Test Report 3480036.

Smart Systems Limited

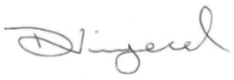
Incorporating Smart Extrusions

Introduction.

This report has been prepared by Jack Nicholls and relates to the activity detailed below:

Job/Registration Details		Client Details
Job number:	**3480036**	Smart Systems Limited Incorporating Smart Extrusions Arnolds Way Yatton BS49 4QN United Kingdom
Job type:	Testing Samples Submitted	
Start Date:	08/03/2022	
Test type:	Direct	
Sample ID:	10198114	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	

The report has been approved for issue by David Vinyard – Senior Test Engineer

Approved For Issue	
	Issue Date: 6 May 2022

Objectives.

Direct Test

Product Scope.

Visofold 6000 Aluminium Double Door

Report Summary.

The sample was received on 08 March 2022 and the testing was started on 18 March 2022.

The sample submitted complied with the requirements of the test work conducted.

BS:6375-1:2015 + A1:2016 Weather Type Test.

1 off double leaf open out glaze in hinged door assembly full glass infill with a with a standard fully rebated threshold

(Sample ID No 10198114)

Date sample received: 08 March 2022

Test Results.

1.	Air Permeability	The test sample met the requirements of the Specification, in respect of Clause 6, for Test Pressure Class 4.
2.	Watertightness	The test sample met the requirements of the Specification, in respect of Clause 7, for Test Pressure Class E1050.
3.	Wind Resistance	The test sample met the requirements of the Specification, in respect of 6375-1:2015 + A1:2016, for Exposure Category BE (1600Pa).

Sample Selection.

The samples submitted for tests were selected using the PCP Scheme Document Specification. Each sample was submitted for test mounted in a 75mm x 100mm timber subframe in accordance with the manufacturer's installation requirements. The test samples were manufactured and supplied by the client, and the test results apply only to the sample as received. The results in this report are only valid for the conditions on which the testing was conducted and for the specified products only. Parts list supplied by client but not verified by BSI.

Clause 5 Sequence of Tests.

The sequence of testing the samples followed that detailed in Clause 5 of BS 6375-1:2015 + A1:2016.

Clause 5 Performance Requirements.

The performance of each sample was assessed against the requirements detailed in Table 1 Exposure Categories and Classifications.

The results contained within this test report are valid only for the conditions under which the tests were conducted and for the specific range of doorsets.

Methods of Test.

1. **Air Permeability**

   The air permeability of the sample was determined by the method given in BS 6375-1:2015 + A1:2016.

2. **Watertightness**

   The watertightness of the sample was determined by the method given in BS 6375-1:2015 + A1:2016.

3. **Wind Resistance**

   The wind resistance of the samples was determined by the methods (P1 and P2) given in BS 6375-1:2015 + A1:2016.

4. **Repeat Tests**

   After testing for resistance to wind loading (P1 and P2) the air permeability test was repeated.

5. **Wind Resistance**

   The wind resistance of the samples was determined by the method (P3) given in BS 6375-1:2015 + A1:2016.

Description of Sample.

Sample Type -	Double leaf open out glaze in hinged door assembly full glass infill with a standard threshold
Material -	Aluminium
Construction -	Cleated
Fittings -	**Master leaf** – a seven-point locking (two hook bolts, two cams, one dead bolt and two shoot bolts) FUHR espagnolette system, a lever handle with key lockable 3* UAP cylinder and four pin hinges **Slave leaf** - a two-point locking (two shoot bolts) FUHR espagnolette system, a lever handle with key lockable 3* UAP cylinder and four pin hinges
Glass -	Double glazed 4-20-4mm toughened glass sealed units
Panel -	Not applicable
Glass Retention System -	Internal beads and gaskets
Weathersealing -	Double-sealed plastic weather strip

Sample dimensions -			
	Overall length:	2148mm	Height: 2293mm
	Master leaf length:	1000mm	Height: 2200mm
	Slave leaf length:	1000mm	Height: 2200mm

Date of test -	18 March 2022
Laboratory temperature -	18.1°C
Laboratory humidity -	40.4%RH
Atmospheric pressure -	101.9kPa
Test engineers -	Kevin Huscroft

SM011. Visofold 6000, Open Out, French Door Set. Fully Rebated. Weather Test.

Outer Frame width	2148	**Outer Frame Material**	Aluminium
Outer Frame height	2293mm	**Outer Frame Gasket**	
Outer Frame Part Numbers		Gasket Type	Edpm
Top	DV614	Manufacturer	Reddiplex.
Bottom	DV614	Product Name	Sealing Gasket.
Lock Side	DV614	Product Code	ACDV244, ACDV272
Hinge Side	DV614	**Threshold Gasket**	
Outer Frame section dimensions		Manufacturer	Reddiplex.
Width	76mm	Product name	Outer Frame Gasket
Depth	55mm	Product Code	ACDV 582
Cill		Materials	Edpm.
Manufacturer	Smart Systems	**Outer Frame Joint Method**	
Product Name	150mm Projecting Cill	Head	Cleat and Glue.
Product code	ETC457	Foot	Cleat and Glue.
Material	Aluminium		

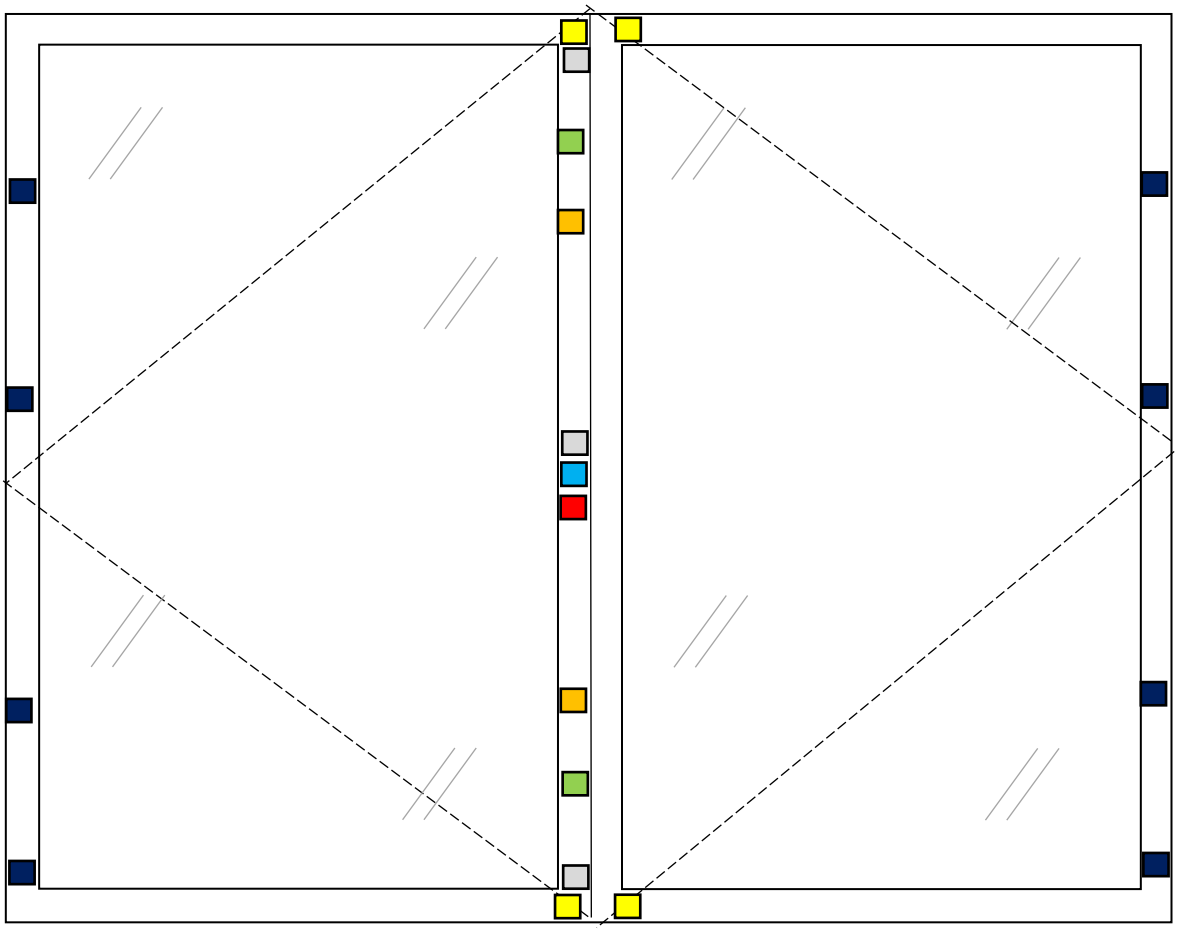
Leaf		**Leaf Material:**	Aluminium
Leaf Width:	1000mm	**Leaf Gasket**	
Leaf Height:	2200mm	Gasket type:	Edpm
Leaf Part Numbers:		Manufacturer:	Reddplex.
Top:	DV624	Product Name:	Sealing Gasket
Bottom:	DV624	Product Code	ACDV272
Lock side:	DV624	**Leaf Midrail:**	NA
Hinge Side	DV624	Manufacturer:	
Leaf section size		Product name:	
Width:	74.5mm	Product code:	
Depth:	41.5mm	Material:	
Rebate Adaptor.		**Leaf joint method**	
Manufacturer:	Smart Systems.	Head:	Cleat and Glue.
Product Name:	Rebate Adaptor.	Foot:	Cleat and Glue.
Product Code:	DV662		
Material:	Aluminium		
Bead			
Manufacturer:	Smart Systems		
Product Name:	Glazing Bead.		
Product Code:	ETC272		
Material:	Aluminium		
Bead Size:	20.5mm x 15.5mm		
Lock Adaptors.	DV640 DV645		

SM011. Visofold 6000, Open Out, French Door Set. Fully Rebated. Weather Test.

Glazing Unit		**Glazing Gasket**	
Manufacturer:	Cornwall Glass	Gasket Type:	Edpm
Inner Thickness:	4mm	Manufacturer:	Reddiplex.
Spacer Material:	Aluminium	Product Name:	E Gasket Wedge.
Outer Thickness:	4mm	Product Code	ACET842 ACET840
Unit Sizes:	941mm x 2141mm	**Glazing Clip NA.**	
Glazing Tape Details NA		Manufacturer:	
Manufacturer:		Product Name:	
Product Name:		Product Code	
Product Code			

Hardware			**Fixings**	**Quantity**
Hinges:	ACDV331	Intermediate Hinges.	M5 Machine Screws. Fixing Plate No 10 Self Tapping Screw.	8.
Hinge Protectors:	NA.			
Lock: And Keep Set.	ACDV677	Fuhr Lock And Keep.	ACET 060	1.
Secondary Door Lock	ACDV586	Fuhr.	ACET060	1
Cylinder:	ACCY5050S3	UAP 3 Star Cylinder.	M5 Machine Screw.	2.
Handle:	ACDV251	Fab and Fix. Lever / Lever.	M5 Machine Screw.	2 Pairs.
Top Shoot Bolts	ACDV738	Fuhr.	ACET 060	2
Bottom Shoot Bolts	ACDV737	Fuhr.	ACET 060	2
Shoot Bolt Keeps.	ACDV586N	Fuhr.	ACET060	2
			.	
Anti Lift Blocks	ACDV081	Atc China Anti Lift	ACET 064	4
Corner Gaskets	ACDV275 ACDV375			4 4
		.		
Cill End Caps	ACET157	ATC China. Cill End Caps.		
Sealing Glue Cleat Glue. Rubber Sealant	ACSIL04 ACSIL013 ACSIL05.			
Stainless Steel Track. Bridge Packers	VG53. ACDV571	Setting Blocks.	Self Adhesive.	2 24.

Elevation Drawing Showing Position of Hardware.



Handle:
Hinge:
Hook Bolt:
Cam:
Dead Bolt:
Shoot Bolt:
Transducer placement:

Graph of Air Permeability Before Gusting.

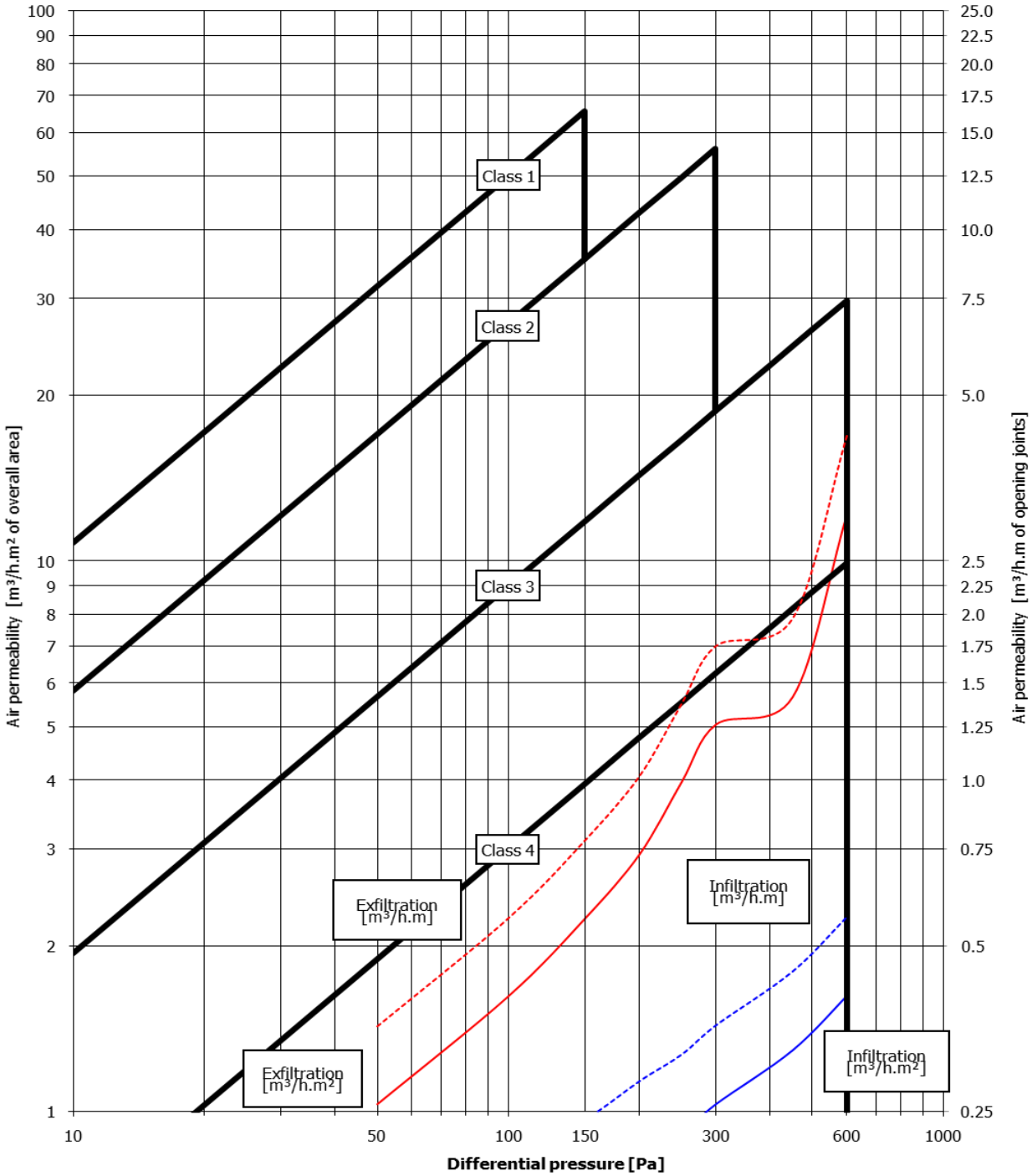


Table of Air Permeability Before Gusting.

AIR PERMEABILITY TEST RESULTS - BS EN 1026:2016 / BS EN 12207:2016

Before resistance to wind tests

Three positive pressure pulses of 660Pa were applied prior to testing

Air Pressure [Pa]	Blank reading [m^3/h]	Maximum total air flow [m^3/h]	Actual rate of air leakage [m^3/h]	Rate of air leakage per meter length of opening joint [$m^3/h.m$]	Rate of air leakage relative to area of sample [$m^3/h.m^2$]
50	2.4	4.4	2.0	0.15	0.44
100	4.0	6.5	2.6	0.20	0.59
150	5.1	8.2	3.1	0.24	0.69
200	6.1	9.7	3.6	0.28	0.82
250	7.1	11.1	4.0	0.32	0.91
300	7.9	12.4	4.6	0.36	1.03
450	10.4	16.0	5.7	0.45	1.29
600	12.6	19.7	7.2	0.56	1.62
-50	2.7	7.2	4.6	0.36	1.03
-100	4.5	11.6	7.2	0.56	1.62
-150	6.0	15.8	9.9	0.78	2.24
-200	7.4	20.2	13.0	1.02	2.93
-250	8.6	25.9	17.5	1.37	3.96
-300	9.6	31.7	22.3	1.75	5.04
-450	12.2	37.0	25.0	1.96	5.65
-600	14.4	67.7	53.9	4.22	12.17

Total opening perimeter = 12.76m

Overall area = 4.43m^2

BS EN 12207:2000 - Joint class = 3

BS EN 12207:2000 - Area class = 3

BS EN 12207:2000 - Overall class before gusting = 3

Note - while testing to BS EN 1026, the chamber leakage exceeded 30% of the combined leakage of the chamber and test sample, therefore a non-standard test method applies.

Graph of Average Air Permeability Before Gusting.

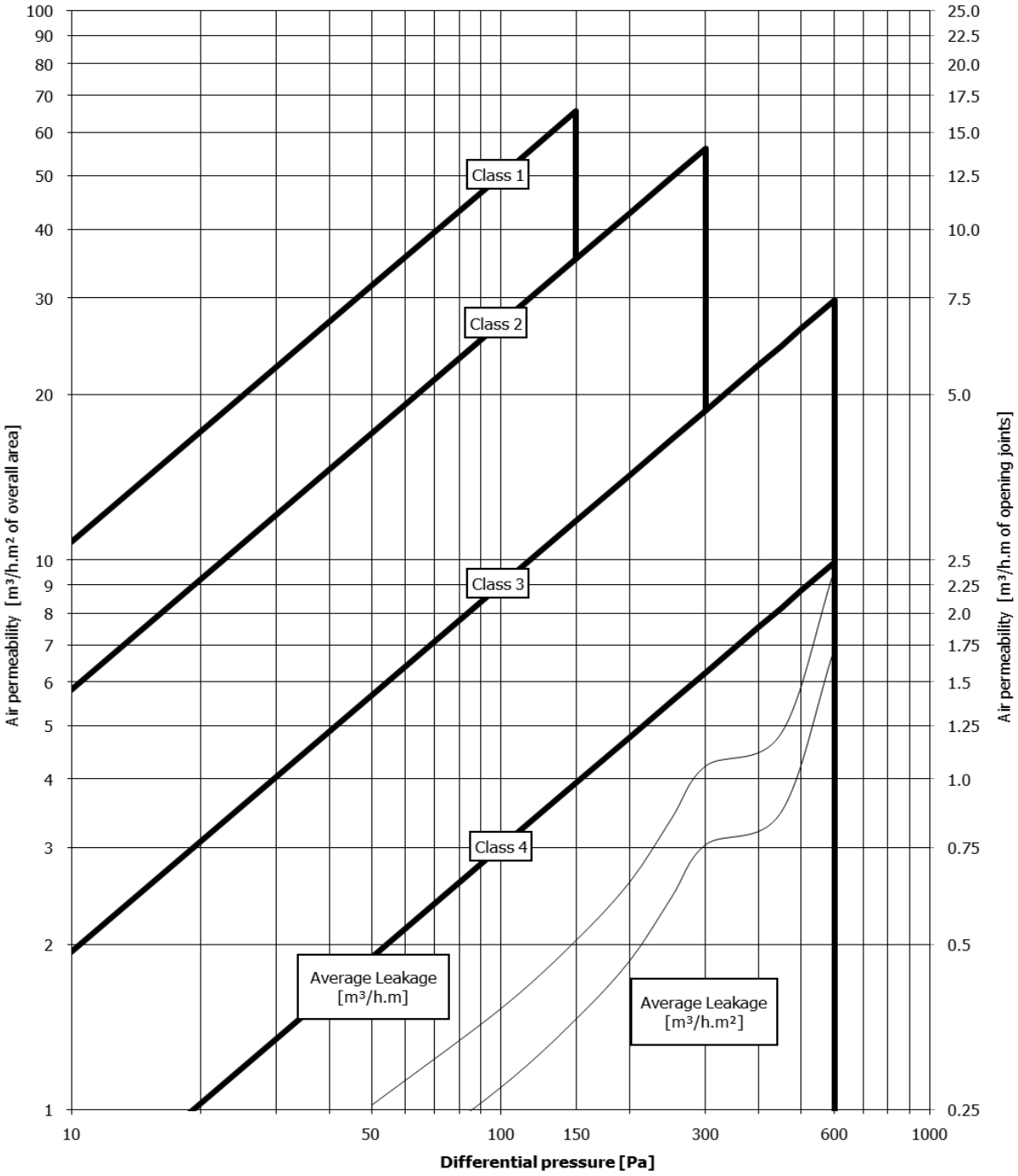


Table of Average Air Permeability Before Gusting.

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2015 / BS EN 1026:2016

Clause 6.3 - Before resistance to wind tests

Three positive pressure pulses of 660Pa were applied prior to testing

Air Pressure [Pa]	Average rate of air leakage [m^3/h]	Average rate of air leakage per meter length of opening joint [$m^3/h.m$]	Average rate of air leakage relative to area of sample [$m^3/h.m^2$]
50	3.3	0.26	0.73
100	4.9	0.38	1.10
150	6.5	0.51	1.47
200	8.3	0.65	1.87
250	10.8	0.85	2.44
300	13.5	1.05	3.04
450	15.4	1.21	3.47
600	30.5	2.39	6.90

Note: The figures in the table above give the leakage as an average of the leakage at positive pressure and the leakage at negative pressure

Total opening perimeter = 12.76m

Overall area = 4.43m^2

BS 6375-1:2015 Clause 6.3 - Joint class = 4

BS 6375-1:2015 Clause 6.3 - Area class = 4

BS 6375-1:2015 Clause 6.3 - Overall class = 4

Note - while testing to BS EN 1026, the chamber leakage exceeded 30% of the combined leakage of the chamber and test sample, therefore a non-standard test method applies.

Watertightness Test Results.

BS EN 1027:2016 Clause 7 watertightness before resistance to wind loads

TABLE 2 – Spraying method 1A

Pressure (Pa)	Point at which water leakage occurred
0	No leakage
50	No leakage
100	No leakage
150	No leakage
200	No leakage
250	No leakage
300	No leakage
450	No leakage
600	No leakage
750	No leakage
900	No leakage
1050	No leakage

Wind Load Resistance Test Results.

Clause 8 Resistance to Wind Load

P1 Deflection Test

Three positive pulses of 1760Pa were applied.

No visible failures or functional defects of the test sample were observed after wind loads were applied at a positive air pressure of 1600Pa.

Actual deflection – 9.60mm (maximum deflection allowed 10.75mm)

Deflection/span ratio 1/223 (maximum ratio allowed 1/200)

Three negative pulses of 1760Pa were applied.

No visible failures or functional defects of the test sample were observed after wind loads were applied at a negative air pressure of 1600Pa.

Actual deflection – 9.70mm (maximum deflection allowed 10.75mm)

Deflection/span ratio 1/221 (maximum ratio allowed 1/200)

Wind Load Resistance Test Results. (continued)

Clause 8 Resistance to Wind Load (continued)

P2 Repeated Pressure Test

No visible failures or defects of the test sample were observed after 50 cycles of repeated wind loads were applied at a positive air pressure of 800Pa.

No visible failures or defects of the test sample were observed after 50 cycles of repeated wind loads were applied at a negative air pressure of -800Pa.

In accordance with BS 6375-1:2015 + A1:2016 clause 6.5, as the classification after the resistance to wind load tests is the same as the classification before the resistance to wind load tests, the resulting classification for the sample is Class BE1600.

Date of test - 18 March 2022

Atmospheric pressure -101.9kPa

Laboratory temperature -18.1°C

Test engineers – Kevin Huscroft

Laboratory humidity – 40.4%RH

Graph of Air Permeability After Gusting.

Including +20% Lines For Each Class.

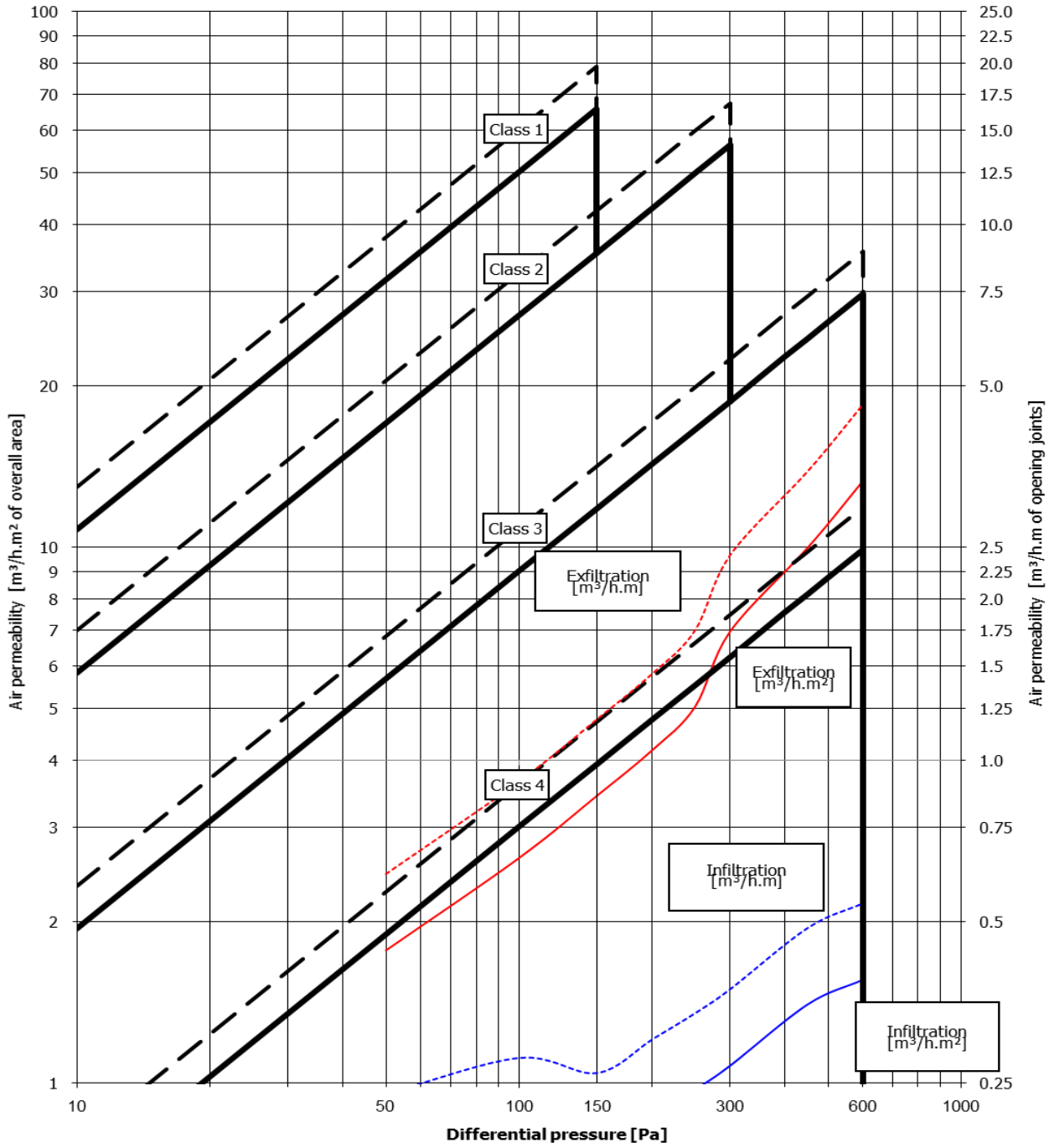


Table of Air Permeability After Gusting.

AIR PERMEABILITY TEST RESULTS - BS EN 1026:2016 / BS EN 12207:2016

After resistance to wind tests

Three positive pressure pulses of 660Pa were applied prior to testing

Air Pressure [Pa]	Blank reading [m³/h]	Maximum total air flow [m³/h]	Actual rate of air leakage [m³/h]	Maximum rate of air leakage per meter length of opening joint [m³/h.m]	Maximum rate of air leakage relative to area of sample [m³/h.m²]
50	2.6	5.6	3.0	0.24	0.69
100	4.3	7.8	3.6	0.28	0.80
150	5.0	8.3	3.3	0.26	0.75
200	5.8	9.6	3.8	0.30	0.87
250	6.7	10.9	4.3	0.34	0.97
300	7.5	12.2	4.8	0.37	1.08
450	9.6	15.8	6.2	0.49	1.40
600	11.9	18.8	6.9	0.54	1.56
-50	2.7	10.4	7.8	0.61	1.76
-100	4.5	15.9	11.6	0.91	2.63
-150	5.9	20.9	15.2	1.19	3.43
-200	7.2	25.5	18.5	1.45	4.18
-250	8.3	30.3	22.3	1.75	5.03
-300	9.3	39.7	30.8	2.41	6.95
-450	11.9	55.6	44.3	3.47	9.99
-600	13.9	72.2	59.0	4.62	13.32

Total opening perimeter = 12.76m

Overall area = 4.43m²

For classification to BS EN 12210:2000 - Section 6.1: Resistance to wind load, the change in air permeability due to the wind pressure and repeated pressure tests has not exceeded the achieved class (3) by more than 20%.

Graph of Average Air Permeability After Gusting.

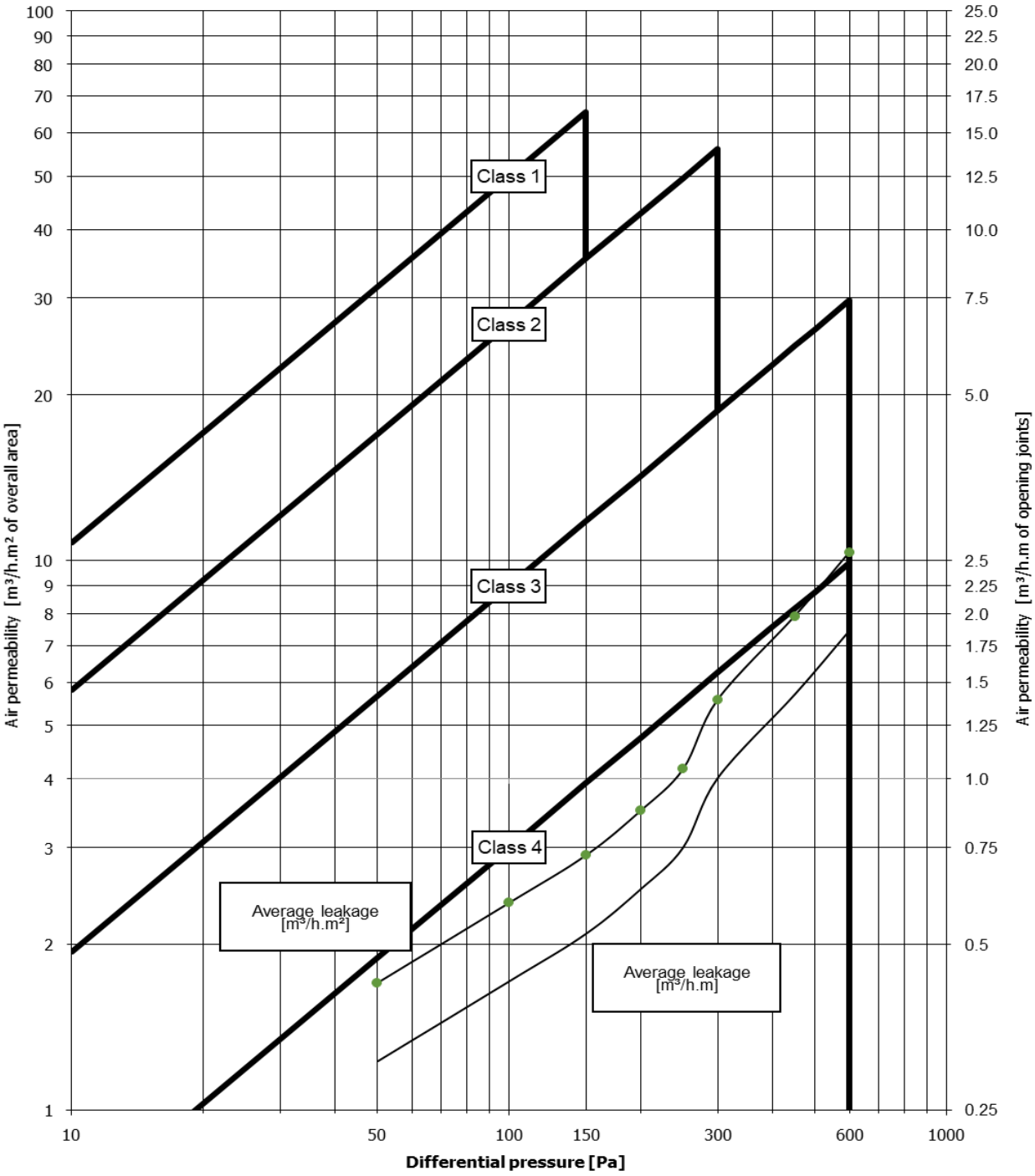


Table of Average Air Permeability After Gusting.

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2015 / BS EN 1026:2016

Clause 6.5 - After resistance to wind tests

Three positive pressure pulses of 660Pa were applied prior to testing

Air Pressure [Pa]	Average rate of air leakage [m^3/h]	Average rate of air leakage per meter length of opening joint [$m^3/h.m$]	Average rate of air leakage relative to area of sample [$m^3/h.m^2$]
50	5.4	0.43	1.23
100	7.6	0.60	1.71
150	9.3	0.73	2.09
200	11.2	0.88	2.52
250	13.3	1.04	3.00
300	17.8	1.39	4.02
450	25.2	1.98	5.70
600	32.9	2.58	7.44

Note: The figures in the table above give the leakage as an average of the leakage at positive pressure and the leakage at negative pressure

Total opening perimeter = 12.76m

Overall area = 4.43m^2

BS 6375-1:2015 Clause 6.5 - Joint class = 3

BS 6375-1:2015 Clause 6.5 - Area class = 4

BS 6375-1:2015 Clause 6.5 - Overall class = 4

In accordance with BS 6375-1:2015 Clause 6.5, as the classification after the resistance to wind load tests is the same as the classification before the resistance to wind load tests, the resulting classification for the sample is Class 4.

Note - while testing to BS EN 1026, the chamber leakage exceeded 30% of the combined leakage of the chamber and test sample, therefore a non-standard test method applies.

Wind Load Resistance Test Results. (continued)

Clause 8 Resistance to Wind Load (continued)

P3 Safety Test

No parts of the test sample became detached and the test sample remained closed after a wind load safety test was applied at a positive air pressure of 2400Pa.

No parts of the test sample became detached and the test sample remained closed after a wind load safety test was applied at a negative air pressure of -2400Pa.

Test Sample.

Sample Id	ER Number	Description
1	10198114	Aluminium Double Door

Description of Test Sample.

Sample Description
1 off double leaf open out glaze in hinged door assembly full glass infill with a standard threshold

Test Requirements.

BS4873 Direct Test

Clause	Requirements
Results table	BS4873 Direct Test

Glossary of Terms.

PASS: Complies. Tested by BSI engineers at BSI laboratories.

PASS1: Complies. Witnessed by BSI engineers in manufacturers laboratory.

PASS2: Complies. Tests carried out by third party lab; results accepted by BSI.

PASS*: Report resulted in uncertainty and states that Compliance is more probable than non-compliance.

FAIL: Non compliance – Product does not meet the requirements of this clause.

FAIL*: Report resulted in uncertainty and states that Non-compliance is more probable than compliance.

N/A: Not applicable to design under consideration.

N/T: Not tested due to similarity to previously tested item; reference earlier test report.

Conditions of Issue.

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UKAS TESTING
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*** End of Report ***