



Test Report: W15232-3

**Classification of Weathertightness in accordance with
BS 6375-1:2009**

**Incorporating Air Permeability test in accordance with
BS EN 1026:2000**

**Watertightness test in accordance with BS EN 1027:2000 and
Resistance to wind load in accordance with BS EN 12211:2000**

Specimen type: Sliding Sash Window
Westbury Sliding sash

Client Westbury Windows & Joinery Ltd

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Date 07 -09 - 15

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Summary

The weathertightness classification tests were commissioned by Ross Howitt-Page, Winkhaus UK Ltd, 2950 Kettering Parkway, Kettering, Northants , NN15 6XZ , and were performed in accordance with the following standards:

- Air permeability tests in accordance with BS EN 1026:2000
- Watertightness test in accordance with BS EN 1027:2000
- Wind resistance tests in accordance with BS EN 12211:2000
- Exposure category classification in accordance with BS 6375-1:2009 (clauses 6, 7 and 8)

This report records the test data and documents all of the calculations in accordance with the equations contained within the above standards.

The following classification was achieved:

UK exposure category	Air permeability		Watertightness		Resistance to wind load			
	Class	Maximum test pressure	Class	Maximum test pressure	Class	P1	P2	P3
2000	4	600 Pa	8A	450 Pa	A5	2000	1000	3000

Gorden Stewart - Test Engineer

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Test Specimen

The test specimen was received on 16 - 07 - 2015.

The specimen type and size to be tested was determined by the client, who selected and delivered the specimen to Build Check's Laboratory.

The specimen was kept in the laboratory from the date it was received until the date it was tested and was conditioned for a minimum of 4 hours.

The specimen had no vents and therefore did not require sealing.

Listed below is a description of the test specimen including size and materials used as supplied by customer- for further information see drawings and photographs in the Appendices.

Description of test specimen

Type of specimen: Sliding Sash Window

Brand/ range name Westbury Sliding sash

Door frame construction

Material / profile: Laminated Redwood / Accoya face

Size (w x h x t) in mm:

Joints Scribed / Dowelled / Glued

Seals Deventer Silicone / Brush

Thermal insert n/a

Sash frame construction

Material / profile: Laminated Redwood / Accoya face

Size (w x h x t) in mm): 62w x 68thk

Joint: As frame

Thermal insert: na

Seals: Deventer Silicone / Brush

Glazing

Size (w x h x t) in mm: 28mm Tough / tough 4/20/4

Unit: Planitherm one / plus

Manufacturer: St Gobain

Beads: Accoya wood

Gasket: Double Sided tape inside / Silicone cap outside

Hardware
 2no. Claw window fastener
 2no Sash lifts
 Pretensioned Spiral Balance

Specimen photograph



Test Procedure

Results and analysis

Air permeability tests:

Individual readings of airflows for each pressure step (positive and negative) for both the chamber air permeability test and the total air permeability tests are tabulated in Appendix 1. The net air permeability was calculated as the difference between total and chamber air permeability and this was adjusted for laboratory temperature and atmospheric pressure on the day of testing using the following equation:

$$V_{\text{net,ad}} = V_{\text{net}} \times \frac{293}{273 + T_x} \times \frac{P_x}{101.3}$$

where

T_x = Temperature of the laboratory in °C

P_x = Atmospheric pressure in the laboratory in kPa

V_{net} = Net air permeability, adjusted for Laboratory conditions

$V_{\text{net,ad}}$ = Net air permeability, defined as total air permeability minus chamber air permeability

The adjusted air permeability was then divided with the overall specimen area to establish the air

permeability in relation to area (V_A) and with the total joint length to give air permeability in relation to opening length (V_L). All recorded and calculated values can be found in Appendix 1.

Graphs of the air permeabilities (V_A and V_L) against air pressure indicate the performance criteria for classes 1 to 4 as defined in BS 6375-1:2009 and from them it can be seen that the following air permeability classes can be awarded:

Classes in relation to overall area:

1st test, positive pressure:	Class 4
1st test, negative pressure:	Class 4
2nd test, positive pressure:	Class 4
2nd test, negative pressure:	Class 4

Classes in relation to length of opening joint:

1st test, positive pressure:	Class 4
1st test, negative pressure:	Class 4
2nd test, positive pressure:	Class 4
2nd test, negative pressure:	Class 4

Giving an overall air permeability class of: **Class 4**

Watertightness tests:

Any water penetrations occurring during the test (including the pressure and the time at which it occurred) were recorded and has been tabulated in Appendix 1. It also contains a drawing with marked positions of the penetration(s).

Based on the requirements in BS EN 12208, the specimen can be awarded the following watertightness class of: **Class 8A**

Wind Resistance tests

Deflection test

The recorded deflections - both the deflections during the wind gust and the residual deflections have been tabulated in Appendix 1. The deflections were expressed relative to the deflection length.

Based on the requirements in BS EN 12210, the specimen can be awarded the following wind deflection class of: **Class A5**

The maximum test pressure (P1) was: 2000 Pa

Repeated pressure test

The results and any damage or functioning defects were recorded - See Appendix 1.

Safety tests

Any occurring damage was recorded - See Appendix 1.

Conclusion

Based on the above the specimen tested can be awarded the following classes with regard to weathertightness in accordance with BS 6375-1:2009:

UK exposure category	Air permeability		Watertightness		Resistance to wind load			
	Class	Maximum test pressure	Class	Maximum test pressure	Class	P1	P2	P3
2000	4	600 Pa	8A	450 Pa	A5	2000	1000	3000

The classes obtained are specific to the type and size of specimen tested.

Appendix 1 - Test data

Air permeability data

1st test - positive pressure					
Pressure	Chamber permeability	Total Permeability	Net perm, adjusted for conditions	Net permeability per m ² area	Net permeability per m opening length
(Pa)	(m ³ /h)	(m ³ /h)	(m ³ /h)	(m ³ /h m ²)	(m ³ /h m)
50	3.7	5.01	1.26	0.58	0.19
100	5.76	8.68	2.82	1.30	0.41
150	7.66	11.43	3.63	1.68	0.53
200	9.44	13.97	4.37	2.02	0.64
250	11.01	16.5	5.29	2.45	0.78
300	12.52	18.71	5.97	2.76	0.88
450	16.9	25.02	7.83	3.62	1.15
600	21.9	30.37	8.17	3.78	1.20

1st test - negative pressure					
Pressure	Chamber permeability	Total Permeability	Net perm, adjusted for conditions	Net permeability per m ² area	Net permeability per m opening length
(Pa)	(m ³ /h)	(m ³ /h)	(m ³ /h)	(m ³ /h m ²)	(m ³ /h m)
50	3.3	5.24	1.87	0.87	0.28
100	5.31	8.12	2.71	1.25	0.40
150	6.97	10.8	3.69	1.71	0.54
200	8.43	13.01	4.42	2.04	0.65
250	9.7	15.35	5.45	2.52	0.80
300	10.8	16.62	5.61	2.60	0.83
450	13.9	21.11	6.95	3.22	1.02
600	16.34	24.27	7.65	3.54	1.12

Average between positive and negative pressure -1st test						
Air pressure	Positive pressure		Negative pressure		Mean	
	Net Permeability per m ² area	Net Permeability per m opening length	Net Permeability per m ² area	Net Permeability per m opening length	Per m ² area	Per m opening length
(Pa)	(m ³ /h m ²)	(m ³ /h m)	(m ³ /h m ²)	(m ³ /h m)	(m ³ /h m)	(m ³ /h m)
50	0.58	0.19	0.87	0.28	0.73	0.23
100	1.30	0.41	1.25	0.40	1.28	0.41
150	1.68	0.53	1.71	0.54	1.70	0.54
200	2.02	0.64	2.04	0.65	2.03	0.65
250	2.45	0.78	2.52	0.80	2.49	0.79
300	2.76	0.88	2.60	0.83	2.68	0.85
450	3.62	1.15	3.22	1.02	3.42	1.09
600	3.78	1.20	3.54	1.12	3.66	1.16

2nd test - positive pressure					
Pressure	Chamber permeability	Total Permeability	Net perm, adjusted for conditions	Net permeability per m ² area	Net permeability per m opening length
(Pa)	(m3/h)	(m3/h)	(m3/h)	(m3/h m2)	(m3/h m)
50	2.84	4.58	1.68	0.78	0.25
100	4.52	7.48	2.85	1.32	0.42
150	5.96	10.42	4.30	1.99	0.63
200	7.13	12.86	5.52	2.56	0.81
250	8.16	14.92	6.52	3.02	0.96
300	9.25	16.82	7.30	3.38	1.07
450	12.72	22.74	9.66	4.47	1.42
600	14.67	27.89	12.75	5.90	1.87

2nd test - negative pressure					
Pressure	Chamber permeability	Total Permeability	Net perm, adjusted for conditions	Net permeability per m ² area	Net permeability per m opening length
(Pa)	(m3/h)	(m3/h)	(m3/h)	(m3/h m2)	(m3/h m)
50	2.96	4.09	1.09	0.50	0.16
100	4.66	6.39	1.67	0.77	0.25
150	6.16	8.89	2.63	1.22	0.39
200	7.43	10.79	3.24	1.50	0.48
250	8.41	11.8	3.27	1.51	0.48
300	9.62	13.2	3.45	1.60	0.51
450	12.07	16.81	4.57	2.12	0.67
600	14.5	20.5	5.78	2.68	0.85

Average between positive and negative pressure - 2nd test						
Pressure	Positive pressure		Negative pressure		Mean	
	Net Permeability per m ² area	Net Permeability per m opening length	Net Permeability per m ² area	Net Permeability per m opening length	Per m ² area	Per m opening length
(Pa)	(m ³ /h m ²)	(m ³ /h m)	(m ³ /h m ²)	(m ³ /h m)	(m ³ /h m)	(m3/h m)
50	0.78	0.25	0.50	0.16	0.64	0.20
100	1.32	0.42	0.77	0.25	1.05	0.33
150	1.99	0.63	1.22	0.39	1.60	0.51
200	2.56	0.81	1.50	0.48	2.03	0.64
250	3.02	0.96	1.51	0.48	2.27	0.72
300	3.38	1.07	1.60	0.51	2.49	0.79
450	4.47	1.42	2.12	0.67	3.29	1.05
600	5.90	1.87	2.68	0.85	4.29	1.36

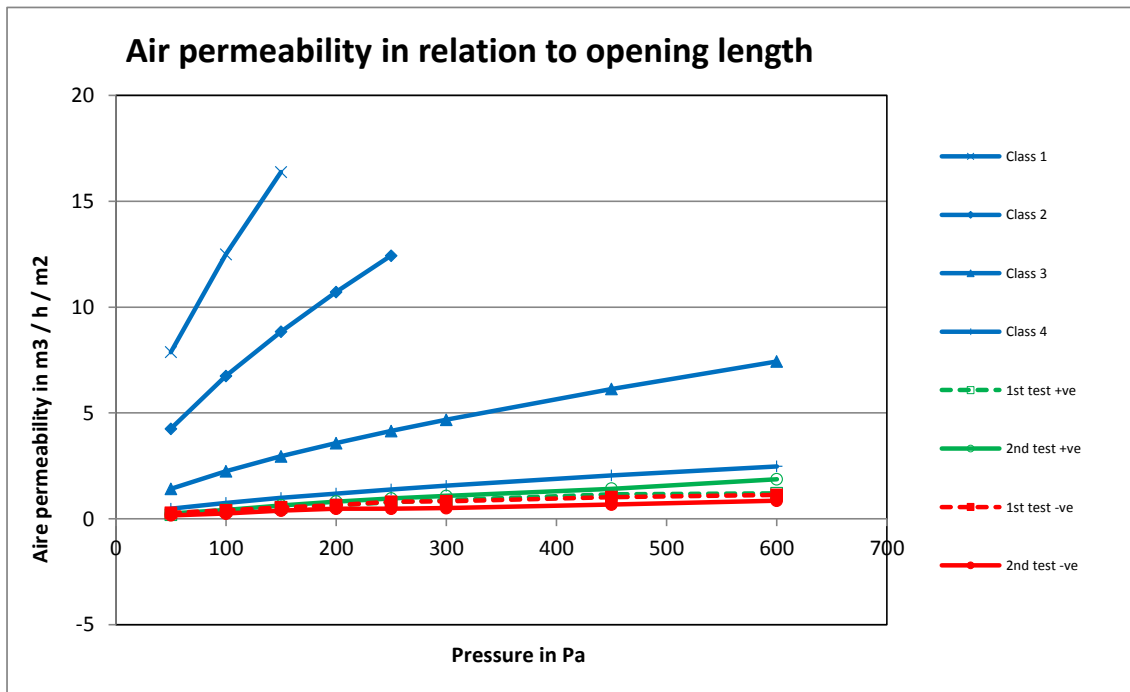
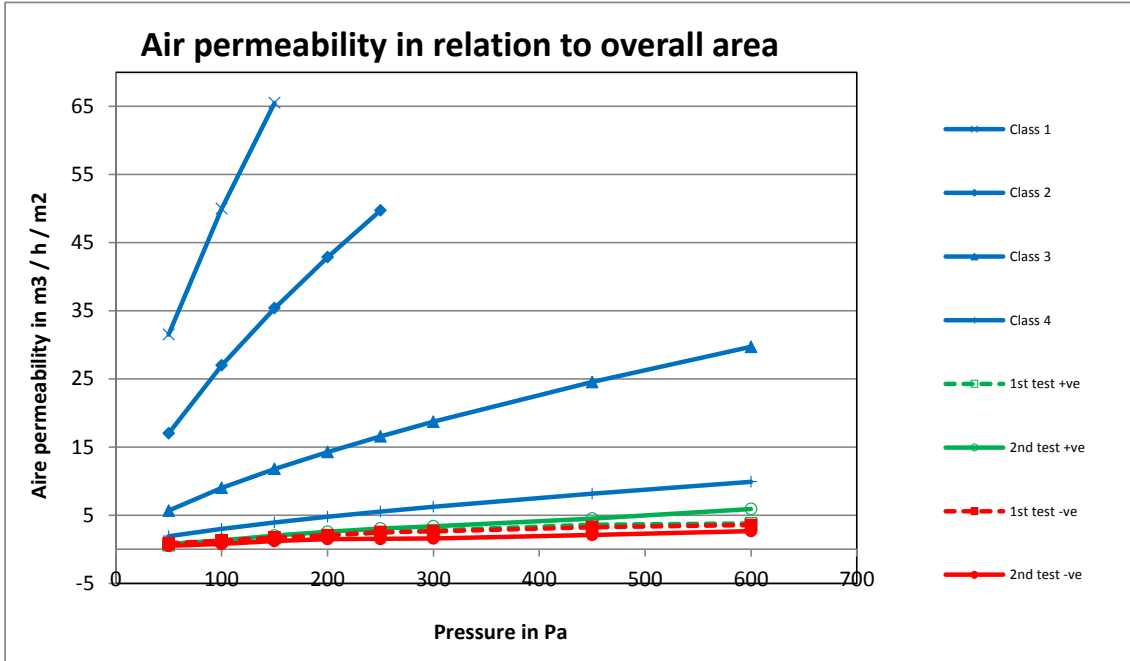
Specimen area.

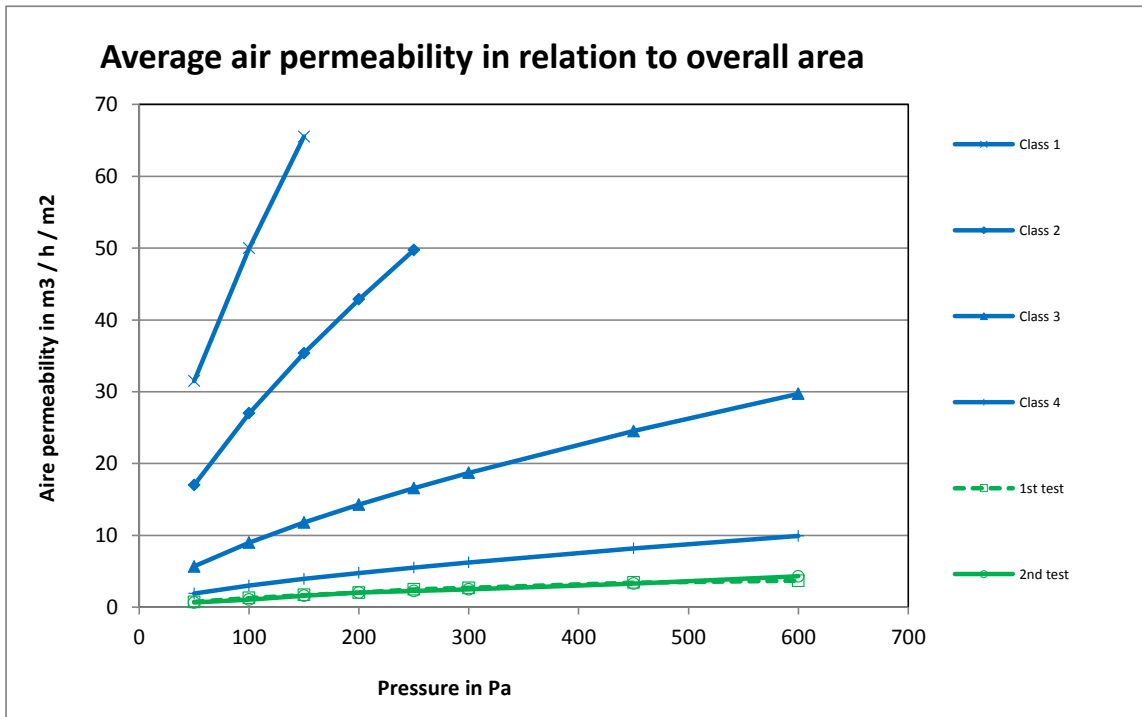
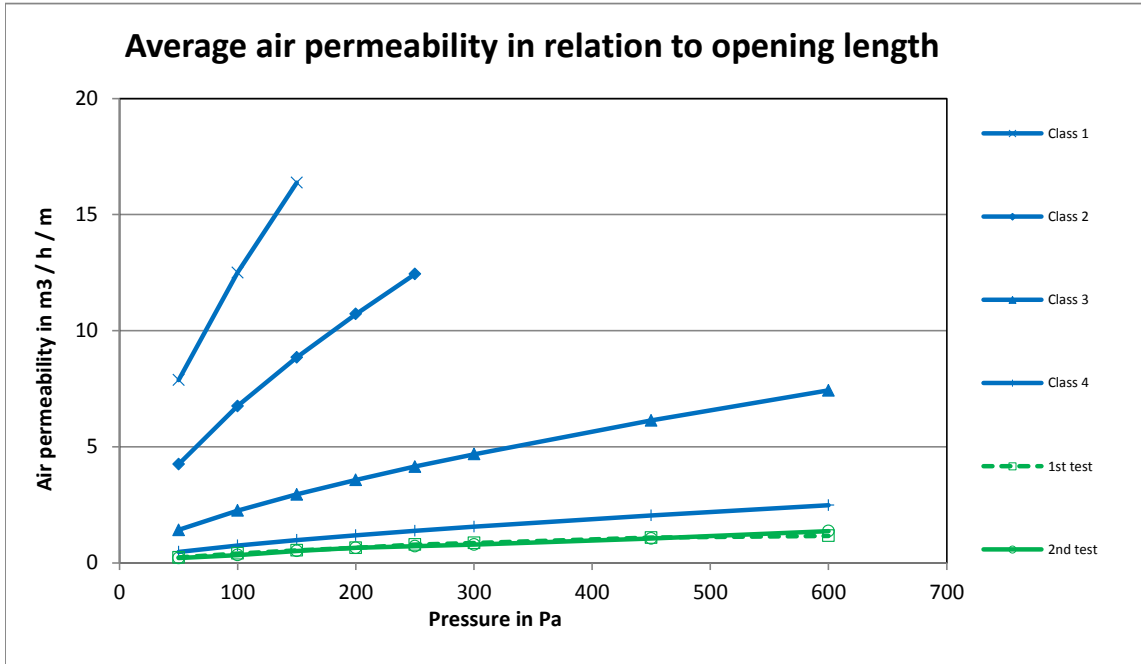
2.16 m2

Specimen length of joint.

6.8 m

Air permeability graphs





Watertightness data

Air pressure (Pa)	Spray Duration (minutes)	Any penetration?	Position of penetration 1)	Time of occurrence (min:sec)
0	15 +1/-0	Nil	---	---
50 ±3	5 +1/-0	Nil	---	---
100 ±5	5 +1/-0	Nil	---	---
150 ±8	5 +1/-0	Nil	---	---
200 ±10	5 +1/-0	Nil	---	---
250 ±13	5 +1/-0	Nil	---	---
300 ±18	5 +1/-0	Nil	---	---
450 ±23	5 +1/-0	Nil	---	---
600 ±30	5 +1/-0	Yes	bottom right corner	1 min 40 sec

Drawing with water penetration points: ←

Spraying Method A



Wind deflection data

Deflection Test: P1= Pa

Positive pressure :						
Member measured on drawing) (mark	Dial Gauge readings in mm				Length	Relative deflection
	Left end	Centre	Right End	Net deflection		
3 pre-gusts of	1320	Pa carried out				
Dial Gauge ID	WT05	WT06	WT07	1.975	1040	1/ 527
Pre-test reading	25.75	25.29	26.67			
Max reading	27.01	28.47	27.82			
Net gust reading	1.26	3.18	1.15			
Residual reading	25.82	25.92	26.71			

Negative pressure :						
Member measured on drawing) (mark	Dial Gauge readings in mm				Length	Relative deflection
	Left End	Centre	Right End	Net deflection		
3 pre-gusts of	1320	Pa carried out				
Dial Gauge ID	WT05	WT06	WT07	-1.01	1860	1/ -1842
Pre-test reading	24.04	24.67	24.88			
Max reading	22.52	22.12	23.32			
Net gust reading	-1.52	-2.55	-1.56			
Residual reading	23.97	24.6	24.8			

Worst case when considering both positive and negative pressure:

Minimum requirement:

=>

Location of deflection reading points ✦



Cyclic wind and wind safety data

Cyclic test (repeated pressure):

P2 = Pa

50 cycles at	1000	Pa carried out
Any damage or function defects?		
No defects		

Passed? (yes/no)

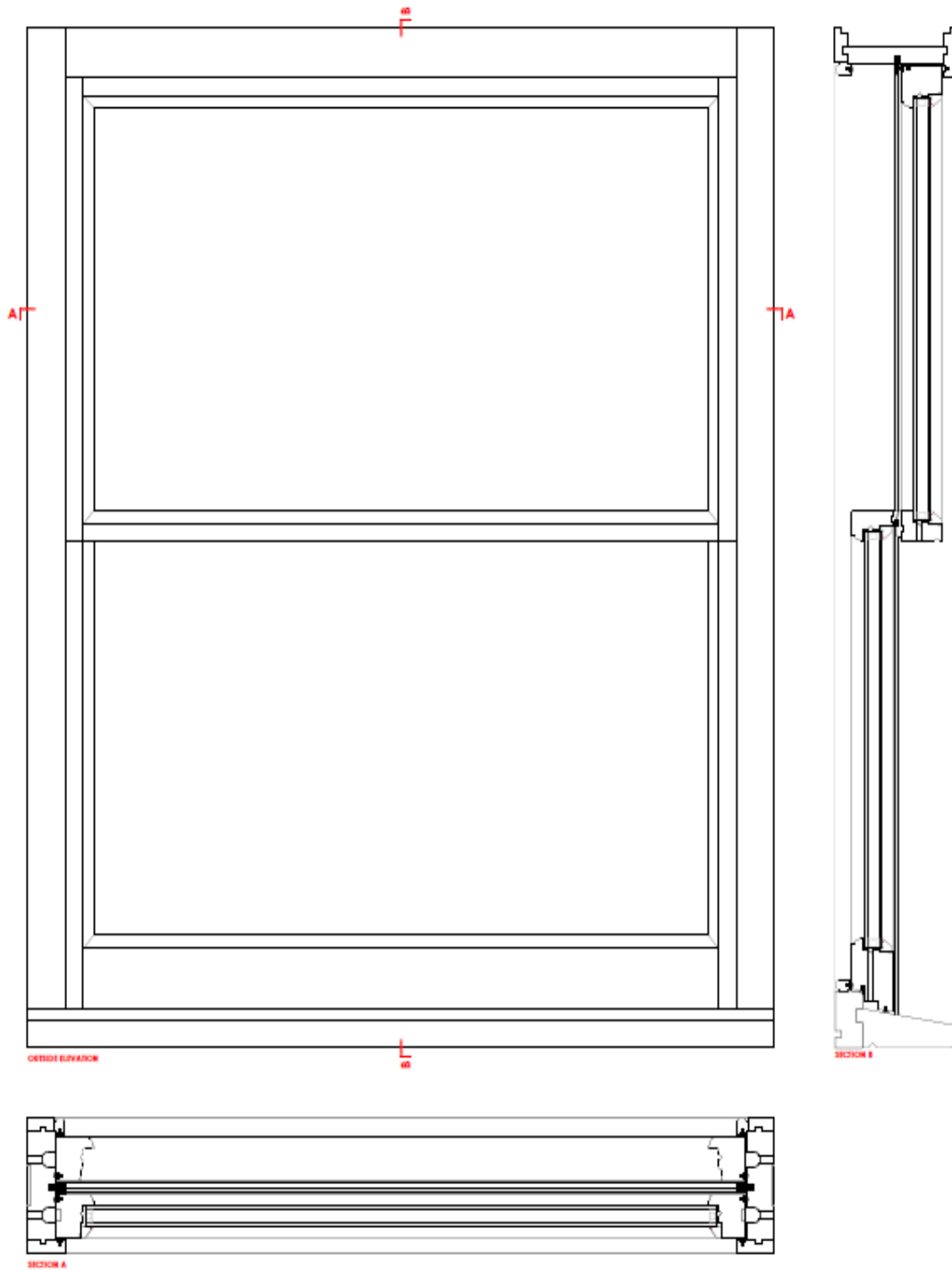
Safety test:

P3 = Pa

1 positive and 1 negative gust of	3000	Pa carried out
Did the specimen remain closed and / or did any part become detached?		
Nodefects		

Passed? (yes/no)

Appendix 2 - Product drawing



Appendix 3 - Test Procedure

General

The tests were carried out on 20 - 07 - 2015.

On the day of testing the laboratory conditions were as follows:

Temperature:	25.2 °C
Relative Humidity:	49 % RH
Atmospheric pressure:	99.4 kPa

The tests were carried out in the following sequence as described in BS 6375-1:2009:

- 1 Air permeability of test chamber in accordance with BS EN 1026:2000
- 2 First air permeability test in accordance with BS EN 1026:2000
- 3 Water resistance test in accordance with BS EN 1027:2000
- 4 Deflection and cyclic wind resistance tests in accordance with BS EN 12211:2000
- 5 Second air permeability test in accordance with BS EN 1026:2000
- 6 Safety test in accordance with BS EN 12211:2000

Installation

At the request of Build Check the Client delivered the test specimen with a 50mm wide x 100mm deep sub-frame made of timber. The sub-frame was clamped to the front of the test chamber as shown in the photograph in the Appendices.

Air permeability tests:

Initially all opening joints / vents on the specimen was sealed in order to establish the chamber air permeability after which the process was repeated with the opening joints / vent being unsealed to establish the total air permeability.

As required in BS 6375-1:2009 the air permeability tests were carried out for both positive and negative pressure as follows:

With the chamber closed 3 pre-gusts of 660 Pa was applied.

The static air pressure on the specimen was then raised in steps of 50Pa until a pressure of 300Pa was reached, then in steps of 150 Pa until the maximum air pressure was reached. At each step the required airflow to maintain the pressure was recorded - see Appendix 1.

Watertightness tests:

The spray nozzles were set-up in the pattern described as spray method "A" in the standard and the spray rate for each nozzle was 8 l/min.

All opening parts was opened and closed at least once before securing in closed position. Initially the specimen was sprayed for 15 minutes with no added air pressure.

The air pressure on the specimen was then raised in steps of 50Pa until a pressure of 300Pa was reached, then in steps of 150 Pa until the maximum air pressure was reached. The pressure was maintained for 5 minutes +1/-0 minutes at each step.

Throughout the process the specimen was inspected and any occurring penetrations were recorded - see table and drawing in the Appendices.

Wind Resistance tests

Deflection test

Dial gauges were set-up to measure deflection at the points indicated on the drawing in the Appendices.

3 pregusts of 2200 Pa was applied. The time to reach the pressure was a minimum of 1 second and it was sustained for at least 3 seconds.

Following this all dial gauges were zeroed.

The test pressure (P1) of 2000 Pa was then applied at a rate not exceeding 100 Pa per second. This pressure was maintained for 30 seconds and the deflection was read and recorded, see Appendix 5.

The pressure was then reduced to 0 Pa at a rate not exceeding 100 Pa per second and the residual deflection was recorded after 60 seconds \pm 5 seconds.

Repeated pressure test

The specimen was subjected to 50 cycles of one negative pressure gust and then one positive pressure gust. The variation from negative to positive took 7 ± 3 seconds.

The pressure at each gust was 3000 Pa.

After completion of the 50 cycles, the moving parts of the specimen was opened and closed and any damage or functioning defects were recorded - See Appendices.

Prior to the safety test being carried out, a repeat air permeability test in accordance with BS EN 1026:2000 was carried out on the specimen to establish if the wind resistance tests have had an impact on the performance - see Appendices.

Safety tests

The specimen was subjected to one cycle of one negative pressure gust and then one positive pressure gust. The variation from negative to positive took 7 ± 3 seconds and the pressure was maintained for 7 seconds \pm 3 seconds.

The pressure at each gust was 3000 Pa.

Following the safety test it was checked whether the test specimen remained closed and if any parts of the test specimen became detached this was recorded - See Appendices.

Appendix 4 - Equipment Used

Build Check weather rig
Weather Station AL-07
Manometer WT-01
Air Flow Meter WT-04
Tape measure WT-03
Water Flow meter WT-15
Nozzle angle check stick WT-12
Set square WT-14
Dial gauge WT-05
Dial gauge WT-06
Dial gauge WT-07