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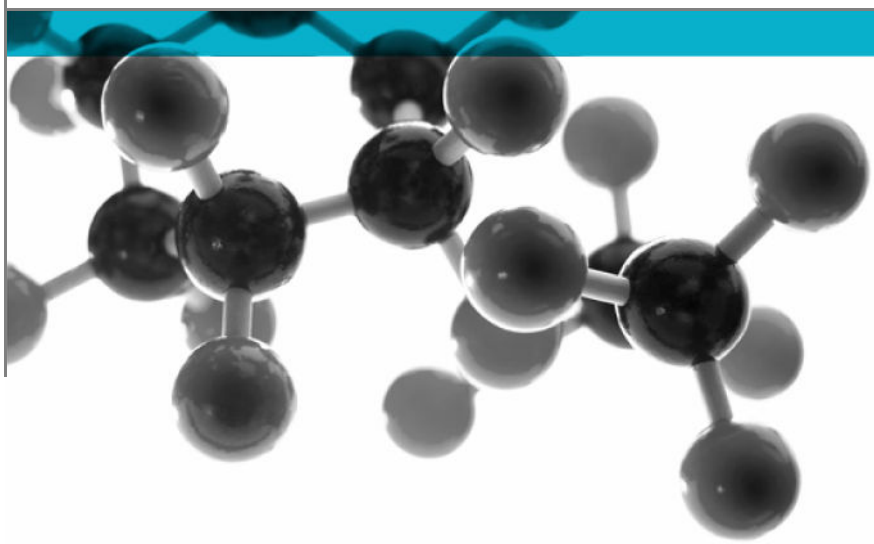
BS 6375-1:2015



Test of: Open out Top Guided Over Fixed Window

Performance of windows & doors - Part 1: Weathertightness

A Report To:
Kastrup
Mosebyvej 40
7500 Holstebro

Document Reference:
WIL 377237

Date: 06/06/2017

Copy: 1

Issue No.: 2

Testing
Advising
Assuring

UKAS TESTING
0621

TEST CONCLUSIONS

Samples of:
Manufacturer Kastrup
Product Window
Model Open out Top Guided Over Fixed Window

have been tested in accordance with: BS6375-1:2015
By Exova Willenhall, a UKAS accredited Testing Laboratory (No. 0621)

At Key Industrial Park, Fernside Rd, Willenhall, West Midlands, WV13 3YA.
Results and comments as detailed below:

Clause No.	Description	Classification
4	**Exposure category and classification**	**2000**
6	Test for air pemeability (to EN1026)	CLASS 4
7	Test for watertightness (to EN1027)	CLASS E1200
8	Test for resistance to wind (to EN12211)	CLASS C5

No inferences can be made regarding performance against other requirements of this standard

Tests marked " N/A" are not applicable to the sample under test.
Tests marked "N/T" were not applied to the sample under test

AUTHORISATION

Tests performed by: Chris Bryan, Test Engineer
Joshua O'Brien, Trainee Test Engineer

Report issued by: Mark Garfield, Door & Window Deputy Laboratory Manager

Signed

Date 09/02/17

For and on behalf of Exova

Report authorised by: Mark West, Door & Window Laboratory Manager

Signed

Date

For and on behalf of Exova

Report issued: 06 June 2017

UKAS TESTING 0621

NOTE.
Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.

The laboratory has tested the product supplied by the client as sampled in accordance with their own requirements

CONTENTS **PAGE NO.**

TEST DETAILS

CLIENT DETAILS

Company name	Kastrup
Address	Mosebyvej 40 7500 Holstebro
Contact	Rene Ostergaard

ORDER DETAILS

Order number	49825
Dated	28/10/2016

SAMPLE DETAILS

Outer frame	1462 x 2730
Opening joint	1380 x 1310
Material	Timber/ aluminium
Details of Hardware	
Hinges	IPA
Hinge protection	PN
Lock	Mila
Handles	Hoppe
Seals	Trelleborg
Glazing details	4-18-4-18-4:

TEST DETAILS

Test specification	BS 6375-1:2015 Performance of windows & doors
Full test	Yes
Test to clauses	N/a
Test methods	BS EN 1026:2016 Windows & Doors - Air Permeability BS EN 1027:2016 Windows & Doors – Watertightness BS EN 12211:2016 Windows & Doors - Resistance to wind
Sample received	09/01/2017
Test started	10/01/2017
Test completed	10/01/2017
Special Test requirements	
Other reports to be used in conjunction with this report	
Airflow measurement device used	1691 Air and water permeability test rig

TEST PROCEDURE

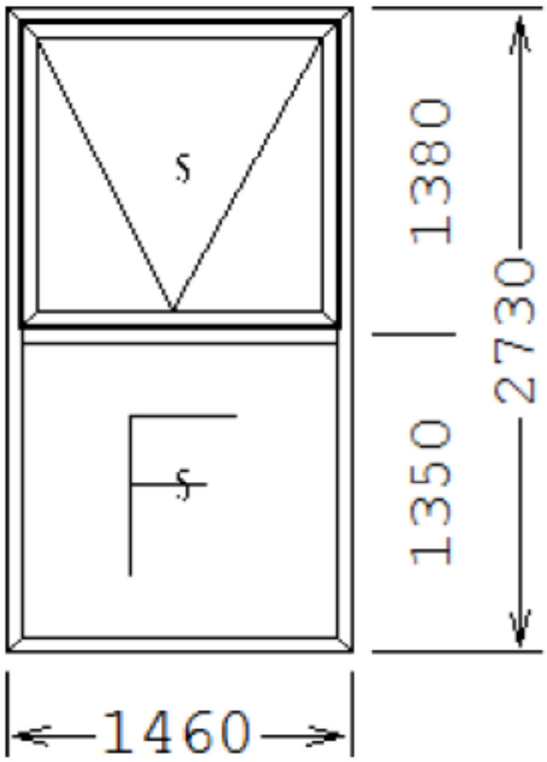
Introduction	This test report should be read in conjunction with the Standard BS 6375-1:2015, Performance of Windows & Doors – Part 1: Classification for weathertightness and guidance on selection and specification. The specimens were judged on their ability to comply with the performance criteria as required in BS EN 1026:2016, classified in accordance with BS EN 12207:2000, BS EN 1027:2016, classified in accordance with BS EN 12208:2000 and BS EN 12211:2016, classified in accordance with BS EN 12210:2016.
Instruction To Test	Initial requirement was for a performance of Class 2 (300Pa) for air permeability, Class 5A (200 Pa) for water tightness, and Class A5 (2000 Pa) for wind resistance, appropriate to a UK exposure category of 2000.
Test Specimen Construction	A description of the test construction is given in the Schedule of Components. The description is based on a survey of the specimens and information supplied by the sponsor of the test.
Installation	The window was supplied mounted within a timber sub-frame of nominal section 75mm x 100mm fitted flush with the exterior face, in accordance with the clients fitting instructions. The sample was set to the locked condition as defined by the manufacturer. Mr Rene Ostergaard, a representative of Kastrup witnessed the test.
Sampling	The samples were not independently witnessed or selected and were provided direct from the test sponsor.
Test Climate	The sample was conditioned in the laboratory in the range 10-30°C and 25-75% humidity. The temperature and humidity in the lab was maintained in the range 15.9-19.4°C and 39.8-56.1% humidity for the duration of the test. The air pressure was 99.8kPa.

INITIAL OBSERVATIONS

The internal face of the sample

TEST SPECIMEN

Figure 1- General Elevation of Test Specimen (External Face)



Do not scale. All dimensions are in mm

SCHEDULE OF COMPONENTS

(Refer to Figures 1 to 3)
(All values are nominal unless stated otherwise)
(All other details are as stated by the sponsor)

Variants

None

Item		Description
1. Window casement (s)		
Overall Size		
i. top hung sash	:	1398x1331mm
Supplier	:	VTI
Profile codes		
i. stile profile code	:	3-layer: 352055,
ii. rail profile code	:	3-layer: 352055,
Material	:	Scandinavian Pine
Density	:	480 kg/m3
Glazing rebate size	:	3-layer 16x47mm,
Casement framing overall section size		
i. rail	:	3-layer 55x63mm,
ii. stile	:	3-layer 55x63mm,
Glazing rebate	:	3-layer 16x47mm,
Corner fixing method	:	
i. type	:	Finger joint + 2 nails pr. joint
ii. size	:	16x32mm
iii. quantity	:	2
Details of adhesive		
i. supplier	:	Akzo Nobel + Berner
ii. reference	:	Adhesive 3384 + MS Polymer
2. Window casement glass		
Supplier	:	Glassolution Poland
Thickness / configuration	:	3-layer 4-18-4-18-4:
Overall size		
i. top hung sash	:	1312x1245mm
ii. side hung sash	:	725x1512mm
iii. fixed sash	:	N/A
iv. direct glazing	:	1398x1288mm
Nominal edge clearance	:	4mm
3. Glazing setting blocks		
Supplier	:	Roslev
Material	:	Plastic
Thickness	:	Wedge 4-8mm
Overall size	:	100x50

Item		Description
4. Glazing tape (internal face)		
Supplier	:	Deventer
Reference	:	S 7523d
Material	:	TPE
Thickness	:	3mm
Overall size	:	6x13mm
Fixing method	:	In grove
5. Glazing tape (external face)		
Supplier	:	Trelleborg
Reference	:	K5672
Material	:	TPE
Thickness	:	4mm
Overall size	:	7x13mm
Fixing method	:	Grove in aluminium cladding
6. Glazing tape (internal face)		
Supplier	:	Trelleborg
Reference	:	K5672
Material	:	TPE
Thickness	:	3mm
Overall size	:	6x13mm
7. Glazing beads		
Glazing method	:	No Glazing beads – see point 8.
Material	:	
Density	:	
Overall size	:	
Fixing method	:	
i. type	:	
ii. size	:	
iii. quantity	:	
iv. centres	:	
8. Window casement cladding		
Supplier	:	Alumeco
Profile code	:	3-layer: 352855, 2-layer: 152055
Material	:	Aluminium
Grade	:	T6
Gauge / wall thickness	:	1,4mm
Overall section size	:	3-layer 55x9mm: 2-layer 55x14mm
Fixing cladding to casement		Clips onto casement
i. type	:	Fixed to timber by 19x10mm Harpon Hexagon Clips. Clips are fixed by one 3 x 30mm screw.
ii. size	:	Clips 19x10mm, Screw 3,0x30mm
iii. quantity	:	1 pr. 160mm
Details of adhesive		
i. supplier	:	N/A
ii. reference	:	N/A

Item		Description
9. Window frame head		
Supplier	:	VTI
Profile code	:	251042 + 101026K
Material	:	Scandinavian Pine + Composite
Density	:	480 kg/m^3
Glazing / casement rebate size	:	16 x 55 mm
Overall section size	:	42 x 120 (timber 42 x 65mm)
Fixing jamb to head joints	:	
i. type	:	Finger joint + 2 nails pr. joint
ii. size	:	16x50mm
iii. quantity	:	2
Details of adhesive		
i. supplier	:	Akzo Nobel
ii. reference	:	Adhesive 3384
10. Window frame jamb		
Supplier	:	VTI
Profile code	:	251042 + 101026K
Material	:	Scandinavian Pine + Composite
Density	:	480 kg/m^3
Glazing / casement rebate size	:	16 x 55 mm
Overall section size	:	42 x 120 (timber 42 x 65mm)
Fixing jamb to sill joints	:	
i. type	:	Finger joint + 2 nails pr. joint
ii. size	:	16x50mm
iii. quantity	:	2
Details of adhesive		
iii. supplier	:	Akzo Nobel
iv. reference	:	Adhesive 3384
11. Window frame mullion		
Supplier	:	VTI
Profile code	:	653058 + 101026K
Material	:	Scandinavian Pine + Composite
Density	:	480 kg/m^3
Glazing / casement rebate size	:	16 x 55 mm
Overall section size	:	42 x 120 (timber 58 x 65mm)
Fixing mullion to head/sill/transom joints	:	
12. type	:	Dowels and screws
13. size	:	Dowels 12x70mm, screws 5,0 x 80mm
14. quantity	:	2 Dowels, 1 Screw
Details of adhesive		
v. supplier	:	Akzo Nobel
vi. reference	:	Adhesive 3384
15. Window frame transom		
Supplier	:	VTI
Profile code	:	653058 + 101026K
Material	:	Scandinavian Pine + Composite
Density	:	480 kg/m^3
Glazing / casement rebate size	:	16 x 55 mm

Item		Description
Overall section size	:	42 x 120 (timber 58 x 65mm)
Fixing transom to jamb/mullion joints	:	
ii. type	:	Dowels and screws
iii. size	:	Dowels 12x70mm, screws 5,0 x 80mm
iv. quantity	:	2 Dowels, 1 Screw
Details of adhesive		
iii. supplier	:	Akzo Nobel
iv. reference	:	Adhesive 3384

16. Window frame sill

Supplier	:	VTI
Profile code	:	251042 + 101026K
Material	:	Scandinavian Pine + Composite
Density	:	480 kg/m^3
Glazing / casement rebate size	:	16 x 55 mm
Overall section size	:	42 x 120 (timber 42 x 65mm)

17. Window frame weather seals

Supplier	:	Trelleborg
Reference	:	713169000
Material	:	EPDM
Fixing method	:	On rebate

18. Window frame cladding

Supplier	:	Alumeco
Profile code	:	101026K
Material	:	Aluminium
Grade	:	T6
Gauge / wall thickness	:	1,2mm
Overall section size	:	11 x 26mm
Fixing cladding to frame		
iv. type	:	Clips onto composite profile.
v. size	:	
vi. quantity	:	Full length
Details of adhesive		
iii. supplier	:	N/A
iv. reference	:	N/A

19. Hinges

Supplier	:	IPA
Description	:	Top guided hinge
Reference	:	62987
Material	:	Aluminium and steel
Quantity	:	2
Fixing hinge to casement		
iii. type	:	Screw
iv. size	:	4,0 x 35mm
v. quantity	:	4 in each hinge
Fixing hinge to frame		
iv. type	:	Screw

Item		Description
v. size	:	1 No. 4,0 x 12mm, 1 No. 4,0 x 15mm, 1 No. 4,0 x 20mm
vi. quantity	:	Se above

20. Hinge protectors

Supplier	:	PN
Description	:	
Reference	:	Combi 900 3944-0-03-60
Material	:	Steel
Quantity	:	2
Position	:	Top corners
Fixing device to casement		
iii. type	:	Screw
iv. size	:	4,0 x 35mm
v. quantity	:	2
Fixing device to frame		
v. type	:	Screw
vi. size	:	4,0 x 20mm
vii. quantity	:	1

21. Lock

Supplier	:	Mila
Description	:	Espagnolette
Reference	:	Garant mini hook
Material	:	Steel
Fixings		
v. type	:	Screw
vi. size	:	4,0 x 35mm
vii. quantity	:	10

22. Lock Keeps

Supplier	:	Engcon
Description	:	Kastrup adjustable safety catches
Reference	:	18110 and 17910
Material	:	Zink
Quantity	:	1 No. 18110 and 2 No. 17910
Fixing keeps to frame		
1. type	:	Screw
2. size	:	2 No. 4,0 x 40mm, 2/5,5 x 10,3
3. quantity	:	Se above

23. Lever handles

Supplier	:	Hoppe
Description	:	
Reference	:	Tokyo
Material	:	Aluminium
Fixings		
1. type	:	Screw
2. size	:	5,0 x 63mm

Item		Description
3. quantity	:	2

PERFORMANCE CRITERIA & TEST RESULTS

Clause 4 Exposure category and classification

Exposure Category Required:	2000
Atmospheric Conditions	
Air Temp	19°C
Humidity	46.1%RH
Air Pressure	99.8kPa
Test Sample	
Overall Size of Sample	1462 x 2730mm
Overall Area	3.99m2
Joint length leaf/casement	1380 x 1310mm
n/a	0 x 0mm
n/a	0 x 0mm
n/a	0 x 0mm

Clause 6 Air Permeability

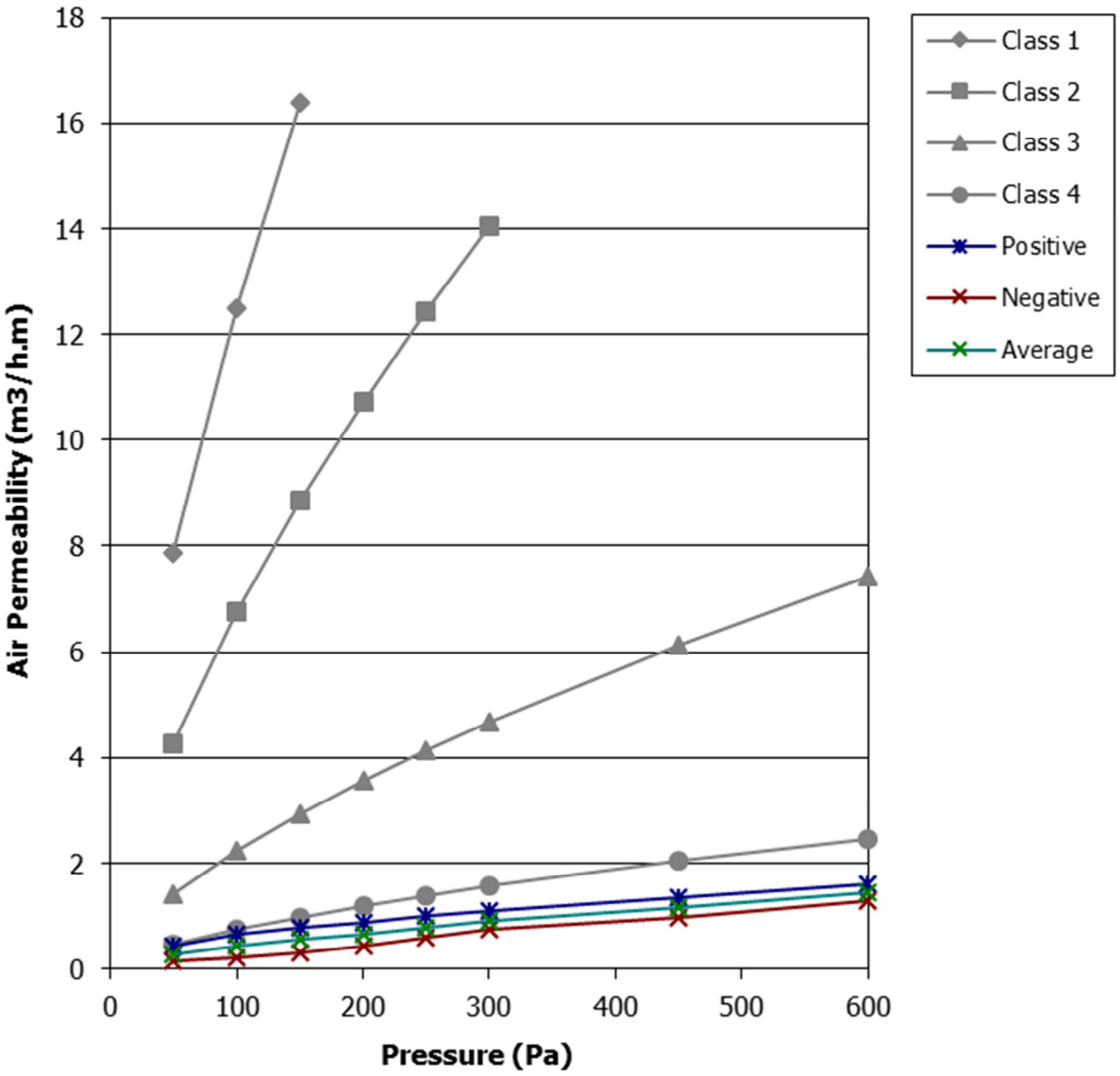
Test Pressure	Calculated Air Permeability per unit length		
	Positive m^3 / h.m	Negative m^3 / h.m	Average m^3 / h.m
50 Pa	0.42	0.15	0.29
100 Pa	0.66	0.21	0.44
150 Pa	0.79	0.31	0.55
200 Pa	0.87	0.45	0.66
250 Pa	1.00	0.58	0.79
300 Pa (if required)	1.09	0.74	0.92
450 Pa (if required)	1.36	0.99	1.17
600 Pa (if required)	1.59	1.28	1.44

Test Pressure	Calculated Air Permeability per unit area		
	Positive m^3 / h.m	Negative m^3 / h.m	Average m^3 / h.m
50 Pa	0.57	0.21	0.39
100 Pa	0.89	0.29	0.59
150 Pa	1.07	0.42	0.74
200 Pa	1.18	0.61	0.89
250 Pa	1.34	0.78	1.06
300 Pa (if required)	1.46	1.00	1.23
450 Pa (if required)	1.83	1.33	1.58
600 Pa (if required)	2.15	1.72	1.93

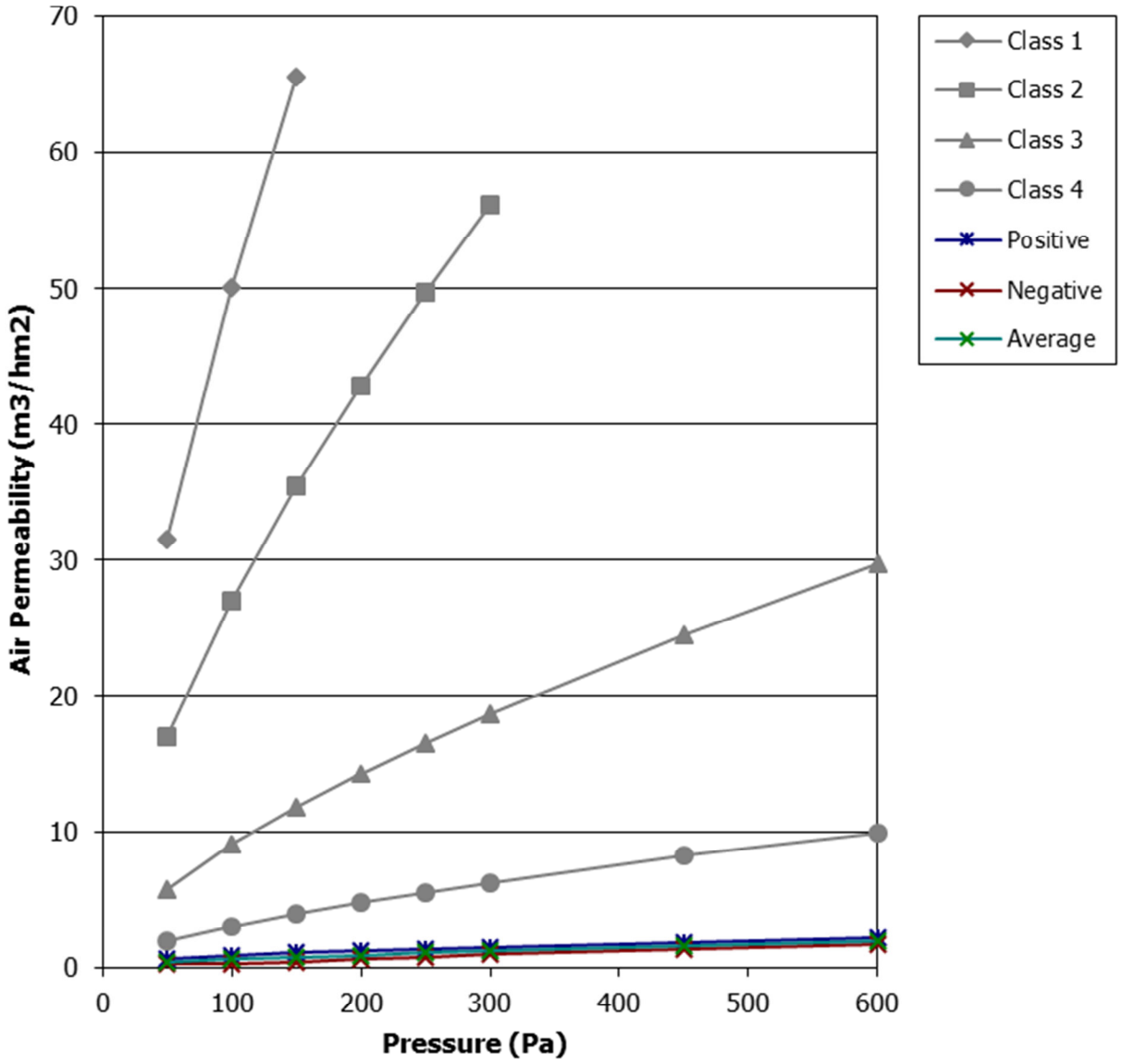
Note:

The instrument used for measuring air permeability is only calibrated in the range 0-300m^3/h. Measurements above 300m^3/h are therefore outside of the calibrated range for the instrument. Affected results are marked with a #.

Graph of air permeability per unit length



Graph of air permeability per unit area



Clause 7 Watertightness

Quantity of 2 l/min nozzles (row 1)	4
Quantity of 1 l/min nozzles (row 2)	4
Total water quantity	12 l/min
Distance of nozzles from sample (250mm +10 –0mm)	250mm
Angle of nozzles (24° +2° - 0°)	24°
Height of nozzle above joint (0 – 150mm)	0mm

Pressure (Pa)	Duration (m:s)	Observations	
0 Pa	15mins	No Leakage	CLASS 1A ACHIEVED
50 Pa	5mins	No Leakage	CLASS 2A ACHIEVED
100 Pa	5mins	No leakage	CLASS 3A ACHIEVED
150 Pa	5mins	No leakage	CLASS 4A ACHIEVED
200 Pa	5mins	No leakage	CLASS 5A ACHIEVED
250 Pa	5mins	No leakage	CLASS 6A ACHIEVED
300 Pa	5mins	No leakage	CLASS 7A ACHIEVED
450 Pa	5mins	No Leakage	CLASS 8A ACHIEVED
600 Pa	5mins	No Leakage	CLASS 9A ACHIEVED
750 Pa	5mins	No Leakage	CLASS E750 ACHIEVED
900 Pa	5mins	No leakage	CLASS E900 ACHIEVED
1050 Pa	5mins	No leakage	CLASS E1050 ACHIEVED
1200 Pa	5mins	No Leakage	CLASS E1200 ACHIEVED

Clause 8 Wind Resistance

Members chosen for deflection measurement

Positive wind pressure

Member tested	Pressure applied	Member Length	Deflection	Fraction
locking side mullion	2003 Pa	1375 mm	3 mm	1/458

Negative wind pressure

Member tested	Pressure applied	Member Length	Deflection	Fraction
Locking side mullion	-2000 Pa	1375 mm	2.9 mm	1/474

Clause 6 Repeated Air Permeability following wind resistance test

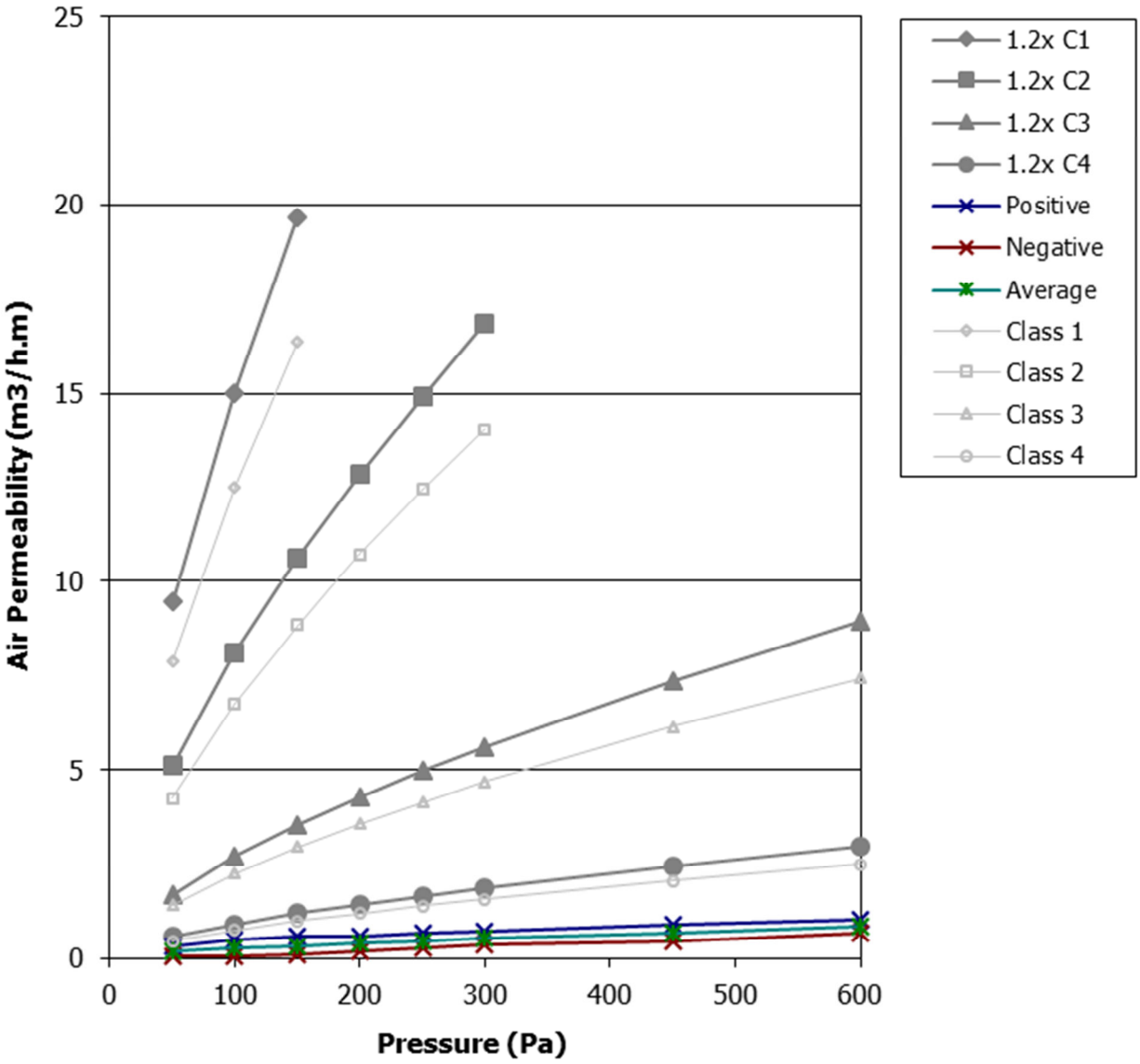
Test Pressure	Calculated Air Permeability per unit length		
	Positive m^3 / h.m	Negative m^3 / h.m	Average m^3 / h.m
50 Pa	0.31	0.04	0.18
100 Pa	0.50	0.04	0.27
150 Pa	0.57	0.09	0.33
200 Pa	0.60	0.19	0.40
250 Pa	0.67	0.27	0.47
300 Pa (if required)	0.72	0.38	0.55
450 Pa (if required)	0.87	0.47	0.67
600 Pa (if required)	1.04	0.66	0.85

Test Pressure	Calculated Air Permeability per unit area		
	Positive m^3 / h.m	Negative m^3 / h.m	Average m^3 / h.m
50 Pa	0.42	0.05	0.24
100 Pa	0.67	0.05	0.36
150 Pa	0.77	0.12	0.45
200 Pa	0.81	0.25	0.53
250 Pa	0.90	0.37	0.63
300 Pa (if required)	0.97	0.51	0.74
450 Pa (if required)	1.18	0.64	0.91
600 Pa (if required)	1.40	0.89	1.14

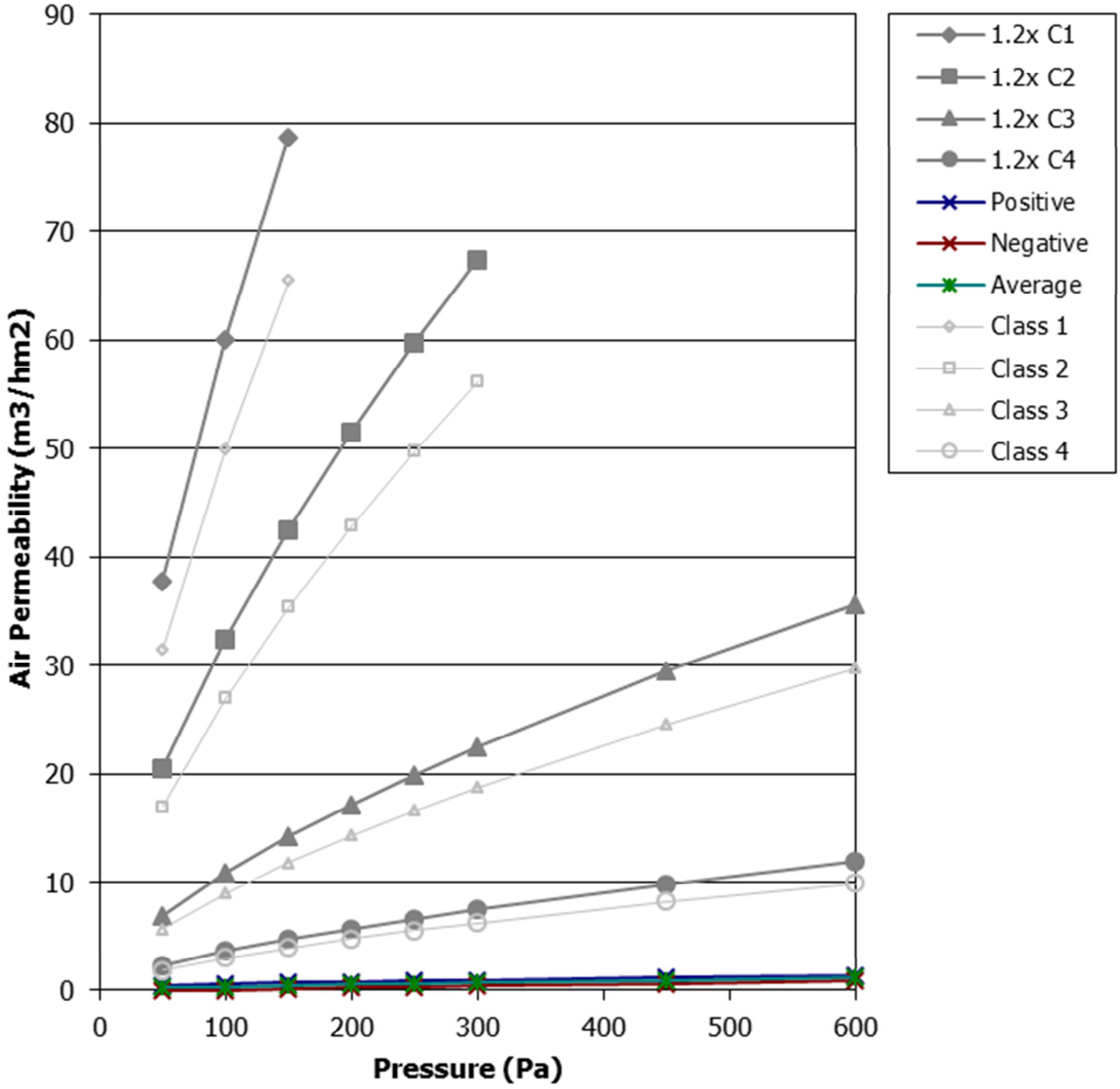
Note:

The instrument used for measuring air permeability is only calibrated in the range 0-300m^3/h. Measurements above 300m^3/h are therefore outside of the calibrated range for the instrument. Affected results are marked with a #.

Graph of air permeability per unit length following wind resistance test



Graph of air permeability per unit area following wind resistance test



Clause	Result	Pass/Fail
6 Test for air permeability	BS6375-1 requires a performance of Class 2 defined in BS EN 12207 for UK exposure category 2000. The client's initial requirement was for Class 2. The sample was tested in accordance with BS EN 1026. The air leakage per unit area and per unit joint length should be less than those for the required class. When positive and negative pressure was applied the average air leakage per unit joint length met the requirements of Class 4, and per unit area met the requirements of Class 4. During the repeat air permeability test the average air leakage continued to meet the requirements of Class 4. **The sample could therefore be classified as Class 4 for the air permeability test.**	**PASS CLASS 4**
7 Test for water tightness	BS6375-1 requires a performance of Class 5A, defined in BS EN 12208 for UK exposure category 2000. The client's initial requirement was for Class 5A. These requirements were satisfied up to 5 min into a test pressure of 1200 Pa. **The sample could therefore be classified as Class E1200 for the water tightness test.**	**PASS CLASS E1200**
8 Test for resistance to wind - Deformation test	BS6375-1 requires a performance of Class A5, defined in BS EN 12210, for UK exposure category 2000. The client's initial requirement was for Class A5. The sample was tested in accordance with BS EN 12211. For Class A5 the test pressure P1 to be applied is 2000Pa, and the frontal displacement following the positive and negative pressure test should be less than 1/150th of the length of the member tested. For positive pressure the member tested was the locking side mullion, it was 1375mm long, and was subject to a maximum deflection of 3mm (1/458) for positive wind pressure. For negative pressure the member tested was the Locking side mullion, it was 1375mm long, and was subject to a maximum deflection of 2.9mm (1/474) for negative wind pressure. **The sample met the requirements for Class C5 for the deflection test.**	**PASS Class C5**
Repeated pressure test	No visible failures should occur during the repeated air test, and the resultant air permeability should not exceed the upper limits of the	**PASS C5**

Clause	Result	Pass/Fail
	claimed class by 20%. Following a test pressure P2 of -1000Pa and 1000Pa repeated 50 times there were no visible failures. **The air permeability of the sample continued to meet the requirements of Class 4, and the sample met the requirements of Class C5 for the repeated pressure test.**	
Safety test	During the safety test under a pressure P3 of -3000Pa & 3000Pa the sample must remain closed and no parts must come detached. On the application of the test pressure the sample remained closed The sample met the requirements for Class C5 for the safety test. **The sample could therefore be classified as Class C5 for the wind resistance test.**	**PASS CLASS C5**

CONCLUSIONS

Evaluation against objective	The sample as provided by the client was subjected to weather performance testing in accordance with BS 6375-1:2015,and achieved a performance of Class 4 for air permeability, Class E1200 for water tightness, and Class C5 for wind resistance. The sample could therefore be classified as 2000 in accordance with BS6375-1.
Observations & comments	

LIMITATIONS

Limitations	The results relate only to the behaviour of the specimens of the element of construction under the particular conditions of test. They are not intended to be the sole criteria for assessing the potential performance of the element in use, nor do they reflect the actual behaviour in use.
Range of assemblies covered by this report	It is our opinion that the range of assemblies covered by this report are limited to the following ▪ Assemblies with identical hardware fitted no further apart than in the tested assembly ▪ Assemblies of the same or smaller overall dimensions to the tested assembly
Uncertainty of Measurement	The uncertainties of measurements calculated for a confidence level of 95% throughout these tests are within the limits of these tolerances. The standard specifies the following tolerances ▪ Air flow ± 5% ▪ Air pressure ± 5% ▪ Water flow ± 10% ▪ Distance ±1mm for tape measures ± 0.1mm for displacement transducers

REVISION HISTORY

Issue No : 2	**Re - Issue Date :** 5th June 2017
Revised By: MW	**Approved By:** MG
Reason for Revision: Modified to correct title to Top Guided, previously stated Top Hung. This version replaces all prior versions that are now withdrawn	

Issue No :	**Re - Issue Date :**
Revised By:	**Approved By:**
Reason for Revision:	

END OF REPORT