# Test Report

| | |
|---|---|
| Report No | 2370/7455254 This Report consists of 9 pages |
| Client | Black Millwork Co Inc<br>Andersen House<br>Dallow Street<br>Burton on Trent<br>Staffordshire<br>DE14 2PQ |
| Authority & date | Request by Client dated 1 October 2009 |
| Items tested | 1 off Timber window, Black Millwork Internally Glazed Casement Window System |
| Specification | BS 7950:1997 Specification for enhanced security performance of windows for domestic applications incorporating Amendments 14289 and 15665 |
| Results | Pass |
| Prepared by | D Kirsop (Technician) |
| Authorized by | M Manito (Senior Engineer) |
| Issue Date | 9 November 2009 |
| Conditions of issue | This Test Report is issued subject to the conditions stated in current issue of *CP0322 'Conditions of contract for testing'*. 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 the Managing Director, BSI, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought. |

UKAS TESTING
0135

**TEST, EXAMINATION AND ASSESSMENT OF ONE TIMBER WINDOW, BLACK MILL WORK CO INC INTERNALLY GLAZED CASEMENT WINDOW SYSTEM**

## INTRODUCTION

At the request of Black Millwork Co Inc, the Timber window, detailed below and described on page 4, was tested and assessed to the requirements of BS 7950:1997 Specification for enhanced security performance of windows for domestic applications incorporating Amendments 14259 and 15666, as indicated on the following pages of this Report. This request was made in BSI Quotation BSI 0000232363 dated 30 October 2009.

It is emphasized that assessments have not been made against the other Clauses of the Specification.

This Report only relates to the actual sample which has been tested and assessed.

## TEST SAMPLE

1 off projecting side hung window

Date sample received: 12 October 2009

## SUMMARY OF RESULTS

| | | |
|---|---|---|
| 1. | Manipulation | The test samples met the requirements of the Specification in respect of Clause 7 Annex A.4. |
| 2. | Glazing removal | The test samples met the requirements of the Specification in respect of Clause 7 Annex A.5. |
| 3. | Mechanical loading | The test samples met the requirements of the Specification in respect of Clause 7 Annex A.6. |
| 4. | Manual check test | The test samples met the requirements of the Specification in respect of Clause 7 Annex A.7. |

**CLAUSE 4 SAMPLE SELECTION**

The samples submitted for tests were selected by the Client for the specific purpose of test.

**CLAUSE 5.2 ASSESSMENT**

The assessment of the test samples followed the sequence detailed in Figure 1 of the Specification.

**CLAUSE 6 TEST APPARATUS AND SAMPLE MOUNTING**

The test apparatus used for the manual and mechanical tests is shown in Appendix A of this Report. This apparatus meets the requirements of the Specification.
Each test sample was submitted for test mounted in a 50 x 100mm timber subframe in accordance with the manufacturer's installation requirements.

**DESCRIPTION OF SAMPLE**

**Sample type -** Projecting side hung

**Material -** Timber

**Construction -** Mortice and Tenon Joints

**Fittings**
**Opening light -** Friction stays: 16” Securistyle side hung stays

Locking: A six point locking (four mushroom bolts and two shootbolts) Winlock espagnolette system operated by a key locking handle
2 off pairs of Dog bolt hinge protectors

**Glass -** Double glazed, 4-16-4mm toughened glass sealed unit

**Glazing system -** Internal beads, gaskets and security glazing tape

**Sample dimensions -** For information only (nominal sizes)

Overall size
Length: 750mm Height: 1350mm

Side hung size
Length: 660mm Height: 1260mm

## EXAMINATION AND TEST

Sample type - Projecting side hung

Date of test – 15 October 2009

Laboratory temperature - 19°C

## CLAUSE 7 PERFORMANCE REQUIREMENTS

### Annex A.4 Manipulation test

The sample was mounted vertically in the test rig as described in Annex A.2.
The test was carried out in accordance with the given objective of this Annex using the implements described in Annex A.3.

The key for the lockable hardware was fully removable.
No entry could be effected within 3 minutes. Pass

### Annex A.5 Glazing removal test

### Annex A.5.1 Manual test

The sample was mounted vertically in the test rig as described in Annex A.2.
The sample was assessed using a selection of tools as described in Annex A.3.

No entry could be effected within 3 minutes Pass

### Annex A.5.2 Mechanical test

The sample was mounted vertically in the test rig as described in Annex A.2.
A perpendicular to plane load of 2.0kN was applied to each corner of the glazing in turn as specified in Annex A.5.2.

No evidence of bead failure
No entry could be effected Pass

**EXAMINATION AND TEST (CONTINUED)**

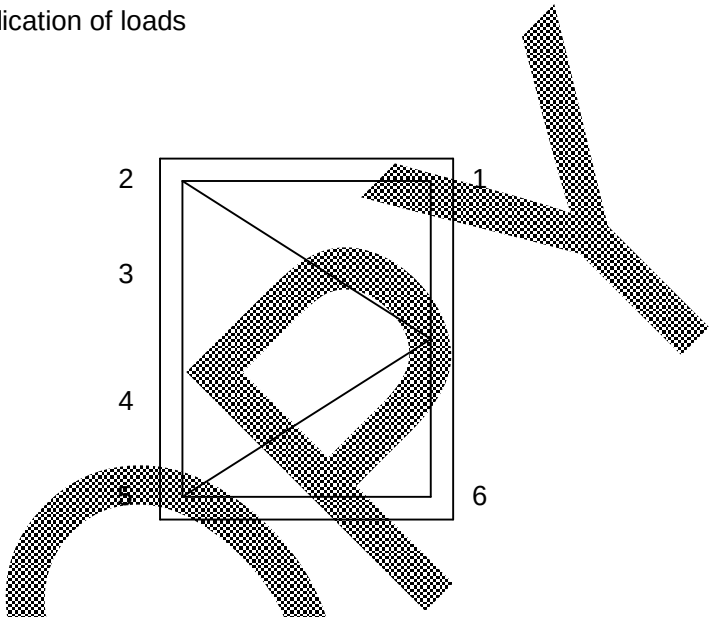
**CLAUSE 7 PERFORMANCE REQUIREMENTS**

**Annex A.6 Mechanical loading test**

The sample was mounted vertically in the test rig as described in Annex A.2.

The test was carried out in accordance with the procedures detailed in Annex A.6 and Figure 1 using the test apparatus detailed in Appendix A of this test report.

Diagram of points of application of loads




**Annex A.6.2 Loading procedure**

Point of application of load

**First sequence**

1 - Friction stay/Dog bolt (right head)

Standard loading case used: 1
Load applied in plane: 1.0kN along edge in direction to disengage bolt
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

Load applied in plane: 1.0kN towards opposite stay
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

**EXAMINATION AND TEST (CONTINUED)**

**Annex A.6.2 Loading procedure (continued)** **ASSESSMENT**

Point of application of load

2 - Corner/Shootbolt/Mushroom bolt (left head)

Standard loading case used: 3/4
Load applied in plane: 1.0kN along edge in direction to disengage bolts
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

Loads applied in plane: 1.0kN at right angles to edge and towards opposite edge
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

3 - Mushroom bolt (upper left jamb)

Standard loading case used: 4
Load applied in plane: 1.0kN along edge in direction to disengage bolt
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

Loads applied in plane: 1.0kN at right angles to edge and towards opposite edge
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

4 - Mushroom bolt (lower left jamb)

Standard loading case used: 4
Load applied in plane: 1.0kN along edge in direction to disengage bolt
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

Loads applied in plane: 1.0kN at right angles to edge and towards opposite edge
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

5 - Corner/Shootbolt/Mushroom bolt (left sill)

Standard loading case used: 3/4
Load applied in plane: 1.0kN along edge in direction to disengage bolt
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

Loads applied in plane: 1.0kN at right angles to edge and towards opposite edge
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

6 - Friction stay/Dog bolt (right sill)

Standard loading case used: 1
Load applied in plane: 1.0kN along edge in direction to disengage bolt
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

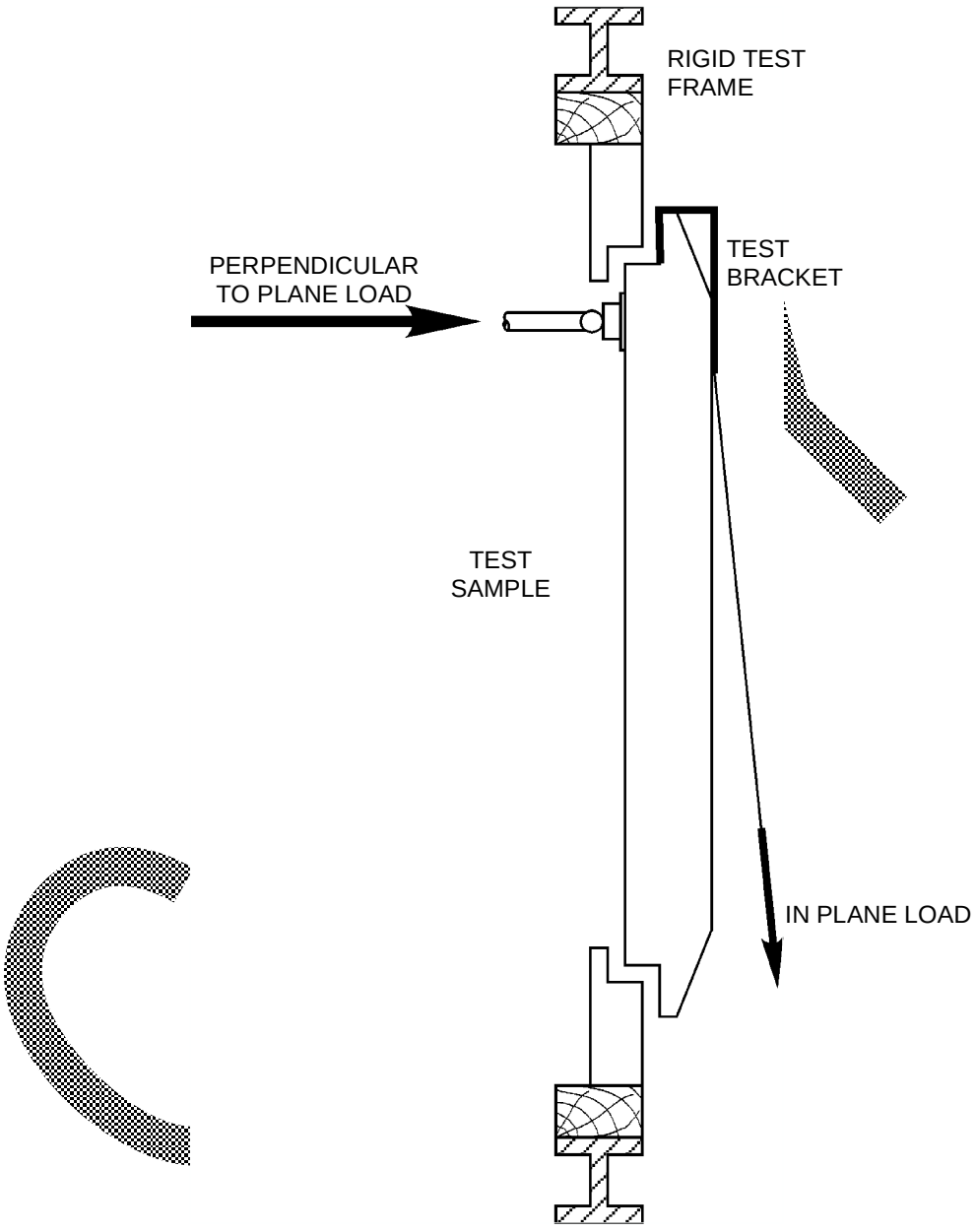
Load applied in plane: 1.0kN towards opposite stay
Load applied perpendicular to plane: 3.0kN applied for 10 seconds

No Entry effected Pass

**EXAMINATION AND TEST (CONTINUED)**

| **CLAUSE 7 PERFORMANCE REQUIREMENTS** | **ASSESSMENT** |
|---|---|
| **Annex A.7 Manual check test** | |
| The sample was mounted vertically in the test rig as described in Annex A.2.<br><br>The test was carried out using the tools described in Annex A.7.2 in accordance with the procedures detailed in Annex A.7.3.<br><br>No alternative method of entry could be effected | Pass |
| **Annex A.8 Additional mechanical loading test** | |
| Not applicable as an alternative method of entry was not identified under Annex A.7. | |

**APPENDIX A**


RIGID TEST
FRAME
TEST
BRACKET
PERPENDICULAR
TO PLANE LOAD
TEST
SAMPLE
IN PLANE LOAD

# Test Report

| | |
|---|---|
| Report No | 2370/7337617 This Report consists of 15 pages |
| Client | Black Mill Work Co Inc<br>Andersen House<br>Dallow Street<br>Burton-on-Trent<br>Staffordshire<br>DE14 2PO |
| Authority & date | Request by Client dated 14 October 2009 |
| Items tested | 1 off Timber window, Black Mill Work Internally Glazed Casement Window System |
| Specification | BS 644:2003 Timber windows – Factory assembled windows of various types - Specification<br>BS 6375-1:2004 Performance of windows and doors Part 1: Classification for weathertightness and guidance on selection and specification type testing for product certification |
| Results | Pass |
| Prepared by | D Kirsop (Technician) |
| Authorized by | M Manito (Senior Engineer) |
| Issue Date | 2 February 2010 |
| Conditions of issue | This Test Report is issued subject to the conditions stated in current issue of *CP0322* 'Conditions of contract for testing'. 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 the Managing Director, BSI , who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought. |

**TEST AND EXAMINATION OF ONE TIMBER WINDOW SUBMITTED FOR ASSESSMENT, BLACK MILL WORK INTERNALLY GLAZED CASEMENT WINDOW SYSTEM**

## INTRODUCTION

At the request of the client, the timber window submitted by Black Mill Work Co Inc detailed below and described on pages 5 and 6, were tested and assessed to the requirements of BS 644:2003 and BS 6375-1:2004, as indicated on the following pages of this Report.
It is emphasized that assessments have not been made against the other Clauses of the Specification.

## TEST SAMPLE

1 off projecting side hung window

Equipment Record No 10103975

Date samples received: 10 December 2010

## SUMMARY OF RESULTS

| | | |
|---|---|---|
| 1. | Construction | The test sample met the requirements of BS 644:2003 in respect of Clause 9, and its parts thereof, against which assessments have been made |
| 2. | Security | The test sample met the requirements of BS 644:2003 in respect of Clause 11.1, and its parts thereof, against which assessments have been made |
| 3. | Safety | The test sample met the requirements of BS 644:2003 in respect of Clause 11.2, and its parts thereof, against which assessments have been made |
| 4. | Air permeability | The test sample met the requirements of BS 644:2003, in respect of Clause 12.2, for Exposure Category Class 4. |
| 5. | Watertightness | The test sample met the requirements of BS 644:2003, in respect of Clause 12.3, for Exposure Category Class 7A. |
| 6. | Wind resistance | The test sample met the requirements of BS 644:2003, in respect of Clause 12.4, for Exposure Category 2400PA. |
| 7. | Operation and Strength | The test sample met the requirements of BS 644:2003, in respect of Clause 13. |

## PREPARATION AND METHOD OF TEST

The samples were prepared as required by BS EN 1026:2000 Windows and doors - Air permeability, BS EN 1027:2000 Windows and doors - Watertightness and BS EN 12211:2000 Windows and doors - Resistance to wind load in respect of BS 6375 -1:2004.
The samples were mounted into a plywood surround for installation in the test apparatus.
The joint between the samples and the plywood surround was sealed.

### 1. Air permeability

The air permeability of the samples was determined by the method given in BS EN 1026:2000.

### 2. Watertightness

The watertightness of the samples was determined by the method given in BS EN 1027:2000.

### 3. Resistance to wind load (P1 and P2)

The resistance to wind load of the samples was determined by the method given in BS EN 12211:2000.

### 4. Repeat test

After testing for resistance to wind load test 1 (air permeability) was repeated

### 5. Resistance to wind load (P3)

The resistance to wind load of the samples was determined by the method given in BS EN 12211:2000.

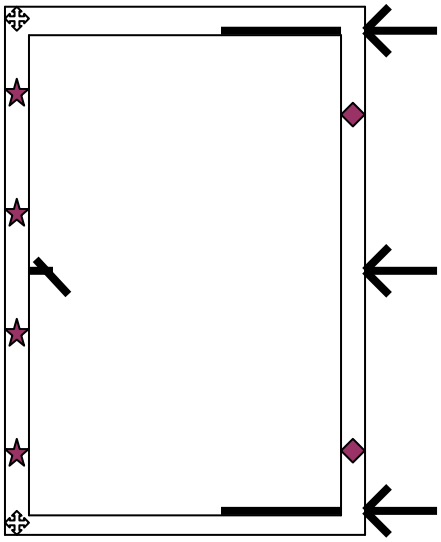
### 6. Operation and strength

The operation and strength characteristics were determined by the methods given in BS 6375-2:1987

**DESCRIPTION OF SAMPLE**

| | |
|---|---|
| **Sample type -** | Projecting side hung |
| **Material -** | Timber |
| **Reinforcement -** | N/A |
| **Construction -** | Mortice and tennon |
| **Fittings -** | Friction stays: 12” side hung stays<br><br>A six point locking (two shoot bolts and four mushroom bolts) espagnolette system operated by a key operated handle<br>2 off pairs of dog bolts<br>2 off run up blocks |
| **Weathersealing -** | Q-Lon |
| **Glass -** | Double glazed, 4-16-4mm sealed unit |
| **Glazing system -** | Internal beads and gaskets |
| **Sample dimensions -** | Length: 750mm Height 1350mm |
| **Date of test:** | 25 January 2010 |
| **Laboratory temperature:** | 17.2ºC |
| **Relative humidity -** | 46.2%RH |
| **Atmospheric pressure -** | 101.7kPa |

**ELEVATION DRAWING INDICATING POSITION OF HARDWARE**



- hinge
- mushroom bolt
- hinge protector
- handle
- shoot bolts
- transducers

**EXAMINATION AND TEST - BS 644:2003**

| Clause | Description | Result |
|---|---|---|
| **11.** | **SECURITY AND SAFETY** | |
| 11.1 | Security | Pass |
| 11.2 | Safety | Pass |

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

### Clause 12.2 Air Permeability

Three positive pressure pulses of 825Pa were applied prior to testing

**Table ****

| Air Pressure [Pa] | Blank reading [$m^3/h$] | Maximum total air flow [$m^3/h$] | Actual rate of air leakage [$m^3/h$] | Rate of air leakage per meter length of opening joint [$m^3/h.m$] | Rate of air leakage relative to area of sample [$m^3/h.m^2$] |
|---|---|---|---|---|---|
| 50 | 4.9 | 5.7 | 0.1 | 0.03 | 0.12 |
| 100 | 8.2 | 9.1 | 0.1 | 0.04 | 0.13 |
| 150 | 10.8 | 11.8 | 0.1 | 0.04 | 0.15 |
| 200 | 13.2 | 14.1 | 0.1 | 0.04 | 0.13 |
| 250 | 15.3 | 16.4 | 0.2 | 0.05 | 0.16 |
| 300 | 17.5 | 18.4 | 0.1 | 0.04 | 0.13 |
| 450 | 23.4 | 24.7 | 0.2 | 0.05 | 0.19 |
| 600 | 29.3 | 30.7 | 0.2 | 0.06 | 0.21 |
| 750 | 36.3 | 36.6 | 0.0 | 0.01 | 0.04 |
| -50 | 5.0 | 5.0 | 0.0 | 0.00 | 0.00 |
| -100 | 8.0 | 8.0 | 0.0 | 0.00 | 0.00 |
| -150 | 10.3 | 10.3 | 0.0 | 0.00 | 0.00 |
| -200 | 12.4 | 12.4 | 0.0 | 0.00 | 0.00 |
| -250 | 14.6 | 14.6 | 0.0 | 0.00 | 0.00 |
| -300 | 16.3 | 16.3 | 0.0 | 0.00 | 0.00 |
| -450 | 20.6 | 20.6 | 0.0 | 0.00 | 0.00 |
| -600 | 23.9 | 23.9 | 0.0 | 0.00 | 0.00 |
| -750 | 26.5 | 26.5 | 0.0 | 0.00 | 0.00 |

Total opening perimeter = 3.64m

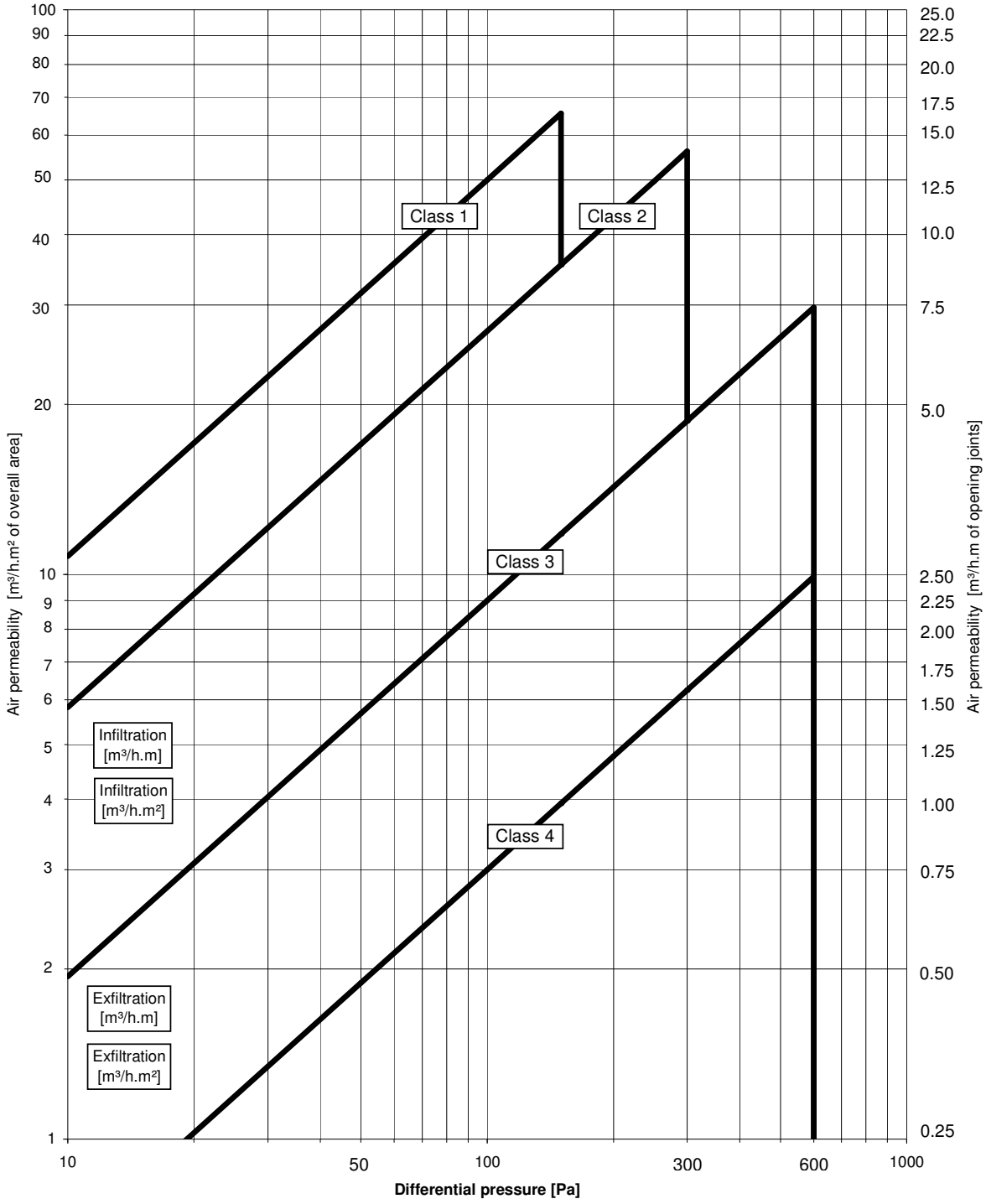
Overall area = 1.0125$m^2$

BS EN 12207:2000 - Joint class = 4

BS EN 12207:2000 - Area class = 4

BS EN 12207:2000 - Overall class before gusting = 4

**GRAPH OF AIR PERMEABILITY BEFORE GUSTING**



**WATERTIGHTNESS TEST RESULTS - BS EN 1027:2000**

**Clause 12.3 Watertightness before resistance to wind loads**

**TABLE 2 - Spraying method 1A**

| Air pressure (Pa) | Point at which water leakage occurred |
|---|---|
| 450 | Water, ran out and over from the sill opening joint |

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

**Clause 14.4 Resistance to wind load**

**P1 DEFLECTION TEST**

Three positive pressure pulses at 2640Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a positive air pressure of 2400Pa.

Actual deflection – 1.09mm (maximum deflection allowed 7.86mm)

Deflection/span ratio 1/1082 (maximum ratio allowed 1/150)

Three negative pressure pulses at 2640Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a negative air pressure of 2400Pa.

Actual deflection – 1.10mm (maximum deflection allowed 7.86mm)

Deflection/span ratio 1/1072 (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 1200Pa.

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 1200Pa.

The change in air permeability due to the wind pressure and repeated pressure tests has not exceeded the achieved class (4) by more than 20% as required by BS 6375-1:2004 - Section 8 (see following Table).

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

### Clause 12.2 Air Permeability

Three positive pressure pulses of 825Pa were applied prior to testing

**Table ****

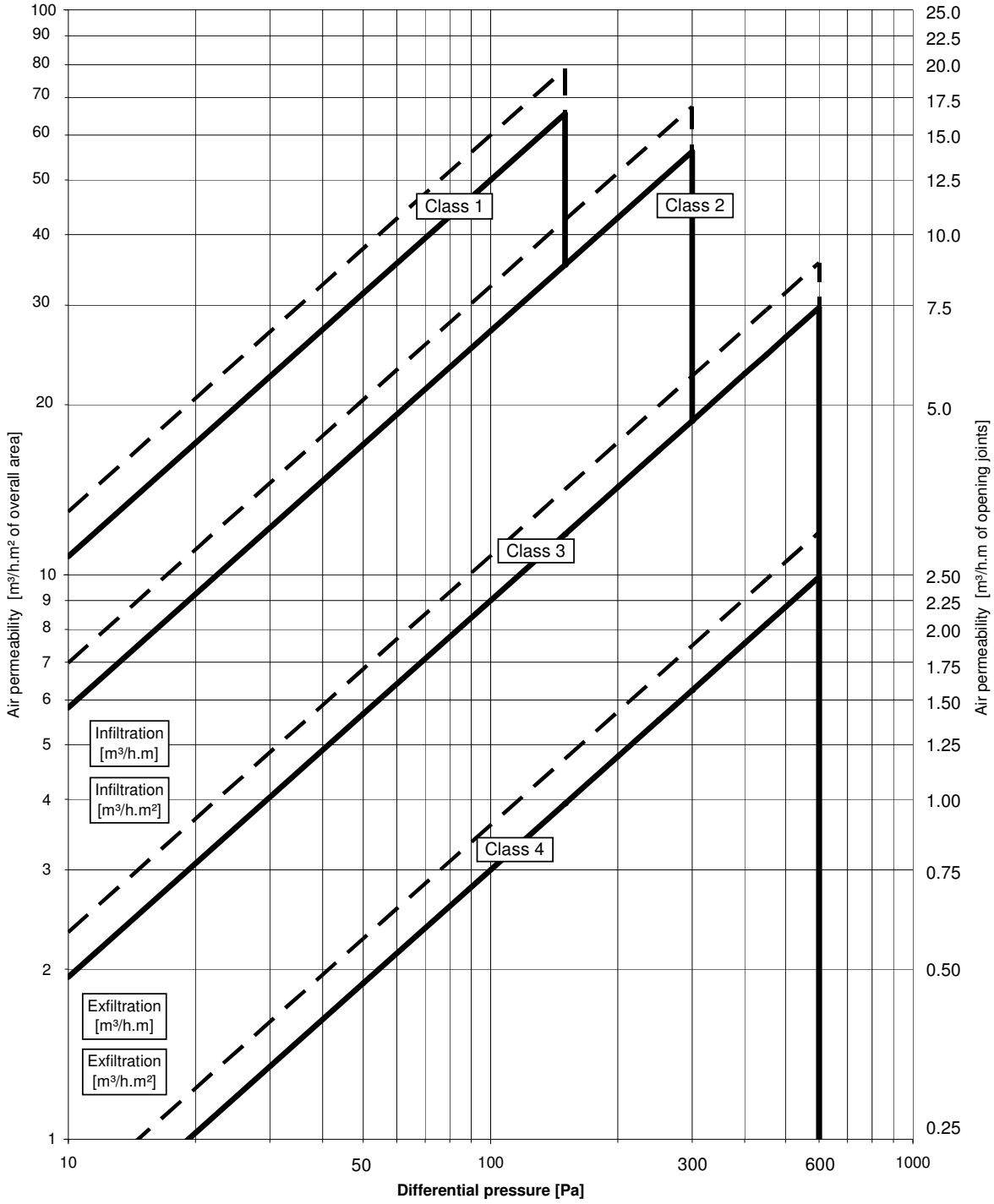
| Air Pressure [Pa] | Blank reading [$m^3/h$] | Maximum total air flow [$m^3/h$] | Actual rate of air leakage [$m^3/h$] | Maximum rate of air leakage per meter length of opening joint [$m^3/h.m$] | Maximum rate of air leakage relative to area of sample [$m^3/h.m^2$] |
|---|---|---|---|---|---|
| 50 | 4.1 | 4.6 | 0.1 | 0.02 | 0.07 |
| 100 | 7.0 | 7.6 | 0.1 | 0.02 | 0.09 |
| 150 | 9.1 | 10.1 | 0.1 | 0.04 | 0.15 |
| 200 | 11.0 | 12.1 | 0.2 | 0.05 | 0.16 |
| 250 | 13.0 | 14.3 | 0.2 | 0.05 | 0.19 |
| 300 | 14.7 | 15.8 | 0.2 | 0.05 | 0.16 |
| 450 | 19.0 | 20.1 | 0.2 | 0.05 | 0.16 |
| 600 | 22.4 | 23.9 | 0.2 | 0.06 | 0.22 |
| 750 | 25.5 | 27.1 | 0.2 | 0.07 | 0.24 |
| -50 | 4.2 | 4.5 | 0.0 | 0.01 | 0.04 |
| -100 | 6.8 | 7.3 | 0.1 | 0.02 | 0.07 |
| -150 | 9.4 | 9.8 | 0.1 | 0.02 | 0.06 |
| -200 | 11.4 | 12.0 | 0.1 | 0.02 | 0.09 |
| -250 | 13.2 | 13.9 | 0.1 | 0.03 | 0.10 |
| -300 | 15.0 | 15.8 | 0.1 | 0.03 | 0.12 |
| -450 | 20.8 | 21.8 | 0.1 | 0.04 | 0.15 |
| -600 | 25.9 | 27.4 | 0.2 | 0.06 | 0.22 |
| -750 | 31.4 | 32.7 | 0.2 | 0.05 | 0.19 |

Total opening perimeter = 3.64m

Overall area = $1.0125m^2$

For classification to BS EN 12210:2000 - Section 6.1: Resistance to wind load, the change in air permeability due to the wind pressure and repeated pressure tests HAS NOT exceeded the achieved class (4) by more than 20%.

**GRAPH OF AIR PERMEABILITY AFTER GUSTING**



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

**P3 SAFETY TEST**

No parts of the test sample became detached and the test sample remained closed after a wind load safety test applied at a positive air pressure of 3600Pa.

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 3600Pa.

**BS 644:2003 - Clause 13 Operation and strength**

**(BS 6375-2:1987)**

| **APPENDIX A Test methods** | **Result** |
|---|---|
| Variable geometry hinges 410mm long, having one bar fixed to the frame, one bar fixed to the sash and five link bars. | |
| **A2 Test 1 : Ease of fastener operation** | |
| Opening force – 7.9Nm (maximum 10Nm) | Pass |
| Closing force – 7.4Nm (maximum 10Nm) | Pass |
| **A3 Test 2 : Ease of movement of sash** | |
| Opening forces | |
| Initial force - 24N (maximum 80N) | Pass |
| Sustained force- 39N (maximum 65N) | Pass |
| Closing forces | |
| Initial force - 35N (maximum 80N) | Pass |
| Sustained force - 51N (maximum 65N) | Pass |
| **A5 Test 4 : Release of jammed sash** | |
| Force applied - 300N for 5s | |
| Ease of fastener operation after removal of force (Test 1) | |
| Opening force – 6.6Nm (maximum 10Nm) | Pass |
| Closing force – 7.4Nm (maximum 10Nm) | Pass |
| No visible damage to the window was observed | Pass |

**(BS 6375-2:1987)**

| **APPENDIX A Test methods** | **Result** |
|---|---|
| **A6 Test 5 : Release of jammed hinge** | |
| Force applied - 300N for 5s (Class A) | |
| Ease of fastener operation after removal of force | |
| Opening force – 5.8Nm (maximum 10Nm) | Pass |
| Closing force – 7.2Nm (maximum 10Nm) | Pass |
| Ease of movement of sash after removal of force | |
| Opening forces | |
| Initial force - 27N (maximum 80N) | Pass |
| Sustained force - 37N (maximum 65N) | Pass |
| Closing forces | |
| Initial force - 28N (maximum 80N) | Pass |
| Sustained force - 57N (maximum 65N) | Pass |
| No visible damage to the window was observed | Pass |
| Note<br>The acceptance level, Class A, is that described in Amendment No1 to BS 6375-2:1987 | |
| **A7 Test 6 : Strength of restricted opening and location devices and maximum opening stops** | |
| Force applied - 200N for 5s | |
| Window remained operable after force removed | Pass |

**Clause 15 Operation and strength**

**(BS 6375-2:1987)**

**APPENDIX A Test methods**

| | **Result** |
|---|---|
| **A8 Test 7 : Resistance to accidental loading** | |
| Force applied - 500N for 5s | |
| Ease of fastener operation after removal of force | |
| Opening force – 6.1Nm (maximum 10Nm) | Pass |
| Closing force – 7.4Nm (maximum 10Nm) | Pass |
| No visible damage to the window was observed | Pass |
| Force applied - 1000N for 1 min | |
| There was no glass breakage and the hardware remained attached to the sash and frame of the window | Pass |

**END OF REPORT**