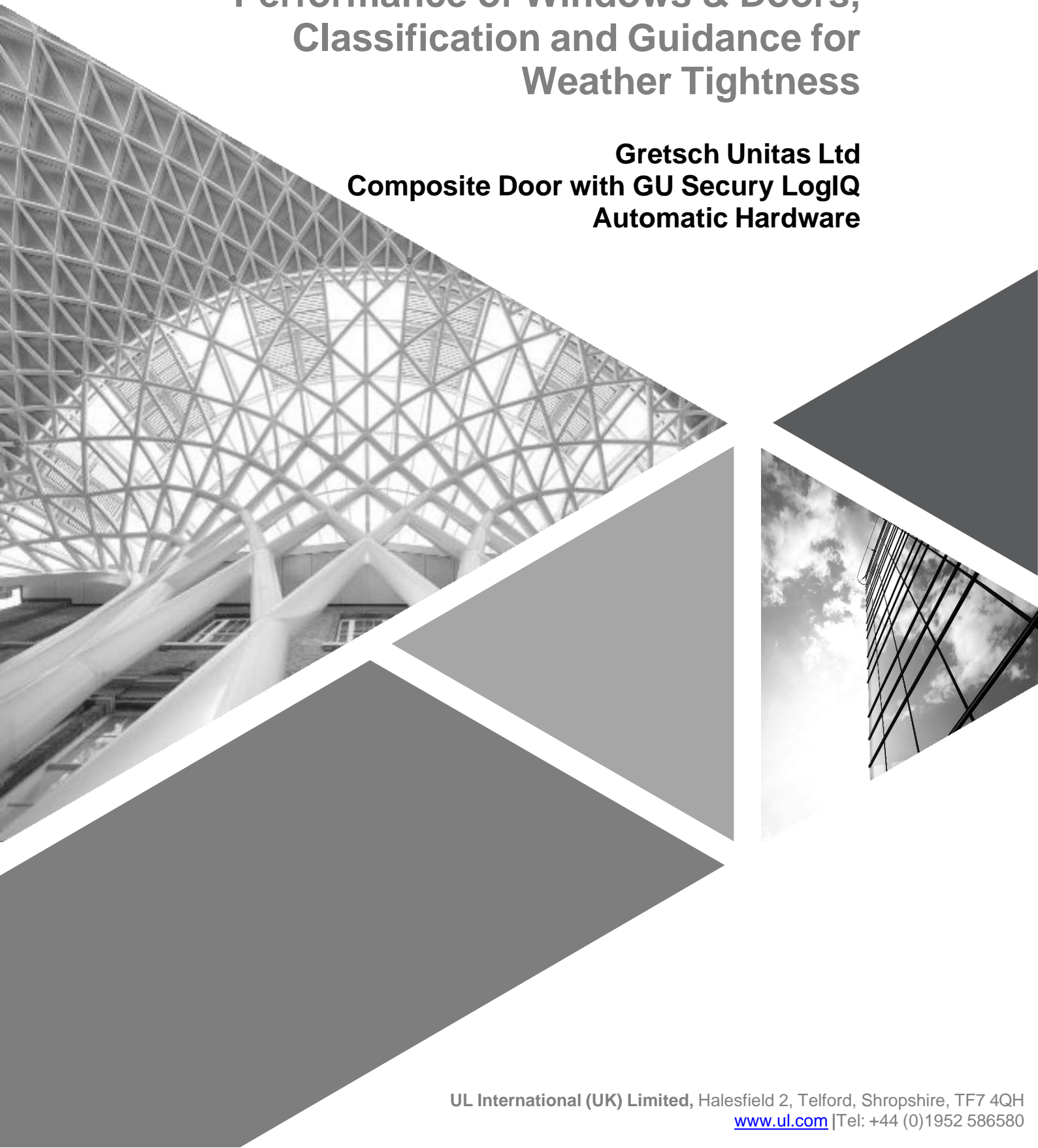


Technical Report – R4791475629-1 BS 6375-1:2015+A1:2016- Performance of Windows & Doors, Classification and Guidance for Weather Tightness

**Gretsch Unitas Ltd
Composite Door with GU Secury LogIQ
Automatic Hardware**





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1. Introduction

Test Details	
Customer:	Gretsch Unitas Ltd 5 Spitfire Close Coventry Business Park Coventry CV5 6UR GB
Test Witnessed By:	S Golder <i>Gretsch Unitas Ltd</i> 9 th December 2024
Product Tested:	Single inward opening composite door with GU Secury LogIQ Automatic hardware
Date(s) Sample(s) Received:	28 th October 2024
Date of Test:	9 th December 2024
Test Conducted at:	UL International (UK) Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	S Ward <i>Engineering Technician</i>

Report Authorisation	
Report Compiled by:	J Ratcliffe <i>Engineering Project handler</i> 
Authorised by:	R Cadwallader <i>Engineer</i> 

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2. Summary of Results

The following summarises the results of testing carried out in accordance with the relevant testing and classification standards:

	Test Method & Classification Standard	Achieved Max. Test Pressure	Classification
Air Permeability	BS EN 1026:2016 BS EN 12207:2000	600 Pa	3
Water Tightness	BS EN 1027:2000 BS EN 12208:2000	50 Pa	2A
Wind Resistance	BS EN 12211:2016 BS EN 12210:2016	800 Pa	C2
Classification according to Table 1 of BS 6375-1:2015+A1:2016			800

More comprehensive details are reported in Section 6.

Note: *These results are valid only for the conditions under which the test was conducted*

All measurement devices, instruments and other relevant equipment were calibrated and traceable to National Standards.

2.1 Decision Rule

Classifications reported in Section 5 indicate that the product conforms with the relevant accuracy requirements of the testing standards (as summarised below) and the expanded measurement uncertainty ($k=2$ for approximately 95% coverage probability) is no greater in magnitude than the accuracy requirements defined in Section 4 of BS EN 12207:2000 and Section 4 and Section 5 of BS EN 12210:2016. If the measured value is on the limit, the result is defined as a pass. This means that the risk of a false positive is 50%. For further information regarding risk assessment refer to ILAC G8: 2019.

2.2 Measurement Uncertainty

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%, and for the air leakage measurements is +/- 1.94 % whereas for the wind resistance measurements is +/- 1.84 %.

3. Description of Test Sample

The description of the test sample in this section has been supplied by Gretsch Unitas Ltd and has not been verified by UL International (UK) Limited.

See Section 7 for test sample drawings as provided by the customer.

Product range name:	Composite door with GU Secury LogIQ Automatic hardware
Project name to appear on front page of the test report:	Composite door with GU Secury LogIQ Automatic hardware
Configuration:	Single composite door
Opening direction:	Inward opening
Is the sample typical of normal production?	Yes
Please define the closing condition of the sample:	Active leaf locked & key removed

Outer Frame			
Outer frame width:	1000mm	Outer frame material:	UPVC
Outer frame height:	2100mm	Outer frame gasket	
Outer frame Part Numbers		Gasket type:	X
Top:	Liniar LSW016	Manufacturer:	Liniar
Bottom:	Stormguard threshold	Product name:	Repair Gasket Black
Lock side:	Liniar LSW016	Product code:	LGA401
Hinge side:	Liniar LSW016	Threshold	
Outer frame section size		Manufacturer:	Stormguard Allamd Smith
Width:		Product name:	Stormguard
Depth:	70mm	Product code:	AM3-70
Reinforcing:		Material:	Aluminium
Manufacturer:	Liniar	Outer frame joint method	
Product name:		Head:	Outer frame corners welded
Product code:	LSR016	Foot:	Threshold mechanical fixed
Material:	Steel	Surface Finish	White

Leaf			
Leaf/Casement width:	850	Leaf/ Casement material:	GRP 68mm composite slab
Leaf/ Casement height:	1970	Leaf/ Casement gasket	
Leaf/ Casement Part Numbers		Gasket type:	X
Top:	n/a	Manufacturer:	Rotoc/Diventer
Bottom:	n/a	Product name:	Black Weatherseal
Lock side:	n/a	Product code:	M5108 6mm
Hinge side:	n/a	Leaf midrail:	n/a
Leaf/ Casement section size		Manufacturer:	██████████
Width:	850	Product name:	██████
Depth:	1970	Product code:	X
Reinforcing:		Material:	X
Manufacturer:	n/a	Leaf/Casement joint method	
Product name:	n/a	Head:	n/a
Product code:	n/a	Foot:	n/a
Material:	n/a	Surface Finish	Acrylic Capped Renolit Foil Finish with a 1.5mm abs sheet bonded to a monocoque structure

Hardware				
	Manufacturer:	Product description:	Product code:	Quantity:
Hinges:	██████	██████ composite door hinge		4no
Hinge fixing:	Rapier Star	5.0 x 40 wood screw		8
Hinge protectors:	Mila	Dog Bolt		4
Hinge protector fixings:				4
Locking hardware:	GU	Secury LogIQ Automatic		
Locking hardware fixing:	UK Fasteners	4.0 x 40 screws		
Cylinder:	Mila	Apecs 3 Star		1no
Cylinder fixing:	Mila			
Handle:	n/a			
Handle fixings:	n/a			
Touch Bar	n/a			
Cylinder Support				
Cylinder Escutcheon	Mila	Supa Finger pull		1no
Keeps:	GU	Centre Keep / Remote Deadbolt Keep.	L-10000-12-L/R-1 / L-10000-20-0-1A	1no / 3no
Keep fixings:	Rapierstar	4.3 x 30 PVC screws / 3.9 x 45 Self drilling steel screws		

Confirmation

Customer is to confirm that the samples provided for testing are representative of standard production. Please note: the details given above, as well as the drawings supplied by the customer as confirmed as typical of normal production are not verified by UL International (UK) Limited.

Company:	GU Ltd
Name:	Simon Golder
Position:	Technical Manager
Date:	28.10.24

4. Test Arrangement

4.1 Test Chamber

A window specimen, supplied for testing in accordance with the relevant British and European Standards, was mounted into a rigid test chamber. The pressure within the chamber was controlled by means of a centrifugal fan and a system of ducting and valves. The static pressure difference between the outside and inside of the chamber being measured by means of a pressure transmitter.

4.2 Instrumentation

4.2.1 Static Pressure

A pressure measurement device capable of measuring rapid changes in pressure to an accuracy within 5%, was used to measure the pressure differential across the sample.

4.2.2 Air Flow

An air flow meter mounted in the air system ducting was used to measure the airflow required to obtain pressures within the test chamber. The system has the capability of measuring airflow through the sample to an accuracy of $\pm 5\%$.

4.2.3 Water Flow

A flow meter(s), mounted in the spray frame water supply system, was used to measure water flow to the test sample to an accuracy of $\pm 10\%$.

4.2.4 Deflection

Deflection measurement devices with an accuracy of $\pm 5\%$ were used to measure deflection of principle framing members. These measurement devices were mounted at mid span and as near to the supports of the members and located in such a way that any measurement was not influenced by the application of any loading to the sample. The gauges were mounted as shown in Figure 2.

4.2.5 Temperature & Humidity

A digital data logger capable of measuring temperature with an accuracy of $\pm 3^\circ\text{C}$ and humidity with an accuracy of $\pm 5\% \text{RH}$ was used.

4.2.6 Barometric Pressure

A digital barometer capable of measuring barometric pressure with an accuracy of $\pm 1 \text{ kPa}$ was used.

4.3 Pressure Generation

4.3.1 Static Air Pressure

The air supply system comprised of a centrifugal fan assembly and associated ducting and control valves and was used to create both positive and negative static pressure differentials. The fan provided a constant airflow at the required pressure and period required for the tests.

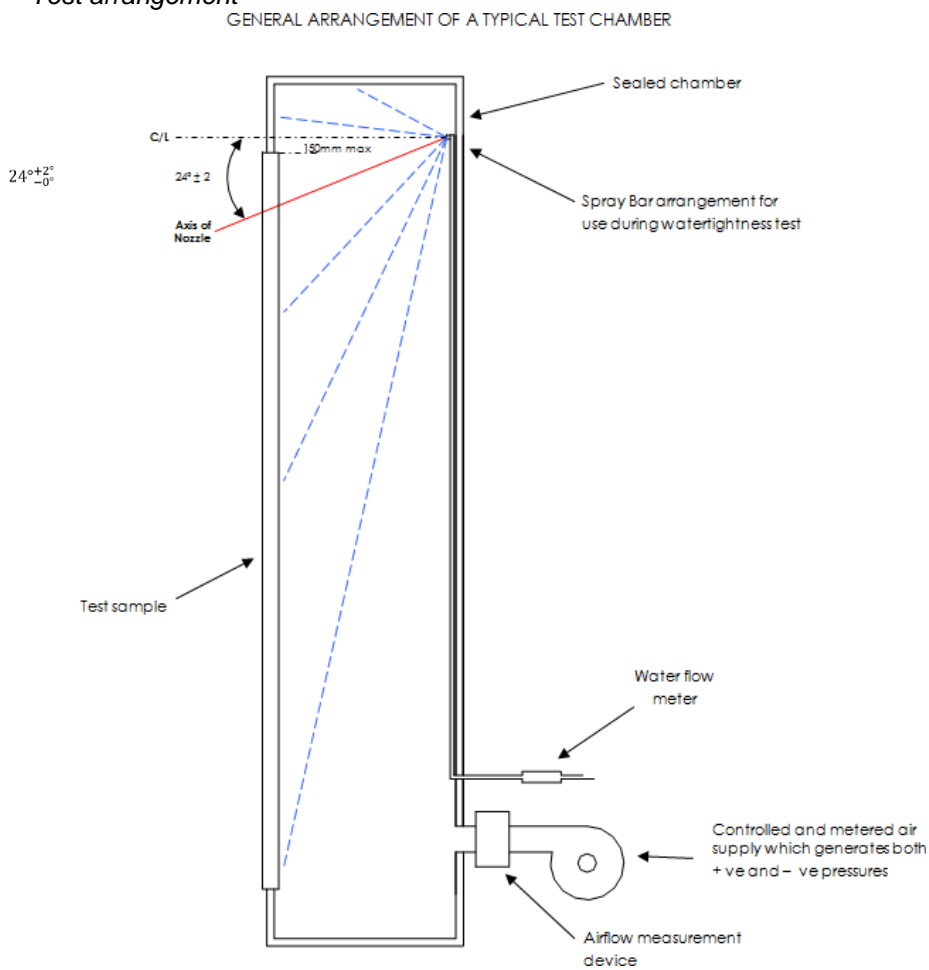
Note: *References are made to both positive and negative pressures in this document, it should be noted that in these instances, positive pressure is when pressure on the weather face of the sample is greater than that on the inside face and vice versa.*

4.4 Water Spray System

The spray nozzles have a circular full cone spray pattern and a spray angle of $120^\circ (+0^\circ/-10^\circ)$ at working pressure of 2 – 3 bar and a flow rate of 2 litres/min (± 0.2 litres/min) per nozzle. The nozzles were spaced at 400 mm (± 10 mm) along the axis of the spraybar and the nozzles were arranged so that the lateral distance between the outer edge of the surround and the outermost nozzles shall be greater than 50mm but not exceeding 250mm.

The nozzle line was located not more than 150mm above the topmost horizontal joint line of any moving frame or the glazing line of any fixed glazing, to provide complete wetting of the adjacent horizontal frame member(s). The nozzle line was also located at 250mm ($+10$ mm/ -0 mm) from the external face of the specimen as defined by the outermost external joint plane of moving parts or the glazing plane of fixed parts.

Figure 1 – Test arrangement



5. Test Procedures

Testing was carried out in accordance with the following standards:

- | | |
|---|------------------------|
| – Performance of windows and doors
Part 1: Classification for weathertightness and guidance on selection and specification | BS 6375-1:2015+A1:2016 |
| – Windows and doors - Air Permeability - Test method | BS EN 1026:2016 |
| – Windows and doors - Air Permeability - Classification | BS EN 12207:2000 |
| – Windows and doors - Watertightness - Test method | BS EN 1027:2000 |
| – Windows and doors - Watertightness - Classification | BS EN 12208:2000 |
| – Windows and doors - Resistance to wind load - Test method | BS EN 12211:2016 |
| – Windows and doors - Resistance to wind load - Classification | BS EN 12210:2016 |

5.1 Sequence of Testing

1. Air Permeability – Infiltration
2. Air Permeability – Exfiltration
3. Watertightness
4. Wind Resistance - P1
5. Wind Resistance - P2
6. Repeat Air Permeability – Infiltration
7. Repeat Air Permeability – Exfiltration
8. Wind Resistance - P3

Note: Prior to all testing the sample was conditioned for at least 4 hours at between 10 – 30°C & 25 – 75% RH, as required by the relevant testing standards.

5.2 Air Permeability - Infiltration

The air leakage of the test chamber and joints between the chamber and test sample was determined by sealing the sample with adhesive tape and polythene sheeting and measuring the air flows at positive pressure differentials of: 50, 100, 150, 200, 250, 300, 450 and 600 Pa, each step being held for at least 10 seconds.

The sample was unsealed, and any opening lights were opened and closed at least once before being brought into the closing condition defined by the manufacturer as listed in Section 3. Three pressure pulses of 660 Pa positive pressure were then applied to the test sample.

Air flows measurements were then repeated with the sample unsealed and the difference between readings being the air leakage through the test sample which was then adjusted to normal conditions as defined in BS EN 1026:2016.

5.3 Air Permeability - Exfiltration

The air permeability test was repeated using negative pressures as described in Section 5.2.

5.4 Watertightness

Any opening lights were opened and closed at least once before being brought into the closing condition defined by the manufacturer as listed in Section 3.

Water was then sprayed on to the sample as per section 4.4, for 15 minutes at 0 Pa. The water spray continued, and the pressure was increased in the following increments: 50 Pa (the stage being held for 5 minutes).

The interior face of the sample was continuously monitored for water ingress throughout the test.

5.5 Wind Resistance

5.5.1 Wind Resistance – P1

Three pressure pulses were applied to the test sample equal to 880 Pa positive pressure (Pressure P1 + 10%) and each peak held for at least 3 seconds. After returning to zero pressure, all sensors were then zeroed.

A peak test pressure of 800 Pa was applied at a rate not exceeding 100 Pa/s, either incrementally or continuously. Once the peak pressure was reached, it was maintained for a period of 30 seconds, and the required frontal deflections were recorded. The pressure was then reduced to 0 Pa, at a rate not greater than 100 Pa/s, and the residual deformation was recorded 60 ± 5 secs of returning to 0 Pa.

The test was then repeated at negative pressures.

5.5.2 Wind Resistance – P2

The sample was subjected to 50 cycles including negative & positive pressures.

The first step was at a test pressure of 400 Pa negative pressure and followed by 400 Pa positive pressure, as was the last of the sequence of 50 cycles. The time in which the variation from – 400 Pa and + 400 Pa and the reverse was 7 ± 3 s, with each peak being maintained for 7 ± 3 s.

Following completion of the required 50 cycles, all moving parts of the test sample were opened and closed and note was taken of any damage or functional defects.

5.5.3 Wind Resistance – P3

The safety test consisted of one cycle of a negative and positive test pressures, with the peak test pressure being 1200 Pa and negative test pressure applied first.

The time in which the variation from 0 Pa to – 1200 Pa and back to 0 Pa was 7 ± 3 s between each stage, with the peak being maintained for 7 ± 3 s.

Positive test pressure was applied following a 7 ± 3 s rest at 0 Pa. Variation from 0 Pa to + 1200 Pa and back to 0 Pa was the same duration as for the negative test pressure P3.

Following completion of the test, the sample was checked to ensure it stayed closed and any parts of the sample which had come detached were recorded.

6. Test Results

6.1 Lab Conditions

The conditions measured inside the laboratory were as follows:

Temperature (°C)	Humidity (%RH)	Atmospheric Pressure (kPa)
18.4	37.8	102.33

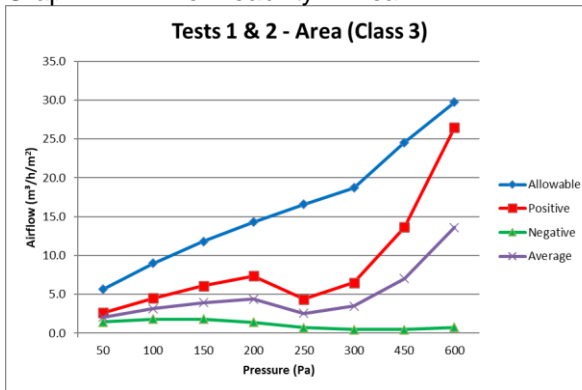
6.2 Air Permeability

Calculated area of test sample 2.10 m²
 Measured length of opening joints 5.66 m

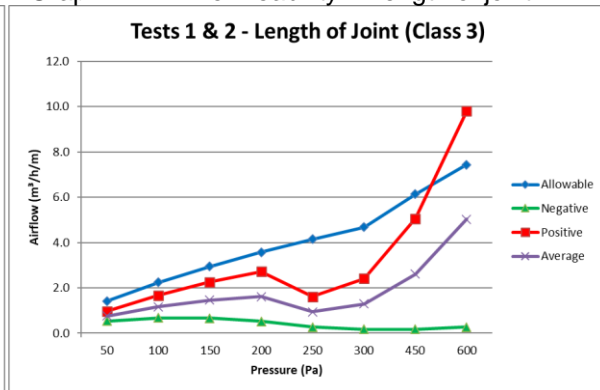
6.2.1 Initial Air Permeability Tests 1 & 2

Pressure Differential Pa	Air Permeability Rate Infiltration & Exfiltration Tests m ³ /hr/m ² - Area			Air Permeability Rate Infiltration & Exfiltration Tests m ³ /hr/m - Length of Joint		
	Test No. 1 (Positive)	Test No. 2 (Negative)	Average	Test No. 1 (Positive)	Test No. 2 (Negative)	Average
50	2.63	1.45	2.04	0.97	0.54	0.76
100	4.50	1.83	3.16	1.67	0.68	1.17
150	6.11	1.80	3.95	2.26	0.67	1.46
200	7.36	1.40	4.38	2.72	0.52	1.62
250	4.37	0.73	2.55	1.62	0.27	0.94
300	6.50	0.46	3.48	2.41	0.17	1.29
450	13.66	0.46	7.06	5.06	0.17	2.61
600	26.46	0.75	13.60	9.80	0.28	5.04

Graph 1 – Air Permeability – Area



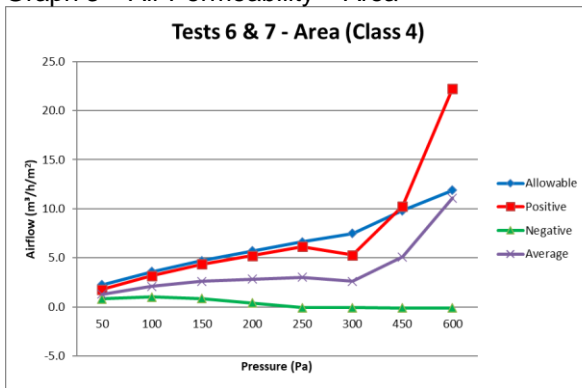
Graph 2 – Air Permeability – Length of joint



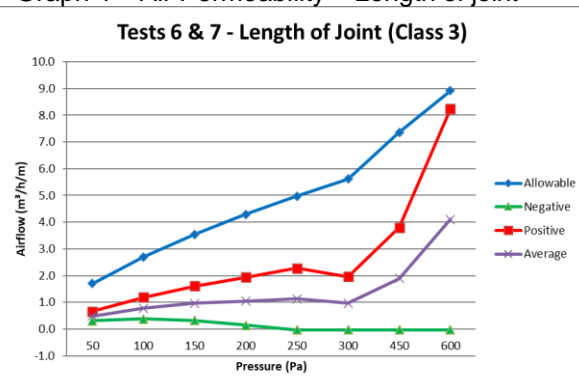
6.2.2 Repeat Air Permeability Tests 6 & 7

Pressure Differential Pa	Air Permeability Rate Infiltration & Exfiltration Tests m ³ /hr/m ² - Area			Air Permeability Rate Infiltration & Exfiltration Tests m ³ /hr/m - Length of Joint		
	Test No. 6 (Positive)	Test No. 7 (Negative)	Average	Test No. 6 (Positive)	Test No. 7 (Negative)	Average
50	1.79	0.83	1.31	0.66	0.31	0.48
100	3.20	1.02	2.11	1.18	0.38	0.78
150	4.36	0.87	2.61	1.61	0.32	0.97
200	5.23	0.40	2.82	1.94	0.15	1.04
250	6.15	0.00	3.03	2.27	0.00	1.12
300	5.28	0.00	2.60	1.96	0.00	0.96
450	10.27	0.00	5.09	3.80	0.00	1.88
600	22.26	0.00	11.08	8.24	0.00	4.10

Graph 3 – Air Permeability – Area



Graph 4 – Air Permeability – Length of joint



6.2.3 Air Permeability – Classification

Based on Area	Based on Length of Opening Joint
3	3
Overall Class	
3	

Note: Due to the high performance of the test specimen, the chamber leakage exceeded the maximum 30% rule and as such is a deviation from the test standard.

6.3 Watertightness Testing

6.3.1 Watertightness – Results

Water Temperature (°C)		14.7	
Spray method used		1A	
Observations			
Air Pressure (Pa)	Time Stage Held (minutes)	Comments	Classification
0	15	No leakage observed	1A
50	5	No leakage observed	2A

6.3.2 Watertightness – Classification

Overall Classification
2A

6.4 Wind Resistance

6.4.1 Test 4 – Wind Resistance – P1 Results

Deflection was calculated using the following formula:

$$\text{Deflection} = [\text{measurement recorded by probe at location 'lx'}] l_2 - \left(\frac{l_3 - l_1}{2}\right)$$

Member Under Test	Test Pressure Pa	Maximum Deflection mm	Residual Deformation mm	Deflection Class	Relative Frontal Deflection
Member A	800	0.5	0.0	Class C	1/4447
	-800	0.4	0.0	Class C	1/5002

An inspection carried out following Test 4 – Wind Resistance, P1, after both positive and negative pressure testing at 800 Pa, showed no evidence of any permanent deformation or damage to the test sample.

Figure 2 – Position of deflection measurement sensors



6.4.2 Test 5 – Wind Resistance – P2 Results

An inspection carried out following Test 5 – Wind Resistance, P2, after 50 cycles at both positive and negative pressure testing at 400 Pa, showed no evidence of any permanent deformation or damage to the test sample.

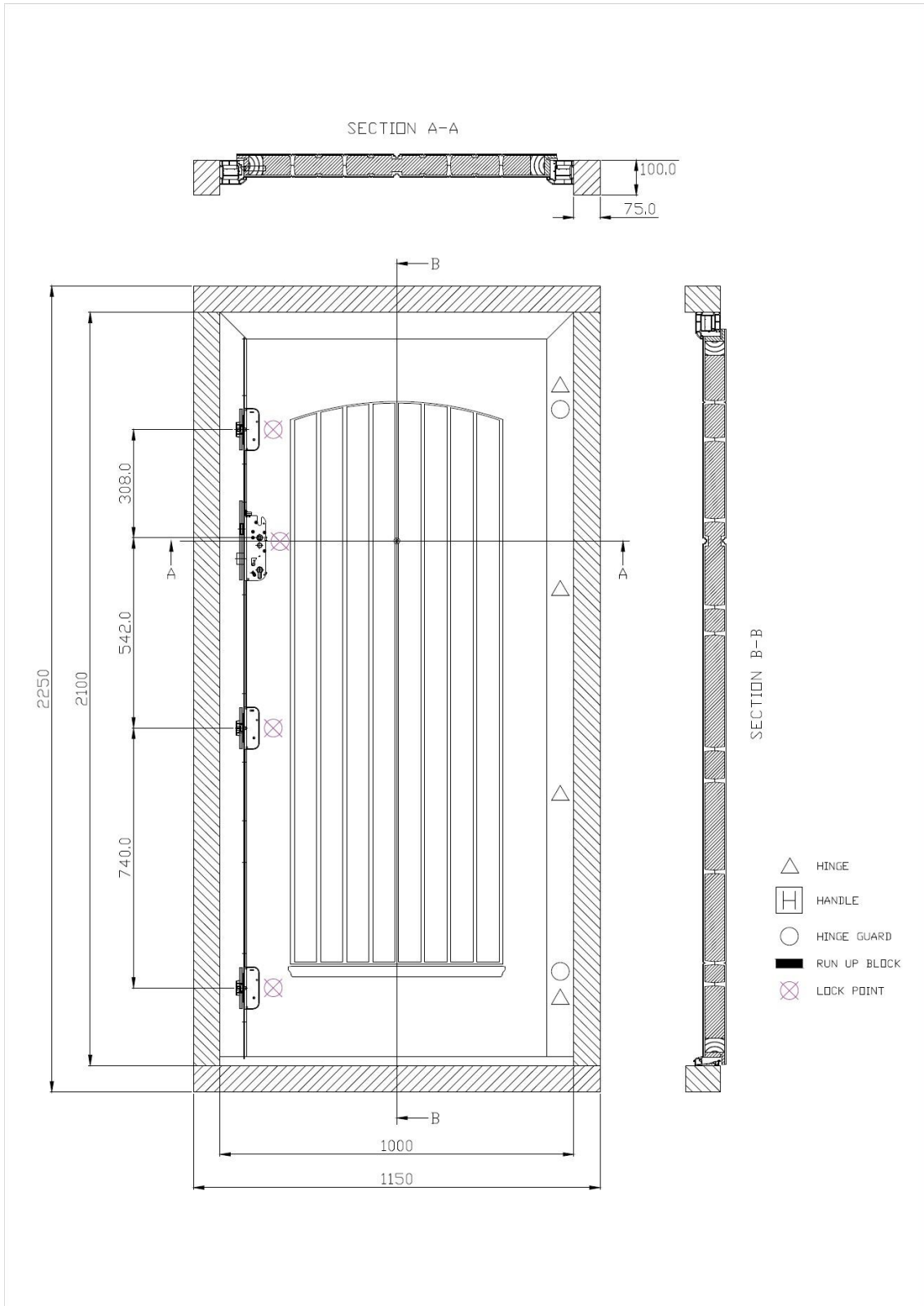
6.4.3 Test 8 – Wind Resistance – P3 Results

An inspection carried out following Test 8 – Wind Resistance, P3, after both positive and negative pressure testing at 1200 Pa, showed no evidence of any permanent deformation or damage to the test sample.

6.4.4 Wind Resistance - Classification

Overall Classification
C2

7. System Drawings





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----- END OF REPORT -----





Facade Testing



Onsite Testing



Product Certification



Window & Door Testing

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