Test Report 8350242.

Smart Systems Limited

incorporating Smart Extrusions

Introduction.

This report has been prepared by Adam Pearce and relates to the activity detailed below:

Job/Registration Details		Client Details
Job number:	**8350242**	Smart Systems Limited incorporating Smart Extrusions Arnolds Way Yatton BS49 4QN United Kingdom
Job type:	Testing Samples Submitted	
Start Date:	14/07/2015	
Test type:	Type	
Sample ID:	10156327	
Registration:	**KM 530838**	
Scheme:	BS 4873 / PAS24	
Protocol:	PP519	
Scheme Mgr:	Lorraine Balch	
Quality system:	ISO 9001:2008	

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

Approved For Issue	
M. Manito	Issue Date: 18 March 2016

Objectives.

Type test for product certification

Product Scope.

Smart Systems Alitherm plus double doors

Report Summary.

The samples were received on 14 July 2015 and the testing was started on 14 July 2015.

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

Test Samples.

Sample Id	ER Number	Description
1	10156327	Aluminium alloy double leaf door

Description of Test Samples.

Sample Description
4 off double leaf open in glaze in door assemblies with full glass infill and low threshold 1 off double leaf open out glaze in door assemblies with full glass infill and standard threshold 1 off double leaf open out glaze in door assemblies with full glass infill and low threshold

Test Requirements.

PAS24/BS4873 Type test

Clause	Requirements
As required	**Test and Assessment** Please see results table for testing and assessment of samples as detailed. *See Table A - PAS24/BS4873 Type test*

Summary of Test Comments.

Clause	Comments

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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BSI
Kitemark House
Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 4SQ

UKAS TESTING
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Unless otherwise stated, any results not obtained from testing in a BSI laboratory are outside the scope of our UKAS accreditation.

Table A - PAS24/BS4873 Type test

Product Description.(Security samples 1 and 2)

2 off double leaf open in glaze in hinged door assembly with full glass infill and low threshold

(Sample ID No 10156327)

Date samples received: 14 July 2015

All parts for all doors documented on page 6 and 7

Test Results.

1.	Manipulation	Test samples met the requirements of the Specification in respect of B.4.3
2.	Infill removal	Test samples met the requirements of the Specification in respect of B.4.4
3.	Mechanical loading	Test samples met the requirements of the Specification in respect of B.4.5
4.	Manual check test	Test samples met the requirements of the Specification in respect of B.4.6
5.	Soft body impact	Test samples met the requirements of the Specification in respect of B.4.8
6.	Hard body impact	Test samples met the requirements of the Specification in respect of B.4.9.2.2
7.	Security hardware and cylinder test	Test samples met the requirements of the Specification in respect of Annex A
8.	Letter plate	None fitted

Description of Samples. (samples 1 and 2)

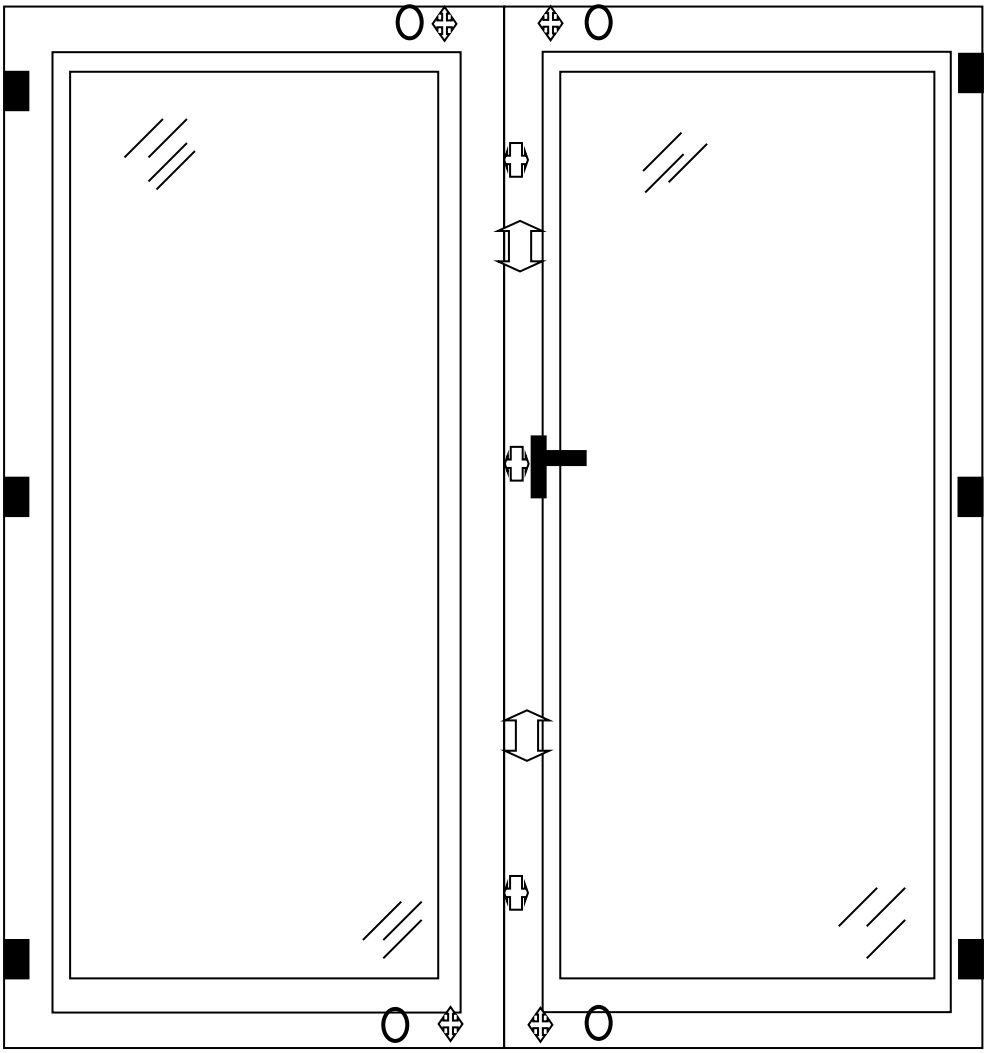
Sample type -	Double leaf open in glaze in door assembly with full glass infill and low threshold
Profile codes -	OUTER FRAMES - ETD012, ETD015,ETD017. OPEN IN SASH - ETD024N. OPEN OUT SASH - ETD025N. LOW THRESHOLD - ETD096. LOW THRESHOLD WOOLPILE CARRIER - ETD197. LOW THRESHOLD REBATE - ETD198. DOUBLE DOOR REBATE - ETD048. GLAZING BEAD - ETC161. DRIP SECTION - VL72. DOOR SASH TRIM = PCX15. OUTER FRAME TRIM - PCX17.
Material -	Aluminium alloy
Finish -	Painted white
Fittings -	**Master leaf** A seven point FUHR Multipoint (D KT) key locking hardware (two shoot bolts, two hook bolts, two roller cams and one dead bolt) Yale cylinder, handle, three SFS pin hinges and two run up blocks **Slave leaf** A two point Multipoint key locking hardware (two shoot bolts) cylinder, three pin hinges, and two run up blocks
Weathersealing -	Double sealed plastic weather-strip and brush pile
Glass -	Double glazed with 6-16-6 mm toughened glass sealed units
Panel -	Not applicable
Glass retention system -	Internal beads and gasket
Sample dimensions -	Overall - Length: 1800mm Height: 2400mm Active Leaf - Length: 865mm Height: 2350mm Slave Leaf - Length: 875mm Height: 2350mm
Date of test -	14 July 2015
Laboratory temperature -	21.4 °C
Laboratory humidity -	36.3 %

Description of Samples Continued. (samples 1 and 2)

Accessory List -

HANDLES - ACDV351.
BOTTOM SHOOTBOLT KIT - ACDV737.
TOP SHOOTBOLT KIT - ACDV738.
SHOOTBOLT EXTENSION - ACDV742.
CORNER CHEVRONS - ACET044.045,154.
OUTER FRAME CLEATS - ACET 057.
DRAIN CAPS - ACET131.
SASH CLEATS - ACET155.
FLIPPER GASKET - ACET160.
DOUBLE DOOR REBATE END CAPS - ACET162.
DOUBLE DOOR REBATE, LOW THRESHOLD END CAPS - ACET289.
BRIDGE PACKERS - ACET200.
HINGES - ACET250.
GUIDE BLOCKS - ACET258.
MULTI POINT LOCK AND KEEP SETS - ACET 282,283.
SECONDARY DOOR LOCK SET - ACET285.
LOW THRESHOLD END CAPS - ACET259.
LOW THRESHOLD WOOLPILE -
DRIP SECTION END CAPS - ACVL059.
DRIP SECTION RIVETS - ACVL061.
SEALING GLUE - ACSIL04.
CLEAT GLUE - ACSIL013.
LOCK FIXING SCREWS - ACET060.
HINGE FIXING SCREWS ACIM062.
DOUBLE DOOR REBATE FIXING SCREWS ACET066.
CYLINDERS - YALE AS3045BN.
EXTERNAL GLAZING GASKET - ACVG31
INTERNAL WEDGE GASKET - ACVG34.
POLYAMIDE FIXING SCREWS - ACET390.
LOCKING KEEP SUPPORTS - ACET217.
LOCKING KEEP SUPPORT SCREWS - ACET060.
PROFILE LIST. ACCESSORIES LIST.
ACSH038.
GUIDE BLOCKS - ACET257.

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating position of hardware)



- hinge
- shoot bolt
- handle
- cam
- run up block
- hook bolt

Test Results.

CLAUSE 7 PERFORMANCE REQUIREMENTS **ASSESSMENT**

B.4.3 Manipulation 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 objective of this Annex using the procedure detailed in B.4.3.1 and the tools described in Group A and B where applicable.

The sample was closed and locked and the key removed.
Although there is no overall time limit no one technique was used for more than 3 minutes.

No entry could be effected by any technique within 3 minutes Pass

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 tools in Group A and B where applicable.

No entry could be effected within 3 minutes Pass

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 and each corner of the boundaries of components in turn as specified.

No evidence of bead failure
No entry could be effected Pass

B.4.4.4 Manual Cutting Test

No applicable

Test Results (Continued).

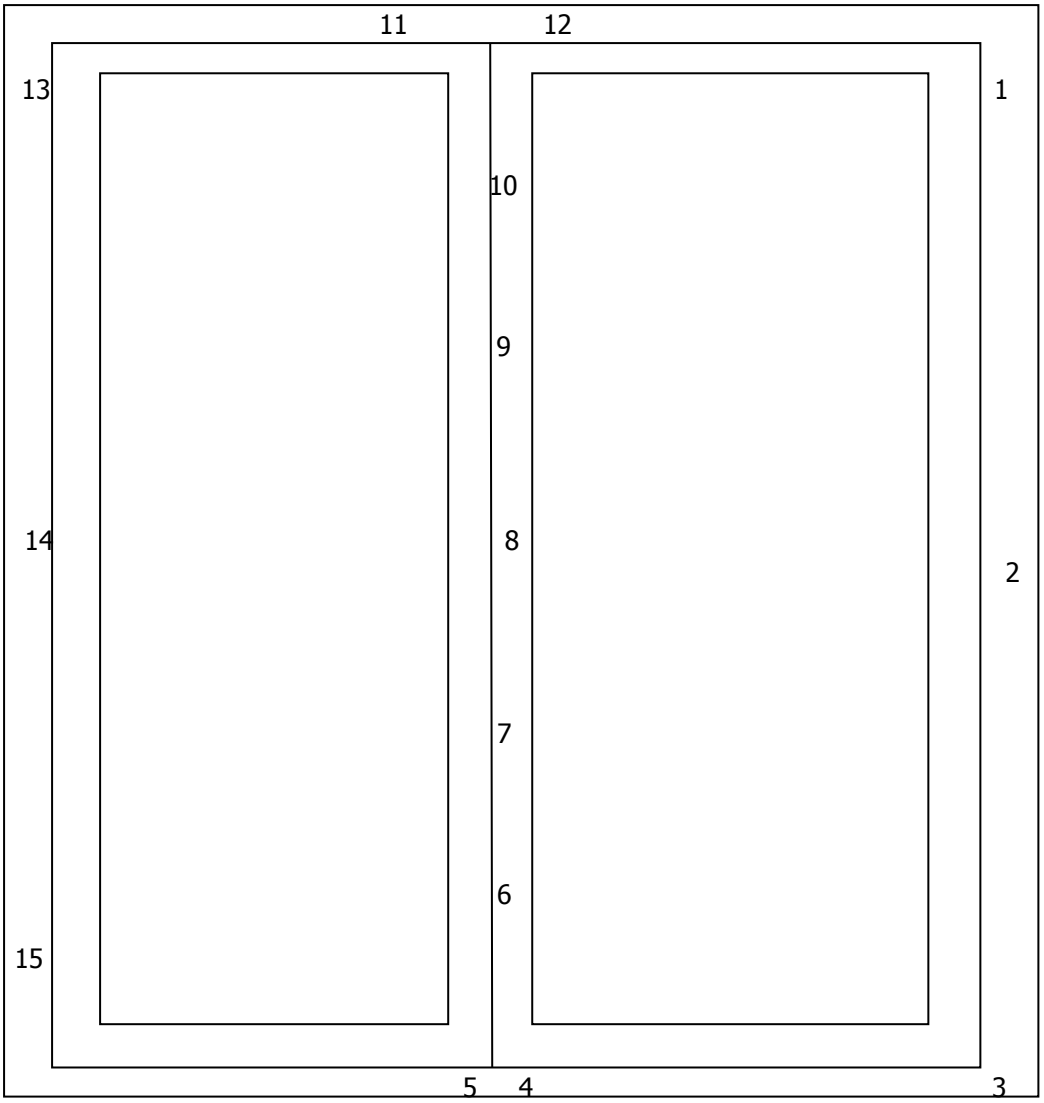
PERFORMANCE REQUIREMENTS

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.9.

Diagram of points of application of loads



Test Results (Continued).

PERFORMANCE REQUIREMENTS **ASSESSMENT**

B.4.5 Mechanical Loading Test

B.4.5.2 Loading Procedures

Point of application of load

First Sequence

1. Hinge (upper right jamb)

   Standard loading case used: 1
   Loads 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 10 seconds

2. Hinge (centre right jamb)

   Standard loading case used: 1
   Loads 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 10 seconds

3. Hinge (lower right jamb)

   Standard loading case used: 1
   Loads 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 10 seconds

4. Shoot bolt (threshold of slave leaf)

   Standard loading case used: 3
   Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

5. Shoot bolt (threshold of master leaf)

   Standard loading case used: 3
   Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

PERFORMANCE REQUIREMENTS **ASSESSMENT**

B.4.5 Mechanical Loading Test

B.4.5.2 Loading Procedures

Point of application of load

6. Roller cam (lower locking jambs)

   Standard loading case used: 6
   Load applied in plane: 1.5kN along edge in a direction to disengage the cam
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

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

7. Hook bolt (lower locking jambs)

   Standard loading case used: 6
   Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

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

8. Dead bolt (centre locking jambs)

   Standard loading case used: 4
   Loads applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   1.5kN at the mullion to oppose the above load
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

9. Hook bolt (upper locking jambs)
   Standard loading case used: 6
   Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

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

Test Results (Continued).

PERFORMANCE REQUIREMENTS **ASSESSMENT**

B.4.5 Mechanical Loading Test

B.4.5.2 Loading Procedures

Point of application of load

10. Roller cam (upper locking jambs)

    Standard loading case used: 6
    Load applied in plane: 1.5kN along edge in a direction to disengage the cam
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

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

11. Shoot bolt (head of slave leaf)

    Standard loading case used: 3
    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

12. Shoot bolt (head of master leaf)

    Standard loading case used: 3
    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

13. Hinge (upper left jamb)

    Standard loading case used: 1
    Loads 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 10 seconds

14. Hinge (centre left jamb)

    Standard loading case used: 1
    Loads 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 10 seconds

15. Hinge (lower left jamb)

    Standard loading case used: 1
    Loads 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 10 seconds

No entry effected Pass

Test Results (Continued).

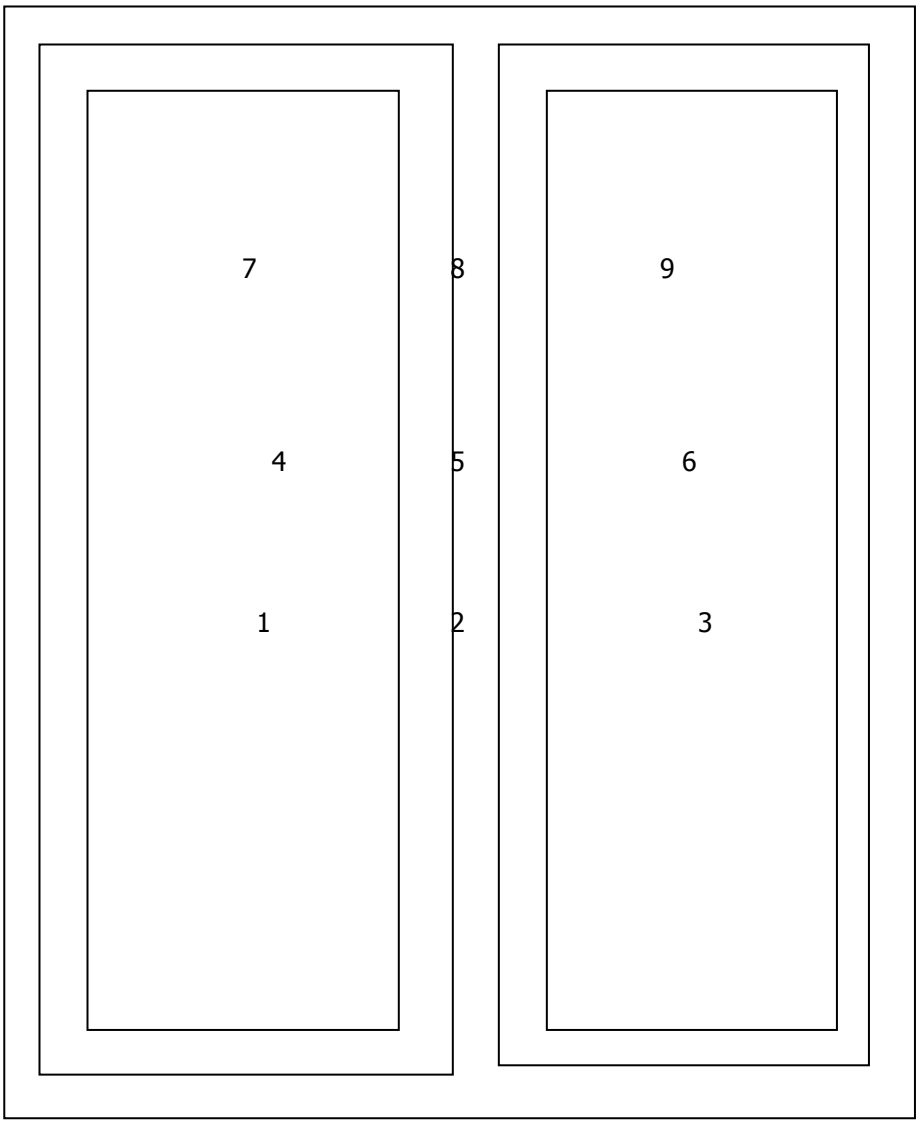
PERFORMANCE REQUIREMENTS

B.4.8 Soft Body Impact Test **ASSESSMENT**

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 point 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

B.4.8 Soft Body Impact Test **ASSESSMENT**

Impact point	Position from floor level	Effect
1	0.80m Master	None
2	0.80m False mullion	None
3	0.80m Slave	None
4	1.25m Master	None
5	1.25m False mullion	None
6	1.25m Slave	None
7	1.7m Master	None
8	1.7m False mullion	None
9	1.7m Slave	None

No entry effected Pass

Test Results (Continued).

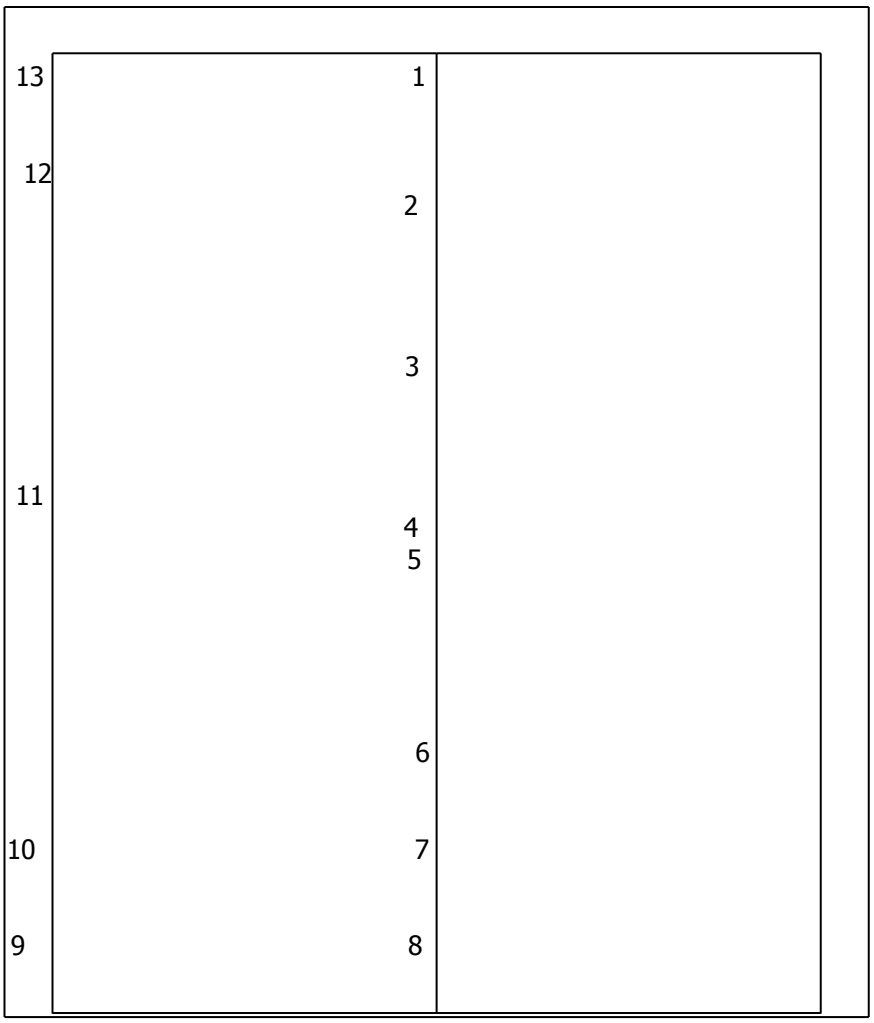
PERFORMANCE REQUIREMENTS

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, B.4.9.2.3 using procedure B.4.9.3, using the test apparatus detailed in B.11 using the impact sequence in figure B.14.

Diagram of points of application of loads



Test Results (Continued).

ASSESSMENT

PERFORMANCE REQUIREMENTS

B.4.9 Hard body impact test (continued)

Impact point	Position	Effect
1	Corner/Shoot bolt	None
2	Roller cam	None
3	Hook bolt	None
4	Hook bolt	None
5	Cylinder	None
6	Roller cam	None
7	Hook bolt	None
8	Corner/Shoot bolt	None
9	Corner	None
10	Hinge	None
11	Hinge	None
12	Hinge	None
13	Corner	None

No entry effected Pass

Test Results (Continued).

PERFORMANCE REQUIREMENTS	ASSESSMENT
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 objective 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 3 minutes.	
No alternative method of entry could be effected within 3 minutes	Pass
B.4.7 Additional Loading Test	
Not applicable as an alternative method of entry was not identified	

Test Results (Continued).

PERFORMANCE REQUIREMENTS

Annex A Security Hardware and Cylinder Test and Assessment

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 objective of this Annex using the procedure detailed in Annex A.3.1 and the tools described in A.2.

The sample was closed and locked and the key removed.

The total attack time was 3 minutes and the total rest time was 7 minutes

No entry could be effected within 3 minutes Pass

Annex A.3.2 (Part 2)

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 objective of this Annex using the procedure detailed in Annex A.3.1 and the tools described in A.2

The sample was closed and locked and the key removed.

The total attack time was 3 minutes and the total rest time was 7 minutes

No entry could be effected within 3 minutes Pass

B.4.3 Letter Plates

None fitted

Product Description. (Weather testing samples 3, 4, 5, 6,)

1 off double leaf open in glaze in hinged door assembly with full glass infill and low threshold (sample 3)
1 off double leaf open in glaze in hinged door assembly with full glass infill and standard threshold (sample 4)
1 off double leaf open out glaze in hinged door assembly with full glass infill and standard threshold (sample 5)
1 off double leaf open out glaze in hinged door assembly with full glass infill and low threshold (sample 6)

(Sample ID No 10156327)
Date samples received: 16 October 2015

Test Results.

1. Air permeability — Test sample 3, 4 and 5 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 4.

2. Watertightness — Test sample 3 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 3A.

   Test sample 4 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 7A.

   Test sample 5 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 8A.

3. Wind resistance — Test sample 3 met the requirements of the Specification, in respect of Clause 8, for Exposure Category Class A3

Classification for Wind Resistance.

Test sample 3	Exposure Category 1200Pa

4. Operational Strength — Test sample 3 met the requirements of the Specification in respect of BS 6375-2

Classification 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 (sample 4)	50,000 complete on active leaf, 10,000 slave leaf

5. Basic security — Test sample 3 met the requirements of BS6375-3

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.

CLAUSE 5 SEQUENCE OF TESTS

The sequence of testing the samples followed that detailed in Clause 5 of BS6375-1:2009.

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 standard BS EN 12046 – 2.

2. Air Permeability

The air permeability of the sample was determined by the method given in BS 6375-1:2009.

3. Watertightness

The watertightness of the sample was determined by the method given in BS 6375-1:2009.

4. Wind Resistance

The wind resistance of the samples was determined by the methods (P1 and P2) given in BS 6375-1:2009.

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 6375-1:2009.

7. Resistance to Vertical Loads

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

8. Resistance to Static Torsion

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

9. Soft and heavy body impact

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

10. Hard body impact

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

11. Closure against obstruction

The Closure against obstruction was carried out using the method given in BS 6375-3

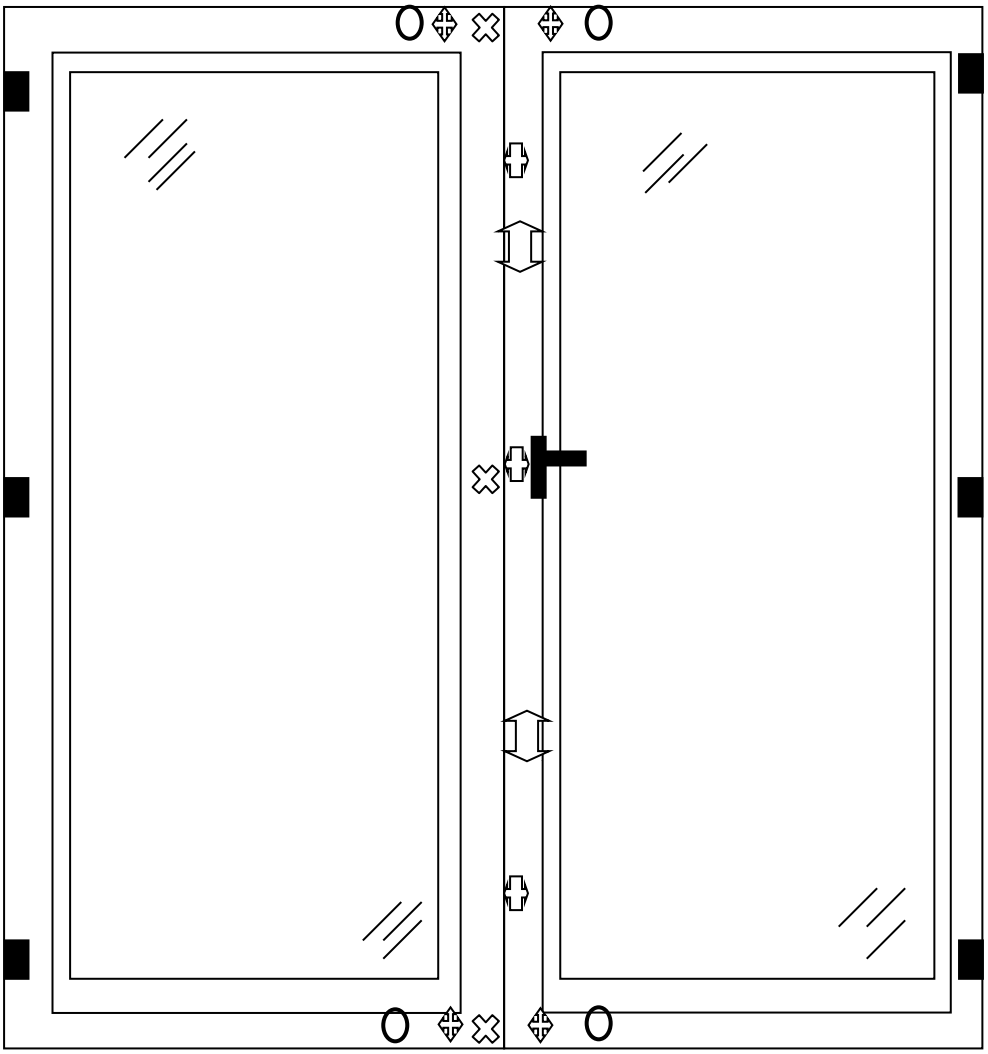
12. Basic security

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

Description of Samples. (sample 3)

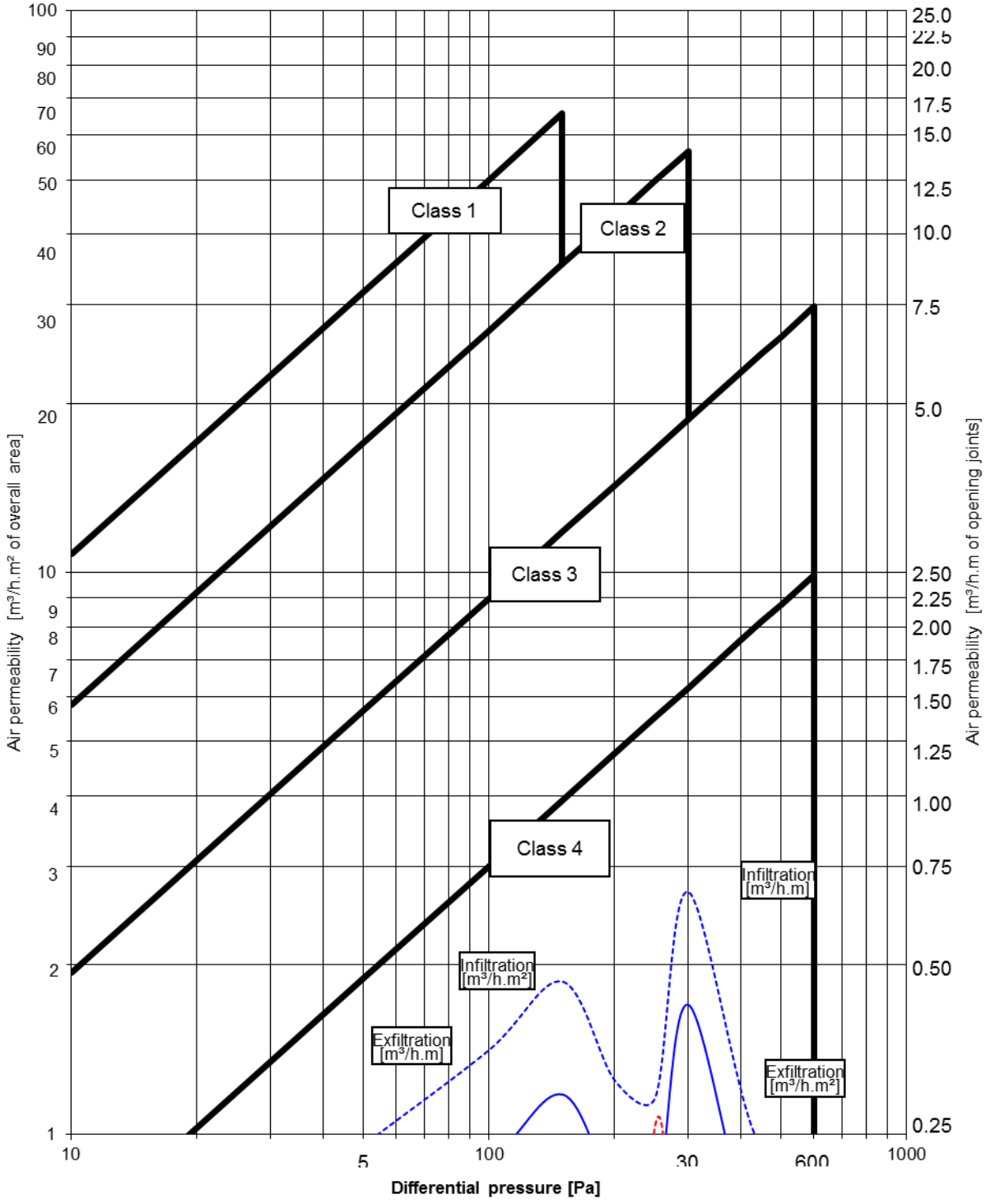
Sample type -	Double leaf open in glaze in door assembly with full glass infill and low threshold
Material -	Aluminium alloy
Finish -	Painted white
Fittings -	**Master leaf** A seven point FUHR Multipoint key locking hardware (two shoot bolts, two hook bolts, two roller cams and one dead bolt) cylinder, handle and three SFS pin hinges **Slave leaf** A two point Multipoint key locking hardware (two shoot bolts) cylinder and three pin hinges
Weathersealing -	Double sealed plastic weather-strip and brush pile
Glass -	Double glazed with 6-16-6 mm toughened glass sealed units
Panel -	Not applicable
Glass retention system -	Internal beads and gasket
Sample dimensions -	Overall - Length: 1800mm Height: 2400mm Active Leaf - Length: 865mm Height: 2350mm Slave Leaf - Length: 875mm Height: 2350mm
Date of test -	17 July 2015
Laboratory temperature -	22.9 °C
Laboratory humidity -	63.0 %

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating position of hardware)



- hinge
- shootbolt
- handle
- cam
- run up block
- hook bolt
- Transducer placement

GRAPH OF AIR PERMEABILITY BEFORE GUSTING



AIR PERMEABILITY TEST RESULTS - BS 6375-1:2009 Clause 6 / BS EN 1026:2000

Clause 6 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	1.0	0.12	0.24
100	3.7	0.42	0.85
150	4.9	0.56	1.14
200	8.1	0.92	1.87
250	10.6	1.20	2.45
300	15.0	1.71	3.48
450	14.1	1.61	3.27
600	16.9	1.92	3.91

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 = 8.79m

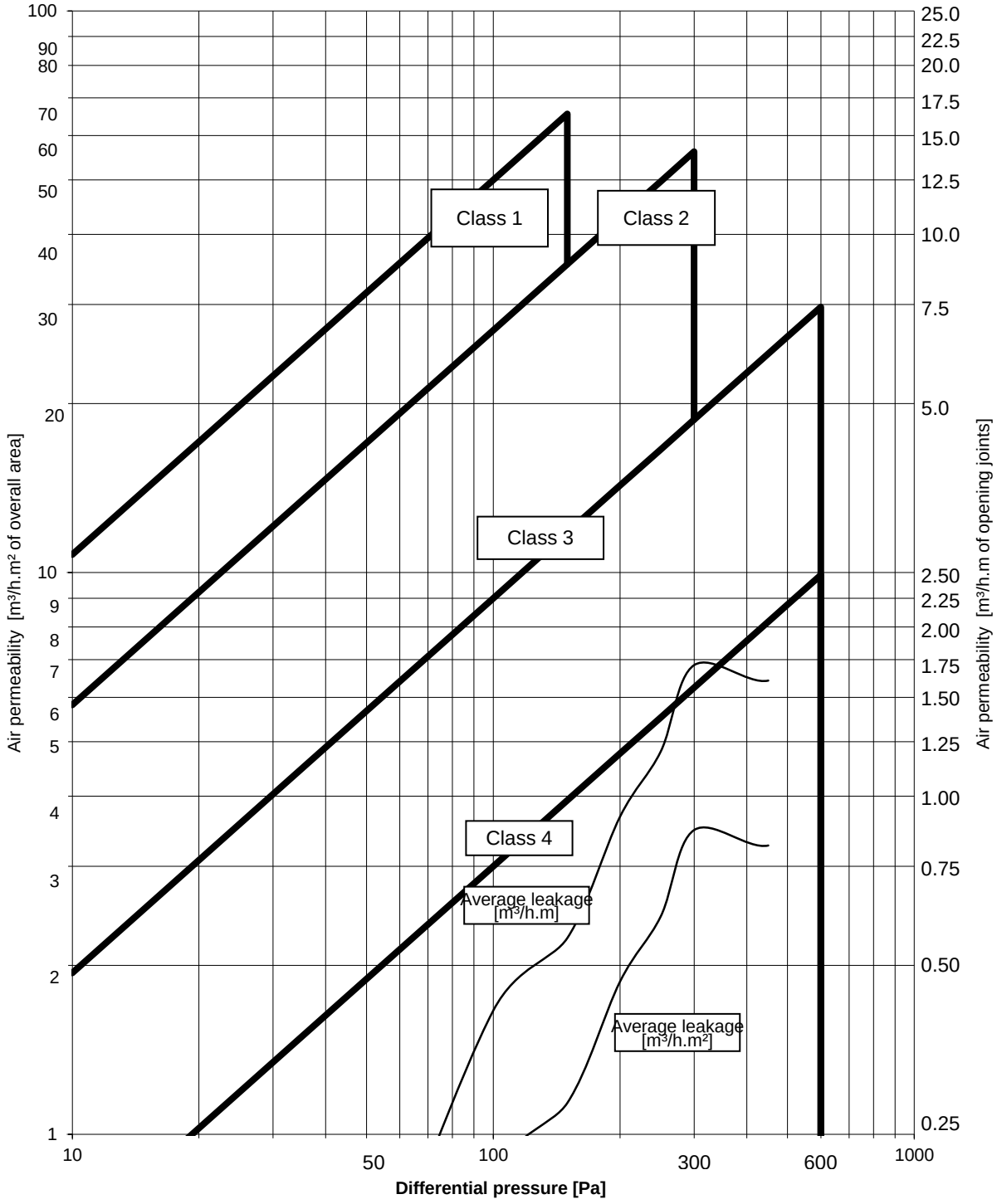
Overall area = 4.32m^2

BS 6375-1:2009 Clause 6.2 - Joint class = 3

BS 6375-1:2009 Clause 6.2 - Area class = 4

BS 6375-1:2009 Clause 6.2 - Overall class = 4

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

Air pressure (Pa)	Point at which water leakage occurred
150	water ran out and over from the threshold opening joint (false mullion)

WIND LOAD

RESISTANCE TEST RESULTS - BS EN 12211:2000

Clause 8 Resistance to wind load

P1 DEFLECTION TEST

Three positive pressure pulses at 1320Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a positive air pressure of 12000Pa.

Actual deflection – 4.60mm (maximum deflection allowed 13.40mm)

Deflection/span ratio 1/436 (maximum ratio allowed 1/150)

Three negative pressure pulses at 1320Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a negative air pressure of 1200Pa.

Actual deflection – 0.75mm (maximum deflection allowed 13.40mm)

Deflection/span ratio 1/2680 (maximum ratio allowed 1/150)

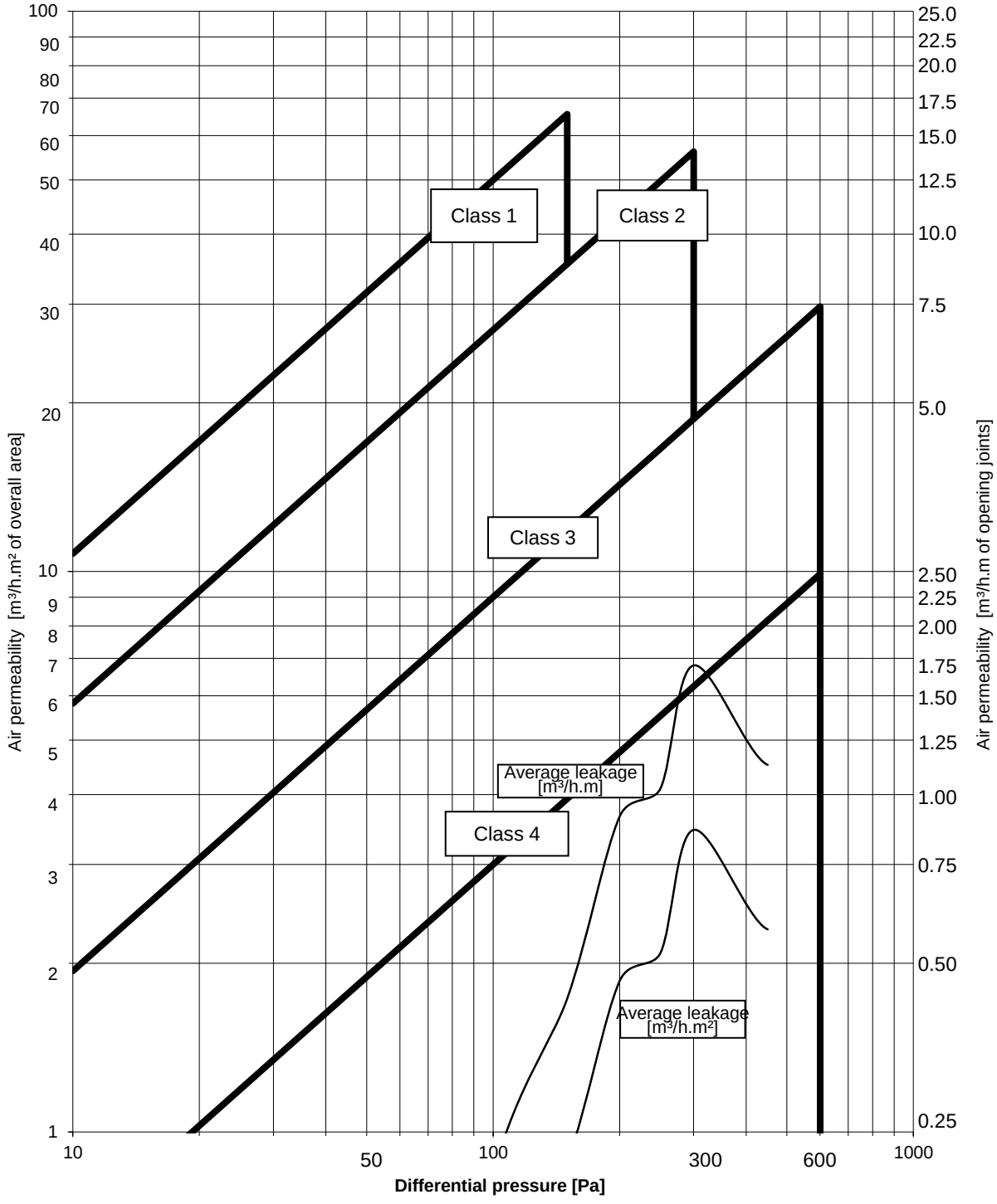
P2 REPEATED PRESSURE TEST

No visible failures or functional defects to the test sample were observed after 50 cycles of repeated wind loads applied at a positive air pressure of 600Pa.

No visible failures or functional defects to the test sample were observed after 50 cycles of repeated wind loads applied at a negative air pressure of 600Pa.

In accordance with BS 6375-1:2009 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. (see following Table).

GRAPH OF AVERAGE AIR PERMEABILITY AFTER GUSTING



AIR PERMEABILITY TEST RESULTS - BS 6375-1:2009 Clause 6 / BS EN 1026:2000

Clause 6 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	0.2	0.02	0.05
100	1.8	0.21	0.43
150	3.8	0.43	0.88
200	8.0	0.91	1.86
250	9.0	1.02	2.08
300	14.9	1.70	3.46
450	9.9	1.13	2.30
600	12.1	1.37	2.79

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 = 8.79m

Overall area = 4.32m^2

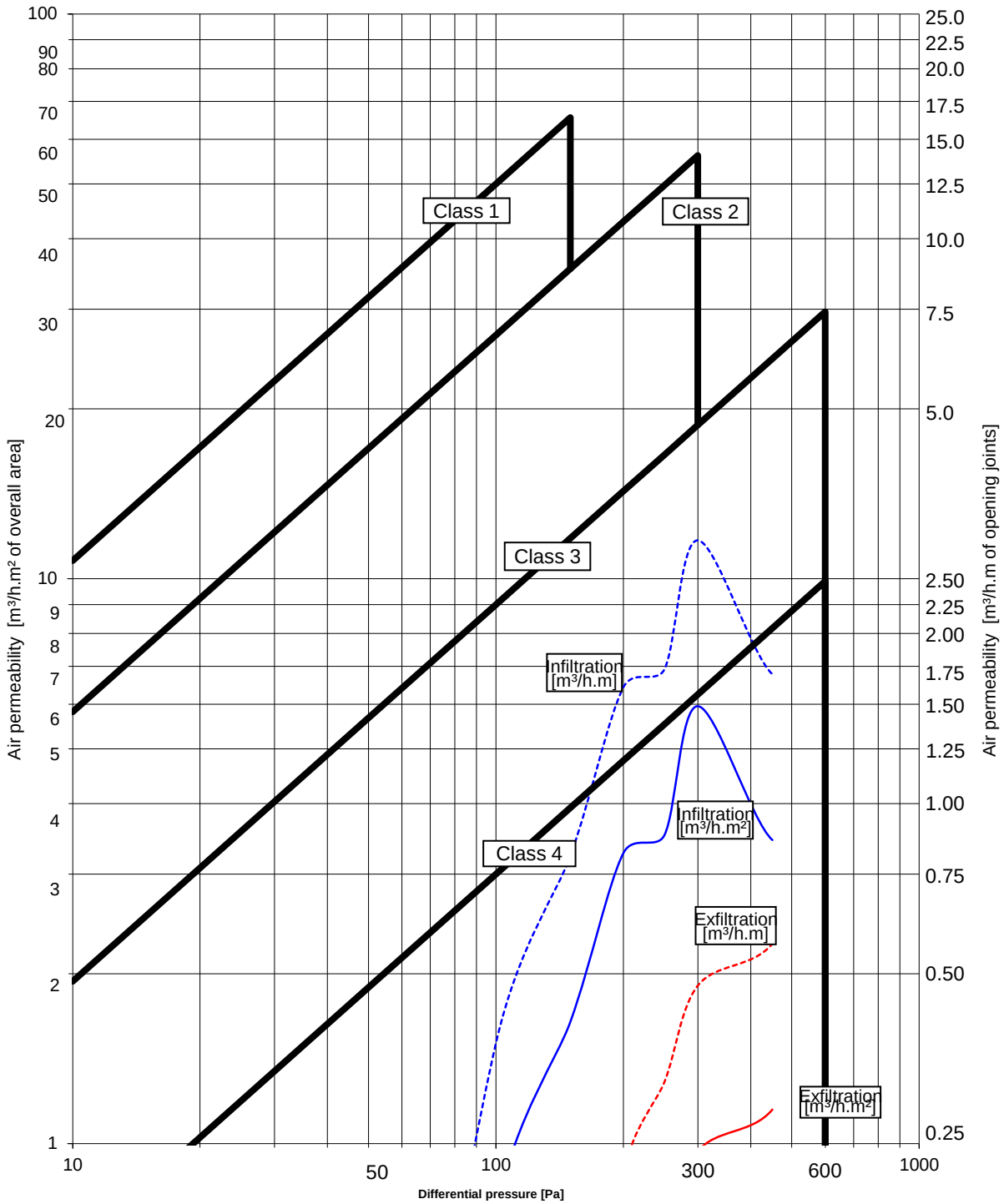
BS 6375-1:2009 Clause 6.5 - Joint class = 3

BS 6375-1:2009 Clause 6.5 - Area class = 4

BS 6375-1:2009 Clause 6.5 - Overall class = 4

In accordance with BS 6375-1:2009 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.

GRAPH OF AIR PERMEABILITY AFTER GUSTING



WIND LOAD RESISTANCE TEST RESULTS - BS EN 12211:2000.

P3 SAFETY TEST

No parts of the test sample became detached and the test sample remained closed after a wind load safety test 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 applied at a negative air pressure of 1800Pa

BS 6375-2:2009.

Clause 6
Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.2 Operating Forces: EN12046-2 and EN12217

The sample was tested three times, closing the leaf, handle, locking the key, unlocking the key, handle opening and maintaining the leaf to stay open, and highest of the three results were then recorded.

Closing leaf force – 32.10N (maximum 75N)	Pass
Handle closing – 97.30N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.25N (maximum 20N)	Pass
Handle opening – 90.40N (maximum 100N)	Pass
Force to maintain opening – 29.05N (maximum 75N)	Pass

Clause 6.3.1 Vertical Load.

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

The diagonal measurement of door was measured to the nearest 1mm (hinge bottom to lockside top corner)

A pre-load of 200± 4N using weights vertically to the top of the lock side corner of the door leaf, at 50± 5mm from the opening edge, and maintained for 60± 5s, then removed and left to rest for a further 60± 5s.

The gauge was zeroed then to the same loading point (Class1) 400N was applied for 300s ± 5s, a maximum deformation measurement was taken

The load was removed and after 180± 5s the residual deflection measurement was taken, along with the diagonal measurement.

Pre diagonal measurement -	2500mm
Maximum deformation –	6.5mm
Residual measurement –	0.90,m
Diagonal measurement –	2500mm

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

BS 6375-2:2009.

Clause 6
Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.3.2 Resistance to static torsion.

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

The door leaf was opened to 90° then fixed at the top lockside 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 lockside corner, at 50± 5mm from the edge, then maintained for 60± 5s.

After 1 minute the gauge was zeroed and loaded to (Class 1) 200N for 300s ± 5s, the maximum deformation was taken, the load was taken off and left to rest for 180s ± 5s, the residual measurement was then taken.

Maximum deformation – 6.8mm

Residual measurement – 0.01mm

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

Clause 6.3.3 Soft and Heavy body Impact .

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, then the deviation was measured again

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

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

Residual measurement – 0mm Pass

BS 6375-2:2009.

Clause 6
Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.3.4 Hard body Impact.

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 side was impacted.

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

Mean of the Diameter – 5.00mm

Mean of the depth – 0.10m

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

Clause 6.4 Load bearing capacity of safety devices.

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 small toys, which may be accidentally trapped between the frame and leaf.

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 5 times and the operating forces were taken Pass

BS 6375-2:2009.

Clause 6
Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.2 Operating Forces: EN12046-2 and EN12217

The sample was tested three times, closing the leaf, handle, locking the key, unlocking the key, handle opening and maintaining the leaf to stay open, and highest of the three results were then recorded.

Closing leaf force – 34.65N (maximum 75N)	Pass
Handle closing – 88.55N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 82.45N (maximum 100N)	Pass
Force to maintain opening – 29.35N (maximum 75N)	Pass

Basic security (Annex A) .
BS 6375: Part 3: 2009 - Performance of windows

The objective of this test is to establish from 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 and the test did not exceed the maximum 3 minute time period.

The screwdriver was used to no effect

No entry could be effected Pass

Photograph of Sample.

Description of Samples. (sample 4)

Sample type - Double leaf open in glaze in door assembly with full glass infill and standard threshold

Material - Aluminium alloy

Finish - Painted white

Fittings -

Master leaf
A seven point FUHR Multipoint key locking hardware (two shoot bolts, two hook bolts, two roller cams and one dead bolt) cylinder, handle, three SFS pin hinges and for location wedges

Slave leaf
A two point Multipoint key locking hardware (two shoot bolts) cylinder and three pin hinges

Weathersealing - Double sealed plastic weather-strip and brush pile

Glass - Double glazed with 6-16-6 mm toughened glass sealed units

Panel - Not applicable

Glass retention system - Internal beads and gasket

Sample dimensions -

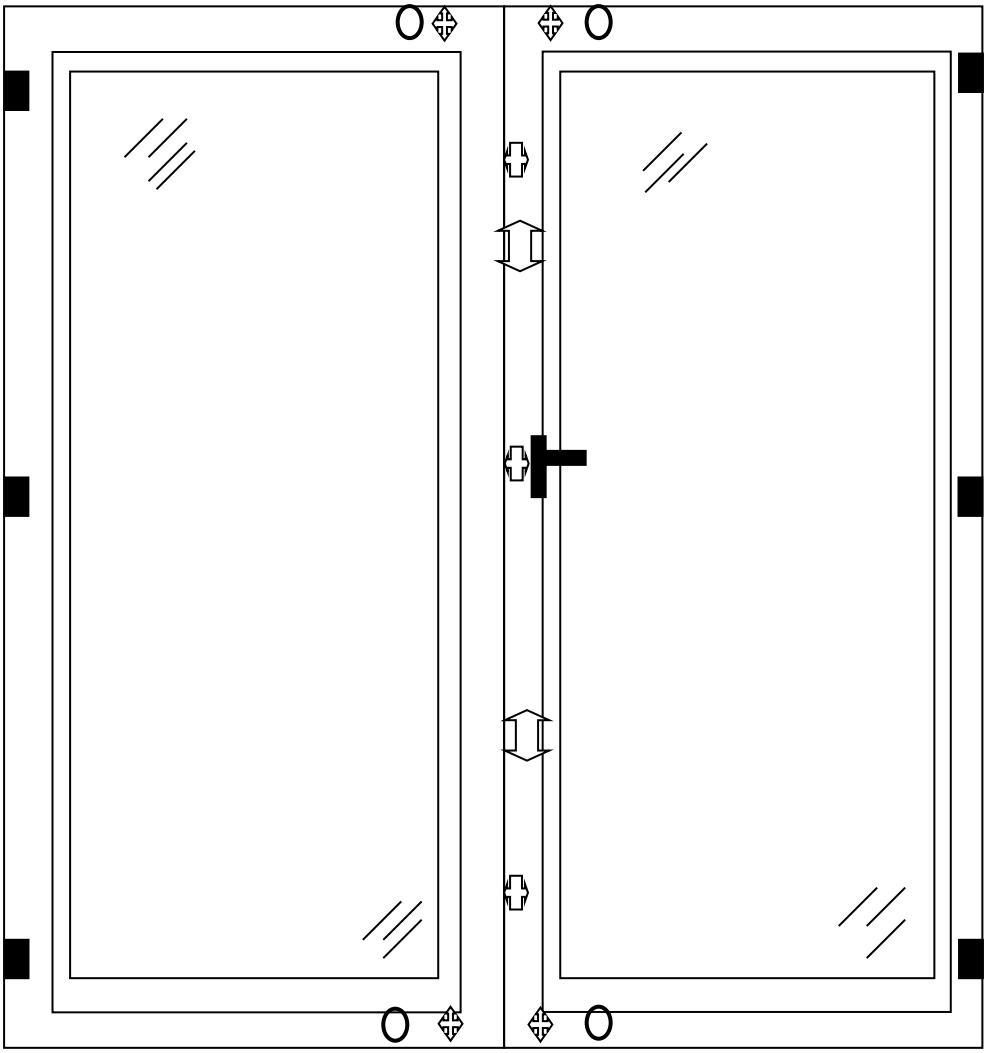
Overall -	Length: 1800mm	Height: 2400mm
Active Leaf -	Length: 865mm	Height: 2350mm
Slave Leaf -	Length: 875mm	Height: 2350mm

Date of test - 18 July 2015

Laboratory temperature - 22.9 °C

Laboratory humidity - 47.2 %

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating position of hardware)



- hinge
- shootbolt
- handle
- cam
- run up block
- hook bolt

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2009 / BS EN 1026:2000

Clause 13 Air Permeability

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

Table 1

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	0.5	0.06	0.12
100	0.5	0.06	0.11
150	0.6	0.07	0.15
200	1.2	0.13	0.27
250	1.0	0.11	0.23
300	1.4	0.16	0.32
450	1.6	0.18	0.37
600	2.5	0.28	0.58

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 = 8.79m

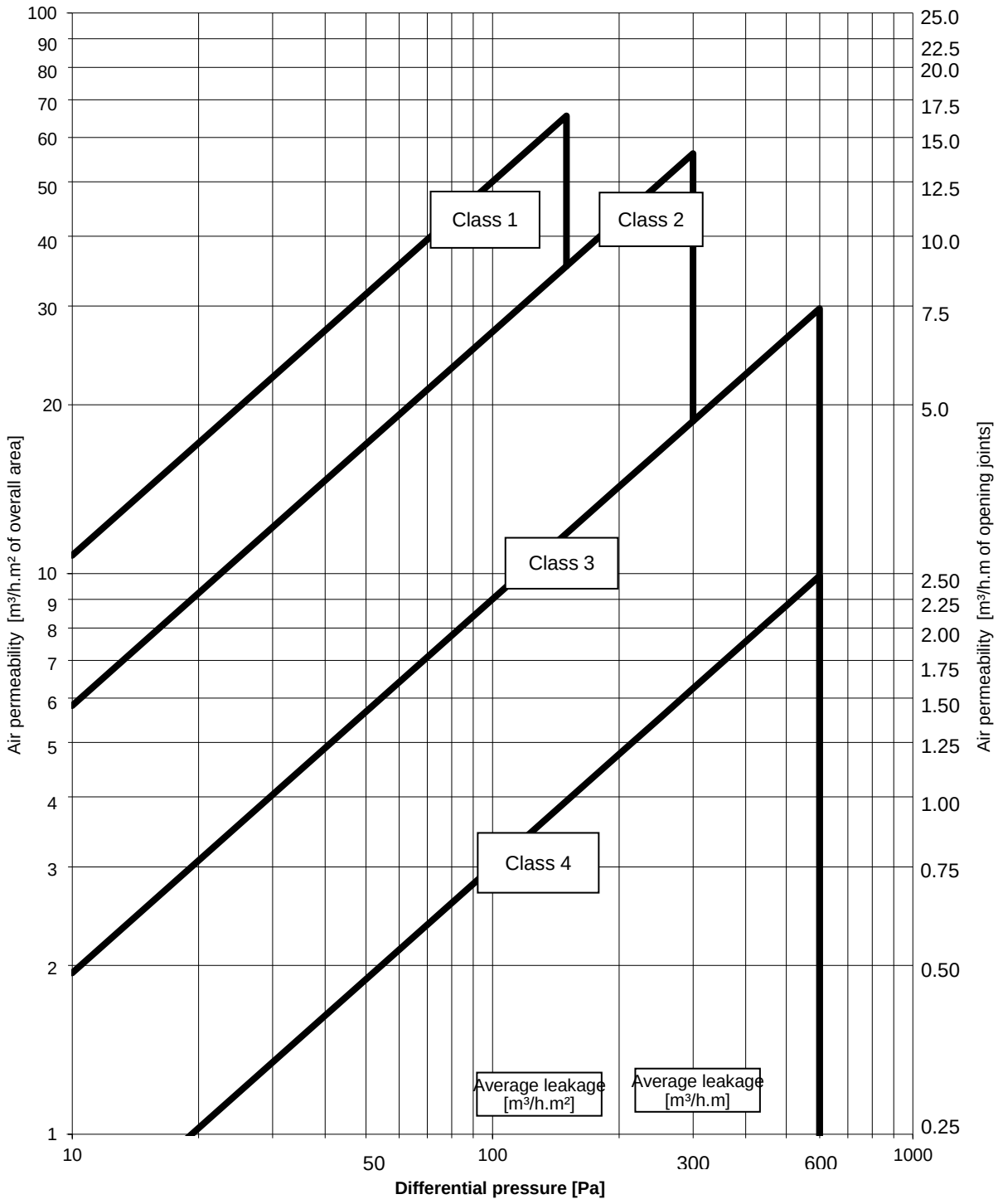
Overall area = 4.32m^2

BS 6375-1:2009 - Joint class = 4

BS 6375-1:2009 - Area class = 4

BS 6375-1:2009 - Overall class = 4

GRAPH OF AVERAGE AIR PERMEABILITY

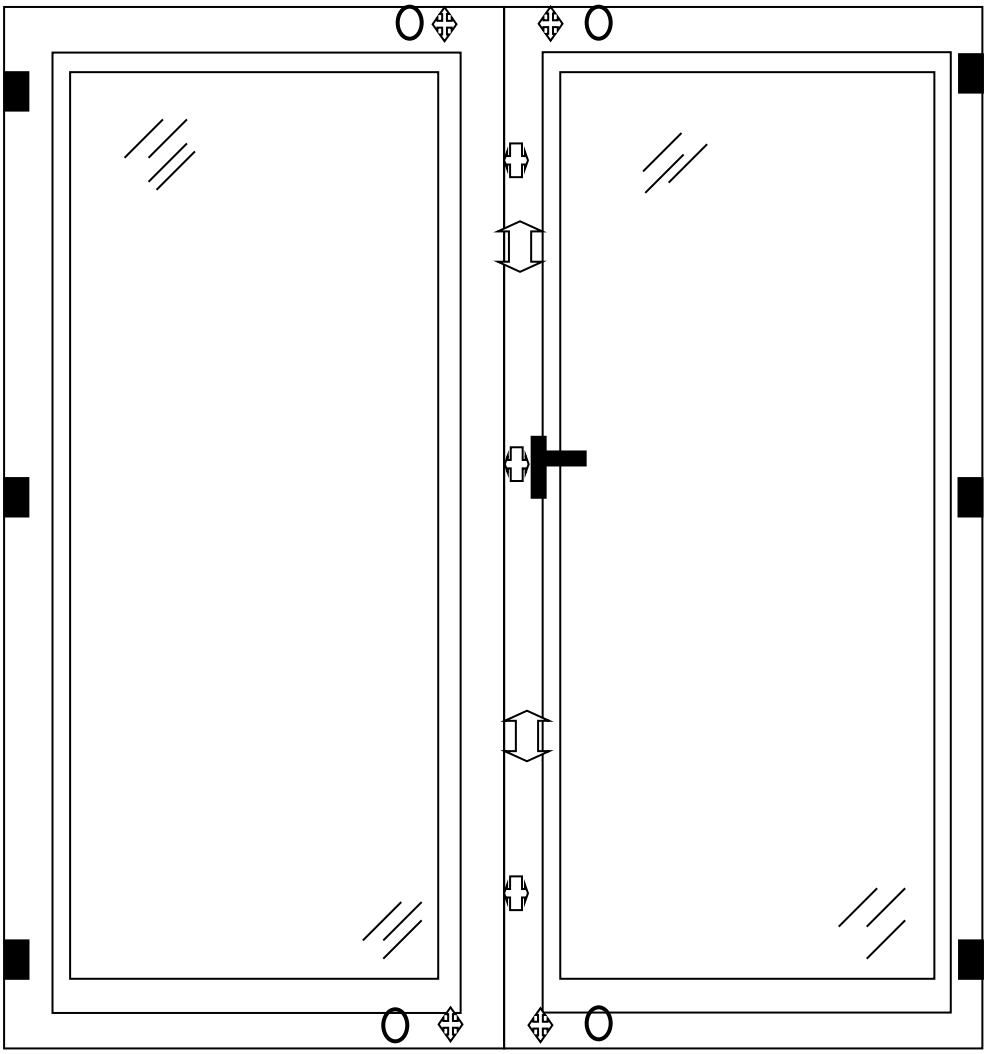


Photograph of Sample.

Description of Samples. (sample 5)

Sample type -	Double leaf open out glaze in door assembly with full glass infill and standard threshold
Material -	Aluminium alloy
Finish -	Painted white
Fittings -	**Master leaf** A seven point FUHR Multipoint key locking hardware (two shoot bolts, two hook bolts, two roller cams and one dead bolt) cylinder, handle, three SFS pin hinges and for location wedges **Slave leaf** A two point Multipoint key locking hardware (two shoot bolts) cylinder and three pin hinges
Weathersealing -	Double sealed plastic weather-strip and brush pile
Glass -	Double glazed with 6-16-6 mm toughened glass sealed units
Panel -	Not applicable
Glass retention system -	Internal beads and gasket
Sample dimensions -	Overall - Length: 1800mm Height: 2400mm Active Leaf - Length: 865mm Height: 2350mm Slave Leaf - Length: 875mm Height: 2350mm
Date of test -	18 July 2015
Laboratory temperature -	22.5 °C
Laboratory humidity -	45.6 %

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating position of hardware)



- hinge
- shootbolt
- handle
- cam
- run up block
- hook bolt

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2009 / BS EN 1026:2000

Clause 13 Air Permeability

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

Table 1

Air Pressure (Pa)	Average rate of air leakage [m³/h]	Average rate of air leakage per meter length of opening joint [m³/h.m]	Average rate of air leakage relative to area of sample [m³/h.m²]
50	0.2	0.03	0.06
100	0.2	0.03	0.06
150	0.4	0.04	0.09
200	0.3	0.04	0.08
250	0.8	0.09	0.19
300	0.8	0.09	0.19
450	0.9	0.10	0.20
600	1.6	0.18	0.37

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 = 8.79m

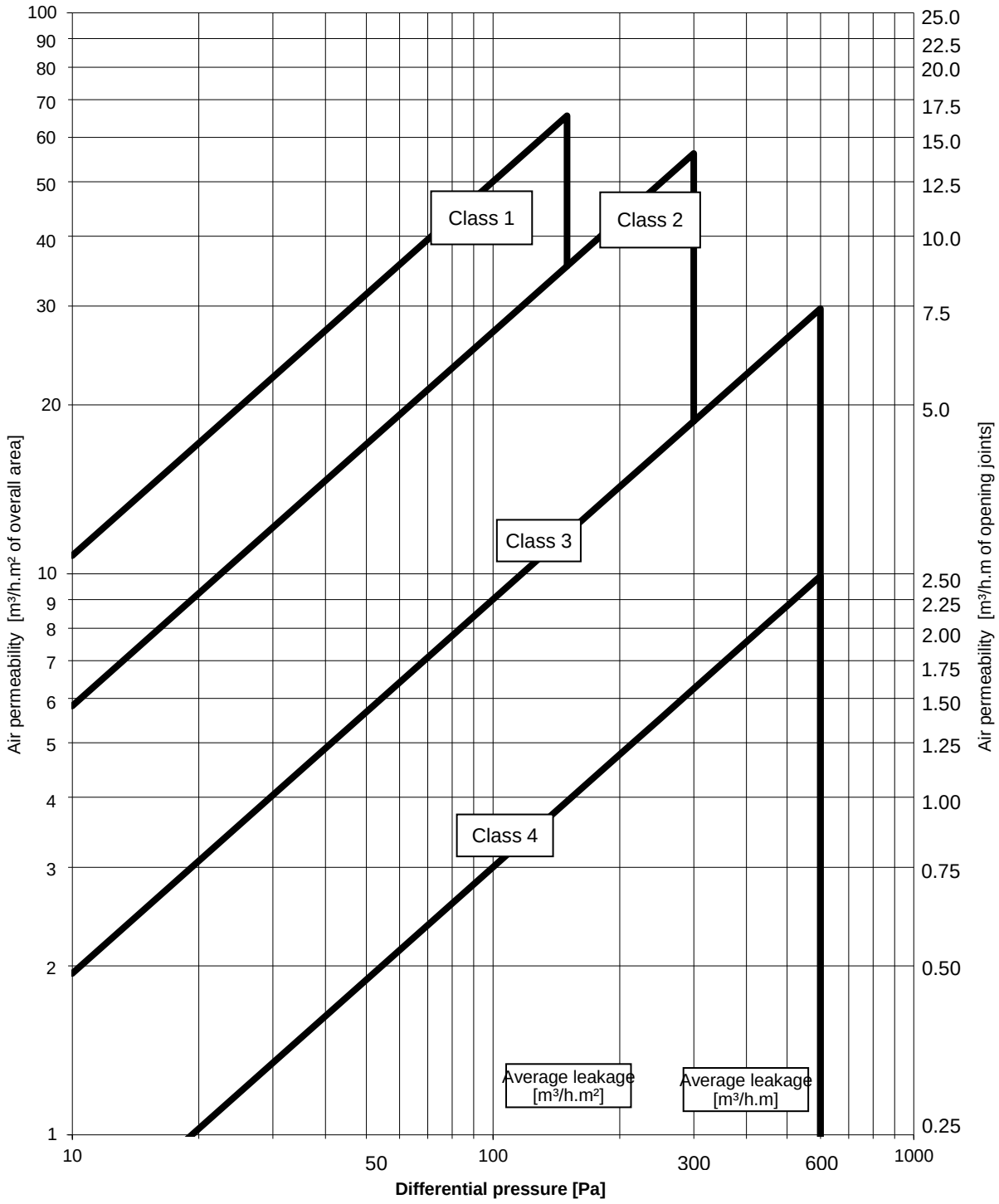
Overall area = 4.32m²

BS 6375-1:2009 - Joint class = 4

BS 6375-1:2009 - Area class = 4

BS 6375-1:2009 - Overall class = 4

GRAPH OF AVERAGE AIR PERMEABILITY



Photograph of Sample.

BS 6375-2:2009. (Sample 6)

Clause 6 Performance characteristics and requirements for pedestrian doorsets Assessment

Clause 6.5 Repeated opening and closing

The sample was opened and closed 5 times before testing started
A procedure was followed

Key rotation of key to unlock: 360 degrees

Clause 6.2 Operating Forces: EN12046-2 and EN12217 (pre test operation)

The sample was tested three times, closing the leaf, handle, locking the key, unlocking the key, handle opening and maintaining the leaf to stay open, and average of the three results were then recorded.

Active leaf tested for 50000 cycles

Closing leaf force – 32.50N (maximum 75N)	Pass
Handle closing – 85.20N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 88.95N (maximum 100N)	Pass
Force to maintain opening – 26.20N (maximum 75N)	Pass

At 25% of the complete cycles the Operating forces were taken again

Closing leaf force – 32.65N (maximum 75N)	Pass
Handle closing – 85.15N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 89.10N (maximum 100N)	Pass
Force to maintain opening – 29.80N (maximum 75N)	Pass

Before the testing was restarted the sample was lubricated and no visible movement from the datum points were detected

BS 6375-2:2009.

Clause 6 Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.5 Repeated opening and closing

At 50% of the complete cycles the Operating forces were taken again

Closing leaf force – 31.95N (maximum 75N)	Pass
Handle closing – 84.60N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 89.00N (maximum 100N)	Pass
Force to maintain opening – 30.10N (maximum 75N)	Pass

Before the testing was restarted the sample was checked and no visible movement from the datum points were detected

At 75% of the complete cycles the Operating forces were taken again

Closing leaf force – 32.00N (maximum 75N)	Pass
Handle closing – 86.75N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 90.40N (maximum 100N)	Pass
Force to maintain opening – 30.20N (maximum 75N)	Pass

BS 6375-2:2009.

Clause 6 Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.5 Repeated opening and closing

Closing leaf force – 32.85N (maximum 75N)	Pass
Handle closing – 86.80N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 98.80N (maximum 100N)	Pass
Force to maintain opening – 28.55N (maximum 75N)	Pass

At 100% of the complete cycles the Operating forces were taken again

The sample met the requirements of the standard and remained within the forces for 50,000cycles

BS 6375-2:2009. (Sample 6)

Clause 6 Performance characteristics and requirements for pedestrian doorsets Assessment

Clause 6.5 Repeated opening and closing

The sample was opened and closed 5 times before testing started
A procedure was followed

Key rotation of key to unlock: 360 degrees

Clause 6.2 Operating Forces: EN12046-2 and EN12217 (pre test operation)

The sample was tested three times, closing the leaf, handle, locking the key, unlocking the key, handle opening and maintaining the leaf to stay open, and average of the three results were then recorded.

Slave leaf tested for 10,000 cycles

Closing leaf force – 26.75N (maximum 75N)	Pass
Handle closing – 70.10N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 65.40N (maximum 100N)	Pass
Force to maintain opening – 18.60N (maximum 75N)	Pass

At 25% of the complete cycles the Operating forces were taken again

Closing leaf force – 26.90N (maximum 75N)	Pass
Handle closing – 70.50N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 64.80N (maximum 100N)	Pass
Force to maintain opening – 19.50N (maximum 75N)	Pass

Before the testing was restarted the sample was lubricated and no visible movement from the datum points were detected

BS 6375-2:2009.

Clause 6 Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.5 Repeated opening and closing

At 50% of the complete cycles the Operating forces were taken again

Closing leaf force – 27.20N (maximum 75N)	Pass
Handle closing – 72.40N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 65.80N (maximum 100N)	Pass
Force to maintain opening – 21.70N (maximum 75N)	Pass

Before the testing was restarted the sample was checked and no visible movement from the datum points were detected

At 75% of the complete cycles the Operating forces were taken again

Closing leaf force – 28.00N (maximum 75N)	Pass
Handle closing – 74.65N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 66.90N (maximum 100N)	Pass
Force to maintain opening – 23.70N (maximum 75N)	Pass

BS 6375-2:2009.

Clause 6 Performance characteristics and requirements for pedestrian doorsets **Assessment**

Clause 6.5 Repeated opening and closing

Closing leaf force – 30.70N (maximum 75N)	Pass
Handle closing – 75.30N (maximum 100N)	Pass
Key force to lock – 0.10N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 68.45N (maximum 100N)	Pass
Force to maintain opening – 25.60N (maximum 75N)	Pass

At 100% of the complete cycles the Operating forces were taken again

The sample met the requirements of the standard and remained within the forces for 10,000cycles

*** End of Report ***