



# Test Report 8421006.


## 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
<b>Job number:</b> 8421006 Job type: Testing Samples Submitted Start Date: 14/12/2015 Test type: Type Sample ID: 10158568 <b>Registration:</b> KM 530838 Scheme: BS 4873 / PAS24 Protocol: PP519 Scheme Mgr: Lorraine Balch Quality system: ISO 9001:2008	Smart Systems Limited incorporating Smart Extrusions Arnolds Way Yatton BS49 4QN United Kingdom

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

Approved For Issue	
	Issue Date: 11 July 2016

## Objectives.

Type test for product certification

## Product Scope.

Eco Futural Aluminium Alloy Double Doors

## Report Summary.

The samples were received on 10 December 2015 and the testing was started on 14 December 2015.

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

## Test Samples.

Sample Id	ER Number	Description
1	10158568	Double leaf Aluminium Alloy doors

## Description of Test Samples.

Sample Description
3 off open in glaze in hinged door assemblies with full glass infill and low threshold
1 off open in glaze in hinged door assemblies with full glass infill and standard threshold
1 off open in glaze out hinged door assemblies with full glass infill and standard threshold

## Test Requirements.

BS4873/PAS24 Type Test

Clause	Requirements
<b>As required</b>	<b>Test and assessment</b> <i>See Table A – BS4873/PAS24 Type Test</i>

## Summary of Test Comments.

Clause	Comments
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## 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



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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

### Product Description. (Security samples 1 and 2)

2 off open in glaze in hinged door assemblies with full glass infill and low threshold.

(Sample ID No 10158568)

Date samples received: 10 December 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)

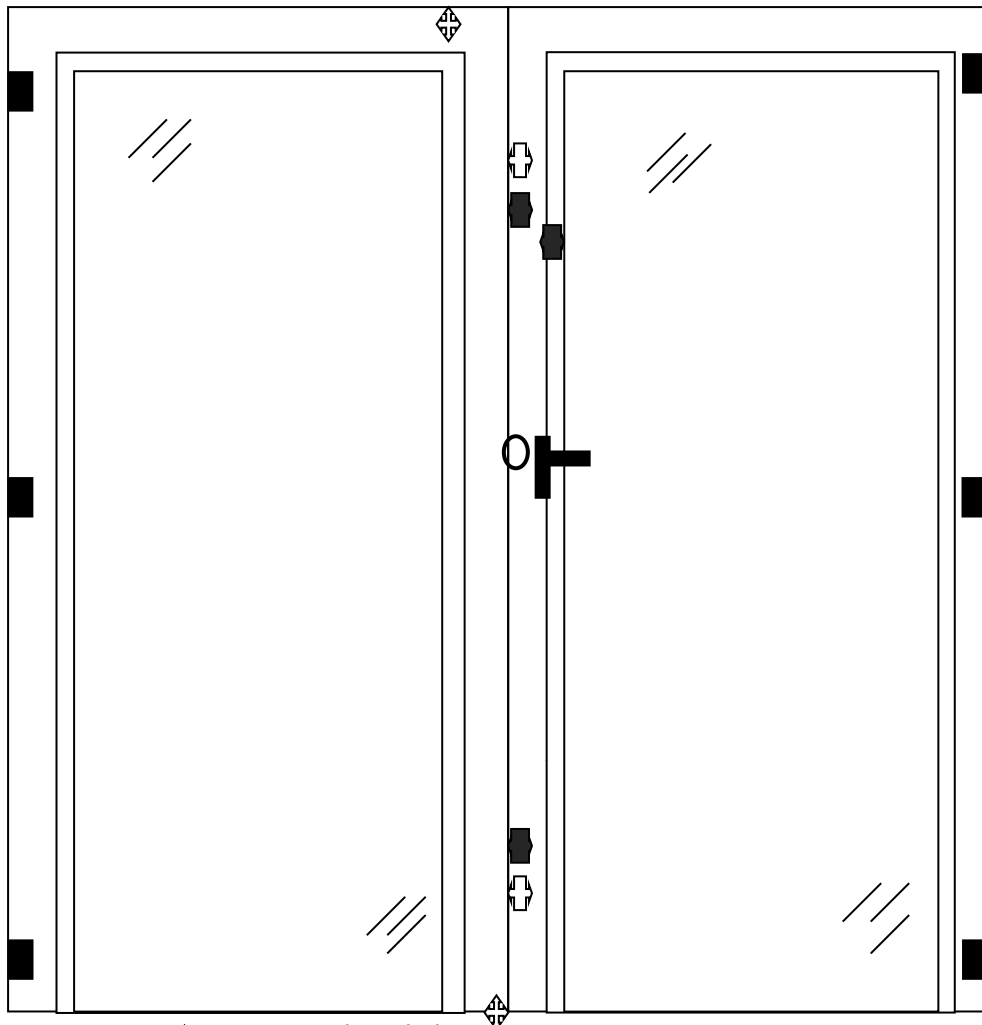
<b>Sample type -</b>	Double leaf open in glaze in door assembly with full glass infill and low threshold		
<b>Profile codes -</b>	OUTER FRAME - EF415. SASH - EF424. MEETING STILE - EF425. GLAZING BEAD - GL526. COVER PROFILE = EF422. BRUSH CARRIER - EF472. LOW THRESHOLD - EF493. THRESHOLD INSERT - VR023A		
<b>Material -</b>	Aluminium alloy		
<b>Finish -</b>	Painted white		
<b>Fittings -</b>	<p><b>Master leaf</b>          A seven point Sobinco Multipoint (D KT) key locking hardware (two hook bolts/bolts, two dead bolts and one hook bolt) Sobinco cylinder, Fapim handle and three Fapim lift off hinges</p> <p><b>Slave leaf</b>          A two point finger operated hardware (two shoot bolts), three lift off hinges</p>		
<b>Weathersealing -</b>	Double sealed plastic weather-strip		
<b>Glass -</b>	Double glazed with 6-18-6 mm toughened glass sealed units		
<b>Panel -</b>	Not applicable		
<b>Glass retention system -</b>	Internal beads and gasket		
<b>Sample dimensions -</b>	Overall -	Length: 2480mm	Height: 2460mm
	Active Leaf -	Length: 1250mm	Height: 2400mm
	Slave Leaf -	Length: 1180mm	Height: 2400mm
<b>Date of test -</b>	14 December 2015		
<b>Laboratory temperature -</b>	17.3 °C		
<b>Laboratory humidity -</b>	49.6 %		







## Description of Samples Continued. (samples 1 and 2)

### Accessory List -

GLAZING SUPPORT - ACEF057.  
FRAME CLEAT - ACEF810.  
FRAME CLEAT - ACEF812.  
SASH CLEAT - ACEF810.  
SASH CLEAT - ACEF814.  
SASH CLEAT - ACEF817.  
END CAP - ACEF854.  
END CAP - ACEF855.  
KEEP GUIDE - ACEF860.  
DOOR HANDLE - ACFA120.  
DRAIN CAP - ACGSL 045.  
SHOOT BOLT - ACGT 430.  
SHOOT BOLT RODS - ACVL127.  
SHOOT BOLT KEEPS - ACVL434.  
CYLINDER - ACMX01613.  
CYLINDER COVER - ACMX208.  
CYLINDER COVER - ACSZ400.  
DOOR HINGES - ACUN450.  
E GASKET - ACFT031N  
GLAZING WEDGE - ACFT033N.  
FLIPPER GASKET - ACVL 032N.  
MULTI POINT LOCKS - ACSZ550,551,552.  
CENTER KEEP - ACSZ650.  
TOP AND BOTTOM KEEPS - ACSZ651.  
THRESHOLD END PIECE - ACEF694.  
END PIECE FOR EF472 - ACEF872.WOOL PILE - ACVL033.  
ANTI LIFT BLOCKS - ACFT512.  
LOW THRESHOLD KEEP SUPPORT - ACEF 948.  
CLEAT GLUE - ACSIL013.  
SEALING GLUE - ACSIL04.  
RUBBER SEALANT - ACMX09830.

**ELEVATION DRAWING OF DOOR ASSEMBLY  
(indicating position of hardware)**



-  - shoot bolt
-  - handle
-  - dead bolt
-  - hook bolt
-  - Lift off hinges
-  - Hook bolt / Dead 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).

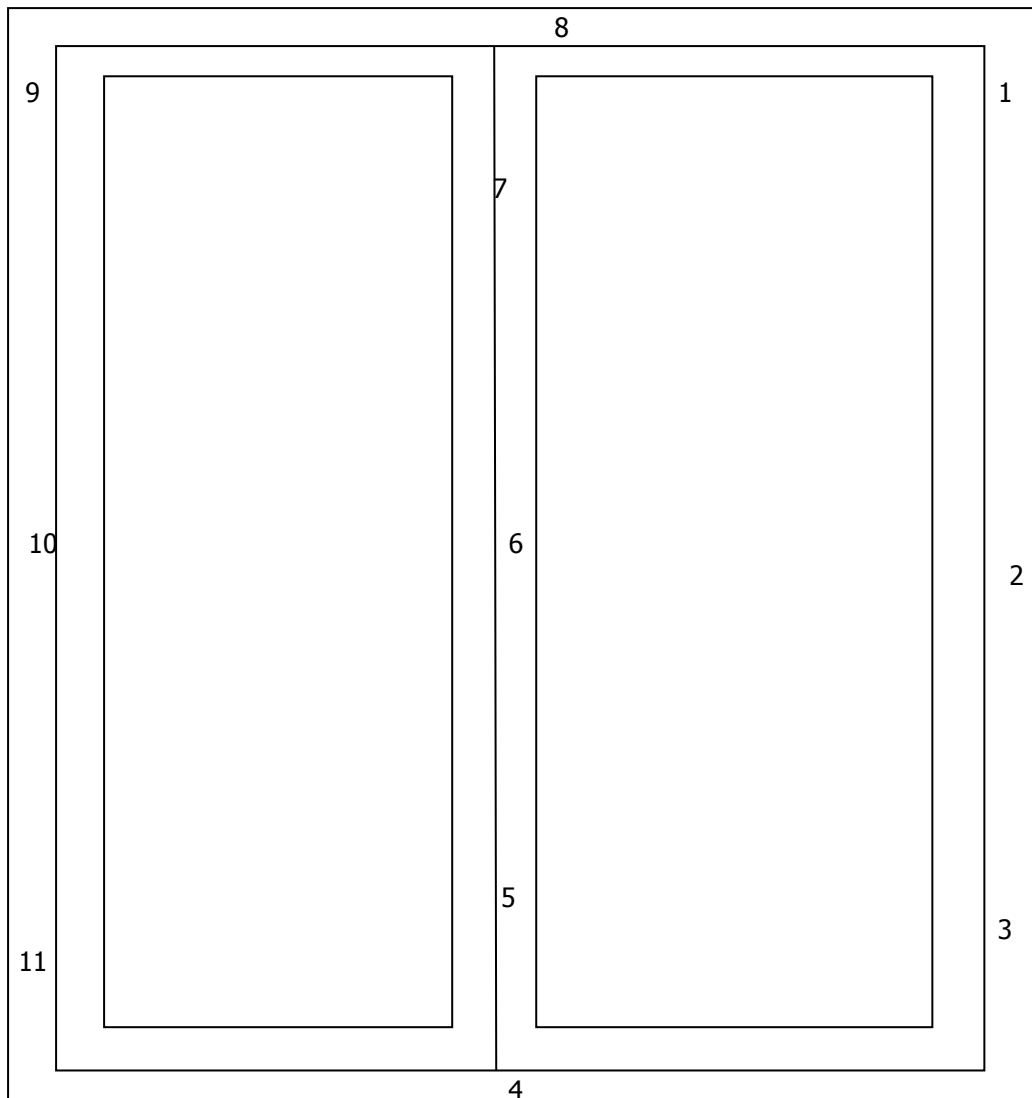
### PERFORMANCE REQUIREMENTS

#### 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: 2

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

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

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

2. Hinge (centre right jamb)

Standard loading case used: 2

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

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

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

3. Hinge (lower right jamb)

Standard loading case used: 2

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

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

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

## Test Results (Continued).

### PERFORMANCE REQUIREMENTS

### ASSESSMENT

#### B.4.5 Mechanical Loading Test

##### B.4.5.2 Loading Procedures

Point of application of load

5. Hook bolt/Bolt (lower locking jambs)

Standard loading case used: 4/6

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

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

6. Hook bolt/Bolt (lower locking jambs)

Standard loading case used: 4/6

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

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/Bolt (upper locking jambs)

Standard loading case used: 4/6

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

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. 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

## Test Results (Continued).

### PERFORMANCE REQUIREMENTS

#### B.4.5 Mechanical Loading Test

### ASSESSMENT

#### B.4.5.2 Loading Procedures

Point of application of load

9. Hinge (upper left jamb)

Standard loading case used: 2

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

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

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

10. Hinge (centre left jamb)

Standard loading case used: 2

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

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

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

11. Hinge (lower left jamb)

Standard loading case used: 2

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

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

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

No entry effected

Pass

# Test Results (Continued).

## PERFORMANCE REQUIREMENTS

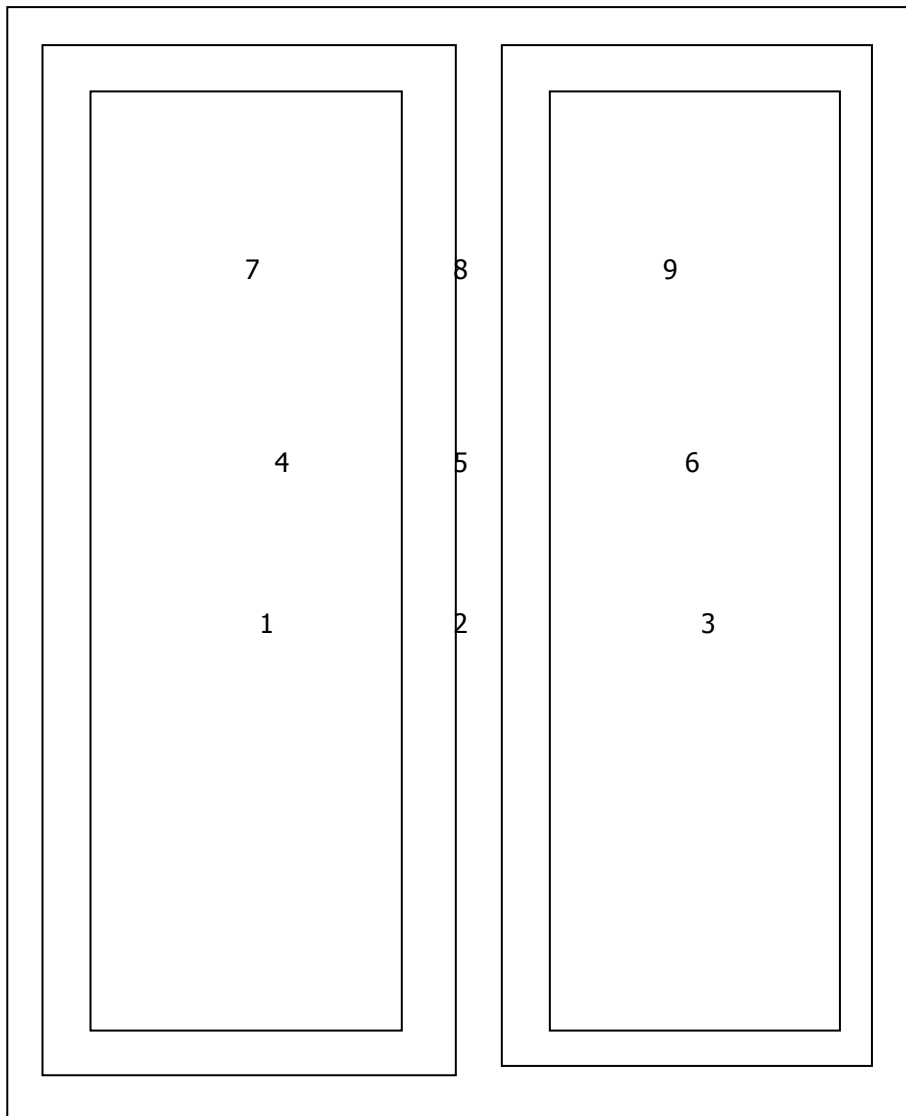
### B.4.8 Soft Body Impact Test

### 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).

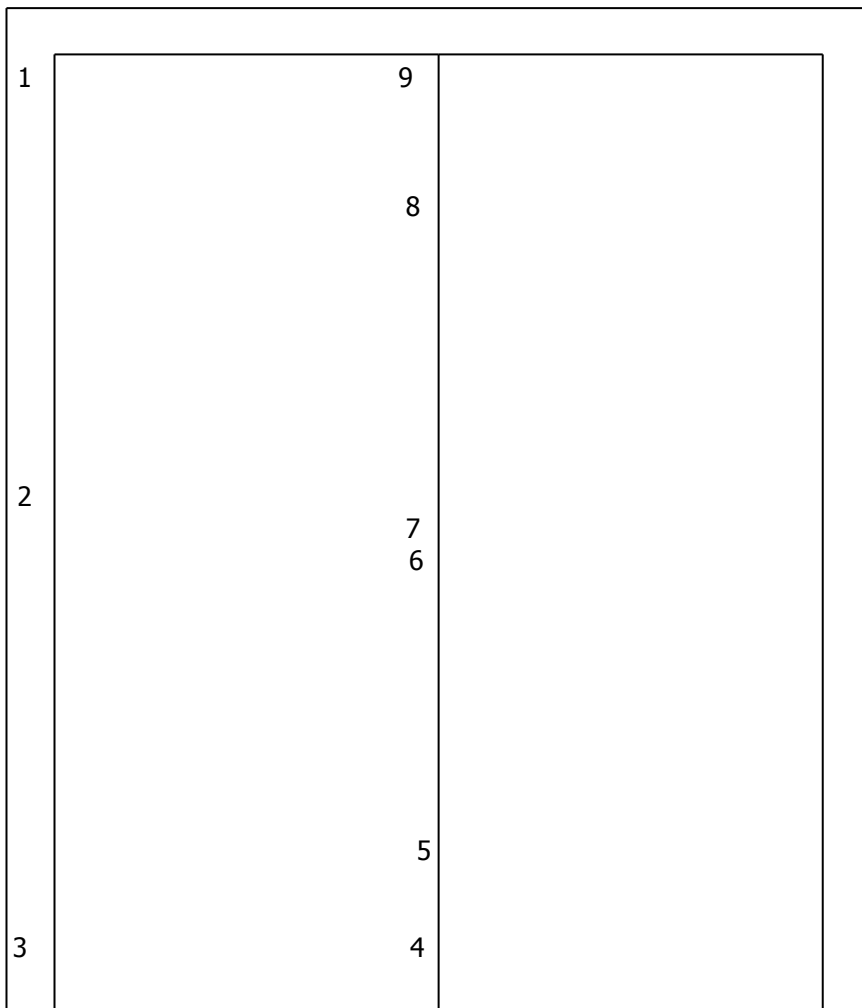
### PERFORMANCE REQUIREMENTS

#### 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/Hinge	None
2	Hinge	None
3	Corner/Hinge	None
4	Corner/Shootbolt	None
5	Hook bolt/Dead bolt / Deadbolt	None
6	Cylinder	None
7	Hook bolt	None
8	Hook bolt/Dead bolt / Deadbolt	None
9	Corner/Shootbolt	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)**

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)

(Sample ID No 10158568)

Date samples received: 10 December 2015

**Test Results.**

- 1. Air permeability                      Test sample 3 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 3.  
  
Test samples 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 4A.  
  
Test sample 4 met the requirements of the Specification, in respect of Clause 13, for Test Pressure Class 6A.  
  
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 and 4 met the requirements of the Specification, in respect of Clause 8, for Exposure Category Class A3

**Classification for Wind Resistance.**

Test sample 3 and 4	Exposure Category 1200Pa
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- 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 6)	50,000 Cycles

- 5. Basic security                      Test sample 3, 4 and 5 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 BS6375-1:2015.

**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 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 Sample. (sample 3)

<b>Sample type -</b>	Double leaf open in glaze in door assembly with full glass infill and low threshold		
<b>Profile codes -</b>	OUTER FRAME - EF415. SASH - EF424. MEETING STILE - EF425. GLAZING BEAD - GL526. COVER PROFILE = EF422. BRUSH CARRIER - EF472. LOW THRESHOLD - EF493. THRESHOLD INSERT - VR023A		
<b>Material -</b>	Aluminium alloy		
<b>Finish -</b>	Painted white		
<b>Fittings -</b>	<p><b>Master leaf</b>          A seven point Sobinco Multipoint (D KT) key locking hardware (two hook bolts/bolts, two dead bolts and one hook bolt) Sobinco cylinder, Fapim handle and three Fapim lift off hinges</p> <p><b>Slave leaf</b>          A two point finger operated hardware (two shoot bolts), three lift off hinges</p>		
<b>Weathersealing -</b>	Double sealed plastic weather-strip		
<b>Glass -</b>	Double glazed with 6-18-6 mm toughened glass sealed units		
<b>Panel -</b>	Not applicable		
<b>Glass retention system -</b>	Internal beads and gasket		
<b>Sample dimensions -</b>	Overall -	Length: 2480mm	Height: 2500mm
	Active Leaf -	Length: 1250mm	Height: 2400mm
	Slave Leaf -	Length: 1180mm	Height: 2400mm
<b>Date of test -</b>	17 December 2015		
<b>Laboratory temperature -</b>	19.6 °C		
<b>Laboratory humidity -</b>	48.9 %		

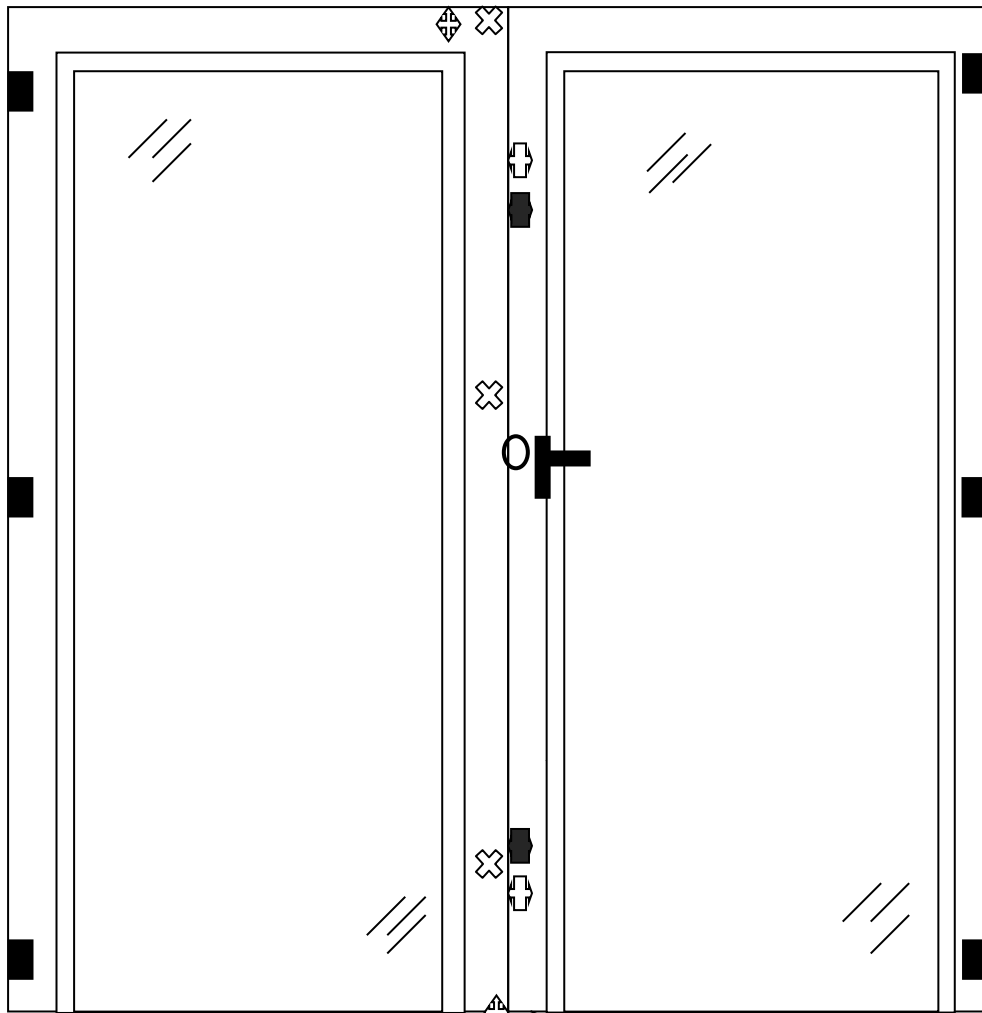
## Description of Sample Continued. (sample 3)








### Accessory List -

GLAZING SUPPORT - ACEF057.  
FRAME CLEAT - ACEF810.  
FRAME CLEAT - ACEF812.  
SASH CLEAT - ACEF810.  
SASH CLEAT - ACEF814.  
SASH CLEAT - ACEF817.  
END CAP - ACEF854.  
END CAP - ACEF855.  
KEEP GUIDE - ACEF860.  
DOOR HANDLE - ACFA120.  
DRAIN CAP - ACGSL 045.  
SHOOT BOLT - ACGT 430.  
SHOOT BOLT RODS - ACVL127.  
SHOOT BOLT KEEPS - ACVL434.  
CYLINDER - ACMX01613.  
CYLINDER COVER - ACMX208.  
CYLINDER COVER - ACSZ400.  
DOOR HINGES - ACUN450.  
E GASKET - ACFT031N  
GLAZING WEDGE - ACFT033N.  
FLIPPER GASKET - ACVL 032N.  
MULTI POINT LOCKS - ACSZ550,551,552.  
CENTER KEEP - ACSZ650.  
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THRESHOLD END PIECE - ACEF694.  
END PIECE FOR EF472 - ACEF872.WOOL PILE - ACVL033.  
ANTI LIFT BLOCKS - ACFT512.  
LOW THRESHOLD KEEP SUPPORT - ACEF 948.  
CLEAT GLUE - ACSIL013.  
SEALING GLUE - ACSIL04.  
RUBBER SEALANT - ACMX09830.

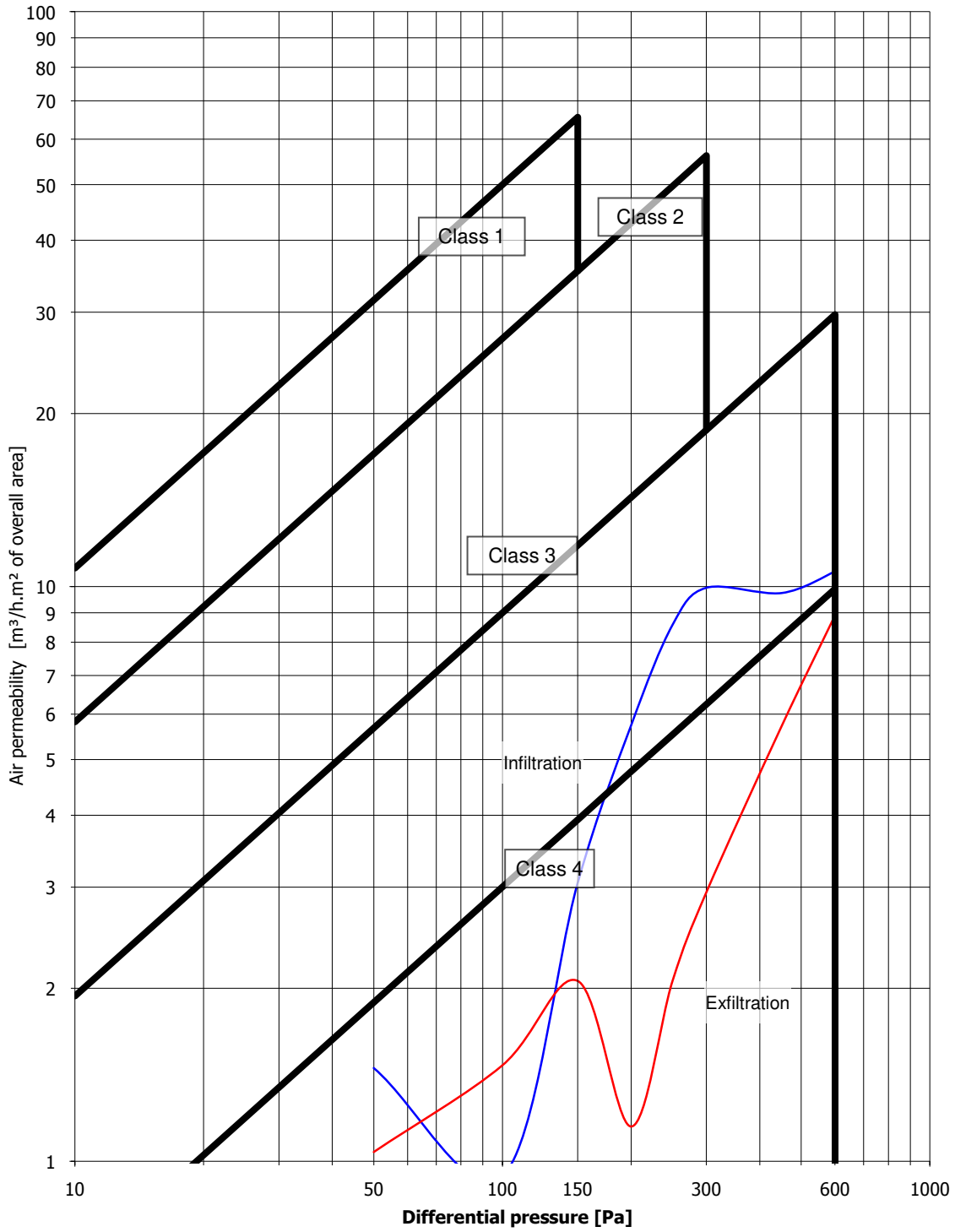


**ELEVATION DRAWING OF DOOR ASSEMBLY  
(indicating position of hardware)**



-  - shoot bolt
  -  - handle
  -  - dead bolt
  -  - hook bolt
  -  - Transducer placement
  -  - Lift off hinges
  -  - Hook bolt / Dead bolt
- Water Leakage

**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 \*\***

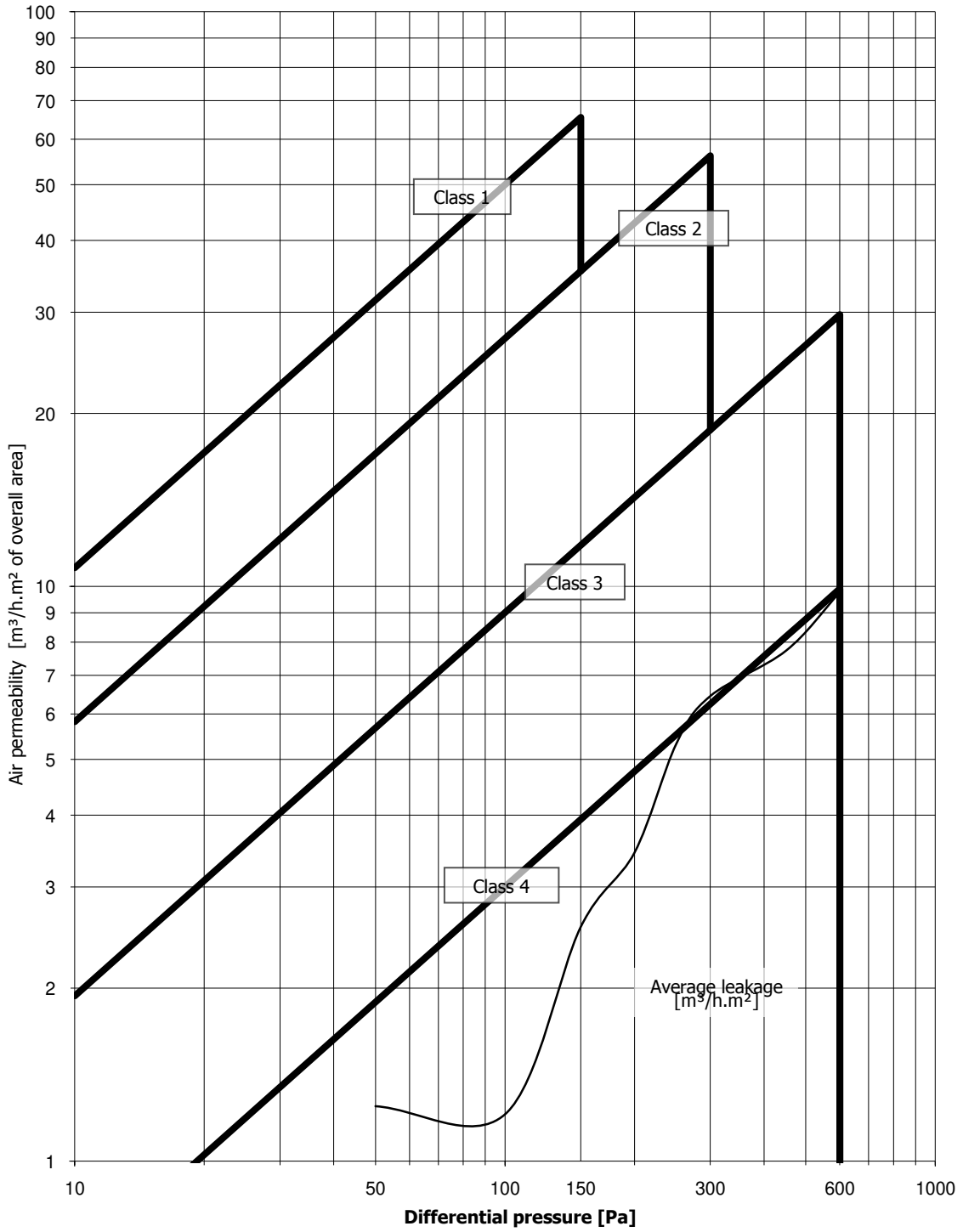
Air Pressure [Pa]	Average rate of air leakage [m <sup>3</sup> /h]	Average rate of air leakage relative to area of sample [m <sup>3</sup> /h.m <sup>2</sup> ]
50	7.7	1.2
100	7.5	1.2
150	15.8	2.6
200	21.3	3.4
250	33.0	5.3
300	40.0	6.4
450	47.9	7.7
600	60.5	9.8

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

Overall area = 6.2m<sup>2</sup>

BS 6375-1:2009 Clause 6.2 - Overall area class = 3

**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
200	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 1200Pa.

Actual deflection – 13.37mm (maximum deflection allowed 14.80mm)

Deflection/span ratio 1/166 (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 – 10.98mm (maximum deflection allowed 14.8mm)

Deflection/span ratio 1/202 (maximum ratio allowed 1/150)

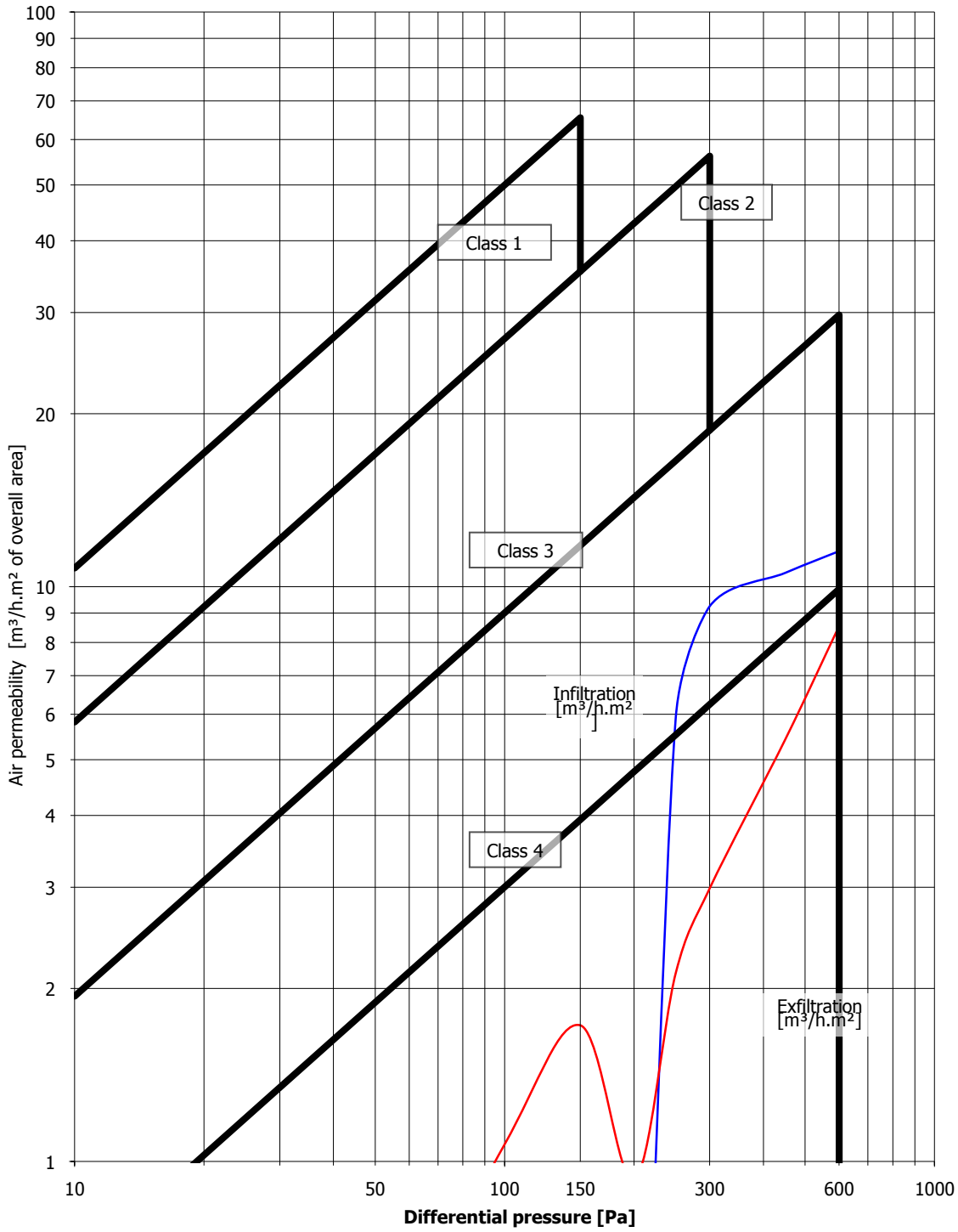
###### P2 REPEATED PRESSURE TEST

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 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 \*\***

Air Pressure [Pa]	Average rate of air leakage [m <sup>3</sup> /h]	Average rate of air leakage relative to area of sample [m <sup>3</sup> /h.m <sup>2</sup> ]
50	7.7	1.2
100	7.5	1.2
150	15.8	2.6
200	21.3	3.4
250	33.0	5.3
300	40.0	6.4
450	47.9	7.7
600	60.5	9.8

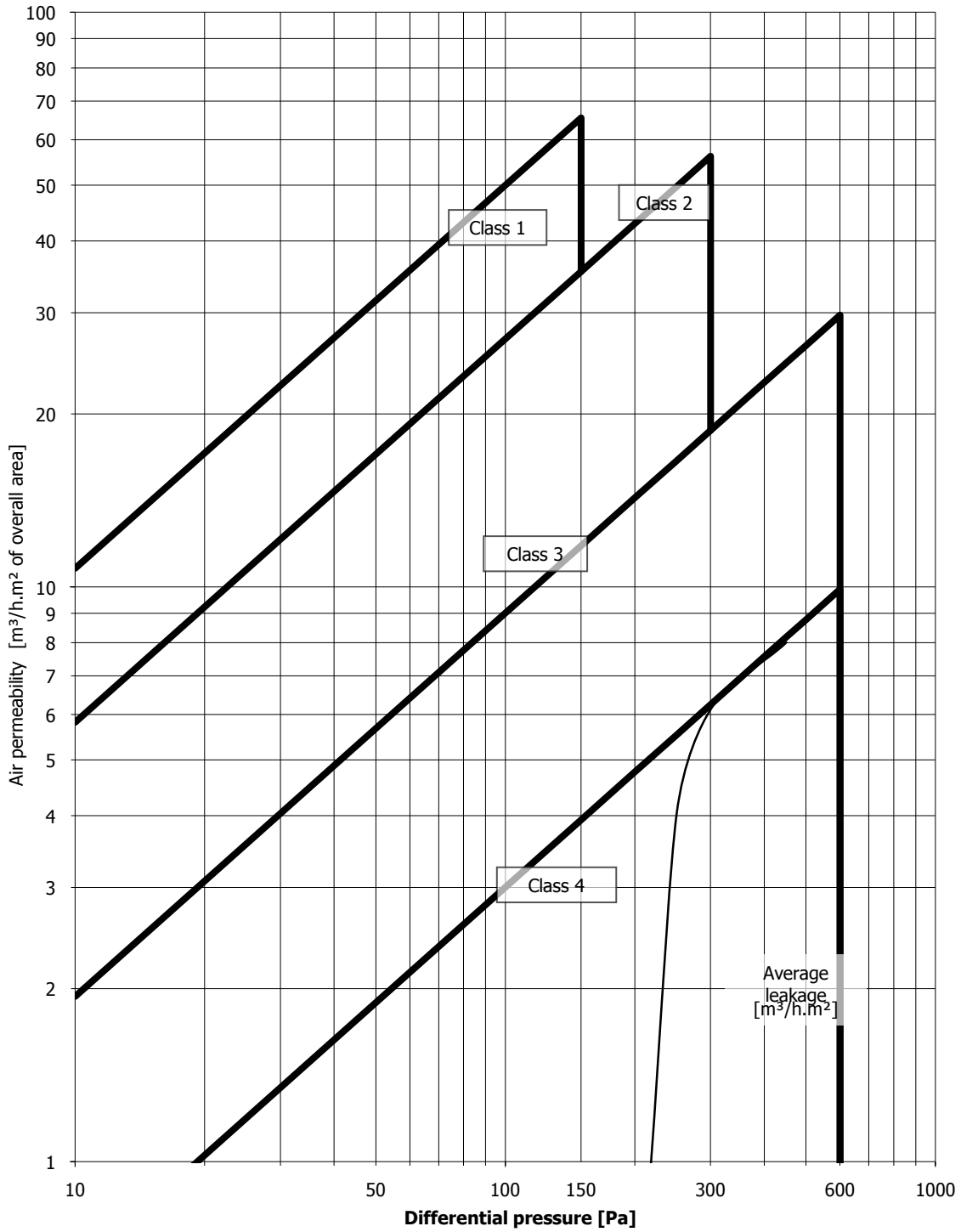
Note: The figures in the table above give the leakage as an average of the leakage at positive pressure and the leakage at negative pressure

Overall area = 6.2m<sup>2</sup>

BS 6375-1:2009 Clause 6.5 - Overall area class = 3

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 3.

**GRAPH OF AVERAGE 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

**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 Sample. (sample 4)

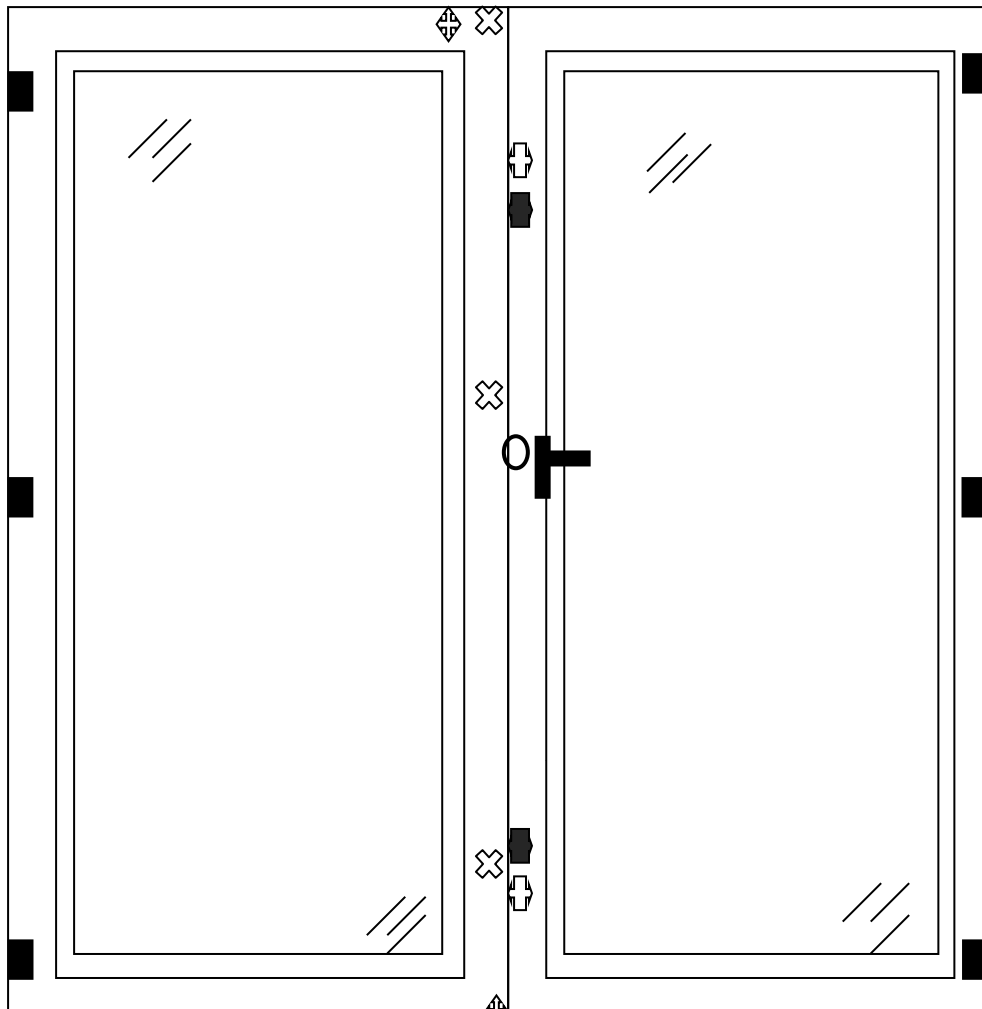
<b>Sample type -</b>	Double leaf open in glaze in door assembly with full glass infill and standard threshold	
<b>Profile codes -</b>	OUTER FRAME - EF415. SASH - EF424. MEETING STILE - EF425. GLAZING BEAD - GL526. COVER PROFILE = EF422. BRUSH CARRIER - EF472. LOW THRESHOLD - EF493. THRESHOLD INSERT - VR023A	
<b>Material -</b>	Aluminium alloy	
<b>Finish -</b>	Painted white	
<b>Fittings -</b>	<p><b>Master leaf</b>          A seven point Sobinco Multipoint (D KT) key locking hardware (two hook bolts/bolts, two dead bolts and one hook bolt) Sobinco cylinder, Fapim handle and three Fapim lift off hinges</p> <p><b>Slave leaf</b>          A two point finger operated hardware (two shoot bolts), three lift off hinges</p>	
<b>Weathersealing -</b>	Double sealed plastic weather-strip	
<b>Glass -</b>	Double glazed with 6-18-6 mm toughened glass sealed units	
<b>Panel -</b>	Not applicable	
<b>Glass retention system -</b>	Internal beads and gasket	
<b>Sample dimensions -</b>	Overall - Length: 2480mm Active Leaf - Length: 1250mm Slave Leaf - Length: 1180mm	Height: 2500mm Height: 2400mm Height: 2400mm
<b>Date of test -</b>	15 December 2015	
<b>Laboratory temperature -</b>	19.6 °C	
<b>Laboratory humidity -</b>	48.9 %	








## Description of Sample Continued. (sample 4)

### Accessory List -

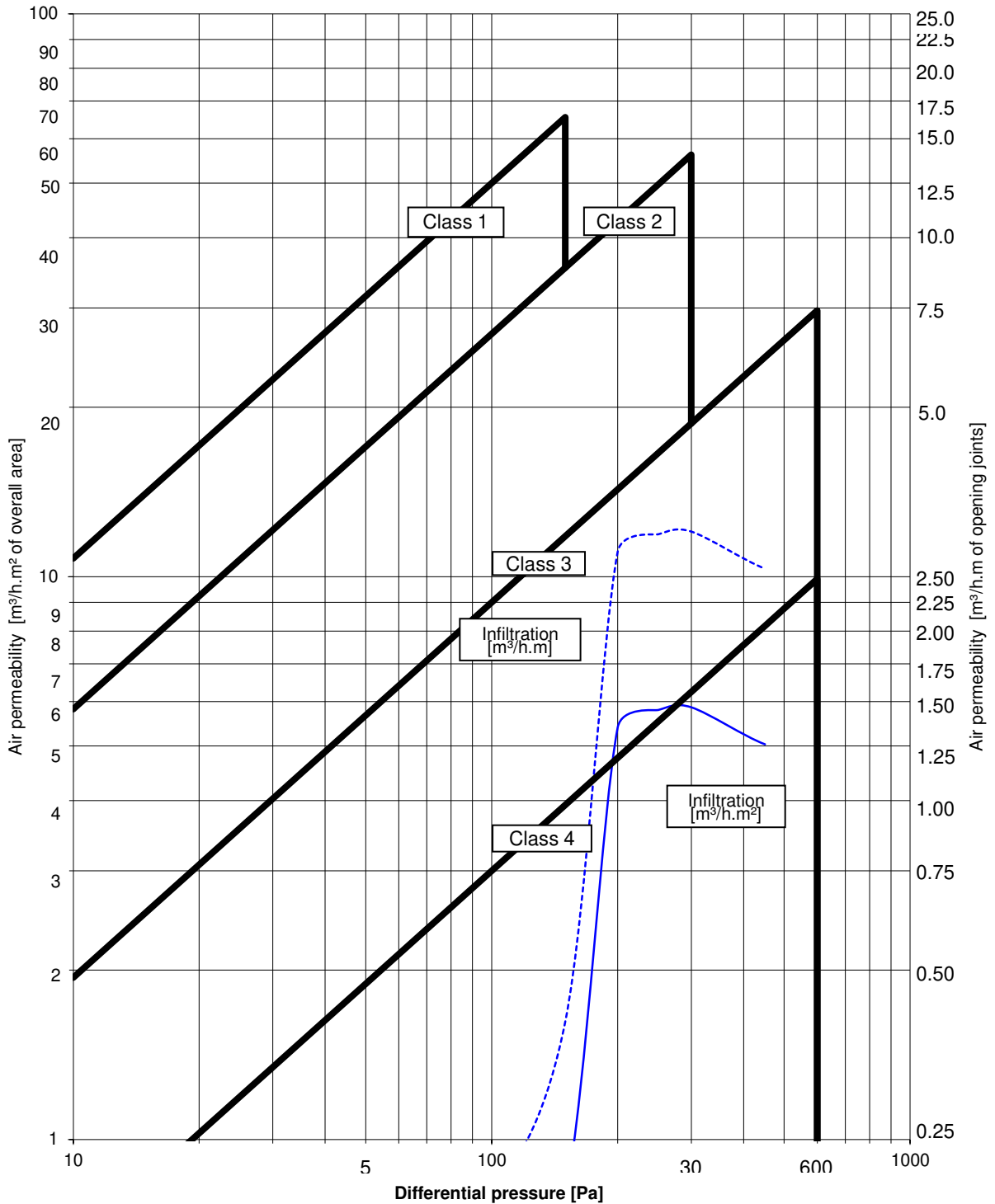
GLAZING SUPPORT - ACEF057.  
FRAME CLEAT - ACEF810.  
FRAME CLEAT - ACEF812.  
SASH CLEAT - ACEF810.  
SASH CLEAT - ACEF814.  
SASH CLEAT - ACEF817.  
END CAP - ACEF854.  
END CAP - ACEF855.  
KEEP GUIDE - ACEF860.  
DOOR HANDLE - ACFA120.  
DRAIN CAP - ACGSL 045.  
SHOOT BOLT - ACGT 430.  
SHOOT BOLT RODS - ACVL127.  
SHOOT BOLT KEEPS - ACVL434.  
CYLINDER - ACMX01613.  
CYLINDER COVER - ACMX208.  
CYLINDER COVER - ACSZ400.  
DOOR HINGES - ACUN450.  
E GASKET - ACFT031N  
GLAZING WEDGE - ACFT033N.  
FLIPPER GASKET - ACVL 032N.  
MULTI POINT LOCKS - ACSZ550,551,552.  
CENTER KEEP - ACSZ650.  
TOP AND BOTTOM KEEPS - ACSZ651.  
THRESHOLD END PIECE - ACEF694.  
END PIECE FOR EF472 - ACEF872.WOOL PILE - ACVL033.  
ANTI LIFT BLOCKS - ACFT512.  
LOW THRESHOLD KEEP SUPPORT - ACEF 948.  
CLEAT GLUE - ACSIL013.  
SEALING GLUE - ACSIL04.  
RUBBER SEALANT - ACMX09830.

**ELEVATION DRAWING OF DOOR ASSEMBLY  
(indicating position of hardware)**



-  - shoot bolt
  -  - handle
  -  - dead bolt
  -  - hook bolt
  -  - Transducer placement
  -  - Lift off hinges
  -  - Hook bolt / Dead bolt
- Water Leakage

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 <sup>3</sup> /h]	Average rate of air leakage per meter length of opening joint [m <sup>3</sup> /h.m]	Average rate of air leakage relative to area of sample [m <sup>3</sup> /h.m <sup>2</sup> ]
50	6.1	0.51	1.00
100	2.9	0.24	0.47
150	2.4	0.20	0.40
200	16.4	1.38	2.70
250	17.7	1.49	2.90
300	18.1	1.52	2.96
450	15.5	1.30	2.53
600	14.8	1.24	2.42

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 = 11.89m

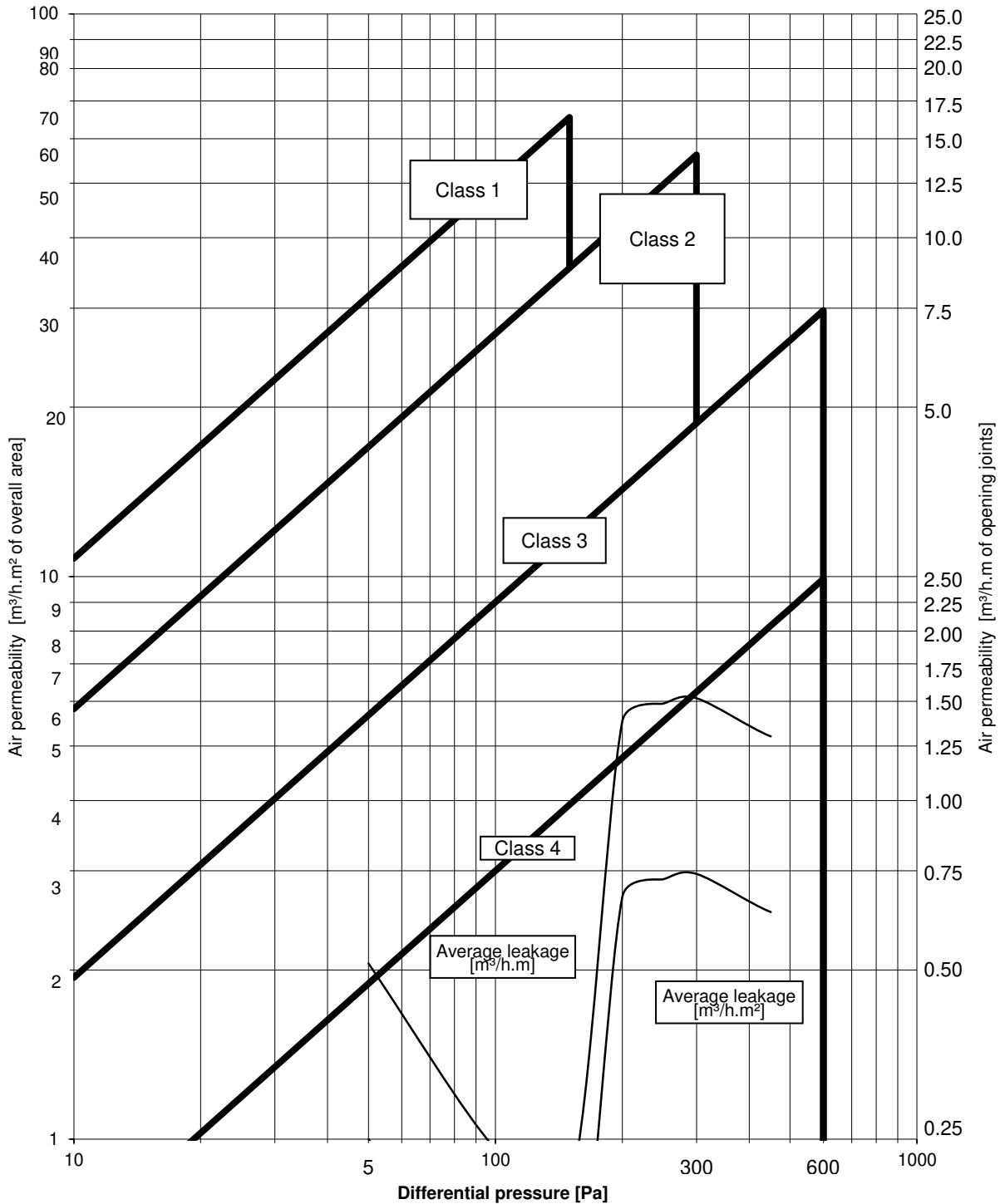
Overall area = 6.1m<sup>2</sup>

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
300	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 1200Pa.

Actual deflection – 13.70mm (maximum deflection allowed 15.20mm)

Deflection/span ratio 1/166 (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 – 11.25mm (maximum deflection allowed 15.20mm)

Deflection/span ratio 1/202 (maximum ratio allowed 1/150)

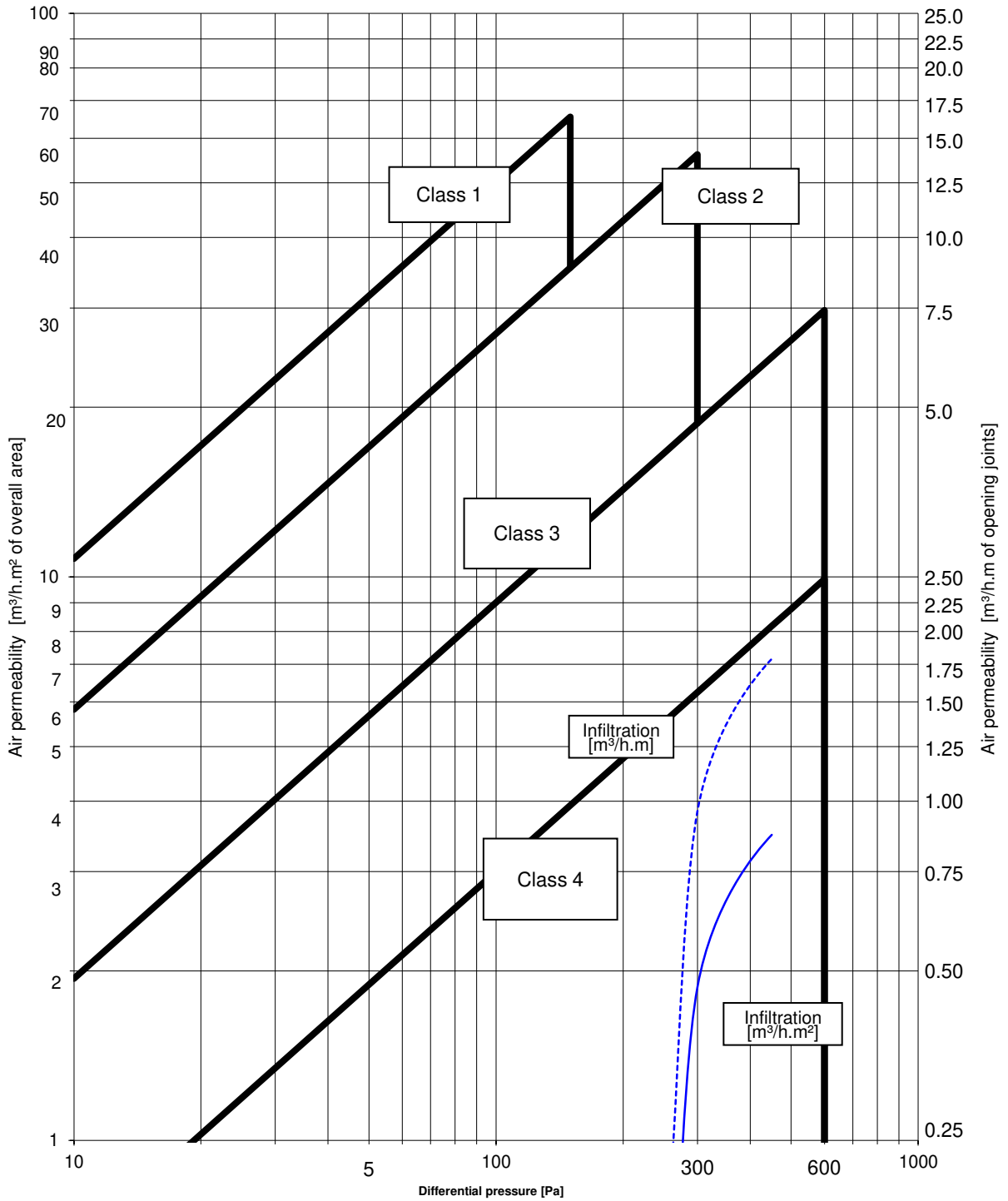
###### P2 REPEATED PRESSURE TEST

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 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 <sup>3</sup> /h]	Average rate of air leakage per meter length of opening joint [m <sup>3</sup> /h.m]	Average rate of air leakage relative to area of sample [m <sup>3</sup> /h.m <sup>2</sup> ]
50	1.4	0.12	0.23
100	1.3	0.11	0.22
150	0.1	0.01	0.02
200	1.0	0.08	0.16
250	1.4	0.12	0.23
300	6.1	0.51	1.00
450	11.0	0.93	1.81
600	11.8	0.99	1.93

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 = 11.89m

Overall area = 6.1m<sup>2</sup>

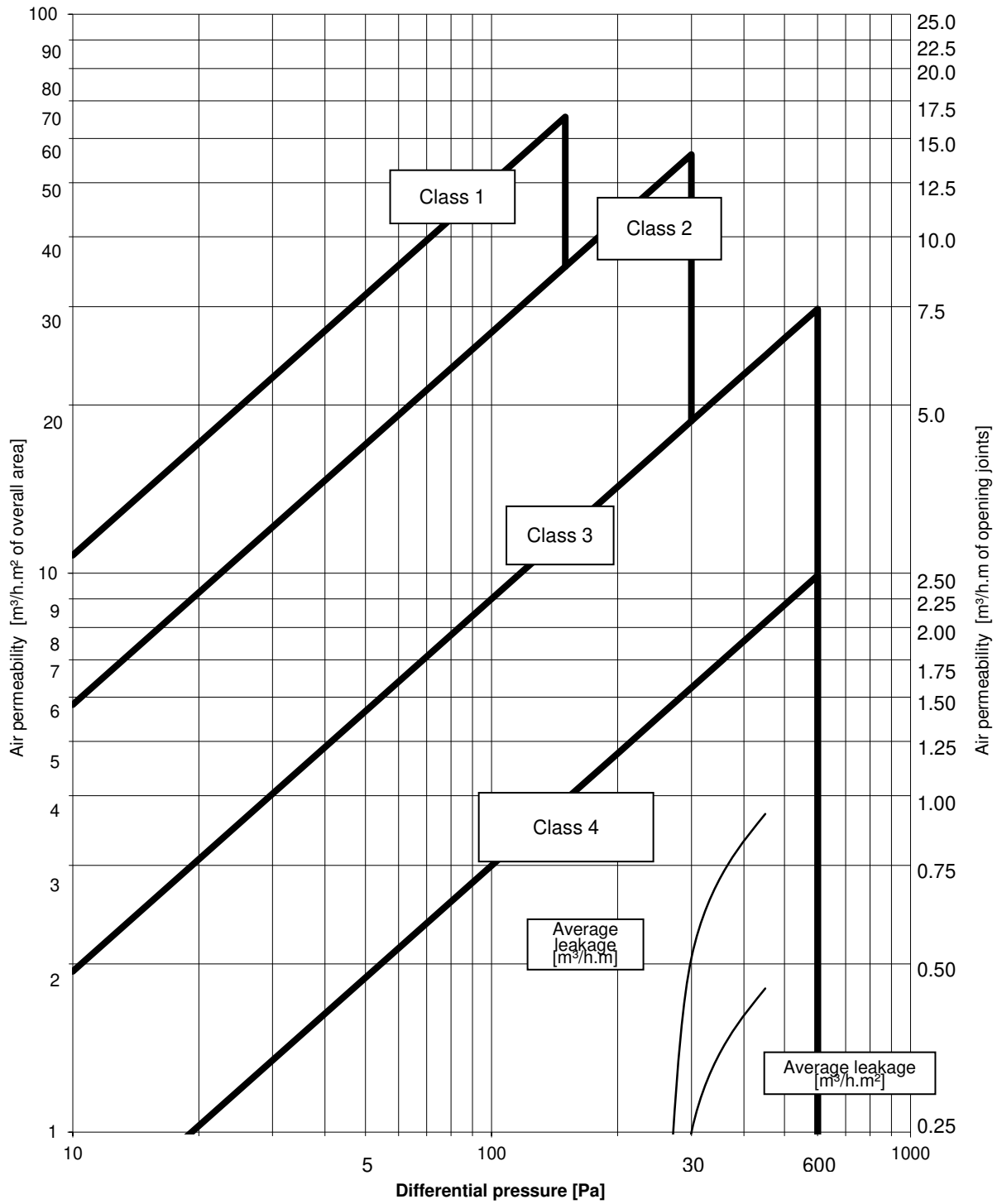
BS 6375-1:2009 Clause 6.5 - Joint class = 4

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 AVERAGE 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 – 58.60N (maximum 75N)	Pass
Handle closing – N/A (maximum 100N)	Pass
Key force to lock – 0.15N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 50.00N (maximum 100N)	Pass
Force to maintain opening – 40.00N (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  $200 \pm 4$ N using weights vertically to the top of the lock side corner of the door leaf, at  $50 \pm 5$ mm from the opening edge, and maintained for  $60 \pm 5$ s, then removed and left to rest for a further  $60 \pm 5$ s.

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

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

Pre diagonal measurement -	2675mm
Maximum deformation –	1.80mm
Residual measurement –	0.02mm
Diagonal measurement –	2675mm

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 – 46.00mm

Residual measurement – 1.80mm

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 – 4.00mm

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 – 62.25N (maximum 75N)	Pass
Handle closing – N/A (maximum 100N)	Pass
Key force to lock – 0.15N (maximum 20N)	Pass
Key force to unlock – 0.10N (maximum 20N)	Pass
Handle opening – 52.25N (maximum 100N)	Pass
Force to maintain opening – 43.00N (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

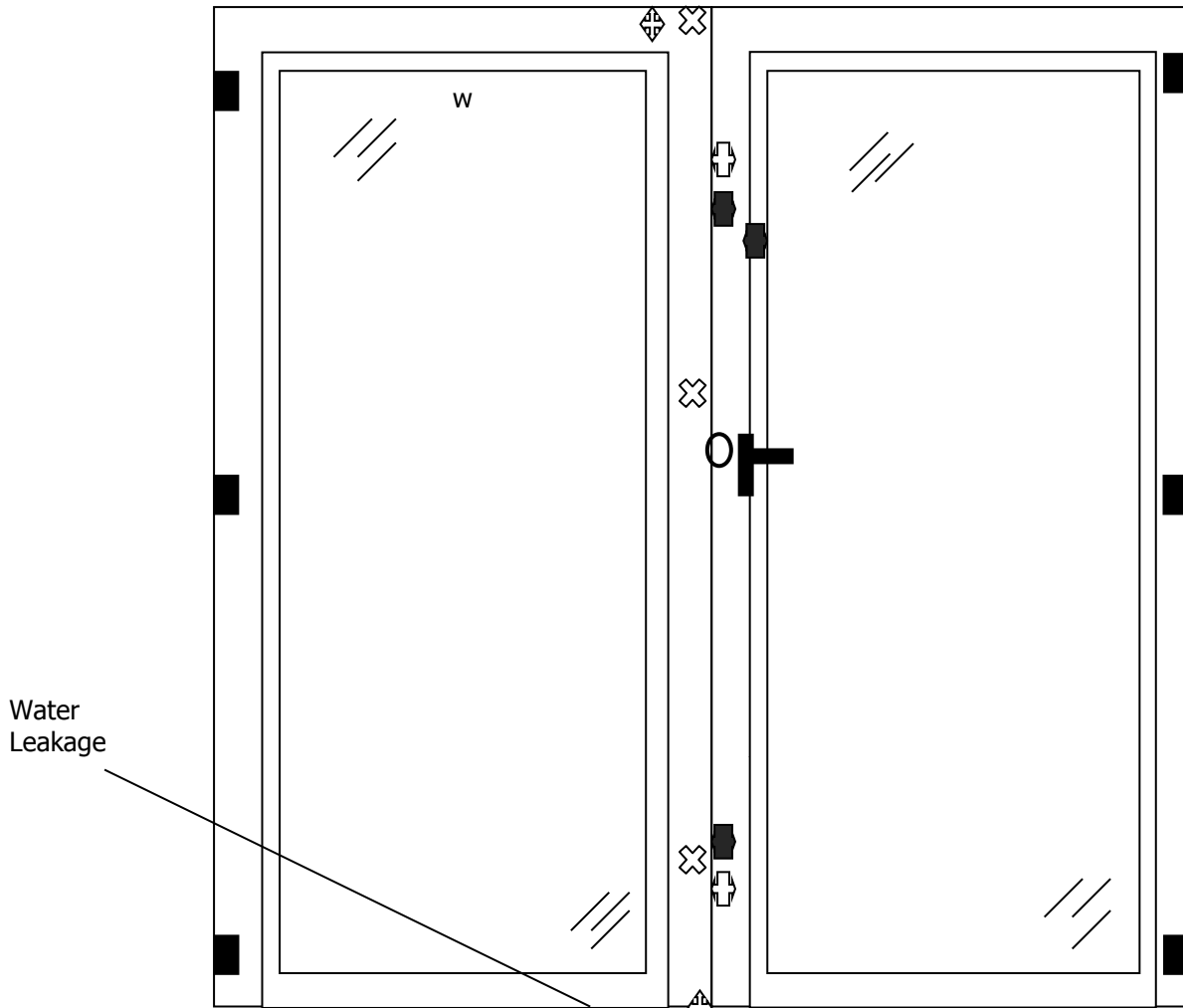
Photograph of Sample.










Description of Samples. (sample 5)

<b>Sample type -</b>	Double leaf open out glaze in door assembly with full glass infill and standard threshold		
<b>Material -</b>	Aluminium alloy		
<b>Finish -</b>	Painted white		
<b>Fittings -</b>	<p><b>Master leaf</b> A seven point Sobinco Multipoint (D KT) key locking hardware (two hook bolts/bolts, two dead bolts and one hook bolt) Sobinco cylinder, Fapim handle and three Fapim lift off hinges</p> <p><b>Slave leaf</b> A two point finger operated hardware (two shoot bolts), three lift off hinges</p>		
<b>Weathersealing -</b>	Double sealed plastic weather-strip		
<b>Glass -</b>	Double glazed with 6-16-6 mm toughened glass sealed units		
<b>Panel -</b>	Not applicable		
<b>Glass retention system -</b>	Internal beads and gasket		
<b>Sample dimensions -</b>	Overall -	Length: 2480mm	Height: 2500mm
	Active Leaf -	Length: 1250mm	Height: 2400mm
	Slave Leaf -	Length: 1180mm	Height: 2400mm
<b>Date of test -</b>	16 December 2015		
<b>Laboratory temperature -</b>	20.4 °C		
<b>Laboratory humidity -</b>	56.4 %		

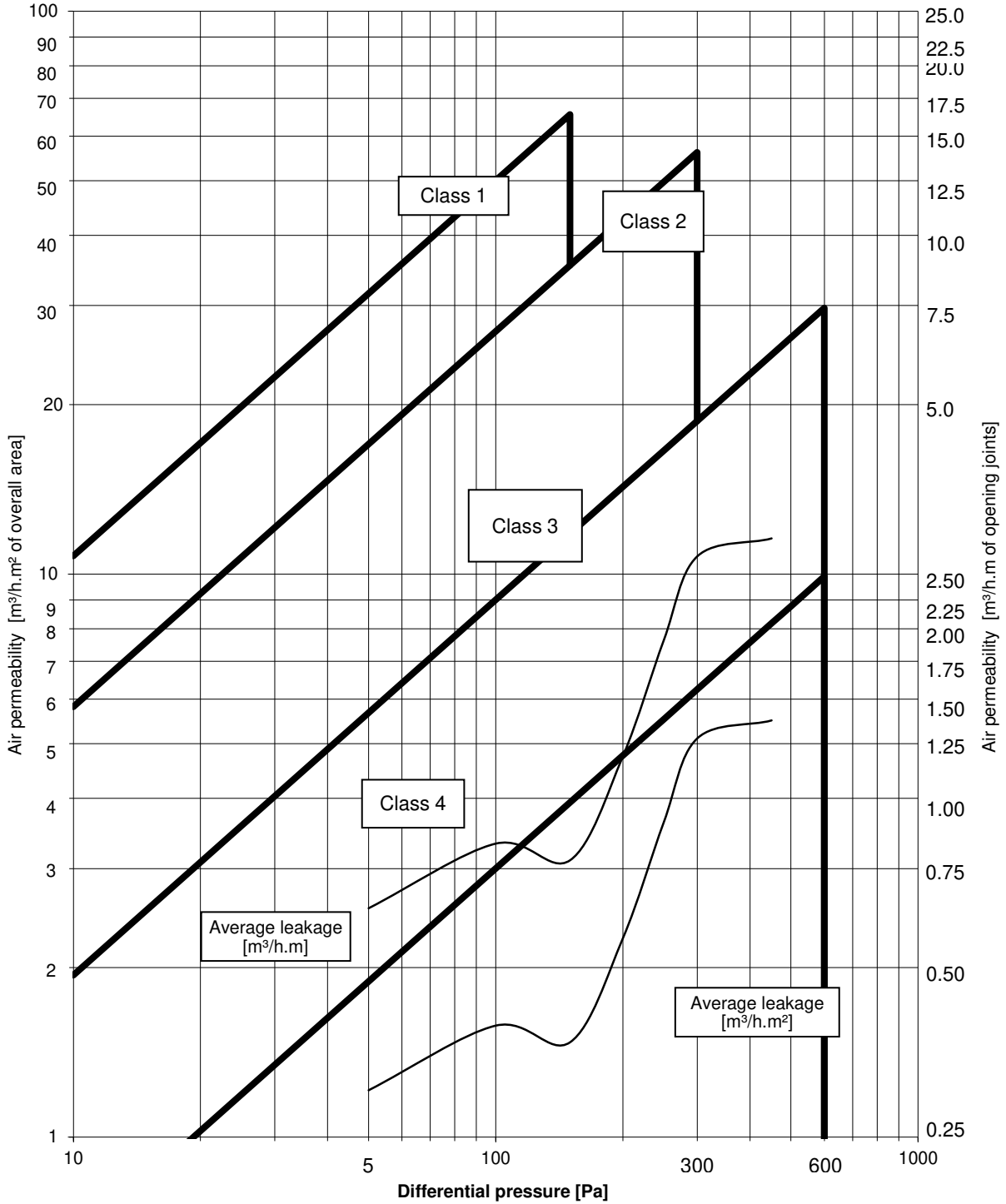
**ELEVATION DRAWING OF DOOR ASSEMBLY  
(indicating position of hardware)**



Water Leakage

-  - shoot bolt
-  - handle
-  - dead bolt
-  - hook bolt
-  - Transducer placement
-  - Lift off hinges
-  - Hook bolt / Dead bolt

GRAPH OF AVERAGE AIR PERMEABILITY



**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 <sup>3</sup> /h]	Average rate of air leakage per meter length of opening joint [m <sup>3</sup> /h.m]	Average rate of air leakage relative to area of sample [m <sup>3</sup> /h.m <sup>2</sup> ]
50	7.5	0.64	1.21
100	9.8	0.83	1.58
150	9.1	0.78	1.47
200	14.0	1.19	2.26
250	22.5	1.91	3.63
300	31.7	2.69	5.11
450	34.1	2.89	5.50
600	36.8	3.12	5.94

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 = 11.78m

Overall area = 6.2m<sup>2</sup>

BS 6375-1:2009 - Joint class = 3

BS 6375-1:2009 - Area class = 4

BS 6375-1:2009 - Overall class = 4

## 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

## 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 50,000 cycles

Closing leaf force – 42.45N (maximum 75N)	Pass
---	------

Handle closing – N/A	
----------------------	--

Key force to lock – 0.5Nm (maximum 20Nm)	Pass
--	------

Key force to unlock – 0.3Nm (maximum 20Nm)	Pass
--	------

Handle opening – 41.55N (maximum 100N)	Pass
--	------

Force to maintain opening – 6.0N (maximum 75N)	Pass
--	------

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

Closing leaf force – 26.75N (maximum 75N)	Pass
---	------

Handle closing – N/A	
----------------------	--

Key force to lock – 1.19Nm (maximum 20Nm)	Pass
---	------

Key force to unlock – 0.69Nm (maximum 20Nm)	Pass
---	------

Handle opening – 58.45N (maximum 100N)	Pass
--	------

Force to maintain opening – 20.65N (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 – 22.55N (maximum 75N) Pass

Handle closing – N/A

Key force to lock – 1.02Nm (maximum 20Nm) Pass

Key force to unlock – 0.80Nm (maximum 20Nm) Pass

Handle opening – 54.35N (maximum 100N) Pass

Force to maintain opening – 20.00N (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 – 34.70N (maximum 75N) Pass

Handle closing – N/A

Key force to lock – 1.20Nm (maximum 20Nm) Pass

Key force to unlock – 0.90Nm (maximum 20Nm) Pass

Handle opening – 60.50N (maximum 100N) Pass

Force to maintain opening – 20.15N (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 – 28.65N (maximum 75N) Pass

Handle closing – N/A

Key force to lock – 0.82Nm (maximum 20Nm) Pass

Key force to unlock – 0.76Nm (maximum 20Nm) Pass

Handle opening – 50.70N (maximum 100N) Pass

Force to maintain opening – 18.30N (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

\*\*\* End of Report \*\*\*