprayed over the external face of the test sample while a positive pressure was applied, the positive pressure was increased at regular intervals. The test pressure, time and location of any water penetration was recorded. Pressure steps applied are defined on the watertightness test sheet in this report.

Resistance to wind load test in accordance with BS EN 12211: 2016 - Positive and negative pressures P1, were applied to the test sample and the deflection under load was measured, a series of 50 cycles of positive and negative pressure P2 were applied and any damage caused was noted and a safety test consisting of a single cycle of positive and negative pressures P3 was applied and any damage caused was noted
 $P2 = 0.5P1$, $P3 = 1.5P1$.
 Values of these loads are defined on the Resistance to wind load test sheet in this report.

The sample was mounted in a timber sub frame (nominal 100mm x 50mm in section) and sealed to the sub frame. The sample was mounted in the test rig without any twists or bends that might influence the test result.

**DETAILS OF SAMPLE**

Sample number	WTH1910E
Sample details	Single top hung flush casement window
Fabricator	Britannia Windows (UK) Ltd
Material:	PVC-U Liniar part numbers; Frame - LCW011, Sash - LSW030 Reinforcement, frame & sash - LAN101
Finish	Gloss white
Lock & keeps	Nico Triple lock shootbolt, comprising; Gearbox - part no 93805, shootbolt extensions - part no 93845-TR Nico cast zinc keeps - part nos 9328L, R & C
Hinges & protectors	Hinges; Nico 24" Standard Top hung hinges, part no 8260 Hinge protector; Nico Xtra bolt, part no 8100
Handle	VBH Alpha cranked handles, part no 2QEH1102 (RH)
Fixings	Lock - 4.3 x 32mm c'sk head gimlet point Keeps - 4.3 x 25mm c'sk head gimlet point Hinges - 4.3 x 25mm pan head gimlet point to sash and frame Hinge protector - 4.3 x 25mm pan head gimlet point to sash and frame Interlocking wedges - 4.3 x 25mm pan head gimlet point to sash and frame
Weather sealing	Co extruded gasket on outer frame Wool pile on sash Nico sash compressors, part nos Catch - 6100, keep - 6117
Glass (or infill)	4-20-4mm toughened glass unit
Glazing system	Internally bead glazed with co extruded gaskets
Sample dimensions	1200 x 1200mm
Additional information	Run up blocks, Liniar LMO303



CONCLUSIONS OF TEST

Standard	Test Description	Test result
BS EN 1026: 2016	Air permeability of test sample (first test)	Class 2
BS EN 1027: 2016	Watertightness test	Class 9A
BS EN 12211: 2016	7.2 Deflection test	Class C4
BS EN 12211: 2016	7.3 Repeated pressure test	Pass
BS EN 1026: 2016	Air permeability of test sample (second test)	Class 2
BS EN 12211: 2016	Safety test	Pass

Due to the minimal leakage from the test sample it was not possible to comply with BS EN 1026:2016 section 7.2.3 which states that "In no case shall the air permeability of the test chamber exceed 30% of the overall air permeability of the test specimen and the test chamber"

Exposure category classification in accordance with BS 6375-1:2015+a1:2016 (clauses 6, 7 & 8)

Classification achieved:

UK exposure category	Air permeability		Watertightness		Resistance to wind load			
	Class	Maximum test pressure (Pa)	Class	Maximum test pressure	Class	P1	P2	P3
1600	2	300	9A	600	C4	1600	800	2400

The results contained in this test report relate only to the particular sample/s tested and to the specific tests carried out as detailed within this report.

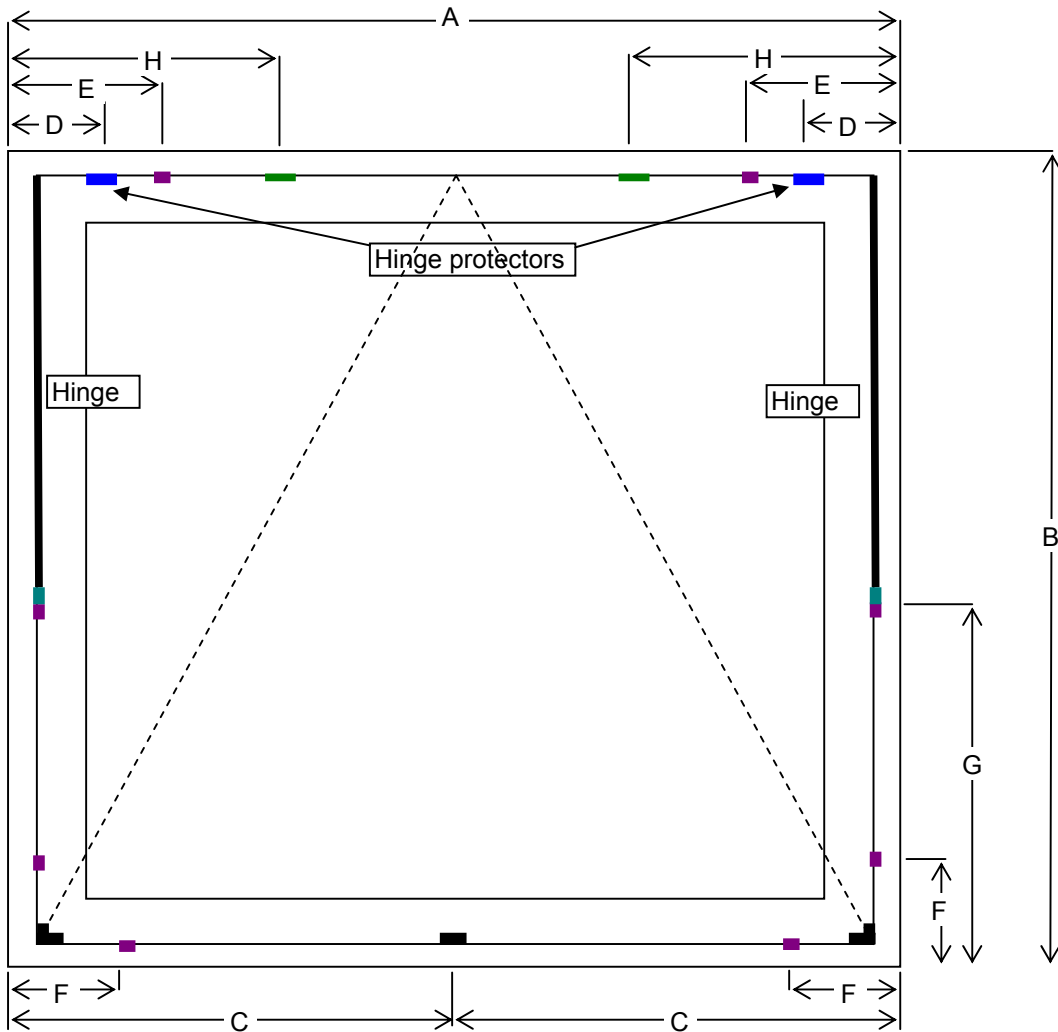
Test specimen details

Details of the samples construction and hardware components is based on information supplied by the test client, while these details have been checked and verified where possible WTH accepts no responsibility for the accuracy of details supplied.

Note : The test specimens were kept in the test laboratory for at least 12 hours at environmental conditions of between 10°C to 30°C, and 25% RH to 75% RH before each test was undertaken



TEST WINDOW DRAWING



- Sash compressor
- Interlocking w
- Hinge protect
- Run up block

A	=	1200	mm
B	=	1200	mm
C	=	600	mm
D	=	125	mm
E	=	200	mm
F	=	150	mm
G	=	530	mm
H	=	360	mm



AIR PERMEABILITY: BS EN 1206: 2016

Closing condition of window	Locked
Window surfaces clean and dry	Yes
Window opened and closed before applying pressure pulses	Yes
Three positive pressure pulses applied	Yes

Sample No	WTH1910	Temperature	17°C	Humidity	42%RH	Date	10/02/2020
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Table 1 - Air permeability with positive pressure (adjusted for laboratory conditions)

Pressure differential Pa	Air flow through test sample m ³ /h	Air flow per unit area of test sample m ³ /h/m ²	Air flow per metre of opening joints m ³ /h/m
50	3.84	2.66	0.86
100	11.35	7.88	2.53
150	21.64	15.03	4.83
200	33.15	23.02	7.40
250	45.69	31.73	10.20
300	61.95	43.02	13.83
450	130.20	90.42	29.06
600	-1.59	-1.11	-0.36

Window opened and closed before applying pressure pulses	Yes
Three negative pressure pulses applied	Yes

Table 2 - Air permeability with negative pressure (adjusted for laboratory conditions)

Pressure differential Pa	Air flow through test sample m ³ /h	Air flow per unit area of test sample m ³ /h/m ²	Air flow per metre of opening joints m ³ /h/m
50	0.99	0.69	0.22
100	0.99	0.69	0.22
150	0.99	0.69	0.22
200	0.99	0.69	0.22
250	0.99	0.69	0.22
300	0.99	0.69	0.22
450	0.99	0.69	0.22
600	0.34	0.23	0.08

Table 3 - Air permeability averages with positive and negative pressures

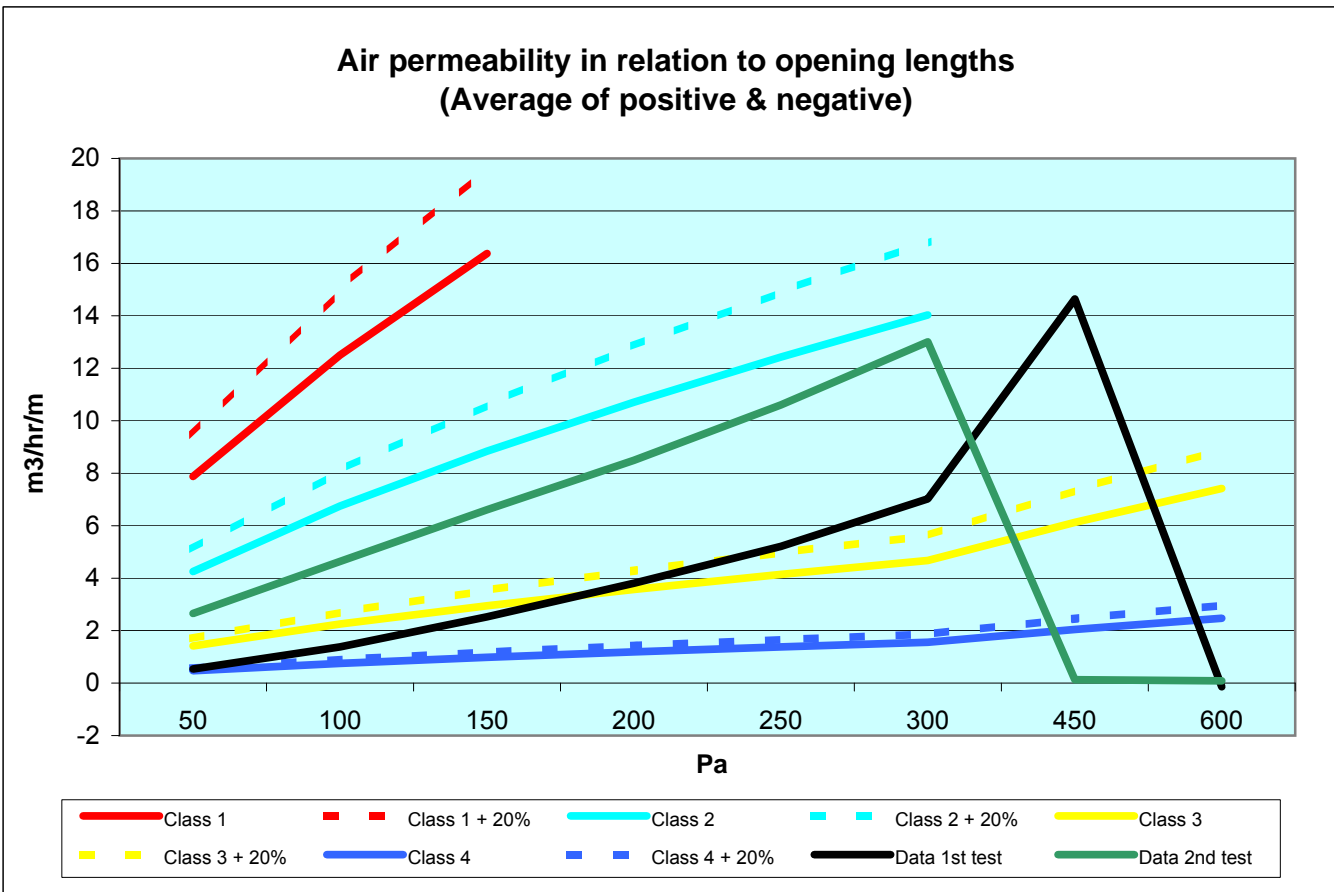
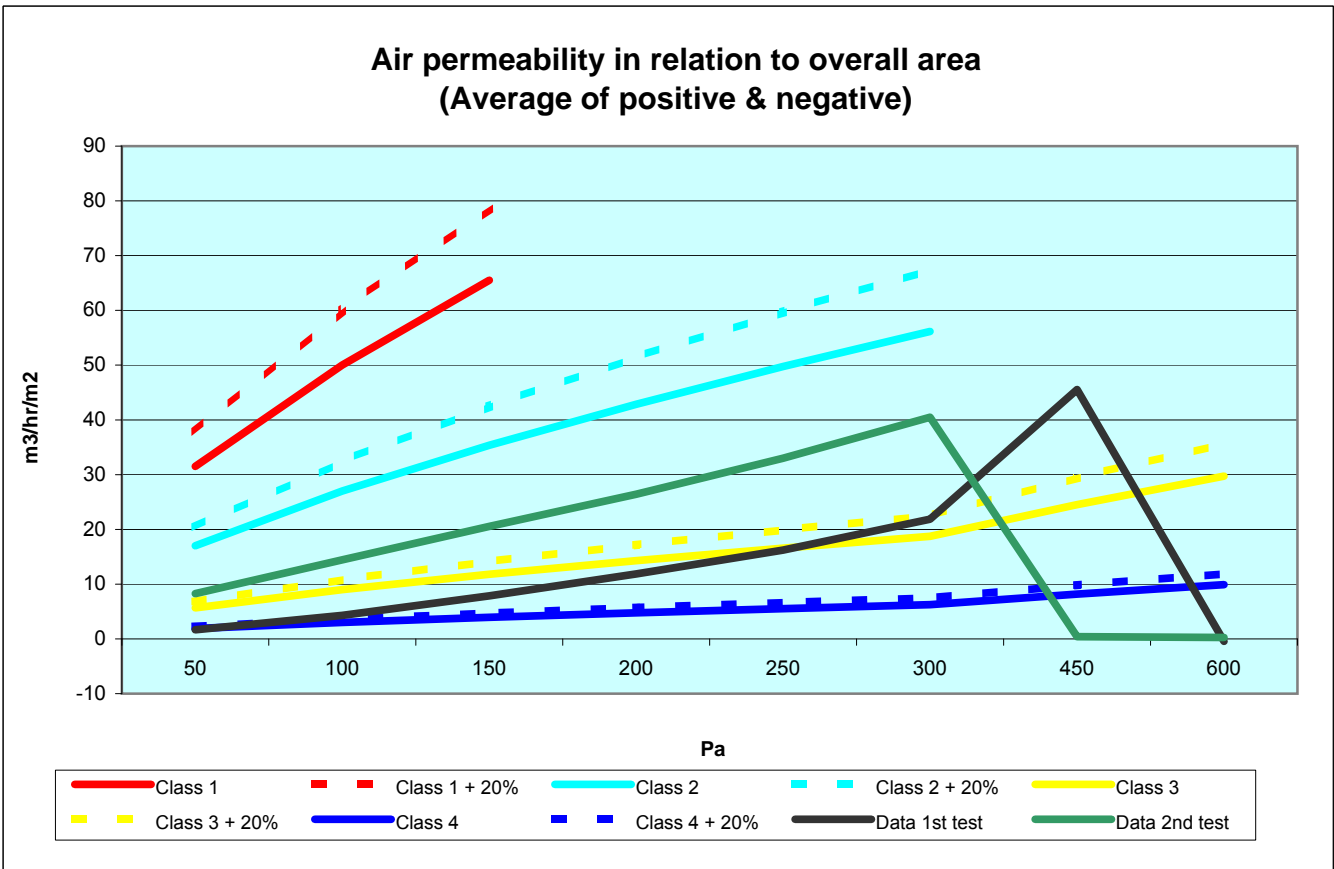
Pressure differential Pa	Air flow per average unit area of test sample m ³ /h/m ²	Air flow average per metre of opening joints m ³ /h/m
50	1.68	0.54
100	4.29	1.38
150	7.86	2.53
200	11.85	3.81
250	16.21	5.21
300	21.85	7.02
450	45.55	14.64
600	-0.44	-0.14

Total surface area of test sample (m ²)
1.44

Total length of opening joints (m)
4.48



AIR PERMEABILITY GRAPHS



Test Report No. WTH1910#5-2	Page 11 of 15
Testing of Single top hung flush casement window	
Testing to BS 6375-1:2015+A1:2016	



Sample No	WTH1910E	Temperature	19°C	Humidity	43%RH	Date	10/02/2020
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WATERTIGHTNESS: BS EN 1027: 2016

Watertightness data (Test method 1A)

Maximum test pressure	600
Pressure pulses	660

(Pressure pulses should be maximum test pressure + 10% or 500Pa whichever is the greater)

Closing condition of window	Locked
Window surfaces clean and dry	Yes
Window opened and closed before applying pressure pulses	Yes
Three positive pressure pulses applied	Yes

Required air pressure (Pa)	Recorded air pressure	Required Spray duration (mins)	Recorded spray duration	Water Leaks	Position of leak (See also leakage diagram)	Time of leak min:sec
0	0	15 +1/-0	15 min	None		
50 +/-5%	50	5 +1/-0	5 min	None		
100 +/-5%	100	5 +1/-0	5 min	None		
150 +/-5%	150	5 +1/-0	5 min	None		
200 +/-5%	201	5 +1/-0	5 min	None		
250 +/-5%	251	5 +1/-0	5 min	None		
300 +/-5%	300	5 +1/-0	5 min	None		
450 +/-5%	452	5 +1/-0	5 min	None		
600 +/-5%	600	5 +1/-0	5 min	None		

Laboratory Conditions

Air pressure (mbar)	995
Laboratory air temp. (°C)	19
Relative humidity (%)	43

Number of spray nozzles	3
Total flow rate (LPM)	6

Classification

Test pressure (Pa)	Classification		Spec.
	Test method A	Test method B	
0	1A	1B	15 min
50	2A	2B	C1+5 min
100	3A	3B	C2+5 min
150	4A	4B	C3+5 min
200	5A	5B	C4+5 min
250	6A	6B	C5+5 min
300	7A	7B	C6+5 min
450	8A	8B	C7+5 min
600	9A	9B	C8+5 min

Test Report No. WTH1910#5-2	Page 12 of 15
Testing of Single top hung flush casement window	
Testing to Weathertightness test BS 6375: Part 1	

Sample No	WTH1910E	Temperature	19°C	Humidity	47%RH	Date	10/02/2020
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RESISTANCE TO WIND LOAD: BS EN 12211: 2016

Closing condition of window	Locked
Window surfaces clean and dry	Yes
Window opened and closed before applying pressure pulses	Yes
Three positive pressure pulses applied	Yes

Deflection test: Positive pressure				P1=	1600	Pa
Section being measured:		Deflection gauge readings (mm)			Measured Length	Relative deflection
Hinge side of sash		1	2	3		
3 pulses of	1760					
Pre-test reading		20.0	20.0	20.0	3.5	1070
Max reading		21.3	24.6	20.9		
Net deflection under load		1.3	4.6	0.9		
Residual reading		20.0	20.3	20.2		

Deflection test: Negative pressure				P1=	1600	Pa
Section being measured:		Deflection gauge readings (mm)			Measured Length	Relative deflection
Hinge side of sash		1	2	3		
3 pulses of	1760					
Pre-test reading		20.0	20.0	20.0	-1.7	1070
Max reading		19.6	18.1	20.0		
Net deflection under load		-0.4	-1.9	0.0		
Residual reading		19.9	19.9	20.0		

Test conclusion:	Worst case deflection	1/ -630	Classification	C
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Cyclic repeated pressure test		P2=	800	Pa
50 cycles +/- at 800 Pa	No damage or functioning defects			Pass

Safety test		P3=	2400	Pa
1 cycle +/- at 2400 Pa	Sample remained closed with no parts becoming detached			Pass

Laboratory Conditions

Air pressure	995.0	mbar
Air temperature	19.0	°C
Relative humidity	47.0	%

Classifications

Wind load			
Class	P1	P2	P3
0	Not tested		
1	400	200	600
2	800	400	1200
3	1200	600	1800
4	1600	800	2400
5	2000	1000	3000

Deflection	
Class	Relative frontal deflection
A	≤ 1/150
B	≤ 1/200
C	≤ 1/300

Resistance to wind load			
Wind load class	Relative frontal deflection		
	A	B	C
1	A1	B1	C1
2	A2	B2	C2
3	A3	B3	C3
4	A4	B4	C4
5	A5	B5	C5



AIR PERMEABILITY: BS EN 1206: 2016

Closing condition of window	Locked
Window surfaces clean and dry	Yes
Window opened and closed before applying pressure pulses	Yes
Three positive pressure pulses applied	Yes

Table 1 - Air permeability with positive pressure (adjusted for laboratory conditions)

Pressure differential Pa	Air flow through test sample m ³ /h	Air flow per unit area of test sample m ³ /h/m ²	Air flow per metre of opening joints m ³ /h/m
50	0.00	0.00	0.00
100	0.12	0.08	0.03
150	1.28	0.89	0.29
200	1.46	1.02	0.33
250	1.58	1.10	0.35
300	1.73	1.20	0.39
450	1.14	0.79	0.26
600	1.44	1.00	0.32

Window opened and closed before applying pressure pulses	Yes
Three negative pressure pulses applied	Yes

Table 2 - Air permeability with negative pressure (adjusted for laboratory conditions)

Pressure differential Pa	Air flow through test sample m ³ /h	Air flow per unit area of test sample m ³ /h/m ²	Air flow per metre of opening joints m ³ /h/m
50	23.79	16.52	5.31
100	41.45	28.78	9.25
150	57.92	40.22	12.93
200	74.63	51.82	16.66
250	93.43	64.88	20.86
300	114.83	79.74	25.63
450	0.00	0.00	0.00
600	-0.66	-0.46	-0.15

Table 3 - Air permeability averages with positive and negative pressures

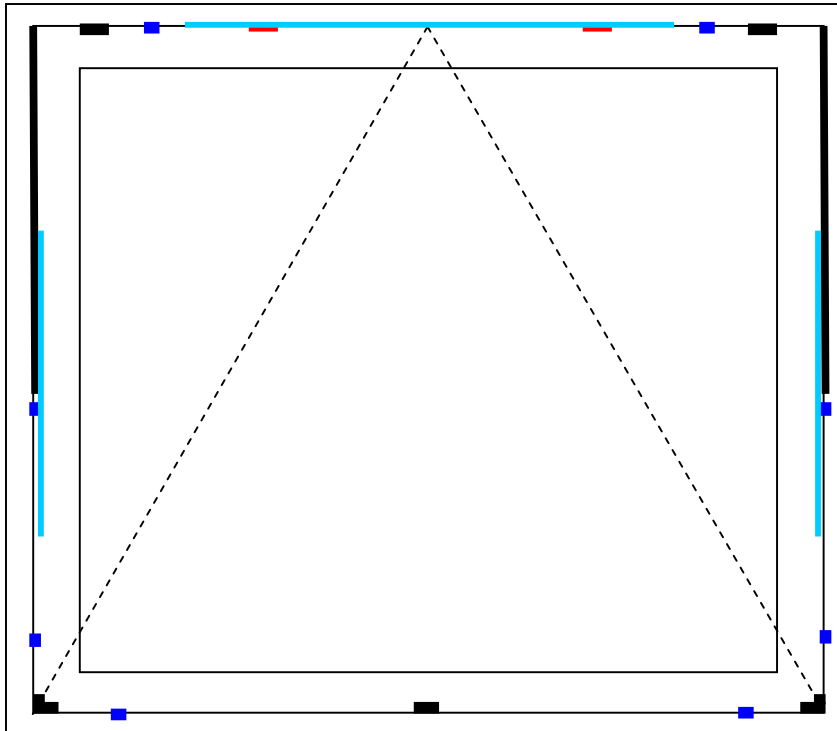
Pressure differential Pa	Air flow per average unit area of test sample m ³ /h/m ²	Air flow average per metre of opening joints m ³ /h/m
50	8.26	2.65
100	14.43	4.64
150	20.56	6.61
200	26.42	8.49
250	32.99	10.60
300	40.47	13.01
450	0.40	0.13
600	0.27	0.09

Total surface area of test sample (m ²)
1.44

Total length of opening joints (m)
4.48



Positions of water leakage and significant air leakage



No water leakage
— Air leakage

Position of deflection measurement

