Test Report

BSI Product Services

Report No	261/4653372/2 of 6 This Report consists of 17 pages
Client	George Barnsdale & Sons Limited High Street Donington Spalding Lincolnshire PE11 4TA
Authority & date	Request by Client dated 20 December 2004
Items tested	1 off timber window, George Barnsdale & Sons Limited E1 Tilt and Turn Internally Glazed Window System
Specification	BS 644:2003 Timber Windows - Factory assembled windows of various types - Specification BWF Timber Window Accreditation Scheme Criteria and Requirements Document 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	See Summary of Results on Page 3
Prepared by	R Avery (Engineer I)
Authorized by	A D Coley (Laboratory Manager)
Issue Date	4 August 2005
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of *PS082* 'General conditions relating to acceptance of 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 Product Services, 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, EXAMINATION AND ASSESSMENT OF ONE TIMBER WINDOW, GEORGE BARNSDALE & SONS LIMITED E1 TILT AND TURN INTERNALLY GLAZED WINDOW SYSTEM

INTRODUCTION

At the request of George Barnsdale & Sons Limited the timber window, detailed below, described on page 4, was tested and assessed to the requirements of BS 644:2003, the BWF Timber Window Accreditation Scheme Criteria and Requirements Document and BS 6375-1:2004, as indicated on the following pages of this Report. This request was made in a Purchase Order from the Client dated 20 December 2004 and referenced 9514.
It is emphasized that assessments have not been made against the other Clauses of the Specification.

TEST SAMPLE

1 off timber window - A multilight window consisting of a tilt and turn light next to a dummy vent

A type test window as detailed in Annex A5 of the BWF Timber Window Accreditation Scheme Criteria and Requirements Document but with a dummy vent in place of the fixed light

Date sample received: 18 February 2005

PERFORMANCE REQUIREMENTS REQUESTED BY CLIENT

Positive pressure sequence only required

Air permeability - 600Pa (Class 4)

Watertightness - 300Pa (Class 7A)

Wind resistance - 2000Pa (Class 5)

SUMMARY OF RESULTS

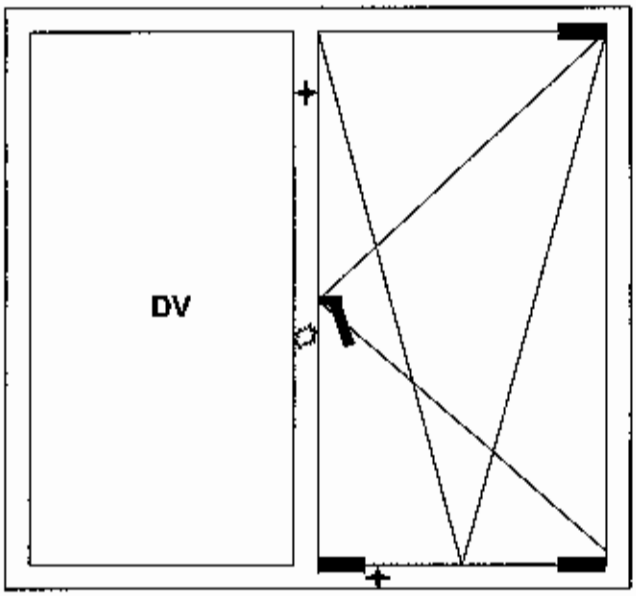
1.	Construction	The test sample met the requirements of BS 644:2003 in respect of Clause 8, and its parts thereof, against which assessments have been made
2.	Security and safety	The test sample met the requirements of BS 644:2003 in respect of Clause 10, and its parts thereof, against which assessments have been made
3.	Air permeability	The test sample met the requirements of the BWF Timber Window Accreditation Scheme Criteria and Requirements Document for Exposure Category 600Pa (Class 4)
4.	Watertightness	The test sample met the requirements of the BWF Timber Window Accreditation Scheme Criteria and Requirements Document for Exposure Category 300Pa (Class 7A)
5.	Wind resistance	The test sample met the requirements of the BWF Timber Window Accreditation Scheme Criteria and Requirements Document for Exposure Category 2000Pa (Class 5)
6.	Operation and Strength	The test sample met the requirements of BS 6375-2:1987

The test sample met the requirements of Exposure Category 2000 given in BS 6375-1:2004 in respect of its air permeability, watertightness and wind resistance characteristics.

DESCRIPTION OF SAMPLE

Sample Type -	A multilight window consisting of a tilt and turn light next to a dummy vent
Material -	Redwood
Construction -	Finger joints
Finish -	Sikkens microporous
Profile reference -	George Barnsdale E1 Tilt and Turn Window Drawing No BSI-E1-02 dated 21-12-04
Fittings -	A three point locking (two mushroom bolts and one roller cam) Segienia espagnolette tilt/turn system operated by a key locking Titon handle
Weathersealing -	Double sealed with plastics weatherstrip, reference Schlegel Aquamac 109 and Schlegel Zero-Gap
Glass -	Double glazed, 4-16-4mm sealed units
Glazing system	Internal beads, reference George Barnsdale E1 Tilt and turn Window Drawing No BSI-E1-02 dated 21-12-04 Gaskets, reference Hodgson Flexibond security glazing tape
Sample dimensions -	Length: 1200mm Height 1200mm
Date of Test:	9 March 2005
Laboratory Temperature:	18.2°C
Relative Humidity -	34.2%RH
Atmospheric Pressure -	101.8kPa

ELEVATION DRAWING INDICATING POSITION OF HARDWARE



▬	-	hinge
☼	-	roller cam
✦	-	mushroom bolt
▰	-	handle
DV	-	dummy vent

PREPARATION AND METHOD OF TEST

The sample was 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 sample was mounted into a plywood surround for installation in the test apparatus.
The joint between the sample and the plywood surround was sealed.

1. Air permeability

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

2. Watertightness

The watertightness of the sample 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 sample 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 sample 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

EXAMINATION AND TEST - BS 644:2003

Clause	Description	Result
9.	**Construction**	
9.1	Timber members	Pass
9.2	Joints	Pass
9.3	Nails, star dowels and other fixings	Pass
9.4	Open joints	Pass
9.5	Horns	Not applicable
9.6	Laminated timber	Not applicable
9.7	Drips and sill members	Pass
9.8	Bead glazing	Pass
9.9	Primer or stain	Pass
9.10	Composite windows	Not applicable
11	**Security and safety**	
11.1	**Security**	
	Fasteners	Pass
	Opening lights	Pass
11.2	**Safety**	
	Limit catches	Not applicable

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

Before resistance to wind load tests

Three positive pressure pulses of 770Pa were applied prior to testing

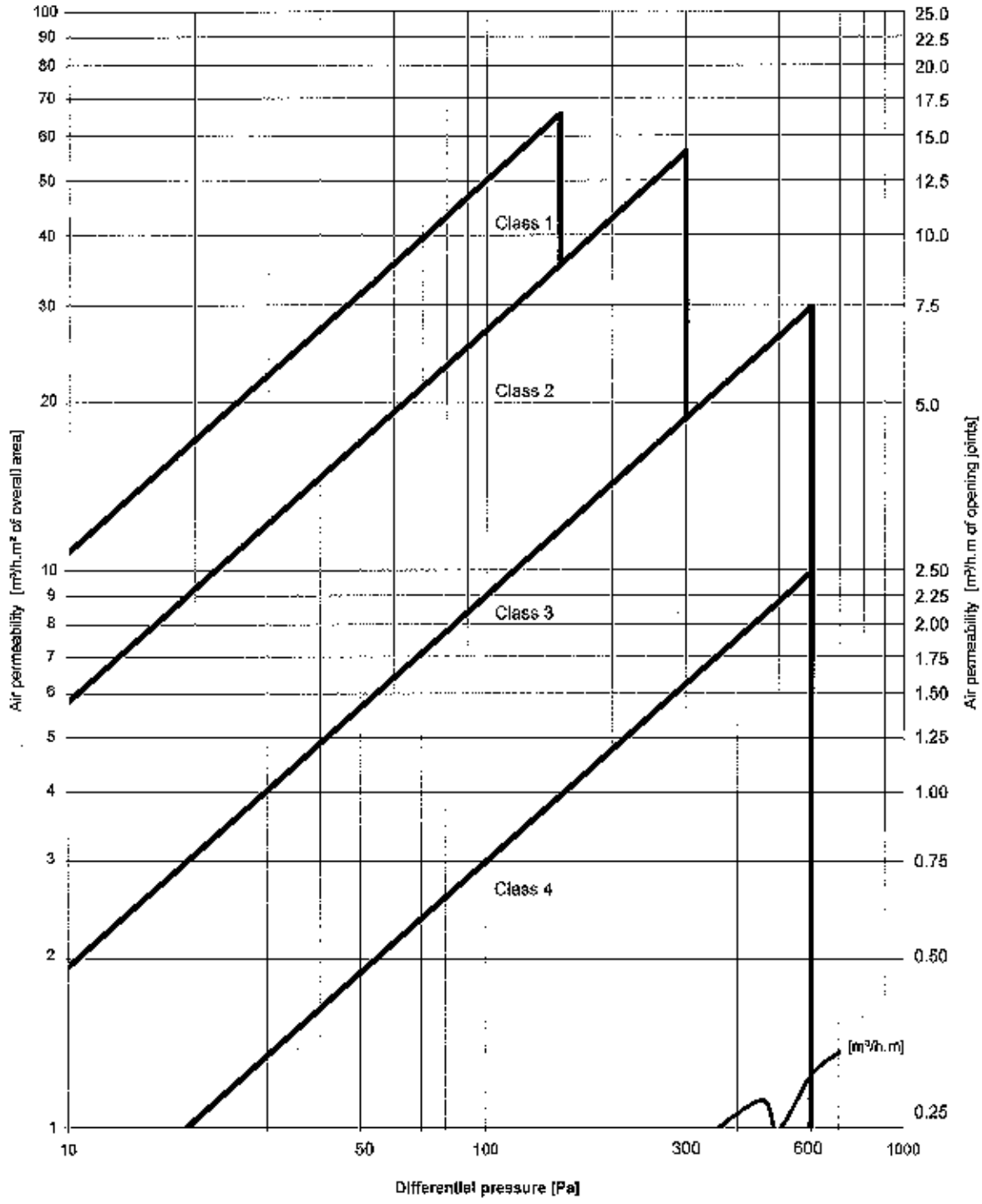
Table 1

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 air leakage per meter length of opening joint [$m^3/h.m$]	Maximum rate air leakage relative to area of sample [$m^3/h.m^2$]
50	1.9	1.9	0.0	0.00	0.00
100	3.8	3.9	0.1	0.03	0.07
150	5.0	5.3	0.3	0.09	0.21
200	6.5	7.0	0.5	0.16	0.35
250	7.5	8.0	0.5	0.16	0.35
300	8.5	9.2	0.7	0.22	0.49
450	11.5	12.4	0.9	0.28	0.63
500	12.5	13.3	0.8	0.25	0.56
600	14.3	15.3	1.0	0.31	0.70
700	16.1	17.2	1.1	0.34	0.77

Total opening perimeter [m]: 3.26

Overall area [m^2]: 1.44

GRAPH OF AIR PERMEABILITY BEFORE GUSTING



WATERTIGHTNESS TEST RESULTS - BS EN 1027:2000/BS EN 12208:2000

Before resistance to wind load tests

TABLE 2 - Spraying method 1A

Air pressure (Pa)	Point at which water leakage occurred
900	No leakage recorded

WIND LOAD RESISTANCE TEST RESULTS - BS EN 12211:2000/BS EN 12210:2000

P1 DEFLECTION TEST

Three positive pressure pulses at 2200Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a positive air pressure of 2000Pa.

Actual deflection - 0.83mm (maximum allowed 7.16mm)

Deflection/span ratio 1/1295 (maximum allowable 1/150)

Three negative pressure pulses at 2200Pa were applied

No visible failures or functional defects to the test sample were observed after wind loads applied at a negative air pressure of 2000Pa.

Actual deflection - 0.84mm (maximum deflection allowed 7.16mm)

Deflection/span ratio 1/1280 (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 1000Pa.

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 1000Pa.

The air permeability has not increased by more than 20% from the initial air permeability test as required by Clause 6.1 of BS EN 12210:2000 (see Table 3).

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

After resistance to wind load tests

Three positive pressure pulses of 770Pa were applied prior to testing

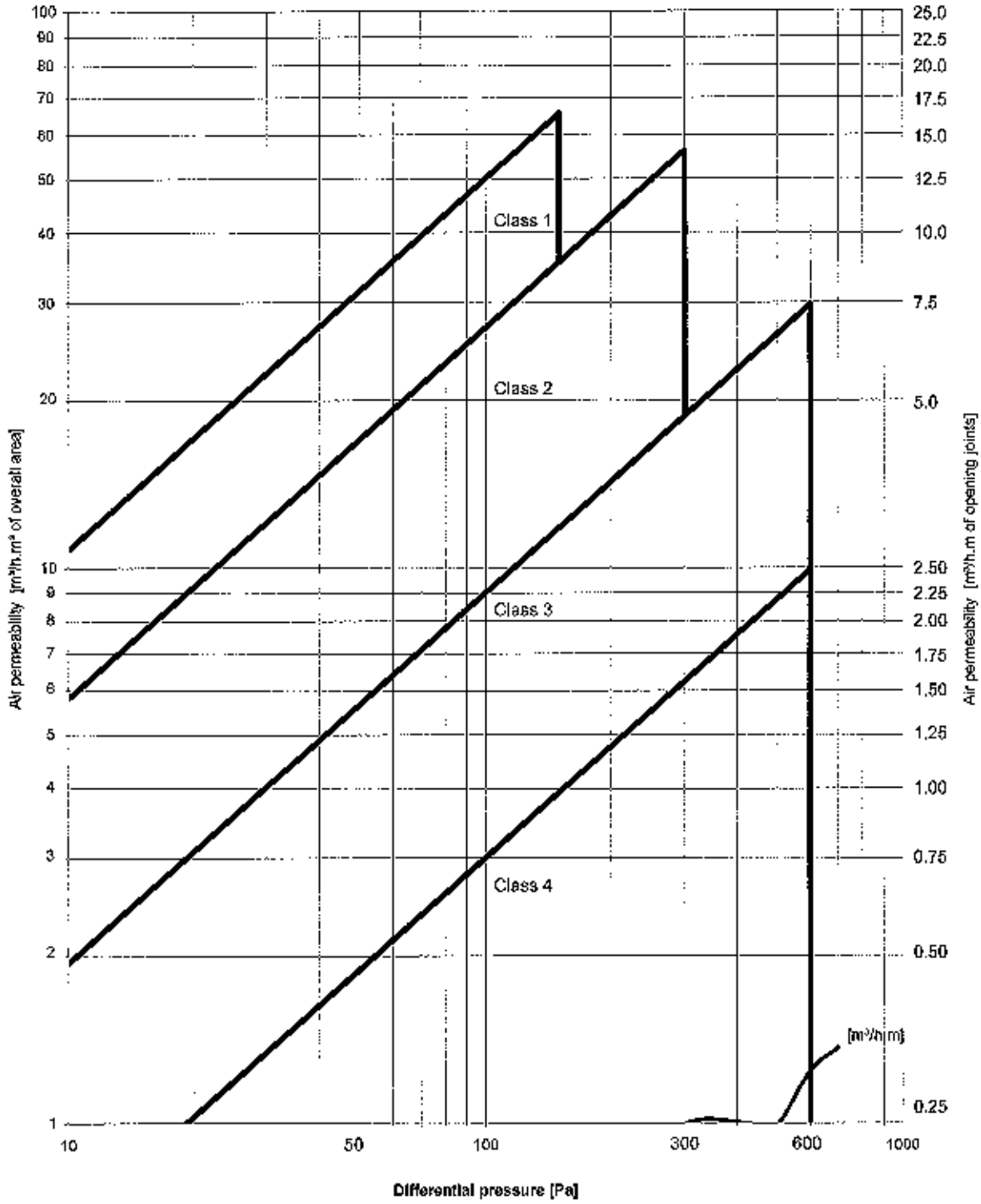
Table 3

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 air leakage per meter length of opening joint [$m^3/h.m$]	Maximum rate air leakage relative to area of sample [$m^3/h.m^2$]
50	1.2	1.2	0.0	0.00	0.00
100	2.9	3.0	0.1	0.03	0.07
150	4.4	4.7	0.3	0.09	0.21
200	5.4	5.7	0.3	0.09	0.21
250	6.7	7.3	0.6	0.19	0.42
300	7.5	8.3	0.8	0.25	0.56
450	9.9	10.7	0.8	0.25	0.56
500	10.9	11.7	0.8	0.25	0.56
600	12.6	13.6	1.0	0.31	0.70
700	14.2	15.3	1.1	0.34	0.77

Total opening perimeter [m]: 3.26

Overall area [m^2]: 1.44

GRAPH OF AIR PERMEABILITY AFTER GUSTING



WIND LOAD RESISTANCE TEST RESULTS - BS EN 12211:2000/BS EN 12210:2000

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 3000Pa.

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 3000Pa.

BS 644:2003 - Clause 13 Operation and strength

(BS 6375-2:1987)

Tilt mode

APPENDIX A Test methods

	Result
A2 Test 1 : Ease of fastener operation	
Opening force - 3.2Nm (maximum 10Nm)	Pass
Closing force - 4.2Nm (maximum 10Nm)	Pass
A3 Test 2 : Ease of movement of sash	
Opening forces	
Initial force - 8N (maximum 80N)	Pass
Sustained force – 15N (maximum 65N)	Pass
Closing forces	
Initial force - 20N (maximum 80N)	Pass
Sustained force - 25N (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 - 4.1Nm (maximum 10Nm)	Pass
Closing force - 4.1Nm (maximum 10Nm)	Pass
No visible damage to the window was observed	Pass
A7 Test 6 : Strength of restricted opening and location devices and maximum opening stops	
Force applied - 200N for 5s (maximum opening stops)	
Window remained operable after force removed	Pass

BS 644:2003 - Clause 13 Operation and strength

(BS 6375-2:1987)

Turn mode

APPENDIX A Test methods

	Result
A2 Test 1 : Ease of fastener operation	
Opening force - 3.1Nm (maximum 10Nm)	Pass
Closing force - 4.1Nm (maximum 10Nm)	Pass
A3 Test 2 : Ease of movement of sash	
Opening forces	
Initial force - 14N (maximum 80N)	Pass
Sustained force – 2N (maximum 65N)	Pass
Closing forces	
Initial force - 2N (maximum 80N)	Pass
Sustained force - 32N (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 - 3.1Nm (maximum 10Nm)	Pass
Closing force - 3.1Nm (maximum 10Nm)	Pass
No visible damage to the window was observed	Pass

BS 644:2003 - Clause 13 Operation and strength (continued)

(BS 6375-2:1987)

Tilt mode

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 (Test 1)	
Opening force - 2.4Nm (maximum 10Nm)	Pass
Closing force - 3.6Nm (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

APPENDIX A

Window types:

a) tilt/turn
b) dummy vent
c) multilight window consisting of tilt/turn light(s) with or without dummy vents

Manufacturer's designation:

George Barnsdale & Sons Limited E1 Tilt and Turn Internally Glazed Timber Window System

General description:

The range of windows is double glazed only, is internally glazed only, has multipoint locking only and is produced in accordance with George Barnsdale & Sons Limited E1 Tilt and Turn Window Drawing No BSI-E1-02 dated 21-12-04

Size limitations:

	Length up to a maximum of	**Height up to a maximum of**	**Perimeter up to a maximum of**	**Transom/mullion length (including frame) up to a maximum of**
Type a)	600mm	1200mm	-	-
Type b)	600mm	1200mm	-	-
Type c)	1200mm	1200mm	4800mm	1200mm

Performance characteristics:

All types
Exposure Category 2000 given in BS 6375-1:2004 in respect of its air permeability, watertightness and wind resistance requirements