

Test Report 3299047.

Debar Ltd

Introduction.

This report has been prepared by David Vinyard and relates to the activity detailed below:

Job/Registration Details	Client Details
Job number: 3299047 Job type: Testing Samples Submitted Start Date: 20/10/2020 Test type: Direct Sample ID: 10193629 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 Mohamed Abukar – Subject Matter Expert

Approved For Issue	
	Issue Date: 30 October 2020

Objectives.

Direct test

Product Scope.

De-Wall aluminium bi-folding door sets

Report Summary.

The samples were received on 13 October 2020 and the testing was started on 20 October 2020.

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

BS4873:2016 Direct Test.

1 off three leaf open in glaze in fully glazed bi-fold door assembly with a standard threshold

(Sample ID No 10193629)

Date sample received: 13 October 2020

Test Results.

1. Air Permeability The test sample met the requirements of the Specification, in respect of Clause 6, for Test Pressure Class 2.
2. Watertightness The test sample met the requirements of the Specification, in respect of Clause 7, for Test Pressure Class 1A.
3. Wind Resistance The test sample met the requirements of the Specification, in respect of BS6375-2:2009, for Exposure Category B2 (800Pa).
4. Operational Strength Test sample 1 met the requirements of the Specification in respect of BS6375-2:2009.
5. Basic Security Test sample 1 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

Sample Selection.

The sample submitted for tests was selected using the PCP Scheme Document Specification. The 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 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 sample followed that detailed in Clause 5 of BS6375-1:2015.

Clause 5 Performance Requirements.

The performance of the 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.

BS:6375-2015 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.

Note – BS 6375:3:2009 not UKAS accredited

Description of Sample. Sample 1

Sample Type -	Three leaf open in glaze in fully glazed bi-fold door assembly with a standard threshold		
Material -	Aluminium		
Construction -	Cleated		
Fittings -	<p>Master leaf A four-point locking (two hook bolts, one shoot bolt and one dead bolt) FUHR espagnolette system, key lockable hoppe handle, 3* Yale cylinder and five pin hinges</p> <p>Two slave leaves Two rollers, two shoot bolts and ten pin hinges</p>		
Glass -	Double glazed 6-14-6mm toughened glass sealed units		
Panel -	Not applicable		
Glass Retention System -	Internal beads and gaskets		
Weathersealing -	Double-sealed plastic weather strip		
Sample dimensions -	Overall -	Length: 3770mm	Height: 2630mm
	Master Leaf -	Length: 1210mm	Height: 2540mm
	Slave Leaf's -	Length: 1210mm	Height: 2540mm
Date of test -	20 October 2020		
Laboratory temperature -	18.8°C		
Laboratory humidity -	63.9%RH		
Atmospheric pressure -	98.1kPa		
Test engineers -	Jack Nicholls		

Description of Test Sample.

Outer Frame width	3772 mm	Outer Frame Material	Aluminium
Outer Frame height	2616 mm	Outer Frame Gasket	
Outer Frame Part Numbers		Gasket Type	EPDM
Top	DBE-002	Manufacturer	Debar Ltd
Bottom	DBE-001	Product Name	Outer frame seal
Lock Side	DBE-002; DBE-201	Product Code	DBA1-144
Hinge Side	DBE-002; DBE-201	Threshold	
Outer Frame section dimensions		Manufacturer	Debar Ltd
Width	55.00 mm	Product name	N/A
Depth	73.00 mm	Product Code	DBE-001
Reinforcing:		Materials	Aluminium
Manufacturer	N/A	Outer Frame Joint Method	
Product Name	N/A	Head	Mechanical corner cleat
Product code	N/A	Foot	Mechanical corner cleat
Material	N/A		

Leaf		Leaf Material:	Aluminium
Leaf Width:	1200 mm	Leaf Gasket	
Leaf Height:	2500 mm	Gasket type:	EPDM
Leaf Part Numbers:		Manufacturer:	Debar Ltd
Top:	DBE-101	Product Name:	N/A
Bottom:	DBE-101; DBE-303	Product Code	DBA1-131R; DBA1-132; DBA1-134; DBA1-137; DBA1-143; DBA1-146
Lock side:	DBE-101; DBE-204; DBE-206; DBE-304	Leaf Midrail:	N/A
Hinge Side	DBE-101	Manufacturer:	N/A
Leaf section size		Product name:	N/A
Width:	55.00 mm	Product code:	N/A
Depth:	73.00 mm	Material:	N/A
Reinforcing		Leaf joint method	
Manufacturer:	N/A	Head:	Mechanical corner cleat
Product Name:	N/A	Foot:	Mechanical corner cleat
Product Code:	N/A		
Material:	N/A		
Bead			
Manufacturer:	Debar Ltd		
Product Name:	28 mm Glass bead		
Product Code:	DBE-170		
Material:	Aluminium		
Bead Size:	21.00 x 19.00 mm		

Description of Test Sample. (Continued)

Glazing Unit		Glazing Gasket	
Manufacturer:	N/A	Gasket Type:	EPDM
Inner Thickness:	6.00 mm	Manufacturer:	Debar Ltd
Spacer Material:	16.00 mm	Product Name:	N/A
Outer Thickness:	6.00 mm	Product Code	DBA1-135N; DBA1-136
Unit Sizes:	2414 x 1114 mm	Glazing Clip	
Glazing Tape Details		Manufacturer:	N/A
Manufacturer:	N/A	Product Name:	N/A
Product Name:	N/A	Product Code	N/A
Product Code	N/A		

Hardware	Product Code:	Supplier:	Fixings:	Quantity
Running Track:	DBPR-001	Debar Ltd	N/A	-
Hinges:	DBA1-350N; (DBA1-356N)	Debar Ltd	Provided with hinge	-
Multi Point Lock and Keep:	DBLK-50/RH or DBLK-50/LH DBLK-52; DBLK-54; DBLK-53/RH or DBLK-53/LH;	Debar Ltd	As per DeWall A1 Fabrication manual	-
Lever Handle:	DBHP-01	Debar Ltd	Provided with handle	-
Security Cylinder:	DBCY-50/503STAR	Debar Ltd	Provided with cylinder	-
Shoot Bolt Lock:	DBLK-06	Debar Ltd	N/A	-
Shoot Bolt Lock Cover:	DBLK-26	Debar Ltd	N/A	-
Shoot Bolt Handle:	DBHL-05	Debar Ltd	Provided with handle	-
Shoot bolt Cones:	DBA1-200/10mm	Debar Ltd	Provided with cones	-
Threaded Rods:	DB-45	Debar Ltd	N/A	-
Shoot Bolt Lock Cylinder	DBCY-40/10	Debar Ltd	Provided with cylinder	-
Additional Hardware:				
Bottom Roller:	DBA1-357/RH or DBA1-357/LH	Debar Ltd	Provided with roller	-
Top Guide:	DBA1-358/RH or DBA1-358/LH	Debar Ltd	Provided with top guide	-
Anti-lift Blocks:	DBA1-205/BL	Debar Ltd	-	-
Fixing Blocks:	DBA1-107	Debar Ltd	Provided with blocks	-
Rebate End Caps:	DBA1-201	Debar Ltd	N/A	-
Plastic Inserts:	DBA1-106	Debar Ltd	N/A	-

Note – Parts list supplied by client but not verified by BSI

Graph of Air Permeability Before Gusting.

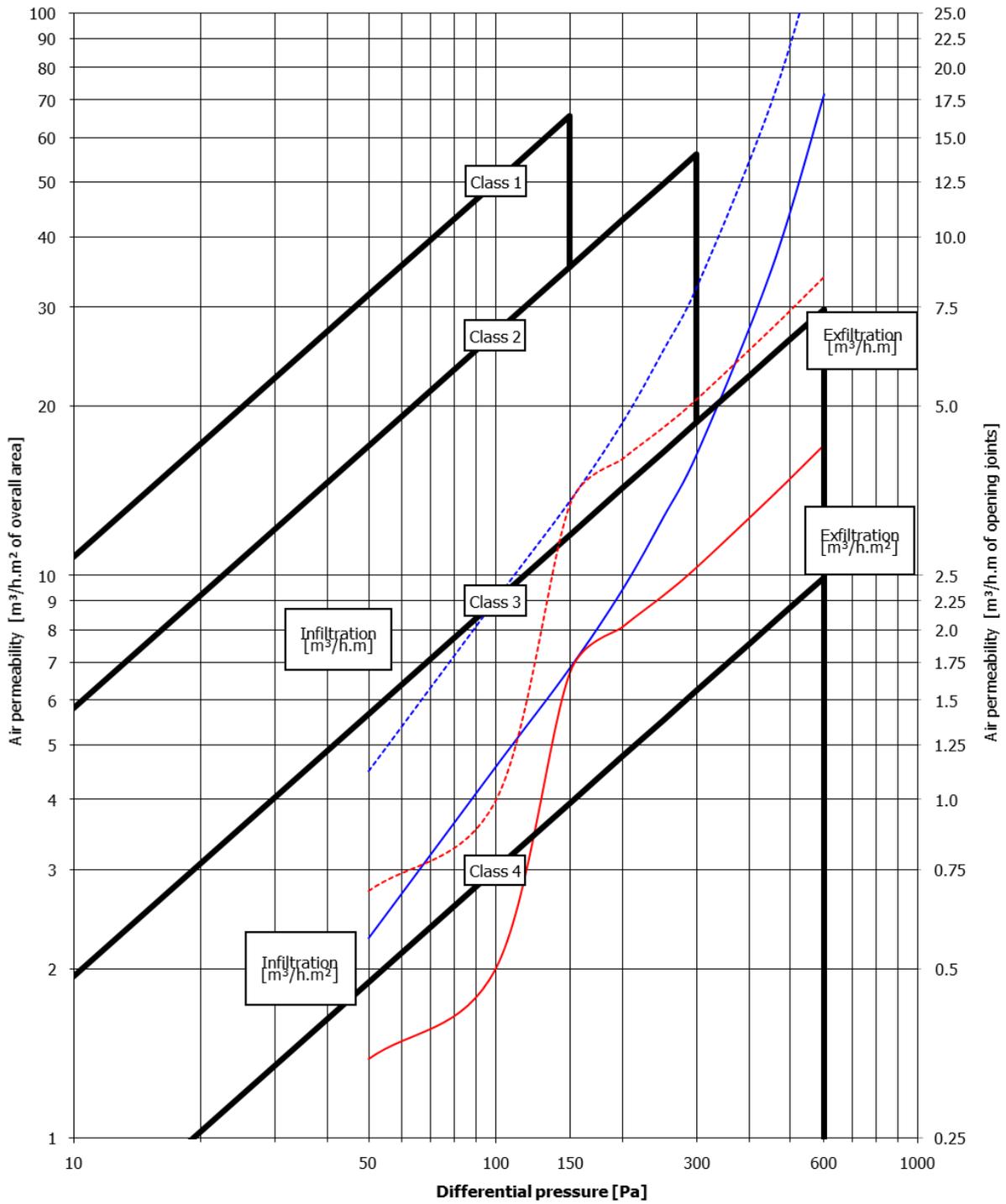


Table of Air Permeability Before Gusting.

AIR PERMEABILITY TEST RESULTS - BS EN 1026:2000 / BS EN 12207:2000

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	10.1	33.2	22.4	1.12	2.26
100	17.0	63.5	45.2	2.26	4.56
150	22.6	92.3	67.8	3.40	6.84
200	27.8	124.1	93.6	4.69	9.44
250	33.7	163.1	125.9	6.31	12.70
300	41.6	209.4	163.1	8.17	16.46
450	58.3	414.3	346.2	17.34	34.93
600	77.5	807.3	709.7	35.56	71.61
-50	7.3	21.3	13.7	0.69	1.38
-100	11.4	31.8	19.8	0.99	2.00
-150	14.2	82.8	66.7	3.34	6.73
-200	17.1	99.7	80.4	4.03	8.11
-250	19.4	113.4	91.4	4.58	9.22
-300	21.4	126.9	102.7	5.14	10.36
-450	25.2	165.9	136.8	6.85	13.80
-600	29.9	203.8	169.1	8.47	17.06

Total opening perimeter = 19.96m

Overall area = 9.91m²

BS EN 12207:2000 - Joint class = 1

BS EN 12207:2000 - Area class = 2

BS EN 12207:2000 - Overall class before gusting = 2

Graph of Average Air Permeability Before Gusting.

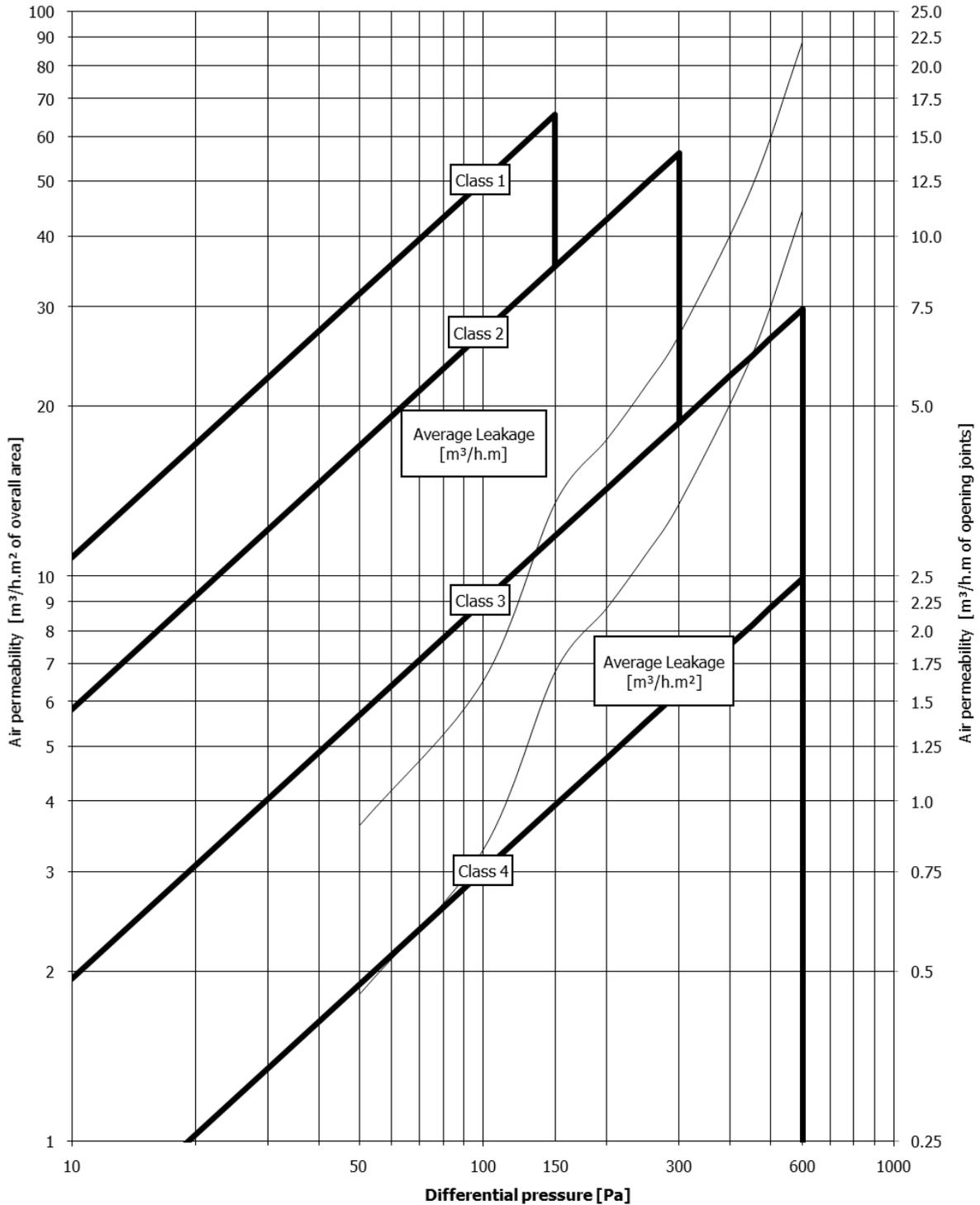


Table of Average Air Permeability Before Gusting.

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

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	18.1	0.90	1.82
100	32.5	1.63	3.28
150	67.2	3.37	6.79
200	87.0	4.36	8.78
250	108.6	5.44	10.96
300	132.9	6.66	13.41
450	241.5	12.10	24.37
600	439.4	22.01	44.34

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 = 19.96m

Overall area = 9.91m²

BS 6375-1:2015 Clause 6.3 - Joint class = 2

BS 6375-1:2015 Clause 6.3 - Area class = 2

BS 6375-1:2015 Clause 6.3 - Overall class = 2

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	Water leaked out and over the threshold at 2 minutes 50 seconds
100	-
150	-
200	-
250	-
300	-
450	-
600	-
750	-
900	-
1050	-

Wind Load Resistance Test Results.

Clause 8 Resistance to Wind Load

P1 Deflection Test

Three positive pulses of 880Pa 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 800Pa.

Actual deflection – 8.80mm (maximum deflection allowed 12.40mm)

Deflection/span ratio 1/281 (maximum ratio allowed 1/200)

Three negative pulses of 880Pa 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 800Pa.

Actual deflection – 8.20mm (maximum deflection allowed 12.40mm)

Deflection/span ratio 1/302 (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 400Pa.

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 400Pa.

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 B2.

Date of test - 20 October 2020

Atmospheric pressure – 63.9kPa

Laboratory temperature – 18.8°C

Test engineers - Jack Nicholls

Laboratory humidity – 98.1%RH

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

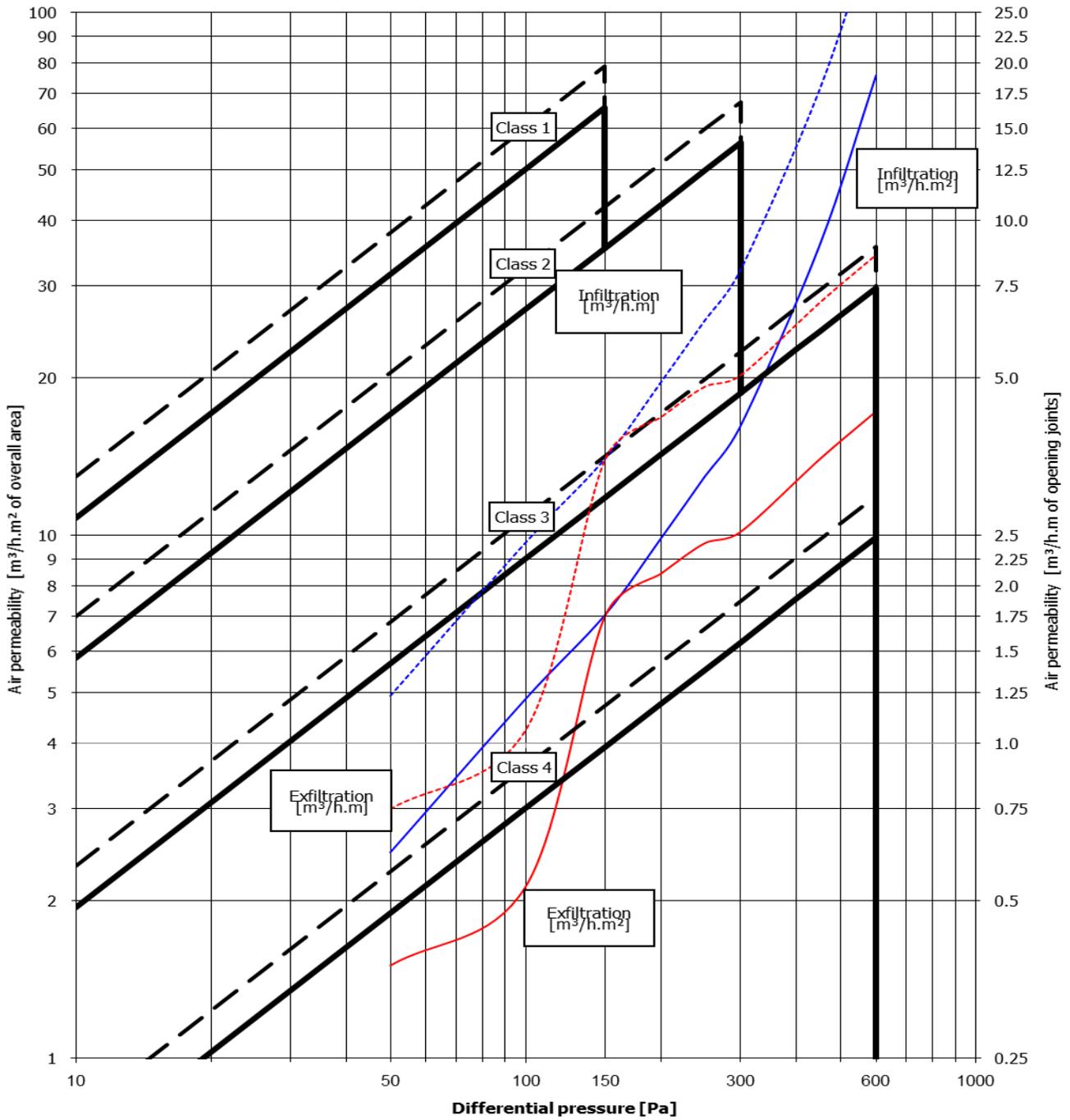


Table of Air Permeability After Gusting.

AIR PERMEABILITY TEST RESULTS - BS EN 1026:2000 / BS EN 12207:2000

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]	Maximum rate of air leakage per meter length of opening joint [m ³ /h.m]	Maximum rate of air leakage relative to area of sample [m ³ /h.m ²]
50	10.2	35.4	24.5	1.23	2.48
100	18.2	67.8	48.3	2.42	4.87
150	23.6	95.4	69.8	3.50	7.04
200	28.4	129.1	97.9	4.91	9.88
250	36.0	168.0	128.4	6.43	12.95
300	44.5	209.4	160.3	8.03	16.17
450	60.4	425.9	355.4	17.81	35.86
600	80.1	850.4	749.0	37.53	75.58
-50	8.3	23.6	14.9	0.75	1.51
-100	14.0	35.7	21.1	1.06	2.13
-150	15.5	87.0	69.5	3.48	7.02
-200	19.5	105.7	83.8	4.20	8.46
-250	21.8	120.3	95.8	4.80	9.67
-300	26.9	130.4	100.7	5.04	10.16
-450	27.4	170.1	138.7	6.95	13.99
-600	31.7	207.6	171.1	8.57	17.26

Total opening perimeter = 19.96m

Overall area = 9.91m²

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 declared class (4) by more than 20%.

Graph of Average Air Permeability After Gusting.

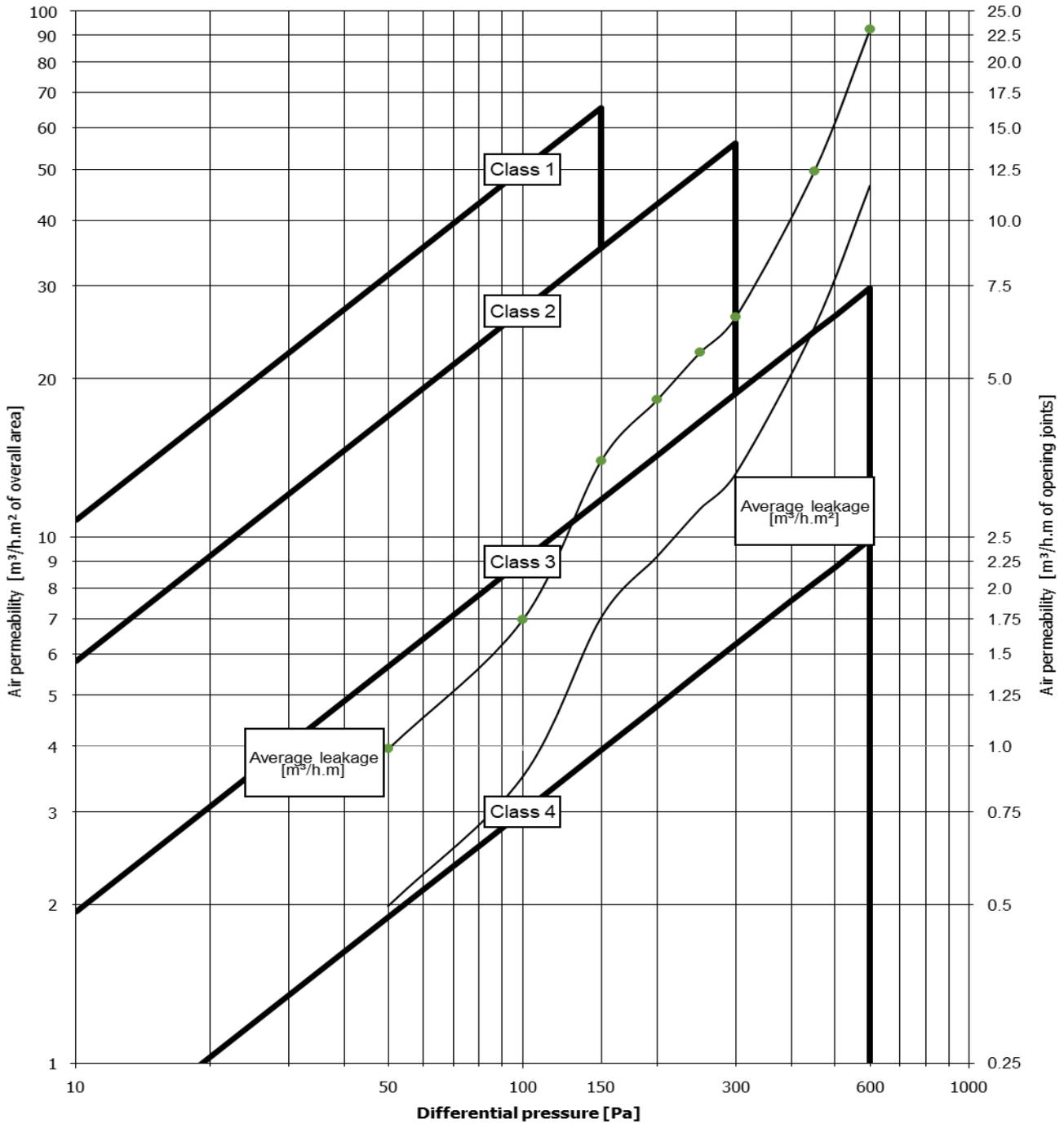


Table of Average Air Permeability After Gusting.

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

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	19.7	0.99	1.99
100	34.7	1.74	3.50
150	69.7	3.49	7.03
200	90.9	4.55	9.17
250	112.1	5.62	11.31
300	130.5	6.54	13.17
450	247.0	12.38	24.93
600	460.1	23.05	46.42

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 = 19.96m

Overall area = 9.91m²

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

BS 6375-1:2015 Clause 6.5 - Area class = 2

BS 6375-1:2015 Clause 6.5 - Overall class = 2

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 2.

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 1200Pa.

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 1200Pa.

Date of test - 20 October 2020

Atmospheric pressure – 63.9kPa

Laboratory temperature – 18.8°C

Test engineers - Jack Nicholls

Laboratory humidity – 98.1%RH

BS 6375-2:2009.

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

Assessment

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 – 51.68N (maximum 75N)	Pass
Handle closing – 41.85N (maximum 100N)	Pass
Key Torque to lock – < 1.00 Nm (maximum 5Nm)	Pass
Key Torque to unlock – < 1.00 Nm (maximum 5Nm)	Pass
Handle opening – 36.78N (maximum 100N)	Pass
Force to maintain opening – 45.55N (maximum 100N)	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 ± 4 N was applied vertically to the top corner of the lock side of the door leaf, at 50 ± 5 mm 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 – 2800mm

Maximum deformation – 2.20 mm

Residual deformation – 0.77 mm

Final diagonal measurement – 2800mm

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 – 93.70mm

Residual deformation – 0.0mm

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 three times to each face, and the deviation was measured again.

For the door to achieve the required class it shall not exceed 2mm residual measurement.

Residual measurement – 0.10mm

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 – 1.00mm

Mean of the depth – 0.10mm

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

Closure Against Obstruction

The objective of this test is to determine the resistance of a door set 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)

Assessment

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 – 56.63N (maximum 75N)	Pass
Handle closing – 45.30N (maximum 100N)	Pass
Key Torque to lock – < 1.00 Nm (maximum 5Nm)	Pass
Key Torque to unlock – < 1.00 Nm (maximum 5Nm)	Pass
Handle opening – 39.65N (maximum 100N)	Pass
Force to maintain opening – 50.80N (maximum 100N)	Pass

Basic Security (Annex A).**Assessment****BS 6375-3:2009**

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**Date of test - 20 October 2020****Atmospheric pressure – 63.9kPa****Laboratory temperature – 18.8°C****Test engineers - Jack Nicholls****Laboratory humidity – 98.1%RH**

PAS24:2016 Direct Test.

1 off three leaf open in glaze in fully glazed bi-fold door assembly with a standard threshold

(Sample ID No 10193629)

Date sample received: 13 October 2020

Test Results.

1.	Manipulation	The test sample met the requirements of the Specification in respect of B.4.3
2.	Infill Removal	The test sample met the requirements of the Specification in respect of B.4.4
3.	Mechanical Loading	The test sample met the requirements of the Specification in respect of B.4.5
4.	Manual Check Test	The test sample met the requirements of the Specification in respect of B.4.6
5.	Soft Body Impact	The test sample met the requirements of the Specification in respect of B.4.8
6.	Hard Body Impact	The test sample met the requirements of the Specification in respect of B.4.9.2.2
7.	Security Hardware and Cylinder Test	The test sample met the requirements of the Specification in respect of Annex A

B.2 Sample Selection.

The sample submitted for tests was selected using the criteria in B.2 of the Specification. The 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.

B.3 Requirements for Test Apparatus.

The test apparatus for the manual and mechanical tests is shown in figures B.2 to B.5.

B.4 Test Methods.

The method of testing the sample followed the sequence detailed in B.4 of the Specification.

Description of Sample. Sample 2

Sample Type -	Three leaf open in glaze in fully glazed bi-fold door assembly with a standard threshold		
Material -	Aluminium		
Construction -	Cleated		
Fittings -	<p>Master leaf A four-point locking (two hook bolts, one shoot bolt and one dead bolt) FUHR espagnolette system, key lockable hoppe handle, 3* Yale cylinder and five pin hinges</p> <p>Two slave leaves Two rollers, two shoot bolts and ten pin hinges</p>		
Classification -	D		
Glass -	Double glazed 6-14-6mm toughened glass sealed units		
Panel -	Not applicable		
Glass Retention System -	Internal beads and gaskets		
Weathersealing -	Double-sealed plastic weather strip		
Sample dimensions -	Overall -	Length: 3770mm	Height: 2630mm
	Master Leaf -	Length: 1210mm	Height: 2540mm
	Slave Leaf's -	Length: 1210mm	Height: 2540mm
Date of test -	20 October 2020		

Description of Test Sample.

Outer Frame width	3772 mm	Outer Frame Material	Aluminium
Outer Frame height	2616 mm	Outer Frame Gasket	
Outer Frame Part Numbers		Gasket Type	EPDM
Top	DBE-002	Manufacturer	Debar Ltd
Bottom	DBE-001	Product Name	Outer frame seal
Lock Side	DBE-002; DBE-201	Product Code	DBA1-144
Hinge Side	DBE-002; DBE-201	Threshold	
Outer Frame section dimensions		Manufacturer	Debar Ltd
Width	55.00 mm	Product name	N/A
Depth	73.00 mm	Product Code	DBE-001
Reinforcing:		Materials	Aluminium
Manufacturer	N/A	Outer Frame Joint Method	
Product Name	N/A	Head	Mechanical corner cleat
Product code	N/A	Foot	Mechanical corner cleat
Material	N/A		

Leaf		Leaf Material:	Aluminium
Leaf Width:	1200 mm	Leaf Gasket	
Leaf Height:	2500 mm	Gasket type:	EPDM
Leaf Part Numbers:		Manufacturer:	Debar Ltd
Top:	DBE-101	Product Name:	N/A
Bottom:	DBE-101; DBE-303	Product Code	DBA1-131R; DBA1-132; DBA1-134; DBA1-137; DBA1-143; DBA1-146
Lock side:	DBE-101; DBE-204; DBE-206; DBE-304	Leaf Midrail:	N/A
Hinge Side	DBE-101	Manufacturer:	N/A
Leaf section size		Product name:	N/A
Width:	55.00 mm	Product code:	N/A
Depth:	73.00 mm	Material:	N/A
Reinforcing		Leaf joint method	
Manufacturer:	N/A	Head:	Mechanical corner cleat
Product Name:	N/A	Foot:	Mechanical corner cleat
Product Code:	N/A		
Material:	N/A		
Bead			
Manufacturer:	Debar Ltd		
Product Name:	28 mm Glass bead		
Product Code:	DBE-170		
Material:	Aluminium		
Bead Size:	21.00 x 19.00 mm		

Description of Test Sample. (Continued)

Glazing Unit		Glazing Gasket	
Manufacturer:	N/A	Gasket Type:	EPDM
Inner Thickness:	6.00 mm	Manufacturer:	Debar Ltd
Spacer Material:	16.00 mm	Product Name:	N/A
Outer Thickness:	6.00 mm	Product Code	DBA1-135N; DBA1-136
Unit Sizes:	2414 x 1114 mm	Glazing Clip	
Glazing Tape Details		Manufacturer:	N/A
Manufacturer:	N/A	Product Name:	N/A
Product Name:	N/A	Product Code	N/A
Product Code	N/A		

Hardware	Product Code:	Supplier:	Fixings:	Quantity
Running Track:	DBPR-001	Debar Ltd	N/A	-
Hinges:	DBA1-350N; (DBA1-356N)	Debar Ltd	Provided with hinge	-
Multi Point Lock and Keep:	DBLK-50/RH or DBLK-50/LH DBLK-52; DBLK-54; DBLK-53/RH or DBLK-53/LH;	Debar Ltd	As per DeWall A1 Fabrication manual	-
Lever Handle:	DBHP-01	Debar Ltd	Provided with handle	-
Security Cylinder:	DBCY-50/503STAR	Debar Ltd	Provided with cylinder	-
Shoot Bolt Lock:	DBLK-06	Debar Ltd	N/A	-
Shoot Bolt Lock Cover:	DBLK-26	Debar Ltd	N/A	-
Shoot Bolt Handle:	DBHL-05	Debar Ltd	Provided with handle	-
Shoot bolt Cones:	DBA1-200/10mm	Debar Ltd	Provided with cones	-
Threaded Rods:	DB-45	Debar Ltd	N/A	-
Shoot Bolt Lock Cylinder	DBCY-40/10	Debar Ltd	Provided with cylinder	-
Additional Hardware:				
Bottom Roller:	DBA1-357/RH or DBA1-357/LH	Debar Ltd	Provided with roller	-
Top Guide:	DBA1-358/RH or DBA1-358/LH	Debar Ltd	Provided with top guide	-
Anti-lift Blocks:	DBA1-205/BL	Debar Ltd	-	-
Fixing Blocks:	DBA1-107	Debar Ltd	Provided with blocks	-
Rebate End Caps:	DBA1-201	Debar Ltd	N/A	-
Plastic Inserts:	DBA1-106	Debar Ltd	N/A	-

Note – Parts list supplied by client but not verified by BSI

Test Results.

Performance Requirements

Assessment

B.4.3 Manipulation Test A

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out in accordance with the given objective of this Annex using the procedure detailed in B.4.3.1 and the tools described in Group A and Group B where applicable.

The sample was closed and locked and the key removed. Although there is a 15 minute overall time limit no one technique was used for more than three minutes.

No tools effective.

No entry gained by any technique within three minutes.

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

B.4.4 Cutting and Infill Medium Removal Test

B.4.4.2 Infill Manual Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out in accordance with the requirements of this Annex using the tools described in Group A and Group B where applicable.

A craft knife was used to cut the gasket

No entry gained within three minutes.

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

Performance Requirements (Continued).

Assessment

B.4.4.3 Infill Mechanical Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out with a perpendicular-to-plane load of 2.0kN applied to each corner of the glazing.

No evidence of bead failure. No entry gained.

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

B.4.4.4 Manual Cutting Test

Not applicable

Test Results (Continued).

Performance Requirements (Continued).

B.4.5 Mechanical Loading Test

The sample was mounted, vertically and square, in the test rig.

The test was carried out in accordance with the procedures detailed in B.4.5, using loading cases B.1 to B.6 and Figures B.12 for loading sequence, and using the test apparatus detailed in Figures B.6 to B.6.

Test Results (Continued).

B.4.5.2 Loading Procedure

First Sequence

1. Hinge (upper right jamb)
Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds
2. Hinge (upper right jamb)
Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds
3. Hinge (centre right jamb)
Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds
4. Hinge (lower right jamb)
Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds
5. Hinge (lower right jamb)
Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

First Sequence (continued)

6. Roller (threshold of slave leaf)

Standard loading case used: 11

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

7. Hook Bolt (lower master leaf)

Standard loading case used: 8

Load applied in plane: 1.5kN along the edge in the direction to disengage the bolt
Load applied perpendicular to plane: 4.5kN applied for ten seconds

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for ten seconds

8. Dead Bolt (centre master leaf)

Standard loading case used: 8

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for ten seconds

9. Hook Bolt (upper master leaf)

Standard loading case used: 8

Load applied in plane: 1.5kN along the edge in the direction to disengage the bolt
Load applied perpendicular to plane: 4.5kN applied for ten seconds

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for ten second

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

First Sequence (continued)

10. Shoot Bolt (head of master leaf)

Standard loading case used: 5

Load applied in plane: 1.5kN along the edge in the direction to disengage the bolt
Load applied perpendicular to plane: 4.5kN applied for ten seconds

11. Roller (head of slave leaf)

Standard loading case used: 11

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

12. Shoot Bolt (head of slave leaf)

Standard loading case used: 5

Load applied in plane: 1.5kN along the edge in the direction to disengage the bolt
Load applied perpendicular to plane: 4.5kN applied for ten seconds

13. Hinge (upper slave to slave leaves)

Standard loading case used: 2

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load
Load applied perpendicular to plane: 4.5kN applied for 10 seconds

14. Hinge (upper slave to slave leaves)

Standard loading case used: 2

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load
Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

First Sequence (continued)

15. Hinge (centre slave to slave leaves)

Standard loading case used: 2

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for 10 seconds

16. Hinge (lower slave to slave leaves)

Standard loading case used: 2

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for 10 seconds

17. Hinge (lower slave to slave leaves)

Standard loading case used: 2

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
1.5kN to oppose the above load

Load applied perpendicular to plane: 4.5kN applied for 10 seconds

18. Shoot Bolt (threshold of slave leaf)

Standard loading case used: 5

Load applied in plane: 1.5kN along the edge in the direction to disengage the bolt

Load applied perpendicular to plane: 4.5kN applied for ten seconds

Test Results (Continued).

Performance Requirements (Continued).

Assessment

B.4.5.2 Loading Procedure (continued)

First Sequence (continued)

19. Hinge (lower left jamb)

Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

20. Hinge (lower left jamb)

Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

21. Hinge (centre left jamb)

Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

22. Hinge (upper left jamb)

Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

23. Hinge (upper left jamb)

Standard loading case used: 1

Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
Load applied perpendicular to plane: 4.5kN applied for ten seconds

No entry gained

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

Performance Requirements (Continued).

Assessment

B.4.3 Manipulation Test B

No fixings were exposed during mechanical loading.

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

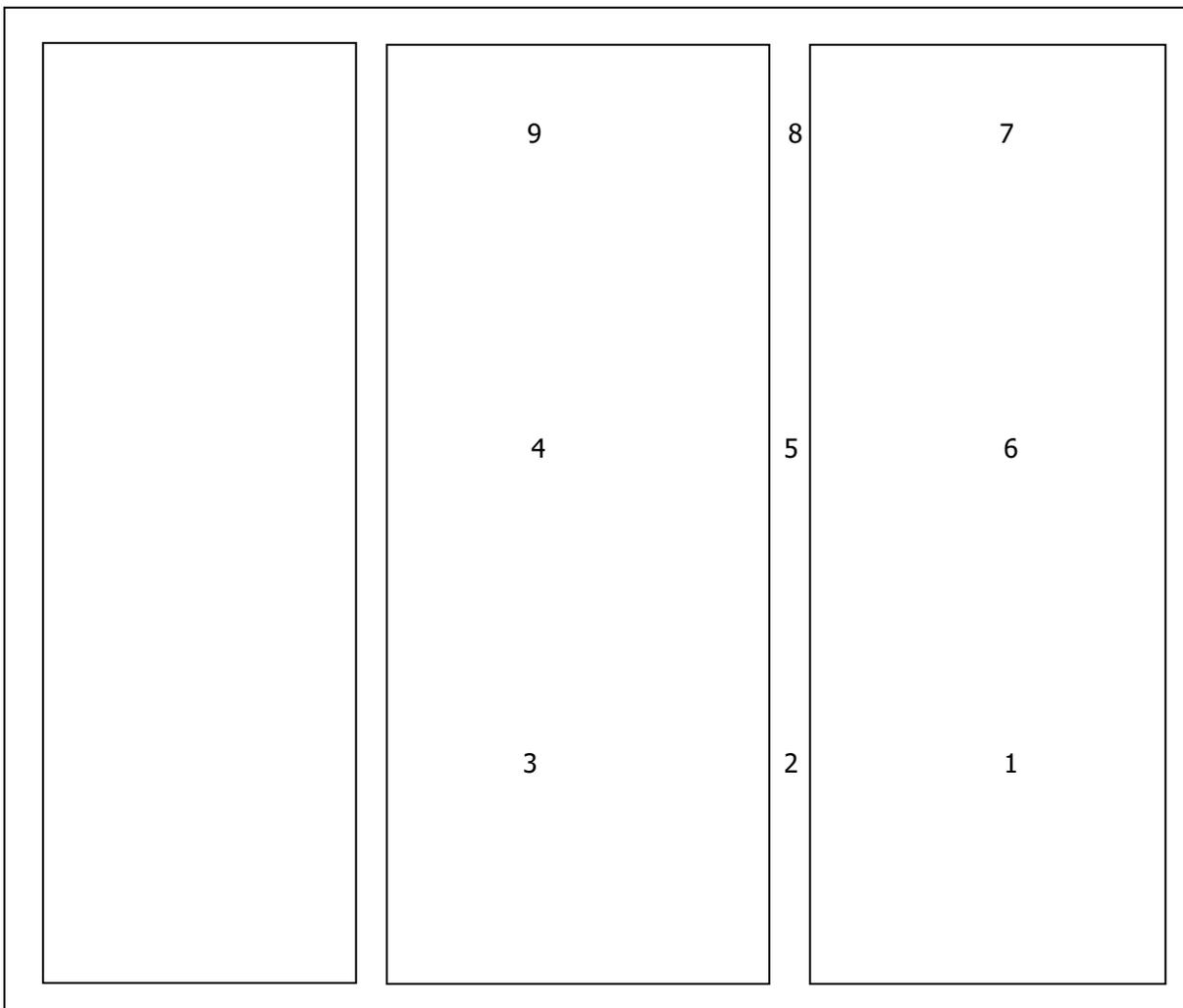
Performance Requirements (Continued).

Clause B.4.8 Soft Body Impact Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1

The test was carried out in accordance with the requirements, objectives and procedures detailed in B.4.8.1 using the impact points and procedure described in B.4.8.2 and B.4.8.3 and Figure B.10.

Diagram of points of application of loads



Test Results (Continued).**Performance Requirements (Continued).****Assessment****Clause B.4.8 Soft Body Impact Test**

Impact point	Position from floor level	Effect
1	0.80m	None
2	0.80m	None
3	0.80m	None
4	1.25m	None
5	1.25m	None
6	1.25m	None
7	1.70m	None
8	1.70m	None
9	1.70m	None

No entry gained

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

Performance Requirements (Continued).

Clause B.4.9 Hard Body Impact Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out in accordance with the requirements, objectives and procedures detailed in B.4.9.1, B.4.9.2.1, B.4.9.2.2 and B.4.9.2.3 using procedure B.4.9.3, using the test apparatus detailed in B.11 and using the impact sequence in figure B.14.

Test Results (Continued).

Clause B.4.9 Hard Body Impact Test (continued)

Assessment

Impact point	Position	Effect
1	Corner / Hinge	None
2	Hinge	None
3	Hinge	None
4	Hinge	None
5	Corner / Hinge	None
6	Corner	None
7	Corner / Roller	None
8	Hook Bolt	None
9	Cylinder	None
10	Dead Bolt	None
11	Hook Bolt	None
12	Corner / Shoot	None
13	Corner / Roller	None
14	Corner / Hinge	None
15	Corner / Shoot	None
16	Hinge	None
17	Hinge	None
18	Hinge	None
19	Corner / Hinge	None
20	Corner / Shoot	None

No entry gained

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

Performance Requirements (Continued).

Assessment

Clause B.4.6 Manual Check Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out in accordance with the given objectives of this clause using the procedure detailed in B.4.6.3 and the tools described in B.4.6.2.

No one technique was used for more than three minutes.

No alternative method of entry could be found.

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Clause B.4.7 Additional Mechanical Loading Test

Not applicable – no alternative method of entry found during manual check testing.

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Test Results (Continued).

Performance Requirements (Continued).

Assessment

Annex A Security Hardware and Cylinder Test

Annex A.3.2 (Part 1)

The sample was mounted, vertically and square, in the test rig as described in Clause 3.1.

The test was carried out in accordance with the given objectives of this Annex using the procedure detailed in Annex A.3.1 and the tools described in A.2.

Mole grips were used to remove the handle and snap the cylinder.

No entry gained within three minutes.

Pass

Date of test – 20 October 2020

Test engineer(s) – Errol Creary, Dave Vinyard and Jack Nicholls

Laboratory temperature – 20.9°C

Annex A.3.2 (Part 2)

Not assessed due to cylinder damage.

Test Sample.

Sample Id	ER Number	Description
1	10193629	Aluminium bi-folding doorsets

Description of Test Samples.

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

Test Requirements.

BS:4873 & PAS:24 door direct test

Clause	Requirements
As required	BS:4873 & PAS:24 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: Noncompliance – 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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End of Report