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:

<table>
<thead>
<tr>
<th>Job/Registration Details</th>
<th>Client Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job number:</strong> 8421006</td>
<td>Smart Systems Limited</td>
</tr>
<tr>
<td>Job type: Testing Samples Submitted</td>
<td>incorporating Smart Extrusions</td>
</tr>
<tr>
<td>Start Date: 14/12/2015</td>
<td>Arnolds Way</td>
</tr>
<tr>
<td>Test type: Type</td>
<td>Yatton</td>
</tr>
<tr>
<td>Sample ID: 10158568</td>
<td>BS49 4QN</td>
</tr>
<tr>
<td><strong>Registration:</strong> KM 530838</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Scheme: BS 4873 / PAS24</td>
<td></td>
</tr>
<tr>
<td>Protocol: PP519</td>
<td></td>
</tr>
<tr>
<td>Scheme Mgr: Lorraine Balch</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Approved For Issue</th>
<th>Issue Date: 11 July 2016</th>
</tr>
</thead>
</table>

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.

<table>
<thead>
<tr>
<th>Sample Id</th>
<th>ER Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10158568</td>
<td>Double leaf Aluminium Alloy doors</td>
</tr>
</tbody>
</table>

Description of Test Samples.

<table>
<thead>
<tr>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 off open in glaze in hinged door assemblies with full glass infill and low threshold</td>
</tr>
<tr>
<td>1 off open in glaze in hinged door assemblies with full glass infill and standard threshold</td>
</tr>
<tr>
<td>1 off open in glaze out hinged door assemblies with full glass infill and standard threshold</td>
</tr>
</tbody>
</table>

Test Requirements.

BS4873/PAS24 Type Test

<table>
<thead>
<tr>
<th>Clause</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required</td>
<td>Test and assessment</td>
</tr>
<tr>
<td></td>
<td>See Table A – BS4873/PAS24 Type Test</td>
</tr>
</tbody>
</table>

Summary of Test Comments.

<table>
<thead>
<tr>
<th>Clause</th>
<th>Comments</th>
</tr>
</thead>
</table>

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.

This Test Report is issued subject to the conditions stated in current issue of ‘BSI Terms of Service’. The results contained herein apply only to the particular sample(s) tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of BSI, who reserve the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.

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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)

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

Profile codes - OUTER FRAME - EF415.
SASH - EF424.
MEETING STILE - EF425.
GLAZING BEAD - GL526.
COVER PROFILE = EF422.
BRUSH CARRIER - EF472.
LOW THRESHOLD - EF493.
THRESHOLD INSERT - VR023A

Material - Aluminium alloy

Finish - Painted white

Fittings - Master leaf
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

Slave leaf
A two point finger operated hardware (two shoot bolts), three lift off hinges

Weathersealing - Double sealed plastic weather-strip

Glass - Double glazed with 6-18-6 mm toughened glass sealed units

Panel - Not applicable

Glass retention system - Internal beads and gasket

Sample dimensions -
Overall - Length: 2480mm  Height: 2460mm
Active Leaf - Length: 1250mm  Height: 2400mm
Slave Leaf - Length: 1180mm  Height: 2400mm

Date of test - 14 December 2015

Laboratory temperature - 17.3 °C

Laboratory humidity - 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
CLAUSE 7 PERFORMANCE REQUIREMENTS

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

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
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
PERFORMANCE REQUIREMENTS
B.4.5 Mechanical Loading Test

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
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
### PERFORMANCE REQUIREMENTS

#### B.4.8 Soft Body Impact Test

<table>
<thead>
<tr>
<th>Impact point</th>
<th>Position from floor level</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.80m Master</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>0.80m False mullion</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>0.80m Slave</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>1.25m Master</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>1.25m False mullion</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>1.25m Slave</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>1.7m Master</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>1.7m False mullion</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>1.7m Slave</td>
<td>None</td>
</tr>
</tbody>
</table>

No entry effected

**ASSESSMENT**

Pass
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
## PERFORMANCE REQUIREMENTS

**B.4.9 Hard body impact test (continued)**

<table>
<thead>
<tr>
<th>Impact point</th>
<th>Position</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Corner/Hinge</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Hinge</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>Corner/Hinge</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>Corner/Shootbolt</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Hook bolt/Dead bolt / Deadbolt</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Cylinder</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>Hook bolt</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Hook bolt/Dead bolt / Deadbolt</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Corner/Shootbolt</td>
<td>None</td>
</tr>
</tbody>
</table>

No entry effected  
Pass
PERFORMANCE REQUIREMENTS

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

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 |

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

Classification for Operational strength.

<table>
<thead>
<tr>
<th>Operating forces</th>
<th>Class 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical load</td>
<td>Class 2</td>
</tr>
<tr>
<td>Resistance to Static torsion</td>
<td>Class 2</td>
</tr>
<tr>
<td>Soft and Heavy body Impact Load bearing</td>
<td>Class 2</td>
</tr>
<tr>
<td>Hard body impact</td>
<td>Class 2</td>
</tr>
<tr>
<td>Load bearing capacity of safety devices</td>
<td>N/A</td>
</tr>
<tr>
<td>Closure against obstruction</td>
<td>Pass</td>
</tr>
<tr>
<td>Repeated opening and closing (sample 6)</td>
<td>50,000 Cycles</td>
</tr>
</tbody>
</table>

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)

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

Profile codes - OUTER FRAME - EF415.
SASH - EF424.
MEETING STILE - EF425.
GLAZING BEAD - GL526.
COVER PROFILE = EF422.
BRUSH CARRIER - EF472.
LOW THRESHOLD - EF493.
THRESHOLD INSERT - VR023A

Material - Aluminium alloy
Finish - Painted white

Fittings - **Master leaf**
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

**Slave leaf**
A two point finger operated hardware (two shoot bolts), three lift off hinges

Weathersealing - Double sealed plastic weather-strip

Glass - Double glazed with 6-18-6 mm toughened glass sealed units

Panel - Not applicable

Glass retention system - Internal beads and gasket

Sample dimensions - Overall - Length: 2480mm  Height: 2500mm
Active Leaf - Length: 1250mm  Height: 2400mm
Slave Leaf - Length: 1180mm  Height: 2400mm

Date of test - 17 December 2015

Laboratory temperature - 19.6 °C
Laboratory humidity - 48.9 %
**Accessory List**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLAZING SUPPORT</td>
<td>ACEF057</td>
</tr>
<tr>
<td>FRAME CLEAT</td>
<td>ACEF810</td>
</tr>
<tr>
<td>FRAME CLEAT</td>
<td>ACEF812</td>
</tr>
<tr>
<td>SASH CLEAT</td>
<td>ACEF810</td>
</tr>
<tr>
<td>SASH CLEAT</td>
<td>ACEF814</td>
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<tr>
<td>SASH CLEAT</td>
<td>ACEF817</td>
</tr>
<tr>
<td>END CAP</td>
<td>ACEF854</td>
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<tr>
<td>END CAP</td>
<td>ACEF855</td>
</tr>
<tr>
<td>KEEP GUIDE</td>
<td>ACEF860</td>
</tr>
<tr>
<td>DOOR HANDLE</td>
<td>ACFA120</td>
</tr>
<tr>
<td>DRAIN CAP</td>
<td>ACGSL 045</td>
</tr>
<tr>
<td>SHOOT BOLT</td>
<td>ACGT 430</td>
</tr>
<tr>
<td>SHOOT BOLT RODS</td>
<td>ACVL127</td>
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<td>SHOOT BOLT KEEPS</td>
<td>ACVL434</td>
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<td>ACMX208</td>
</tr>
<tr>
<td>CYLINDER COVER</td>
<td>ACSZ400</td>
</tr>
<tr>
<td>DOOR HINGES</td>
<td>ACUN450</td>
</tr>
<tr>
<td>E GASKET</td>
<td>ACFT031N</td>
</tr>
<tr>
<td>GLAZING WEDGE</td>
<td>ACFT033N</td>
</tr>
<tr>
<td>FLIPPER GASKET</td>
<td>ACVL 032N</td>
</tr>
<tr>
<td>MULTI POINT LOCKS</td>
<td>ACSZ550,551,552</td>
</tr>
<tr>
<td>CENTER KEEP</td>
<td>ACSZ650</td>
</tr>
<tr>
<td>CENTER KEEP</td>
<td>ACSZ651</td>
</tr>
<tr>
<td>THRESHOLD END PIECE</td>
<td>ACEF694</td>
</tr>
<tr>
<td>END PIECE FOR EF472</td>
<td>ACEF872</td>
</tr>
<tr>
<td>WOOL PILE</td>
<td>ACVL033</td>
</tr>
<tr>
<td>ANTI LIFT BLOCKS</td>
<td>ACFT512</td>
</tr>
<tr>
<td>LOW THRESHOLD KEEPS</td>
<td>ACEF 948</td>
</tr>
<tr>
<td>CLEAT GLUE</td>
<td>ACSIL013</td>
</tr>
<tr>
<td>SEALING GLUE</td>
<td>ACSIL04</td>
</tr>
<tr>
<td>RUBBER SEALANT</td>
<td>ACMX09830</td>
</tr>
</tbody>
</table>
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
GRAPH OF AIR PERMEABILITY BEFORE GUSTING

Air permeability [m³/h.m² of overall area]

Differential pressure [Pa]

Clause 6 Before resistance to wind tests

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

Table **

<table>
<thead>
<tr>
<th>Air Pressure [Pa]</th>
<th>Average rate of air leakage [m³/h]</th>
<th>Average rate of air leakage relative to area of sample [m³/h.m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>7.7</td>
<td>1.2</td>
</tr>
<tr>
<td>100</td>
<td>7.5</td>
<td>1.2</td>
</tr>
<tr>
<td>150</td>
<td>15.8</td>
<td>2.6</td>
</tr>
<tr>
<td>200</td>
<td>21.3</td>
<td>3.4</td>
</tr>
<tr>
<td>250</td>
<td>33.0</td>
<td>5.3</td>
</tr>
<tr>
<td>300</td>
<td>40.0</td>
<td>6.4</td>
</tr>
<tr>
<td>450</td>
<td>47.9</td>
<td>7.7</td>
</tr>
<tr>
<td>600</td>
<td>60.5</td>
<td>9.8</td>
</tr>
</tbody>
</table>

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 = 6.2m²

BS 6375-1:2009 Clause 6.2 - Overall area class = 3
GRAPH OF AVERAGE AIR PERMEABILITY BEFORE GUSTING

Air permeability [m³/h.m² of overall area]

Differential pressure [Pa]

Class 1
Class 2
Class 3
Class 4
Average leakage [m³/h.m²]
WATERTIGHTNESS TEST RESULTS.

BS EN 1027:2000 Clause 7 Watertightness before resistance to wind loads

TABLE 2 - Spraying method 1A

<table>
<thead>
<tr>
<th>Air pressure (Pa)</th>
<th>Point at which water leakage occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>water ran out and over from the threshold opening joint (false mullion)</td>
</tr>
</tbody>
</table>

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 [m³/h·m² of overall area]

Differential pressure [Pa]

Clause 6 After resistance to wind tests

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

Table **

<table>
<thead>
<tr>
<th>Air Pressure [Pa]</th>
<th>Average rate of air leakage [m³/h]</th>
<th>Average rate of air leakage relative to area of sample [m³/h.m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>7.7</td>
<td>1.2</td>
</tr>
<tr>
<td>100</td>
<td>7.5</td>
<td>1.2</td>
</tr>
<tr>
<td>150</td>
<td>15.8</td>
<td>2.6</td>
</tr>
<tr>
<td>200</td>
<td>21.3</td>
<td>3.4</td>
</tr>
<tr>
<td>250</td>
<td>33.0</td>
<td>5.3</td>
</tr>
<tr>
<td>300</td>
<td>40.0</td>
<td>6.4</td>
</tr>
<tr>
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<td>47.9</td>
<td>7.7</td>
</tr>
<tr>
<td>600</td>
<td>60.5</td>
<td>9.8</td>
</tr>
</tbody>
</table>

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 = 6.2m²

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

Air permeability [m³/h.m² of overall area]

Differential pressure [Pa]

Class 1
Class 2
Class 3
Class 4
Average leakage [m³/h.m²]
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)

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

Profile codes - OUTER FRAME - EF415.
SASH - EF424.
MEETING STILE - EF425.
GLAZING BEAD - GL526.
COVER PROFILE = EF422.
BRUSH CARRIER - EF472.
LOW THRESHOLD - EF493.
THRESHOLD INSERT - VR023A

Material - Aluminium alloy

Finish - Painted white

Fittings - Master leaf
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

Slave leaf
A two point finger operated hardware (two shoot bolts), three lift off hinges

Weathersealing - Double sealed plastic weather-strip

Glass - Double glazed with 6-18-6 mm toughened glass sealed units

Panel - Not applicable

Glass retention system - Internal beads and gasket

Sample dimensions - Overall - Length: 2480mm Height: 2500mm
Active Leaf - Length: 1250mm Height: 2400mm
Slave Leaf - Length: 1180mm Height: 2400mm

Date of test - 15 December 2015

Laboratory temperature - 19.6 °C

Laboratory humidity - 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 - ACGL0 045.
SHOOT BOLT - ACGL430.
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 [m³/h.m² of overall area]

Differential pressure [Pa]

Class 1  Class 2

Infiltration [m³/h.m]

Infiltration [m³/h.m²]

Class 3  Class 4

Clause 6 Before resistance to wind tests

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

Table 4

<table>
<thead>
<tr>
<th>Air Pressure [Pa]</th>
<th>Average rate of air leakage [m³/h]</th>
<th>Average rate of air leakage per meter length of opening joint [m³/h.m]</th>
<th>Average rate of air leakage relative to area of sample [m³/h.m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>6.1</td>
<td>0.51</td>
<td>1.00</td>
</tr>
<tr>
<td>100</td>
<td>2.9</td>
<td>0.24</td>
<td>0.47</td>
</tr>
<tr>
<td>150</td>
<td>2.4</td>
<td>0.20</td>
<td>0.40</td>
</tr>
<tr>
<td>200</td>
<td>16.4</td>
<td>1.38</td>
<td>2.70</td>
</tr>
<tr>
<td>250</td>
<td>17.7</td>
<td>1.49</td>
<td>2.90</td>
</tr>
<tr>
<td>300</td>
<td>18.1</td>
<td>1.52</td>
<td>2.96</td>
</tr>
<tr>
<td>450</td>
<td>15.5</td>
<td>1.30</td>
<td>2.53</td>
</tr>
<tr>
<td>600</td>
<td>14.8</td>
<td>1.24</td>
<td>2.42</td>
</tr>
</tbody>
</table>

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 = 6.1m²

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

- **Class 1**
- **Class 2**
- **Class 3**
- **Class 4**

Average leakage

- **Average leakage [m³/h.m]**
- **Average leakage [m³/h.m²]**

Air permeability [m³/h.m² of overall area]

Differential pressure [Pa]
WATERTIGHTNESS TEST RESULTS.

BS EN 1027:2000 Clause 7 Watertightness before resistance to wind loads

TABLE 2 - Spraying method 1A

<table>
<thead>
<tr>
<th>Air pressure (Pa)</th>
<th>Point at which water leakage occurred</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>water ran out and over from the threshold opening joint (false mullion)</td>
</tr>
</tbody>
</table>

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 [m³/h.m² of overall area]

Infiltration [m³/h.m]

Differential pressure [Pa]

Class 1

Class 2

Class 3

Class 4

Clause 6 After resistance to wind tests

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

Table 4

<table>
<thead>
<tr>
<th>Air Pressure [Pa]</th>
<th>Average rate of air leakage [m³/h]</th>
<th>Average rate of air leakage per meter length of opening joint [m³/h.m]</th>
<th>Average rate of air leakage relative to area of sample [m³/h.m²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1.4</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td>100</td>
<td>1.3</td>
<td>0.11</td>
<td>0.22</td>
</tr>
<tr>
<td>150</td>
<td>0.1</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>200</td>
<td>1.0</td>
<td>0.08</td>
<td>0.16</td>
</tr>
<tr>
<td>250</td>
<td>1.4</td>
<td>0.12</td>
<td>0.23</td>
</tr>
<tr>
<td>300</td>
<td>6.1</td>
<td>0.51</td>
<td>1.00</td>
</tr>
<tr>
<td>450</td>
<td>11.0</td>
<td>0.93</td>
<td>1.81</td>
</tr>
<tr>
<td>600</td>
<td>11.8</td>
<td>0.99</td>
<td>1.93</td>
</tr>
</tbody>
</table>

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 = 6.1m²

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

Air permeability [m³/h.m² of overall area]

Differential pressure [Pa]

Class 1

Class 2

Class 3

Class 4

Average leakage [m³/h.m]

Average leakage [m³/h.m²]
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.
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± 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 -  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

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
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
Clause 6
Performance characteristics and requirements for pedestrian doorsets

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.

<table>
<thead>
<tr>
<th>Task</th>
<th>Force</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing leaf force</td>
<td>62.25 N</td>
<td>Pass</td>
</tr>
<tr>
<td>Handle closing</td>
<td>N/A</td>
<td>Pass</td>
</tr>
<tr>
<td>Key force to lock</td>
<td>0.15 N</td>
<td>Pass</td>
</tr>
<tr>
<td>Key force to unlock</td>
<td>0.10 N</td>
<td>Pass</td>
</tr>
<tr>
<td>Handle opening</td>
<td>52.25 N</td>
<td>Pass</td>
</tr>
<tr>
<td>Force to maintain opening</td>
<td>43.00 N</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Basic security (Annex A).

BS 6375: Part 3: 2009 - Performance of windows

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

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

Damaged tools shall be replaced 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)

**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**<br>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
- **Slave leaf**<br>A two point finger operated hardware (two shoot bolts), three lift off hinges

**Weathersealing** - Double sealed plastic weather-strip

**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: 2480mm Height: 2500mm
- Active Leaf - Length: 1250mm Height: 2400mm
- Slave Leaf - Length: 1180mm Height: 2400mm

**Date of test** - 16 December 2015

**Laboratory temperature** - 20.4 °C

**Laboratory humidity** - 56.4 %
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
GRAPH OF AVERAGE AIR PERMEABILITY

Class 1
Class 2
Class 3
Class 4

Average leakage [m³/h.m]
Average leakage [m³/h.m²]

Air permeability [m³/h.m² of overall area]
Differential pressure [Pa]

Air permeability [m³/h.m of opening joints]
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

<table>
<thead>
<tr>
<th>Air Pressure (Pa)</th>
<th>Average rate of air leakage [m³/h]</th>
<th>Average rate of air leakage per meter length of opening joint [m³/h.m]</th>
<th>Average rate of air leakage relative to area of sample [m³/h.m²]</th>
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</thead>
<tbody>
<tr>
<td>50</td>
<td>7.5</td>
<td>0.64</td>
<td>1.21</td>
</tr>
<tr>
<td>100</td>
<td>9.8</td>
<td>0.83</td>
<td>1.58</td>
</tr>
<tr>
<td>150</td>
<td>9.1</td>
<td>0.78</td>
<td>1.47</td>
</tr>
<tr>
<td>200</td>
<td>14.0</td>
<td>1.19</td>
<td>2.26</td>
</tr>
<tr>
<td>250</td>
<td>22.5</td>
<td>1.91</td>
<td>3.63</td>
</tr>
<tr>
<td>300</td>
<td>31.7</td>
<td>2.69</td>
<td>5.11</td>
</tr>
<tr>
<td>450</td>
<td>34.1</td>
<td>2.89</td>
<td>5.50</td>
</tr>
<tr>
<td>600</td>
<td>36.8</td>
<td>3.12</td>
<td>5.94</td>
</tr>
</tbody>
</table>

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 = 6.2m²

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 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)  
  - **Assessment**: Pass

- **Handle closing** – N/A

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

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

- **Handle opening** – 41.55N (maximum 100N)  
  - **Assessment**: Pass

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

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

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

- **Handle closing** – N/A

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

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

- **Handle opening** – 58.45N (maximum 100N)  
  - **Assessment**: Pass

- **Force to maintain opening** – 20.65N (maximum 75N)  
  - **Assessment**: Pass

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

Clause 6 Performance characteristics and requirements for pedestrian doorsets

Assessment

Clause 6.5 Repeated opening and closing

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Force/Value</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closing leaf force</td>
<td>28.65N (maximum 75N)</td>
<td>Pass</td>
</tr>
<tr>
<td>Handle closing</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Key force to lock</td>
<td>0.82Nm (maximum 20Nm)</td>
<td>Pass</td>
</tr>
<tr>
<td>Key force to unlock</td>
<td>0.76Nm (maximum 20Nm)</td>
<td>Pass</td>
</tr>
<tr>
<td>Handle opening</td>
<td>50.70N (maximum 100N)</td>
<td>Pass</td>
</tr>
<tr>
<td>Force to maintain opening</td>
<td>18.30N (maximum 75N)</td>
<td>Pass</td>
</tr>
</tbody>
</table>

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 50,000 cycles

*** End of Report ***