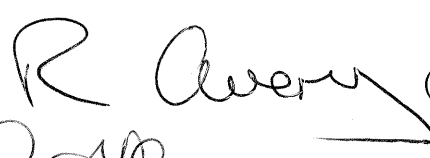



Test Report

Report No	261/7125560/1 of 2	This Report consists of 47 pages
Licence/Certificate No	KM 530838	
Client	Smart Systems Limited Arnolds Way Yatton North Somerset BS49 4QN	
Authority & date	BSI Product Services: Service Management Order No 7125560 dated 18 January 2008 - Equipment Record No 10092330	
Items tested	2 off single leaf hinged door assemblies, Smart Systems Limited Alitherm 47 Thermally Broken Aluminium Alloy Residential Door System	
Specification	Test Development Specification Single and double leaf external door assemblies to dwellings Issue 2 - 6 February 2007 type testing for product certification	
Results	See Summary of Results on Page 2	
Prepared by	R Avery	 (Engineer I)
Authorized by	A D Coley	 (Laboratory Manager)
Issue Date	10 February 2008.	
Conditions of issue	<p>This Test Report is issued subject to the conditions stated in current issue of <i>PS082</i> '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.</p>	

TEST AND EXAMINATION OF TWO SINGLE LEAF HINGED DOOR ASSEMBLIES SUBMITTED FOR TYPE ASSESSMENT, SMART SYSTEMS LIMITED ALITHERM 47 THERMALLY BROKEN ALUMINIUM ALLOY RESIDENTIAL DOOR SYSTEM

INTRODUCTION

At the request of BSI Product Services the door assemblies submitted by Smart Systems Limited, detailed below and described on pages 7, 8, 38 and 39, were tested and assessed to the requirements of Test Development Specification Single and double leaf door assemblies to dwellings Issue 2 - 6 February 2007, as indicated on the following pages of this Report. This request was made on BSI Product Services: Service Management Order No 7125560 dated 18 January 2008. It is emphasized that assessments have not been made against the other Clauses of the Specification.

TEST SAMPLES

1 off single leaf open in glaze in hinged door assembly with midrail (Sample 1)

1 off single leaf open out glaze in hinged door assembly with midrail (Sample 2)

Equipment Record No 10092330

Date samples received: 18 January 2008

PERFORMANCE REQUIREMENTS REQUESTED BY CLIENT

Exposure category - 1600

NOTES

The Smart Systems Limited Alitherm 47 Thermally Broken Aluminium Alloy Residential Door System has been tested to PAS 24-1:1999, BSI Test Report 261/7125560/2 of 2 refers

This Report covers open in doors only.

SUMMARY OF RESULTS

- | | | |
|-----|--|---|
| 1. | Operating forces before weathertightness tests | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.1, and its parts thereof, against which assessments have been made |
| 2. | Air permeability | Test sample 1 met the requirements of the Specification, in respect of Clause 5.2.1, for Test Pressure Class 2 |
| 3. | Watertightness | Test sample 1 met the requirements of the Specification, in respect of Clause 5.2.2, for Test Pressure Class 5A |
| 4. | Wind resistance | Test sample 1 met the requirements of the Specification, in respect of Clause 5.2.3, for Test Pressure Class 4 |
| 5. | Classification | Test sample 1 met the requirements of the Specification for Exposure Category 1600. |
| 6. | Operating forces after weathertightness tests | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.1, and its parts thereof, against which assessments have been made |
| 7. | Resistance to vertical loads | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.2 |
| 8. | Resistance to static torsion | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.3 |
| 9. | Slamming resistance | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.4. |
| 10. | Closure against obstructions | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.5. |
| 11. | Abusive forces on handles | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.6. |
| 12. | Door resistance to soft and heavy impact | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.7 |
| 13. | Door leaf resistance to hard body impact | Test sample 1 met the requirements of the Specification in respect of Clause 5.3.8 |
| 14. | Cyclic operation test | Test sample 2 met the requirements of the Specification in respect of Clause 5.4.1. |
| 15. | Basic security | Test sample 2 met the requirements of the Specification in respect of Clause 5.4.4. |

CLAUSE 4.2 SAMPLE SELECTION

The samples submitted for tests were selected using the criteria in Clause 4.2 of the Specification.

Each sample was submitted for test mounted in a 75mm x 100mm timber subframe in accordance with the manufacturer's installation requirements.

CLAUSE 4.3 SEQUENCE OF TESTS

The sequence of testing the samples followed that detailed in Clause 4.3 of the Specification.

CLAUSE 5 PERFORMANCE REQUIREMENTS

The performance of each sample was assessed against the requirements detailed in Clause 5 of the Specification.

CLAUSE 6 TEST METHODS

The samples were prepared for test and tested in accordance with Clause 6 of the Specification.

METHODS OF TEST

1. Operating Forces

The operating forces acting on the sample were determined by the methods given in Clause 6.3 of TDS Issue 2 - 6 February 2007.

2. Air Permeability

The air permeability of the sample was determined by the method given in BS 6375-1:2004.

3. Watertightness

The watertightness of the sample was determined by the method given in BS 6375-1:2004.

4. Wind Resistance

The wind resistance of the sample was determined by the methods (P1 and P2) given in BS 6375-1:2004.

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 sample was determined by the method (P3) given in BS 6375-1:2004.

7. Resistance to Vertical Loads

The resistance to vertical loads test was carried out using the method given in TDS Issue 2 - 6 February 2007.

8. Repeat Test

After testing for resistance to vertical loads test 1 was repeated.

9. Resistance to Static Torsion

The resistance to static torsion test was carried out using the method given in TDS Issue 2 - 6 February 2007.

10. Repeat Test

After testing for resistance to static torsion test 1 was repeated.

11. Slamming Resistance

The resistance to slamming test was carried out using the method given in TDS Issue 2 - 6 February 2007.

12. Repeat Test

After testing for slamming resistance test 1 was repeated.

METHODS OF TEST (CONTINUED)

13. Closure Against Obstruction

The closure against obstruction test was carried out using the method given in TDS Issue 2 - 6 February 2007.

14. Repeat Test

After testing for closure against obstruction test 1 was repeated.

15. Abusive Forces on Handles

The abusive forces on the handles test was carried out using the method given in TDS Issue 2 - 6 February 2007.

16. Repeat Test

After testing for abusive forces on handles test 1 was repeated.

17. Door Assembly Resistance to Soft and Heavy Impact

The door assembly resistance to soft and heavy impact test was carried out using the method given in TDS Issue 2 - 6 February 2007.

18. Repeat Test

After testing for door assembly resistance to soft and heavy impact test 1 was repeated.

19. Door Leaf Resistance to Hard Body Impact

The door leaf resistance to hard body impact test was carried out using the method given in TDS Issue 2 - 6 February 2007.

20. Operating Forces

Before testing for door assembly cyclic operation test 1 was carried out

21. Cyclic Operation Test

The cyclic operation test was carried out using the method given in TDS Issue 2 - 6 February 2007

22. Repeat Test

After testing for door assembly cyclic operation test 1 was repeated.

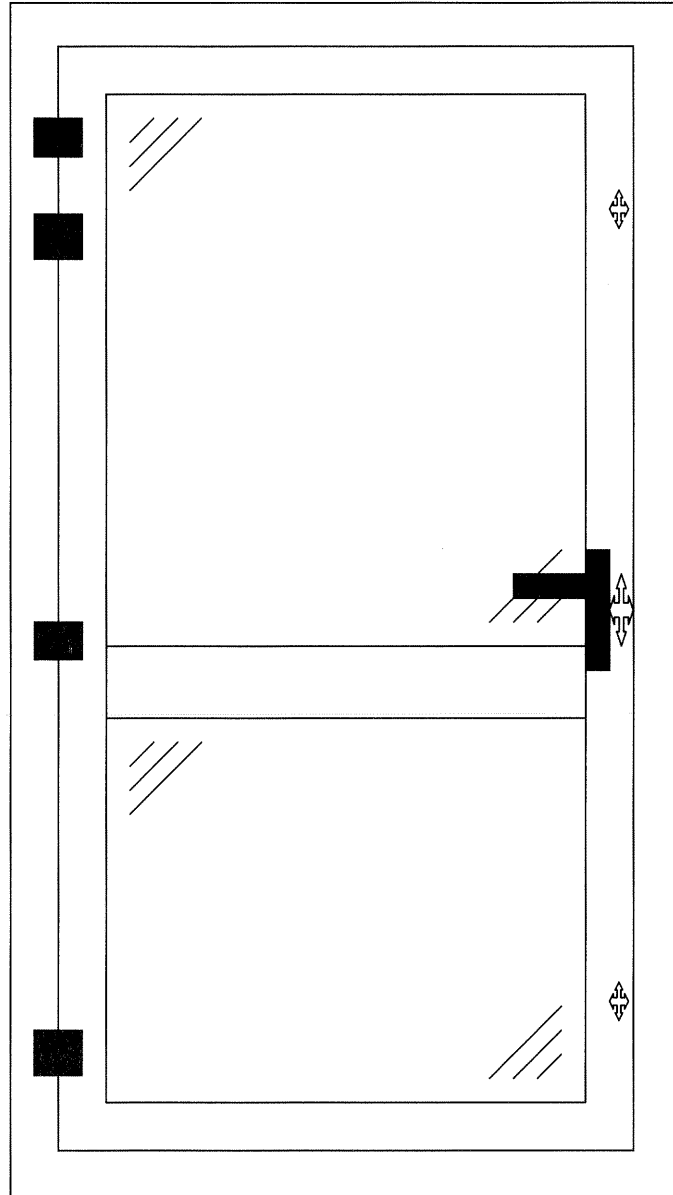
21. Basic Infill Security Test

The basic infill security of the door assembly was carried out using the method and tools given in TDS Issue 2 - 6 February 2007

DESCRIPTION OF SAMPLE

Sample Type -	A single leaf open in glaze in hinged door. The leaf has a midrail with glass above and glass below		
Material -	Aluminium alloy, thermally broken		
Finish -	RAL9010 Gloss		
Extrusions -	Frame:	ETD018	
	Leaf:	ETD020	
	Midrail:	ETD030	
	Frame filler:	PCX16	
	Leaf filler:	PCX15	
Construction -	Mechanically fixed joints		
Fittings -	A three point locking (two hookbolts, one deadbolt and a latch) ACET086 PL18 Paddock Lockmaster espagnolette system with PLK374 keeps, an AVCL117 Sobinco 30/50 euro profile cylinder, a 1710/3623N Hoppe Tokyo Series Secured by Design lever/lever key locking handle with cylinder guard and four ACET054 butt hinges		
Weathersealing -	Double sealed with plastics weatherstrip, reference ACSH039 6mm brush pile for PCX16 and ACVL032 small flipper gasket		
Glass -	Double glazed with 4-16-4 mm toughened glass sealed units		
Glass Retention System -	Internal glazing beads, reference ETC162		
	Glazing Gaskets, reference ACVG31 3mm E gasket and AVCG34 5mm wedge gasket		
Sample Dimensions -	Overall		
	Length: 950mm		Height: 2100mm
	Door		
	Length: 880mm		Height: 2030mm
Date of Test -	21 January 2008 - conducted by M Walters		
Laboratory Temperature -	20.3°C		
Laboratory Humidity -	46.9%RH		
Atmospheric Pressure -	99.9kPa		

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating positions of hardware)



- hinge



- deadbolt and latch



- hookbolt



- handle, cylinder and lockcase

OPERATING FORCE RESULTS – BEFORE WEATHERTIGHTNESS TESTS

Clause 5.3 Mechanical Performance

ASSESSMENT

Clauses 5.3.1 and 6.3 Operating Forces

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 94N	Unlock - 65N	(maximum allowed 100N)	Pass
2)	Lock - 92N	Unlock - 74N	(maximum allowed 100N)	Pass
3)	Lock - 86N	Unlock - 63N	(maximum allowed 100N)	Pass
4)	Lock - 89N	Unlock - 70N	(maximum allowed 100N)	Pass
5)	Lock - 87N	Unlock - 56N	(maximum allowed 100N)	Pass

OPERATING FORCE RESULTS – BEFORE WEATHERTIGHTNESS TESTS

Clause 5.3 Mechanical Performance

ASSESSMENT

Clauses 5.3.1 and 6.3 Operating Forces

The door was tested in accordance with Clause 6.3.1

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement.

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2004 / BS EN 1026:2000

Clause 5.2.1 Air Permeability before resistance to wind tests

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

Table 1

Air Pressure [Pa]	Average rate of air leakage [m ³ /h]	Average rate of air leakage per meter length of opening joint [m ³ /h.m]	Average rate of air leakage relative to area of sample [m ³ /h.m ²]
50	9.6	1.64	4.81
100	14.0	2.40	7.01
150	18.2	3.11	9.11
200	20.9	3.58	10.49
250	24.0	4.12	12.05
300	26.2	4.48	13.11
450	32.4	5.54	16.22
600	37.2	6.37	18.64
750	42.3	7.25	21.21

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 = 5.84m

Overall area = 1.995m²

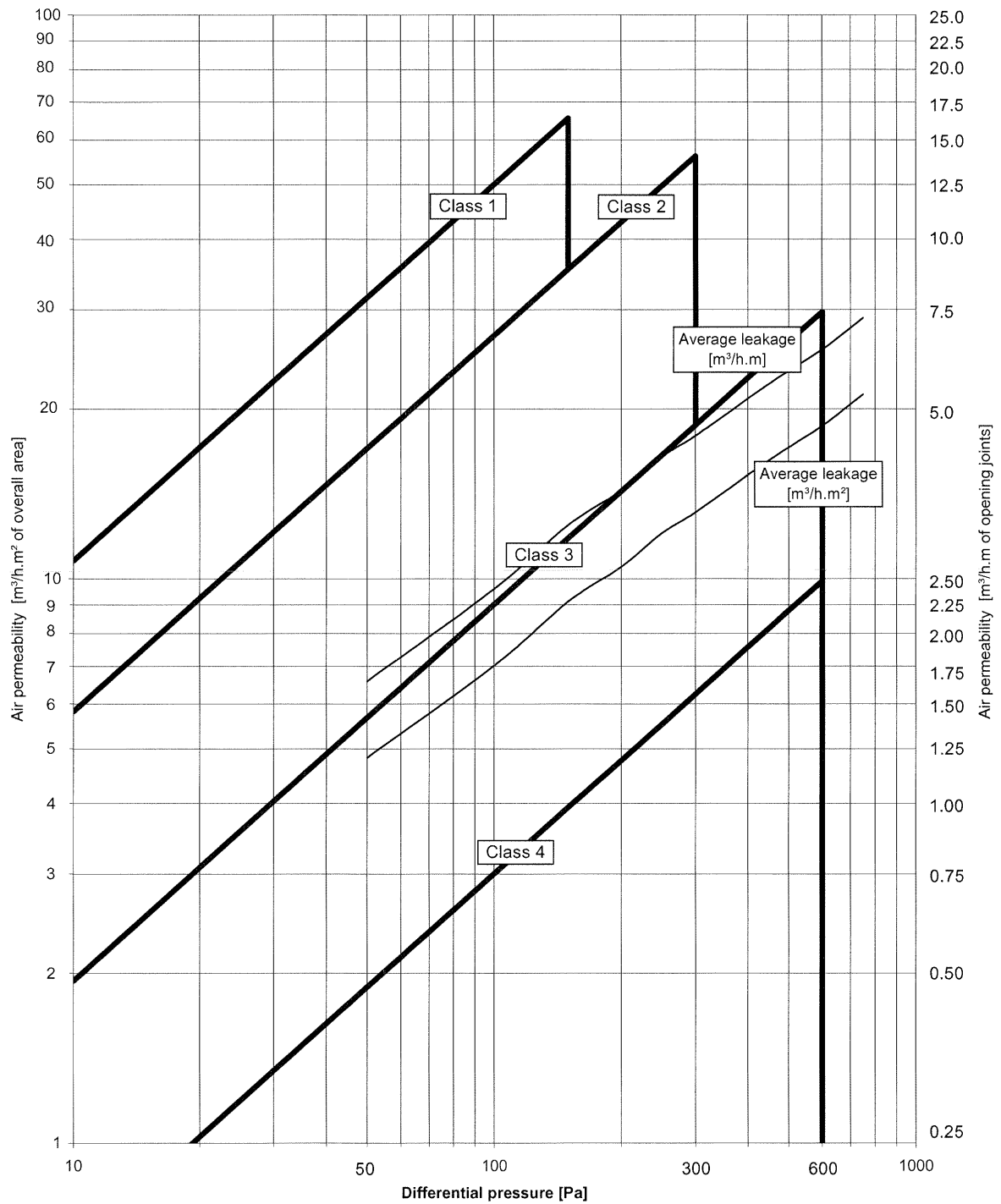
BS 6375-1:2004 - Joint class = 2

BS 6375-1:2004 - Area class = 3

BS 6375-1:2004 - Overall class = 3

NOTE: At the request of the Client the air permeability class of the test sample was reclassified from Class 3 to Class 2. This reclassification allows the sample to meet the requirements of the second air permeability test and is in accordance with the NOTE to Clause 6.1 of BS EN 12210:1999.

GRAPH OF AVERAGE AIR PERMEABILITY BEFORE GUSTING



WATERTIGHTNESS TEST RESULTS - BS EN 1027:2000

Clause 5.2.2 Watertightness before resistance to wind loads

TABLE 2 - Spraying method 1A

Pressure (Pa)	Point at which water leakage occurred
250	Water, from the sill opening joint, ran onto and over the threshold

WIND RESISTANCE TEST RESULTS - BS EN 12211:2000

Clause 5.2.3 Resistance to wind load

P1 DEFLECTION TEST

Three positive pressure pulses at 1760 Pa were applied

No visible failures or functional defects to the sample were observed after wind loads applied at a positive pressure of 1600Pa

Actual deflection - 1.46mm (maximum deflection allowed 13.00mm)

Deflection/span ratio 1/1336 (maximum ratio allowed 1/150)

Three negative pressure pulses at 1760 Pa were applied

No visible failures or functional defects to the sample were observed after wind loads applied at a negative pressure of 1600Pa

Actual deflection - 3.26mm (maximum deflection allowed 13.00mm)

Deflection/span ratio 1/598 (maximum ratio allowed 1/150)

P2 REPEATED PRESSURE TEST

No visible failures or functional defects to the sample were observed after 50 cycles of repeated wind loads applied at a positive pressure of 800Pa

No visible failures or functional defects to the sample were observed after 50 cycles of repeated wind loads applied at a negative pressure of 800Pa

The change in air permeability due to the wind pressure and repeated pressure tests has not exceeded the declared class (2) by more than 20% as required by BS 6375-1:2004 - Section 8 (see following Table).

AIR PERMEABILITY TEST RESULTS - BS 6375-1:2004 / BS EN 1026:2000

Clause 5.2.1 Air Permeability after resistance to wind tests

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

Table 3

Air Pressure [Pa]	Average rate of air leakage [m ³ /h]	Average rate of air leakage per meter length of opening joint [m ³ /h.m]	Average rate of air leakage relative to area of sample [m ³ /h.m ²]
50	10.2	1.75	5.14
100	14.6	2.50	7.31
150	18.3	3.13	9.16
200	21.5	3.68	10.77
250	24.4	4.18	12.25
300	26.6	4.56	13.36
450	33.6	5.75	16.84
600	39.3	6.72	19.68
750	45.1	7.72	22.59

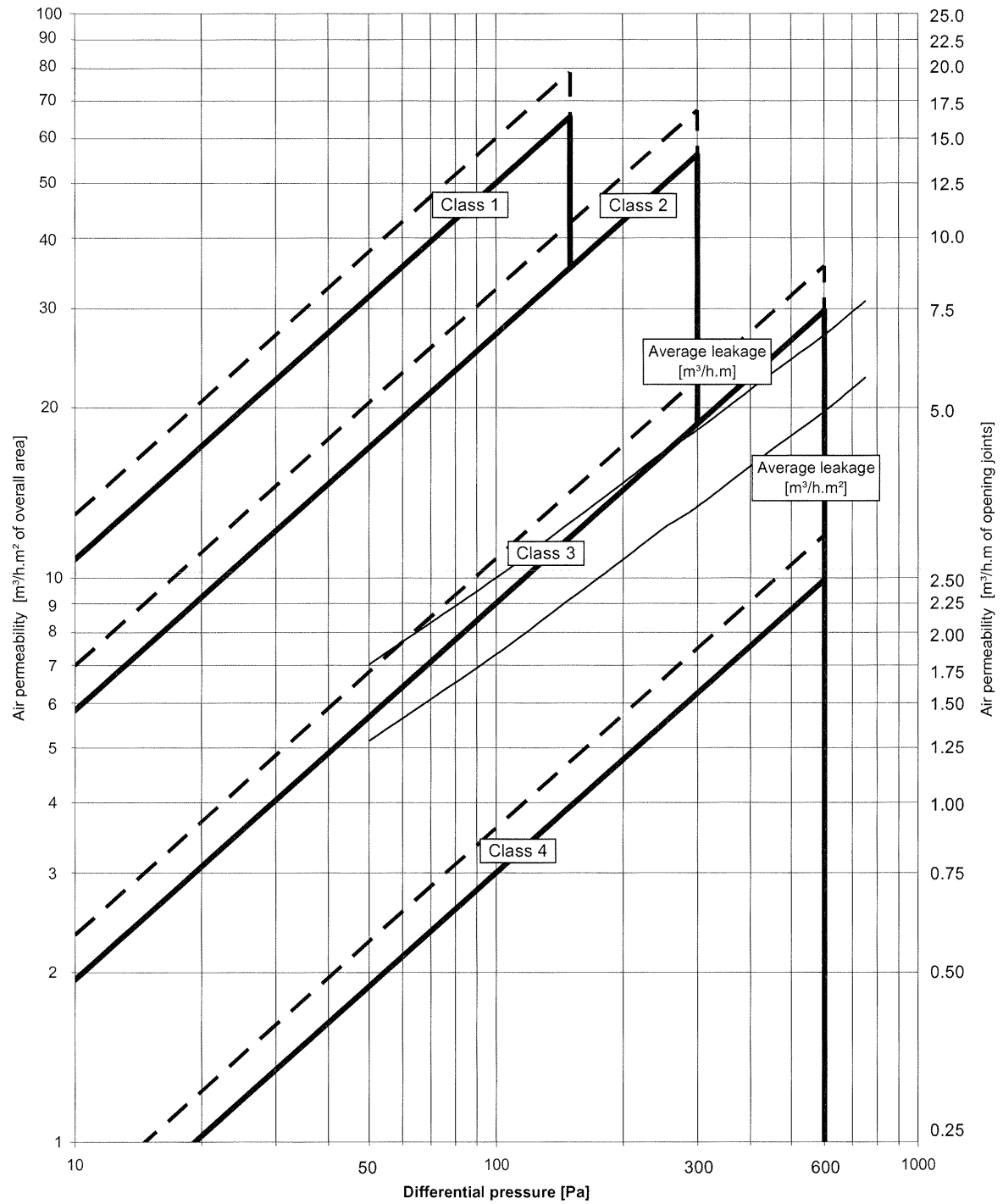
Note: The figures in the table above give the leakage as an average of the leakage at positive pressure and the leakage at negative pressure

Total opening perimeter = 5.84m

Overall area = 1.995m²

For classification to BS 6375-1:2004 - Section 8: Resistance to wind,
the change in air permeability due to the wind pressure and repeated pressure tests
HAS NOT exceeded the declared class (2) by more than 20%.

GRAPH OF AVERAGE AIR PERMEABILITY AFTER GUSTING



WIND RESISTANCE TEST RESULTS - BS EN 12211:2004

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 2400Pa

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 2400Pa

OPERATING FORCE RESULTS – AFTER WEATHERTIGHTNESS TESTS

Clause 5.3 Mechanical Performance

ASSESSMENT

Clauses 5.3.1 and 6.3 Operating Forces

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 52N	Unlock - 39N	(maximum allowed 100N)	Pass
2)	Lock - 49N	Unlock - 42N	(maximum allowed 100N)	Pass
3)	Lock - 45N	Unlock - 42N	(maximum allowed 100N)	Pass
4)	Lock - 44N	Unlock - 41N	(maximum allowed 100N)	Pass
5)	Lock - 46N	Unlock - 35N	(maximum allowed 100N)	Pass

OPERATING FORCE RESULTS – AFTER WEATHERTIGHTNESS TESTS

Clause 5.3 Mechanical Performance

ASSESSMENT

Clauses 5.3.1 and 6.3 Operating Forces

The door was tested in accordance with Clause 6.3.1

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement.

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.2 and 6.4 Resistance to Vertical Loads

Loads were applied using suitable apparatus as required by Clause 6.4.1.1

The door leaf, fixed in its own frame and without any vertical restraint, was positioned at an angle of 90° to the plane of the frame.

A vertical downward load of 500N was applied to the free edge of the open door leaf.

The load was applied and removed in 100N maximum increments over a minimum of 1s for each increment.

Clauses 5.3.1 and 6.3 Operating Forces (After Resistance to Vertical Loads Test)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Resistance to Vertical Loads Test)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 49N	Unlock - 46N	(maximum allowed 100N)	Pass
2)	Lock - 47N	Unlock - 43N	(maximum allowed 100N)	Pass
3)	Lock - 49N	Unlock - 36N	(maximum allowed 100N)	Pass
4)	Lock - 47N	Unlock - 44N	(maximum allowed 100N)	Pass
5)	Lock - 46N	Unlock - 25N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Resistance to Vertical Loads Test)**

ASSESSMENT

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.3 and 6.5 Resistance to Static Torsion

Loads were applied using suitable apparatus as required by Clause 6.5.1.1

The door leaf, fixed in its own frame, was closed and all locking hardware, including latch mechanisms, was disengaged.

The lower corner of the opening side of the door leaf was restrained using a block which covered the door leaf 50mm from the edge.

A load of 350N was applied in the direction of opening, on the unrestrained corner of the opening side, at a point 50mm from both edge of the door frame.

The load was applied and removed in 100N maximum increments over a minimum of 1s for each increment.

Clauses 5.3.1 and 6.3 Operating Forces (After Resistance to Static Torsion Test)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Resistance to Static Torsion Test)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 52N	Unlock - 37N	(maximum allowed 100N)	Pass
2)	Lock - 57N	Unlock - 36N	(maximum allowed 100N)	Pass
3)	Lock - 56N	Unlock - 48N	(maximum allowed 100N)	Pass
4)	Lock - 52N	Unlock - 45N	(maximum allowed 100N)	Pass
5)	Lock - 52N	Unlock - 44N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Resistance to Static Torsion Test)**

ASSESSMENT

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clause 5.3.4 and 6.6 Slamming Resistance

Loads were applied using suitable apparatus as described in Clauses 6.6.1.1, 6.6.1.2 and 6.6.1.3.

The door leaf, fixed in its own frame, was to be closed through an angle of 60° by the descent of a 15kg weight.

A line was attached to the door leaf at a point within 150mm of the lockside edge at the level of the handle.

This line was arranged to pass horizontally from the door leaf over a steel bar, arranged horizontally and with its axis parallel to the plane of the door frame, and then descend vertically from the steel bar carrying a 15kg weight at its lower extremity.

The steel bar was set 400mm from the leaf face when the leaf was closed so that it spanned the width of the doorset.

The length of line was arranged so that as the door leaf was closed by the action of the descending weight, the weight struck a platform, so removing tension from the line just prior to the instant of closing.

The door leaf was opened to an angle of 60° and then slammed by the action of the descending weight.

The test was carried out twenty times.

Clause 5.3.1 and 6.3 Operating Forces (After Slamming Resistance Tests)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Slamming Resistance Tests)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 79N	Unlock - 45N	(maximum allowed 100N)	Pass
2)	Lock - 53N	Unlock - 41N	(maximum allowed 100N)	Pass
3)	Lock - 57N	Unlock - 48N	(maximum allowed 100N)	Pass
4)	Lock - 53N	Unlock - 48N	(maximum allowed 100N)	Pass
5)	Lock - 52N	Unlock - 45N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Slamming Resistance Tests)**

ASSESSMENT

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.5 and 6.7 Closure Against Obstruction

Loads were applied using suitable apparatus as described in Clauses 6.7.1.1, and 6.6.1.2.

The door leaf, fixed in its own frame, had a block placed in the gap between the door leaf and the bottom of the hinge side jamb of the door frame to hold the door ajar.

The block was inserted from the closing face with its plane vertical and parallel to the door frame.

A progressively increasing force was applied, perpendicular to the plane of the frame, to the lockside edge at the handle height until 200N was reached and then removed.

Clause 5.3.1 and 6.3 Operating Forces (After Closure Against Obstruction Test)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Closure to Obstruction Test)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 54N	Unlock - 44N	(maximum allowed 100N)	Pass
2)	Lock - 53N	Unlock - 37N	(maximum allowed 100N)	Pass
3)	Lock - 53N	Unlock - 39N	(maximum allowed 100N)	Pass
4)	Lock - 52N	Unlock - 44N	(maximum allowed 100N)	Pass
5)	Lock - 55N	Unlock - 37N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(after closure to obstruction test)**

ASSESSMENT

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.6 and 6.8 Abusive Forces on Handles

ASSESSMENT

Loads were applied using suitable apparatus as required by Clause 6.8.1.1

The door leaf, fixed in its own frame, was closed and latched but not locked or bolted.

A load of 500N was applied progressively to the handle, without shock, over a period of between 3s and 10s.

This load was applied perpendicular to and away from the face of the door leaf for 60s.

The load was removed without shock.

No loosening of the handle or damage to the handle assembly was observed

Pass

Clause 5.3.1 and 6.3 Operating Forces (After Abusive Forces on Handles Test)

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Abusive Forces on Handles Test)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 54N	Unlock - 44N	(maximum allowed 100N)	Pass
2)	Lock - 56N	Unlock - 45N	(maximum allowed 100N)	Pass
3)	Lock - 54N	Unlock - 42N	(maximum allowed 100N)	Pass
4)	Lock - 57N	Unlock - 47N	(maximum allowed 100N)	Pass
5)	Lock - 53N	Unlock - 44N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating forces
(After Abusive Forces on Handles Test)**

ASSESSMENT

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.7 and 6.9 Door Assembly Resistance to Soft and Heavy Body Impact

Loads were applied using suitable apparatus as required by Clauses 6.9.1.1 and 6.9.1.2.

The door leaf, fixed in its own frame, was closed and latched but not locked or bolted.

The impact points were identified.

Clause 5.3.1 and 6.3 Operating Forces (After Door Assembly Resistance to Soft and Heavy Body Impact Tests)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching Test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating Forces
(After Door Assembly Resistance to Soft and Heavy Body Impact Tests)**

ASSESSMENT

Clause 6.3.4 Hardware Operating Test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 68N	Unlock - 59N	(maximum allowed 100N)	Pass
2)	Lock - 61N	Unlock - 49N	(maximum allowed 100N)	Pass
3)	Lock - 62N	Unlock - 49N	(maximum allowed 100N)	Pass
4)	Lock - 61N	Unlock - 50N	(maximum allowed 100N)	Pass
5)	Lock - 61N	Unlock - 53N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2N	Unlock - 0.2N	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2N	Unlock - 0.2N	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2N	Unlock - 0.2N	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2N	Unlock - 0.2N	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2N	Unlock - 0.2N	(maximum allowed 2Nm)	Pass

Clauses 5.3.1 and 6.3 Operating Forces **ASSESSMENT**
(After Door Assembly Resistance to Soft and Heavy Body Impact Tests)

Clause 6.3.5 Initiate Movement Test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.3.8 and 6.10 Door Leaf Resistance to Hard Body Impact

ASSESSMENT

Impacts were applied using suitable apparatus as required by Clauses 6.10.1.1, 6.10.1.2 and 6.10.1.3

The door leaf was mounted horizontally, with rigid supports under its long edges, on a solid base.

Aiming pattern number 3 was selected.

The door leaf construction was symmetrical.

The release apparatus was positioned vertically over each of the impact points in turn and the steel ball dropped from a height measured from its underside to the surface of the door leaf.

The diameter and depth of imprint left by each impact was measured within 30 min.

Impact energy - 8J

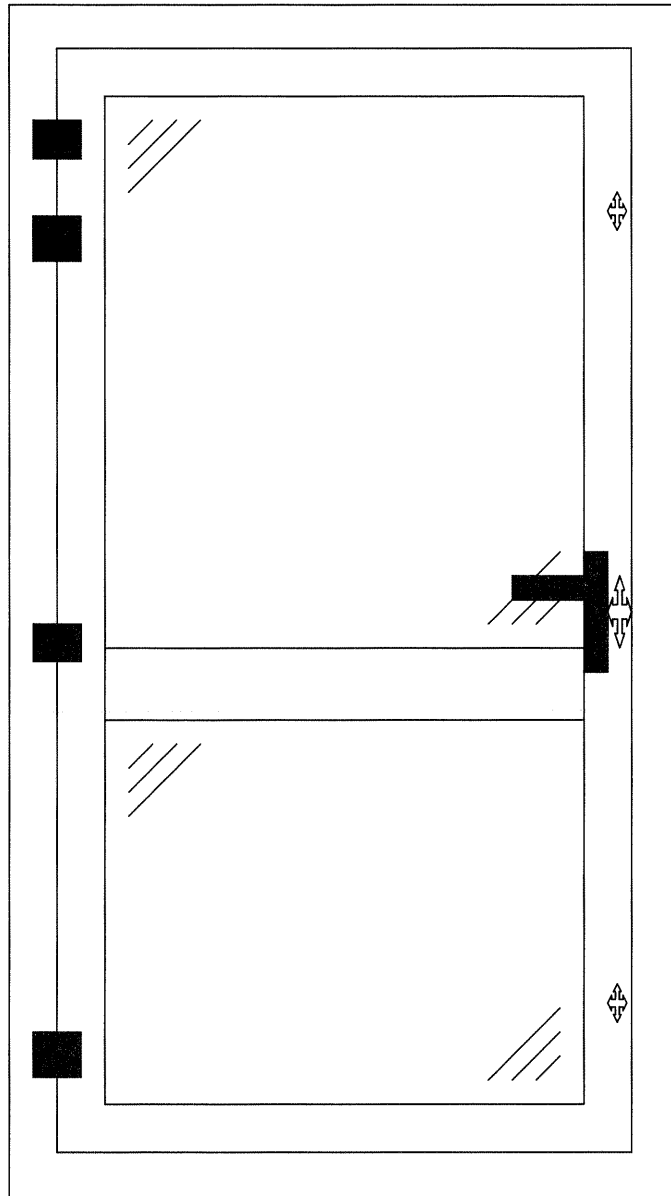
Mass of impactor - 510.63grams

Average depth - 0.70mm	(maximum allowed 2mm)	Pass
Maximum depth - 1.26mm	(maximum allowed 3mm)	Pass

DESCRIPTION OF SAMPLE

Sample Type -	A single leaf open out glaze in hinged door. The leaf has a midrail with glass above and glass below	
Material -	Aluminium alloy, thermally broken	
Finish -	RAL9010 Gloss	
Extrusions -	Frame:	ETD018
	Leaf:	ETD020
	Midrail:	ETD030
	Frame filler:	PCX16
	Leaf filler:	PCX15
Construction -	Mechanically fixed joints	
Fittings -	A three point locking (two hookbolts, one deadbolt and a latch) ACET086 PL18 Paddock Lockmaster espagnolette system with PLK374 keeps, an AVCL117 Sobinco 30/50 euro profile cylinder, a 1710/3623N Hoppe Tokyo Series Secured by Design lever/lever key locking handle with cylinder guard and four ACET054 butt hinges	
Weathersealing -	Double sealed with plastics weatherstrip, reference ACSH039 6mm brush pile for PCX16 and ACVL032 small flipper gasket	
Glass -	Double glazed with 4-16-4 mm toughened glass sealed units	
Glass Retention System -	Internal glazing beads, reference ETC162 Glazing Gaskets, reference ACVG31 3mm E gasket and AVCG34 5mm wedge gasket	
Sample Dimensions -	Overall	
	Length: 950mm	Height: 2100mm
	Door	
	Length: 880mm	Height: 2030mm
Dates of Test -	29 th January to 4 th February 2008 - conducted by M Walters	
Laboratory Temperature -	19.4°C	

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating positions of hardware)



- hinge



- deadbolt and latch



- hookbolt



- handle, cylinder and lockcase

MECHANICAL PERFORMANCE TEST RESULTS

Clause 5.4.1 and 6.11.1 Cyclic operation test

The test was carried out using suitable apparatus as described in Clauses 6.11.1.1, 6.11.1.2., 6.11.1.3 and 6.11.1.4.

The door assembly was installed in accordance with Clause 6.1.3, adjusted and lubricated in accordance with the door manufacturer's published instructions and the door leaf subjected, manually, to five cycles of operation.

The door leaf was operated from its closed position to an open position of 90°.

The operation forces were measured and recorded in accordance with Clause 6.3.

The operating equipment, applied to the fasteners/locking devices, was positioned in such a way as to release the fasteners/locking devices, set the leaf continuously in motion to its maximum opening position, and in the same manner, to its closed position and secure the fasteners/locking devices.

The cycles of operation were conducted at a maximum rate of 6 cycles per minute.

The operating forces were measured and recorded in accordance with Clause 6.3.

Clauses 5.3.1 and 6.3 Operating forces (before cyclic operation test)

ASSESSMENT

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating forces
(before cyclic operation test)**

ASSESSMENT

Clause 6.3.4 Hardware operating test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 68N	Unlock - 38N	(maximum allowed 100N)	Pass
2)	Lock - 59N	Unlock - 38N	(maximum allowed 100N)	Pass
3)	Lock - 56N	Unlock - 38N	(maximum allowed 100N)	Pass
4)	Lock - 45N	Unlock - 36N	(maximum allowed 100N)	Pass
5)	Lock - 52N	Unlock - 35N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating forces
(before cyclic operation test)**

ASSESSMENT

Clause 6.3.5 Initiate movement test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

**Clauses 5.3.1 and 6.3 Operating forces
(after cyclic operation test)**

The door was tested in accordance with Clause 6.3.1

Clause 6.3.3 Latching test

Clause 5.3.1.a) latching force.

The tests were performed after manual operation of all moving parts five times.

The door leaf was opened for a distance of 200mm.

A closing force of 70N was applied at the operating point using the apparatus described in Clause 6.3.2.1.

The test was carried out five times

On each occasion the door latched

Pass

**Clauses 5.3.1 and 6.3 Operating forces
(after cyclic operation test)**

ASSESSMENT

Clause 6.3.4 Hardware operating test

Clause 5.3.1.b) 1) hand operated hardware.

A perpendicular to plane load of 50N was applied to act at the handle position and in the direction of closing and maintained for the duration of the test.

A force was applied, without shock, to the operating hardware in the direction of locking and unlocking the hardware.

The test was carried out five times

The results were as follows

1)	Lock - 52N	Unlock - 32N	(maximum allowed 100N)	Pass
2)	Lock - 46N	Unlock - 32N	(maximum allowed 100N)	Pass
3)	Lock - 45N	Unlock - 32N	(maximum allowed 100N)	Pass
4)	Lock - 45N	Unlock - 33N	(maximum allowed 100N)	Pass
5)	Lock - 45N	Unlock - 35N	(maximum allowed 100N)	Pass

Clause 5.3.1.b) 3) key operation.

A key was inserted into the locking handle and operated by means of a torque driver.

The test was carried out five times

The results were as follows

1)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.2Nm	Unlock - 0.2Nm	(maximum allowed 2Nm)	Pass

**Clauses 5.3.1 and 6.3 Operating forces
(after cyclic operation test)**

ASSESSMENT

Clause 6.3.5 Initiate movement test

Clause 5.3.1.c) force to initiate movement

The hardware was disengaged and the door closed.

A load of 50N was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf.

The test was carried out five times

On each occasion the door opened

Pass

MECHANICAL PERFORMANCE TESTS RESULTS

Clauses 5.4.4 and 6.14 Basic infill security test

ASSESSMENT

The test was carried out using suitable apparatus as required by
Clauses 6.14.1.1, 6.14.1.2 and 6.14.1.3

An attempt to gain entry from the exterior face using the tools specified
in Clause 6.14.1 was made by the removal of gaskets, beads, any security
devices and the infill.

The test was limited to a period not exceeding 3 minutes.

No entry could be effected within 3 minutes.

Pass

APPENDIX A

Door Type: a single leaf open in glaze in hinged door.

Door System: Smart Systems Limited Alitherm 47 Thermally Broken Aluminium Alloy Residential Door System

Fabrication and Installation: As detailed in the latest Synseal Extrusions Limited PAS 23/24 Alitherm 47 Residential Doors Manual

General Description of Doors: The door system is single leaf only, open in only, glaze in only, with midrail, infill glass only and of mechanically fixed joint construction.

Size Limitations: (up to a maximum of)	Length	Height
Overall	950mm	2100mm
Door	880mm	2030mm

Performance Characteristics:

Open in Up to Exposure Category 1600 as given in Table 1 of BS 6375-1:2004

Extrusion Reference:

Frame:	ETD018
Leaf:	ETD020
Midrail:	ETD030
Frame filler:	PCX16
Leaf filler:	PCX15

Glass Retention System -

Internal glazing beads, reference ETC162
Glazing Gaskets, reference ACVG31 3mm E gasket and
AVCG34 5mm wedge gasket

Weatherseal -

Double sealed with plastics weatherstrip, reference ACSH039
6mm brush pile for PCX16 and ACVL032 small flipper gasket

APPENDIX A (CONTINUED)

Hardware Requirements:	Hinges	-	ACET054 butt hinges
	Locking	-	ACET086 PL18 Paddock Lockmaster (two hookbolts, one deadbolt and a latch) with PLK374 keeps espagnolette system 1710/3623N Hoppe Tokyo Series Secured by Design lever/lever key locking handle with cylinder guard AVCL117 Sobinco 30/50 euro profile cylinder
Hardware Fixing Requirements:			
Hinges		-	¾"size 8 countersunk self-tapping stainless steel screws
Locking	Lock	-	RCA054 countersunk screws
	Keeps	-	RCA054 countersunk screws
	Handle	-	M6 hardened stainless steel screw