

Test Report 8919300 Weather Test Issue 2.

Debar Ltd


Introduction.

This report has been prepared by Errol Creary and relates to the activity detailed below:

Job/Registration Details	Client Details
Job number: 8919300 Job type: Testing Samples Submitted Start Date: 18/05/2018 Test type: Direct Sample ID: 10177159 Registration: NA Protocol: NA Quality system: NA Registration: NA Protocol: NA Quality system: NA	Debar Ltd Concept House Brackenbeck Road Bradford BD7 2LW United Kingdom

The report has been approved for issue by Mark Manito – Team Manager

This issue supersedes all previous issues. The amendment giving rise to this issue of the report can be ascertained by contacting the authorizing signatory.

Approved For Issue	
	Issue Date: 3 January 2019

Objectives.

Direct test

Product Scope.

Smart Systems Aluminium Bi-Fold Door

Report Summary.

The samples were received on 21 May 2018 and the testing was started on 23 May 2018.

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

BS7412:2007 Weather Type Test.

2 off three leaf open out glaze in bi fold door assembly with full glass infill and standard threshold

(Sample ID No 10177159)

Date sample received: 21 May 2018

Test Results.

- | | | |
|----|----------------------|--|
| 1. | Air Permeability | The test sample met the requirements of the Specification, in respect of Clause 6, for Test Pressure Class 1. |
| 2. | Watertightness | The test sample met the requirements of the Specification, in respect of Clause 7, for Test Pressure Class 8A. |
| 3. | Wind Resistance | The test sample met the requirements of the Specification, in respect of BS6375-2:2009, for Exposure Category A3 (1200Pa). |
| 4. | Operational Strength | The test sample met the requirements of the Specification in respect of BS6375-2:2009. |
| 5. | Basic Security | The test sample met the requirements of the Specification in respect of BS6375-3:2009. |

Classifications for Operational Strength.

Operating forces	Class 1
Vertical load	Class 2
Resistance to Static torsion	Class 2
Soft and Heavy body Impact Load bearing	Class 2
Hard body impact	Class 2
Load bearing capacity of safety devices	N/A
Closure against obstruction	Pass
Repeated opening and closing	Not applicable

Sample Selection.

The sample 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 sample was manufactured by the client.

Clause 5 Sequence of Tests.

The sequence of testing the samples followed that detailed in Clause 5 of BS6375-1:2015.

Clause 5 Performance Requirements.

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

Methods of Test.

1. **Operating Forces**

The operating forces acting on the sample were determined by the methods given in BS EN 12046-2:2000.

2. **Air Permeability**

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

3. **Watertightness**

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

4. **Wind Resistance**

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

5. **Repeat Tests**

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

6. **Wind Resistance**

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

7. **Resistance to Vertical Loads**

The resistance to vertical loads test was carried out using the method given in BS EN 947:1999.

8. **Resistance to Static Torsion**

The resistance to static torsion test was carried out using the method given in BS EN 948:1999.

9. **Soft and Heavy Body Impact**

The resistance to soft and heavy body impact was carried out using the method given in BS EN 949:1999.

10. **Hard Body Impact**

The resistance to hard body impact was carried out using the method given in BS EN 950:1999.

Methods of Test (Continued).

11. **Closure Against Obstruction**

The closure against obstruction was carried out using the method given in BS 6375-3:2009.

12. **Basic Security**

The basic security test was carried out using the method given in BS 6375-3:2009.

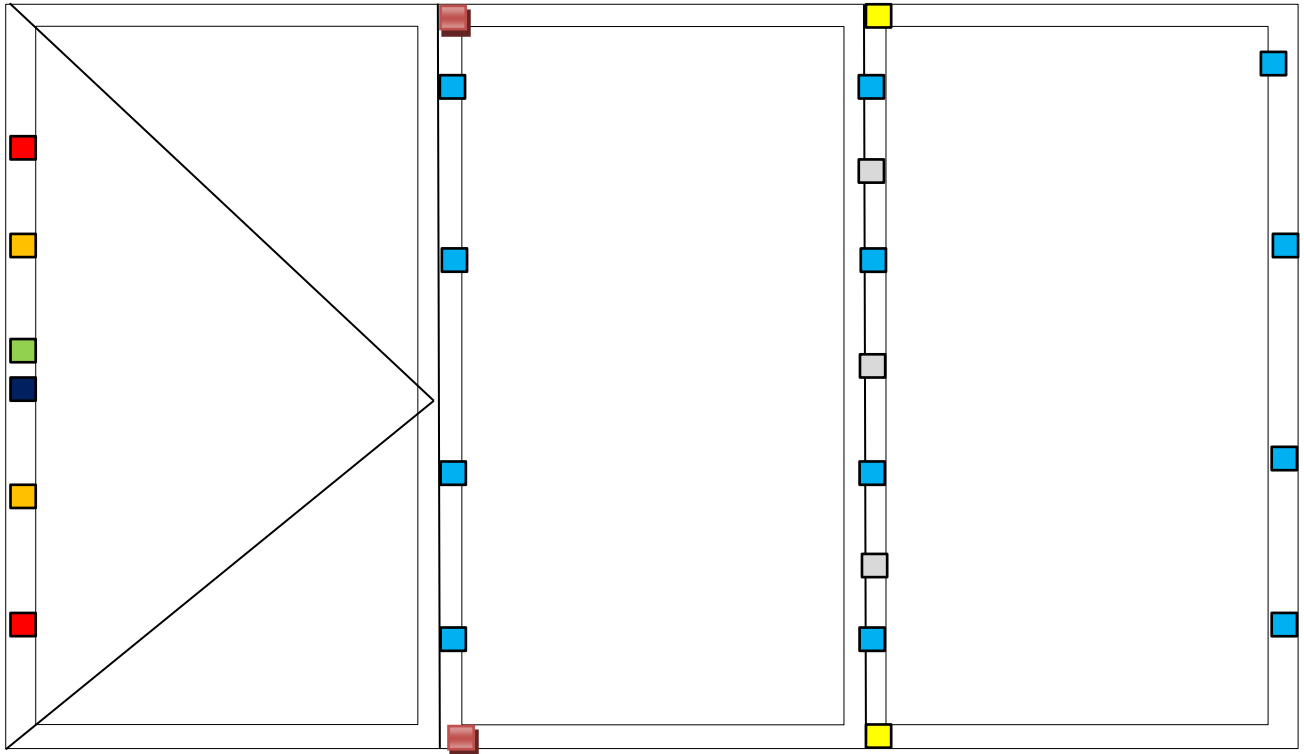
13. **Repeated Opening and Closing**

The repeated opening and closing test was carried out using the method given in BS EN 1191:2012.

Description of Sample.

Sample Type -	A three leaf open in glaze in bi fold door assembly with full glass infill and low threshold		
Material -	Aluminium		
Construction -	Cleated		
Fittings -	<p>Master leaf A four point locking (two hook bolts, one dead bolt and two shootbolts) FUHR espagnolette system, three star Yale cylinder, key locking Hoppe handle, four Debar pin hinges</p> <p>Two Sliding leaves Two rollers, two shootbolts and twelve Debar pin hinges</p>		
Glass -	Double glazed 6 / 16 /6 DG mm toughened glass sealed units		
Panel -	Not applicable		
Glass Retention System -	Internal beads and gaskets		
Weathersealing -	Double-sealed plastic weather strip		
Sample dimensions -	Overall length:	Length 3750mm	Height: 2590mm
	Master Leaf -	Length: 1200mm	Height: 2510mm
	Slave Leaves -	Length: 1200mm	Height: 2510mm
Date of test -	23 May 2018		
Laboratory temperature -	19.1°C		
Laboratory humidity -	41.2%RH		
Atmospheric pressure -	99.9kPa		

Elevation Drawing of Door Assembly.



Water Leakage Point

- Handle: ■
- Hinge: ■
- Hook Bolt: ■
- Cam: ■
- Dead Bolt: ■
- Shoot Bolt: ■
- Roller: ■
- Transducer placement: ■

Graph of Air Permeability Before Gusting.

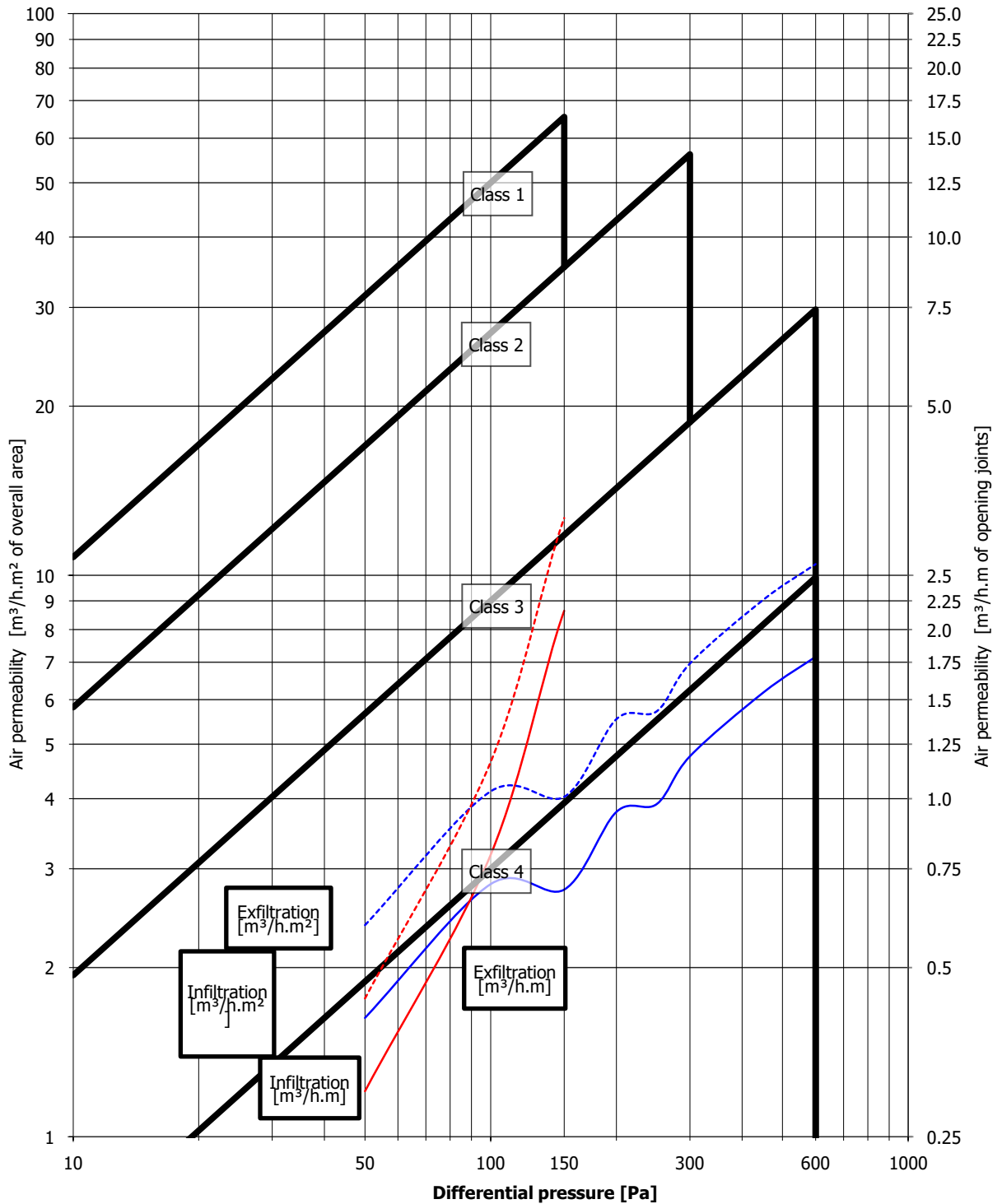


Table of Average Air Permeability Before Gusting.

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2015 / BS EN 1026:2000

Clause 6.3 - Before resistance to wind tests

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

Table 4

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	8.9	0.52	1.42
100	18.9	1.10	3.00
150	35.8	2.08	5.70
200	52.9	3.08	8.41
250	-	-	-
300	-	-	-
450	-	-	-
600	-	-	-

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 = 17.2m

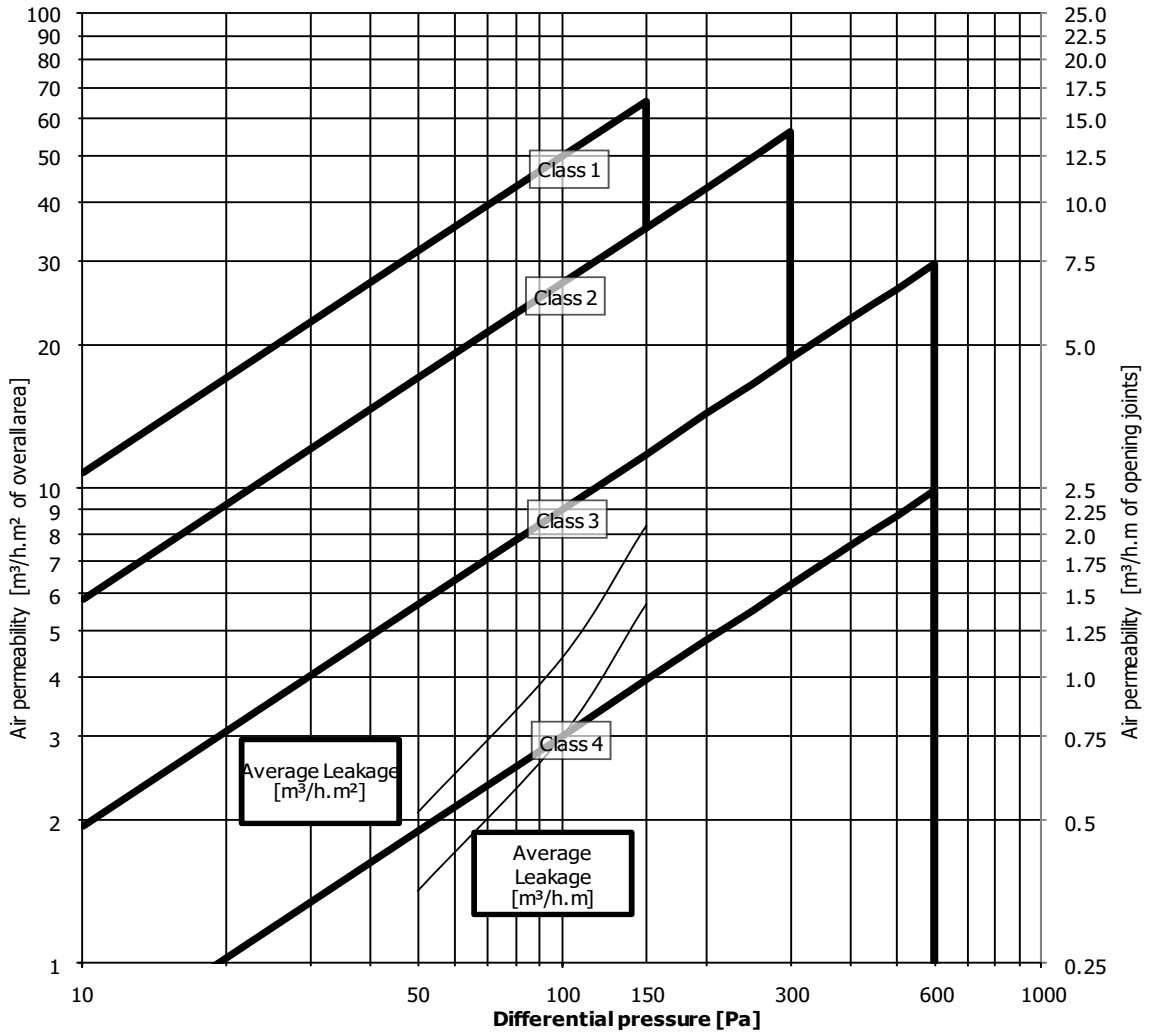
Overall area = 6.29m²

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

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

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

Graph of Average Air Permeability Before Gusting.



Watertightness Test Results.

BS EN 1027:2000 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	Water leaked out and over the threshold at 0 minute 20 seconds
750	-
900	-
1050	-

Wind Load Resistance Test Results.

Clause 8 Resistance to Wind Load

P1 Deflection Test

Three positive pulses of 1320-Pa 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 1200Pa.

Actual deflection 10.20mm (maximum deflection allowed 16.06mm)

Deflection/span ratio 1/236 (maximum ratio allowed 1/150)

Three negative pulses of 1320Pa 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 1200Pa.

Actual deflection 12.35mm (maximum deflection allowed 16.06mm)

Deflection/span ratio 1/195 (maximum ratio allowed 1/150)

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 600Pa.

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 600Pa.

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 1.

Graph of Air Permeability After Gusting.

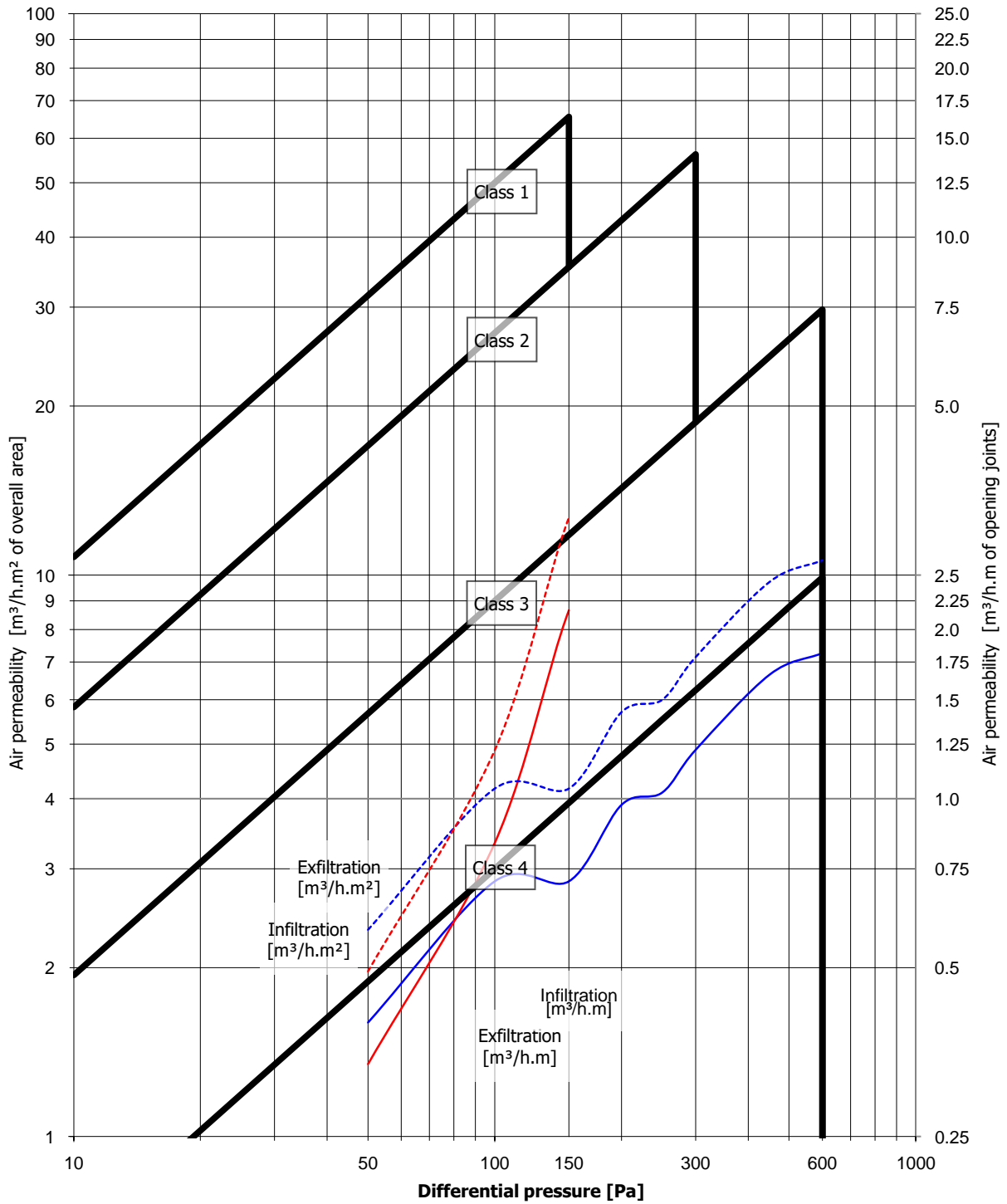


Table of Average Air Permeability After Gusting.

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2015 / BS EN 1026:2000

Clause 6.5 - After resistance to wind tests

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

Table 4

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	9.3	0.54	1.47
100	19.4	1.13	3.09
150	36.2	2.10	5.75
200	53.5	3.11	8.50
250	-	-	-
300	-	-	-
450	-	-	-
600	-	-	-

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 = 17.2m

Overall area = 6.29m²

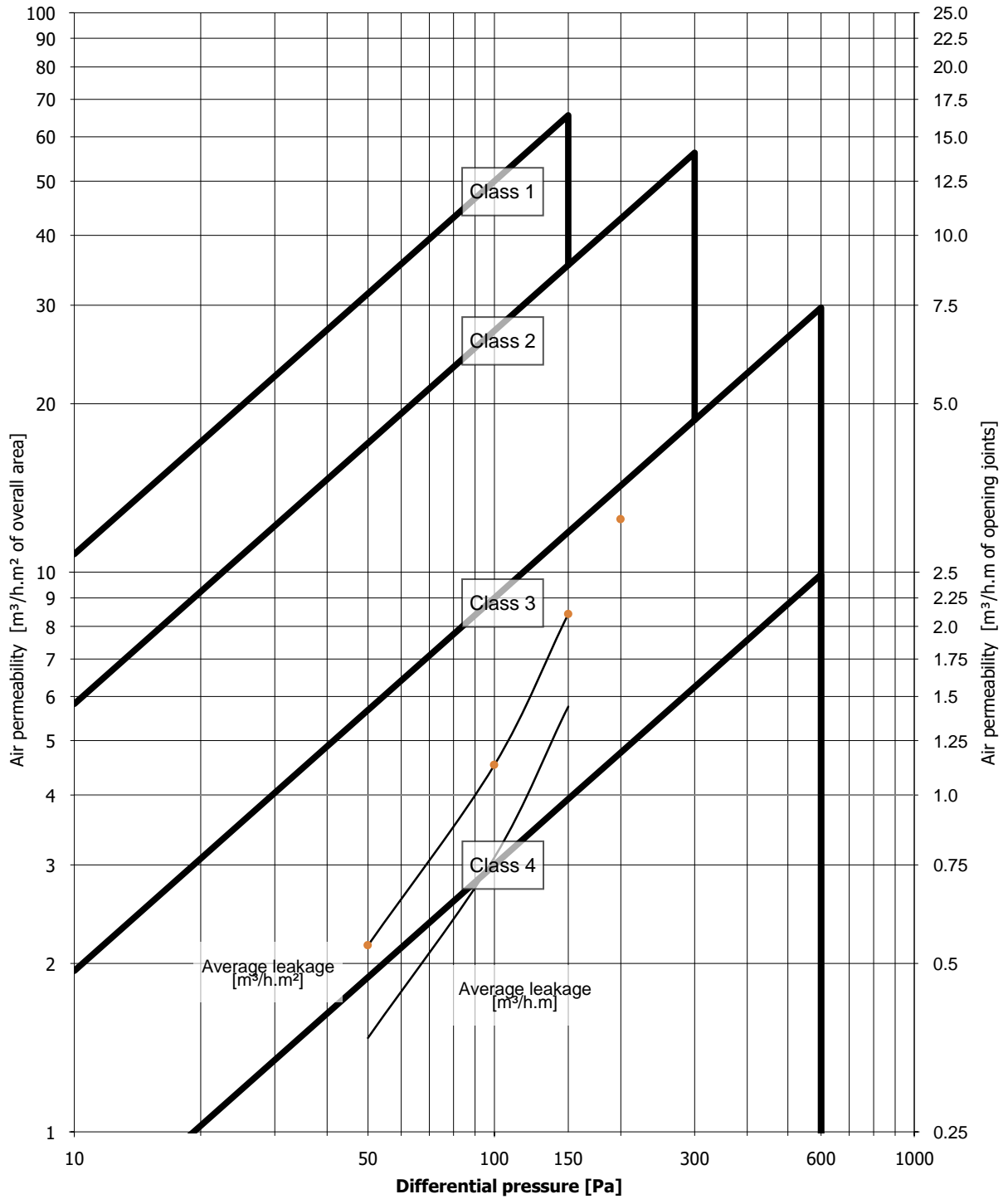
BS 6375-1:2015 Clause 6.5 - Joint class = 1

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

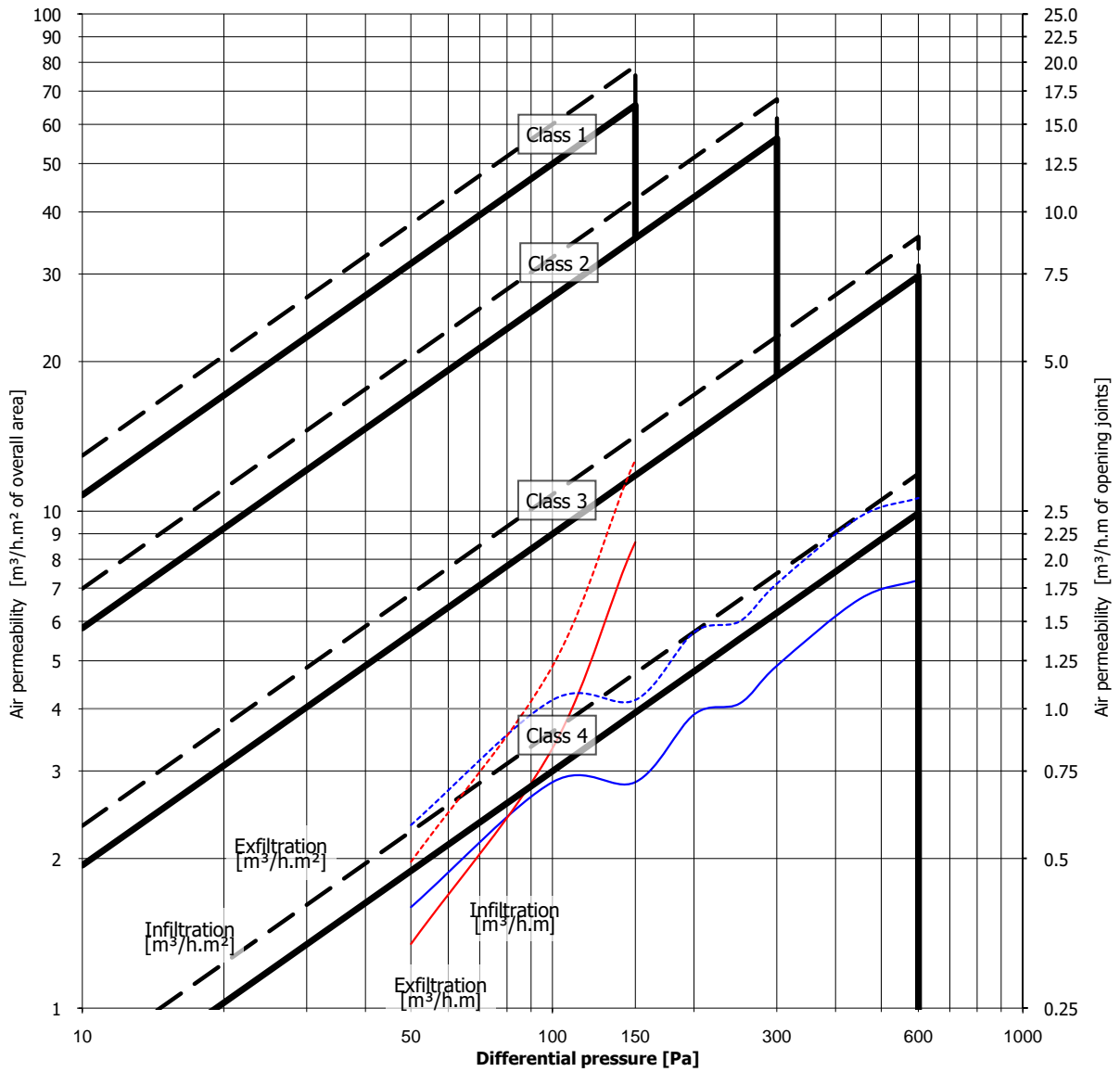
BS 6375-1:2015 Clause 6.5 - Overall class = 1

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 1.

Graph of Average Air Permeability After Gusting.



Graph of Average Air Permeability After Gusting. (including +20% lines for each class)



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 1800Pa.

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 1800Pa.

BS 6375-2:2009.

Clause 6.2 Operating Forces: Assessment EN12046-2:2000 and EN12217:2015 (Class 1)

The sample was tested three times – closing the leaf, lifting the handle, locking the key, unlocking the key, opening the handle and opening the leaf – and the average force recorded

Closing leaf force – 44.15N (maximum 75N)	Pass
Handle closing – 61.50N (maximum 100N)	Pass
Key Torque to lock – <1Nm (maximum 5Nm)	Pass
Key Torque to unlock – <1Nm (maximum 5Nm)	Pass
Handle opening – 57.26N (maximum 100N)	Pass
Force to maintain opening – 40.91N (maximum 75N)	Pass

Clause 6.3.1 Vertical Load (Class 2)

All loads were applied and removed in maximum increments of 100N.

The diagonal measurement of the door was taken to the nearest 1mm (bottom hinge side corner to top lock side corner).

A pre-load of 200±4N was applied vertically to the top corner of the lock side of the door leaf, at 50±5mm from the opening edge, and maintained for 60±5 seconds. The load was then removed and the sample left to rest for 60±5 seconds.

The gauge was zeroed before a 600N load (Class 2) was applied to the same loading point for 300±5 seconds, and the maximum deformation was measured.

The load was removed and after 180±5 seconds the residual deflection and diagonal measurements were taken.

Initial diagonal measurement – 2760mm

Maximum deformation – 3.6mm

Residual deformation – 0.6mm

Final diagonal measurement – 2760mm

For the door to pass the residual deformation must not exceed 1.0mm Pass

BS 6375-2:2009 (continued).

Clause 6.3.2 Resistance to Static Torsion (Class 2)

Assessment

All loads were applied and removed in maximum increments of 100N.

The door leaf was opened to 90° then fixed at the top lock side corner, 50±5mm from the edge.

A pre-load of 200±4N was applied horizontally and normally to the plane of the leaf at the lower lock side corner, 50±5mm from the edge, and maintained for 60±5 seconds.

After one minute the gauge was zeroed and a load of 250N (Class 2) was applied for 300±5 seconds before the maximum deformation was measured. The load was then removed and the sample left to rest for 180±5 seconds before the residual deformation was measured.

Maximum deformation – 36.2mm

Residual deformation –1.1 mm

For the door to pass the residual deformation must not exceed 2.0mm

Pass

Clause 6.3.3 Soft and Heavy Body Impact (Class 2)

The door was closed to its normal operating mode and the sample was marked at the centre of the door leaf.

The deviation across the width of the door was measured at the impact point.

A 30±0.6kg leather impactor was raised to the required drop height and impacted to the exterior face, and the deviation was measured again.

For the door to achieve the required class it shall not exceed 2mm residual measurement across the face of the impacted side.

The sample was impacted in the centre of the active leaf and from the outside.

Residual measurement – 0.00mm

Pass

Clause 6.3.4 Hard Body Impact (Class 2)

The door leaf was mounted horizontally with rigid supports under the long edges of the leaf and pattern 2 was selected. Glazed impact points were omitted, and the exterior face was impacted.

If permanent damage is left after impact, measurements are taken after 30 minutes.

Mean of the diameter –3.00 mm

Mean of the depth –0.10 mm

The mean to qualify for a class shall not exceed 20mm, and the mean for the depth shall not exceed 1.0mm.

Pass

BS 6375-2:2009 (continued).**Clause 6.4 Load Bearing Capacity of Safety Device****Assessment**

Not assessed due to no safety device being fitted

Closure Against Obstruction

The objective of this test is to determine the resistance of a doorset to closure of the door leaf against small objects such as toys which may be accidentally trapped between the leaf and the frame.

A 50 x 50 x 10mm aluminium block was placed in the gap between the leaf and the bottom of the hinge side jamb.

A 200N force was applied to the lock side of the leaf and held for 15±5 seconds.

The leaf was then opened and closed five time and the operating forces were repeated.

**Clause 6.2 Operating Forces:
EN12046-2:2000 and EN12217:2015 (Class 1)**

The sample was tested three times – closing the leaf, lifting the handle, locking the key, unlocking the key, opening the handle and opening the leaf – and the average force recorded.

Closing leaf force – 47.06N (maximum 75N)	Pass
Handle closing – 65.43N (maximum 100N)	Pass
Key Torque to lock – < 1Nm (maximum 5Nm)	Pass
Key Torque to unlock – <1Nm (maximum 5Nm)	Pass
Handle opening – 60.28N (maximum 100N)	Pass
Force to maintain opening – 44.80N (maximum 75N)	Pass

Basic Security (Annex A).

BS 6375-3:2009

Assessment

The objective of this test is to establish if, from the outside, entry can be gained by defeating the glazing or locking system.

The force used did not result in permanent set or plastic deformation of any tool.

Damaged tools shall be replaced. The test did not exceed the maximum three minute time period.

The screwdriver was used to no effect.

No entry gained within three minutes.

Pass

Test Samples.

Sample Id	ER Number	Description
1	10177159	Aluminium Bi-Fold Door

Description of Test Samples.

Sample Description
2 off three leaf open out glaze in bi fold door assembly with full glass infill and standard threshold

Test Requirements.

BS4873 Door Direct Test

Clause	Requirements
As required	BS4873 Door 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.

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End of Report