Test Report

Report No	2370/7698525 This Report consists of 39 pages
Client	Smarts Systems Limited Arnolds Way Yatton BS49 4QN
Authority & date	Request by Client dated 23 June 2011
Items tested	2 off single leaf hinged door assemblies, Smart Systems Alitherm Plus Aluminium Alloy Residential Door System
Specification	Test Development Specification 01 Single and double leaf external door assemblies to dwellings Issue 3 – 11 May 2011
Results	Pass
Prepared by	D Kirsop (Technician)
Authorized by	M Manito (Senior Engineer)
Issue Date	03 August 2011
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of CPO322 '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, 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
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TEST, EXAMINATION AND ASSESSMENT OF TWO SINGLE LEAF HINGED DOOR ASSEMBLIES, SMART SYTEMS ALITHERM PLUS ALUNINIUM ALLOY RESIDENTIAL DOOR SYSTEM

INTRODUCTION

At the clients request the door assemblies submitted by Smart Systems Limited, detailed below and described on pages 7, 8, 9, 31, 32, and 33 were tested and assessed to the requirements of Test Development Specification Single and double leaf door assemblies to dwellings Issue 3 – May 2011, as indicated on the following pages of this Report.
This request was made on Quote No: 0000318068 dated 23 June 2011.
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 glazed with glass above and below midrail
Standard threshold (Sample 1)

1 off single leaf open out glaze in hinged door assembly glazed with glass above and below midrail
Standard threshold (Sample 2)

Equipment Record No 10124995

Date samples received: 24 June 2011

SUMMARY OF RESULTS

1.	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
2.	Resistance to vertical loads	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.2
3.	Resistance to static torsion	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.3
4.	Slamming resistance	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.4.
5.	Closure against obstructions	Test sample 1 failed to meet the requirements of the Specification in respect of Clause 5.3.5.
6.	Abusive forces on handles	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.6.
7.	Door resistance to soft and heavy impact	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.7
8.	Door leaf resistance to hard body impact	Test sample 1 met the requirements of the Specification in respect of Clause 5.3.8
9.	Cyclic operation test	Test sample 2 met the requirements of the Specification in respect of Clause 5.4.1.
10.	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. Resistance to Vertical Loads

The resistance to vertical loads test was carried out using the method given in TDS Issue 3 – 11 May 2011.

2. Repeat Test

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

3. Resistance to Static Torsion

The resistance to static torsion test was carried out using the method given in TDS Issue 3 – 11 May 2011.

4. Repeat Test

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

5. Slamming Resistance

The resistance to slamming test was carried out using the method given in TDS Issue 3 – 11 May 2011.

6. Repeat Test

After testing for slamming resistance test 1 was repeated.

7. Closure Against Obstruction

The closure against obstruction test was carried out using the method given in TDS Issue 3 – 11 May 2011.

8. Repeat Test

After testing for closure against obstruction test 1 was repeated.

9. Abusive Forces on Handles

The abusive forces on the handles test was carried out using the method given in TDS Issue 3 – 11 May 2011.

10. Repeat Test

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

11. 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 3 – 11 May 2011.

12. Repeat Test

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

METHODS OF TEST (continued)

13. 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 3 – 11 May 2011.

14. Operating Forces

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

15. Cyclic Operation Test

The cyclic operation test was carried out using the method given in TDS Issue 3 – 11 May 2011.

16. Repeat Test

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

17. Basic Infill Security Test

The basic infill security of the door assembly was carried out using the method and tools given in TDS Issue 3 – 11 May 2011.

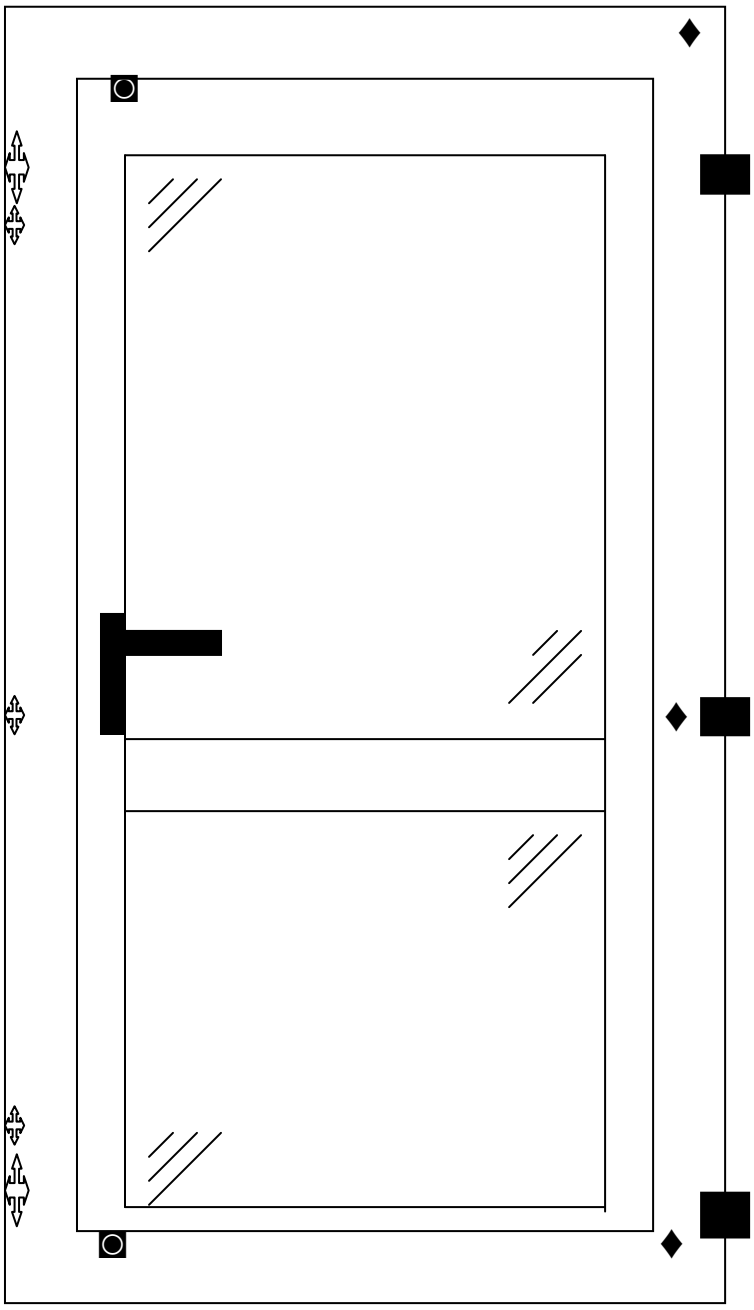
DESCRIPTION OF SAMPLE

Sample Type -	A single leaf open in glaze in hinged door. The leaf has glass above and below the midrail.
Material -	Aluminium alloy
Finish -	Natural
Profile reference -	Outerframe: - ETD 017 Leaf: - ETD 025N Bead: - ETC164 Midrail - ETD033 Threshold - ETD095
Construction -	Outerframe - Thermally broken Leaf - Thermally broken Threshold - Thermally broken
Fittings -	A seven point locking (two hookbolts/bolt, two roller cams, two shootbolts and a key operated deadbolt/latch) Paddock Lockmaster ref: ACET183 espagnolette system with Paddock top and bottom shootbolts, a Sobinco euro profile cylinder 30/50 cylinder, a Hoppe Tokyo SBD key locking handle, three Fapim hinges, a VL72 drip bar and three Wagner dog bolts
Weathersealing -	Double sealed with plastics weatherstrip ref ACET160 Flipper gasket
Glass -	Double glazed with 4-20-4 mm toughened glass sealed units
Glass retention system -	Internal beads ref ETC161 and ACVG31 3mm E gasket ACVG34 5mm Wedge gasket

DESCRIPTION OF SAMPLE (CONTINUED)

Sample dimensions -	Overall Length: 970mm	Height: 2180mm
	Door leaf Length: 900mm	Height: 2100mm
Date of test -	18 July 2011 - conducted by M Manito	
Laboratory temperature -	20.2°C	
Laboratory humidity -	37.5%RH	
Atmospheric pressure -	101.9kPa	

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating positions of hardware)



- hinge/dog bolt
- roller cam
- hook bolt/dead bolt
- handle, cylinder and lockcase
- shootbolts

OPERATING FORCE RESULTS

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 100mm.

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 - 88N	Unlock - 59N	(maximum allowed 100N)	Pass
2)	Lock - 79N	Unlock - 57N	(maximum allowed 100N)	Pass
3)	Lock - 77N	Unlock - 54N	(maximum allowed 100N)	Pass
4)	Lock - 82N	Unlock - 55N	(maximum allowed 100N)	Pass
5)	Lock - 81N	Unlock - 55N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 without shock, to the operating point to initiate
movement in the opening direction of the door leaf did not exceed 50N.

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 100mm.

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 - 82N	Unlock - 56N	(maximum allowed 100N)	Pass
2)	Lock - 76N	Unlock - 54N	(maximum allowed 100N)	Pass
3)	Lock - 72N	Unlock - 51N	(maximum allowed 100N)	Pass
4)	Lock - 72N	Unlock - 49N	(maximum allowed 100N)	Pass
5)	Lock - 71N	Unlock - 48N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock – 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 100mm.

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 - 76N	Unlock - 56N	(maximum allowed 100N)	Pass
2)	Lock - 80N	Unlock - 49N	(maximum allowed 100N)	Pass
3)	Lock - 68N	Unlock - 47N	(maximum allowed 100N)	Pass
4)	Lock - 79N	Unlock - 54N	(maximum allowed 100N)	Pass
5)	Lock - 69N	Unlock - 54N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock – 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf did not exceed 50N.

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 100mm.

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 - 87N	Unlock - 52N	(maximum allowed 100N)	Pass
2)	Lock - 76N	Unlock - 56N	(maximum allowed 100N)	Pass
3)	Lock - 85N	Unlock - 58N	(maximum allowed 100N)	Pass
4)	Lock - 77N	Unlock - 58N	(maximum allowed 100N)	Pass
5)	Lock - 81N	Unlock - 54N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 100mm.

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

Sample 1

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 - 91N	Unlock - 54N	(maximum allowed 100N)	Pass
2)	Lock - 88N	Unlock - 55N	(maximum allowed 100N)	Pass
3)	Lock - 81N	Unlock - 55N	(maximum allowed 100N)	Pass
4)	Lock - 91N	Unlock - 55N	(maximum allowed 100N)	Pass
5)	Lock - 84N	Unlock - 61N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 100mm.

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 - 83N	Unlock - 57N	(maximum allowed 100N)	Pass
2)	Lock - 85N	Unlock - 60N	(maximum allowed 100N)	Pass
3)	Lock - 87N	Unlock - 63N	(maximum allowed 100N)	Pass
4)	Lock - 80N	Unlock - 58N	(maximum allowed 100N)	Pass
5)	Lock - 84N	Unlock - 58N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 100mm.

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 **ASSESSMENT**
(After Door Assembly Resistance to Soft and Heavy Body Impact Tests)

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 - 55N	(maximum allowed 100N)	Pass
2)	Lock - 82N	Unlock - 52N	(maximum allowed 100N)	Pass
3)	Lock - 82N	Unlock - 55N	(maximum allowed 100N)	Pass
4)	Lock - 75N	Unlock - 55N	(maximum allowed 100N)	Pass
5)	Lock - 85N	Unlock - 58N	(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 - 0.1N	Unlock - 0.1N	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1N	Unlock - 0.1N	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1N	Unlock - 0.1N	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1N	Unlock - 0.1N	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1N	Unlock - 0.1N	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 4 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 - 0.218mm	(maximum allowed 2mm)	Pass
Maximum depth - 0.7mm	(maximum allowed 3mm)	Pass

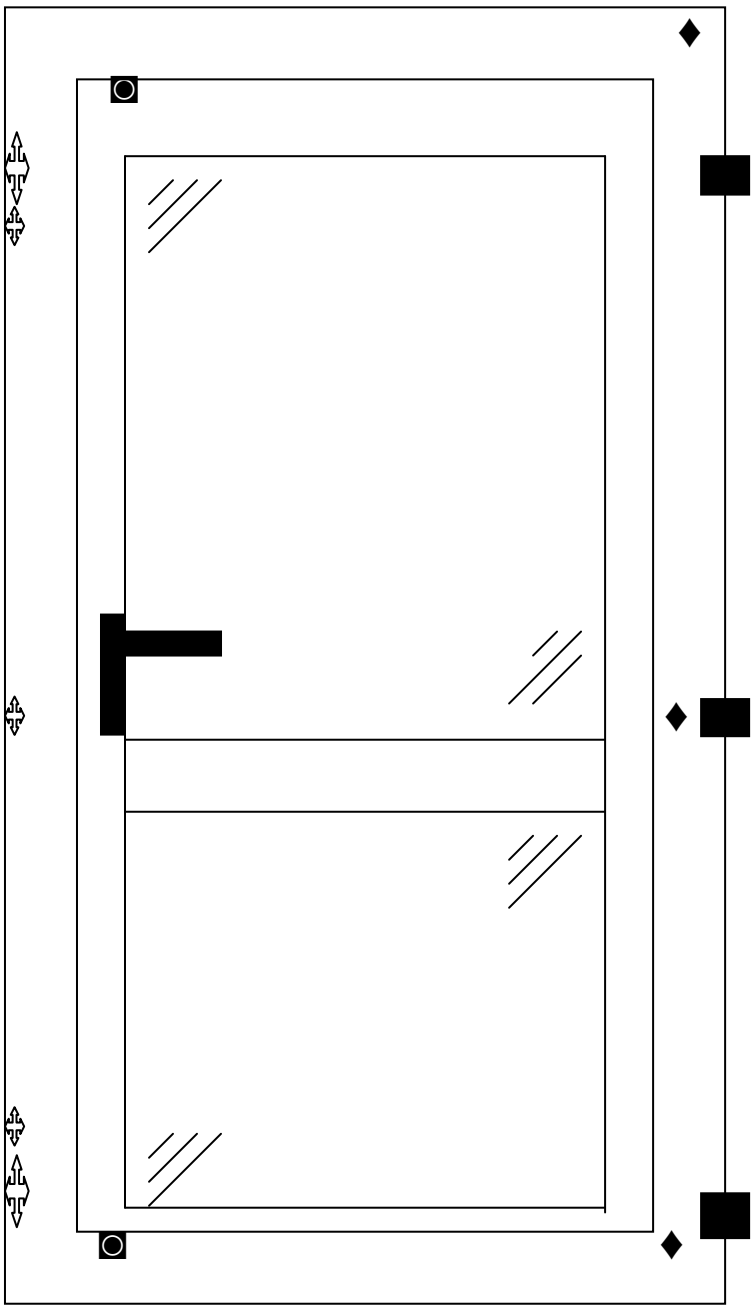
DESCRIPTION OF SAMPLE

Sample Type -	A single leaf open out glaze in hinged door. The leaf has glass above and below the midrail.
Material -	Aluminium alloy
Finish -	Natural
Profile reference -	Outerframe: - ETD 017 Leaf: - ETD 025N Bead: - ETC164 Midrail - ETD033 Threshold - ETD095
Construction -	Outerframe - Thermally broken Leaf - Thermally broken Threshold - Thermally broken
Fittings -	A seven point locking (two hookbolts/bolt, two roller cams, two shootbolts and a key operated deadbolt/latch) Paddock Lockmaster ref: ACET183 espagnolette system with Paddock top and bottom shootbolts, a Sobinco euro profile cylinder 30/50 cylinder, a Hoppe Tokyo SBD key locking handle, three Fapim hinges, a VL72 drip bar and three Wagner dog bolts
Weathersealing -	Double sealed with plastics weatherstrip
Glass -	Double glazed with 4-20-4 mm toughened glass sealed units
Glass retention system -	Internal beads and gaskets

DESCRIPTION OF SAMPLE (CONTINUED)

Sample dimensions -	Overall Length: 970mm Height: 2180mm Door leaf Length: 900mm Height: 2100mm
Date of test -	18 July 2011 to 26 July 2011 - conducted by M Manito and D Kirsop
Laboratory temperature -	19°C
Laboratory humidity -	33.5%RH
Atmospheric pressure -	101.3kPa

ELEVATION DRAWING OF DOOR ASSEMBLY
(indicating positions of hardware)



- hinge
- roller cam
- hook bolt/dead bolt
- handle, cylinder and lockcase
- shootbolts

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 90º.

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.

The Slave Door (inactive leaf) completed 5,000 cycles of operation

The Master Door (active leaf) completed 50,000 cycles of operation

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 100mm.

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 - 61N	Unlock - 42N	(maximum allowed 100N)	Pass
2)	Lock - 64N	Unlock - 38N	(maximum allowed 100N)	Pass
3)	Lock - 58N	Unlock - 40N	(maximum allowed 100N)	Pass
4)	Lock - 57N	Unlock - 39N	(maximum allowed 100N)	Pass
5)	Lock - 58N	Unlock - 34N	(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 - 0.4Nm	Unlock - 0.5Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.5Nm	Unlock - 0.5Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.5Nm	Unlock - 0.5Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.5Nm	Unlock - 0.5Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.5Nm	Unlock - 0.5Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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 100mm.

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 - 47N	Unlock - 26N	(maximum allowed 100N)	Pass
2)	Lock - 45N	Unlock - 20N	(maximum allowed 100N)	Pass
3)	Lock - 38N	Unlock - 20N	(maximum allowed 100N)	Pass
4)	Lock - 33N	Unlock - 20N	(maximum allowed 100N)	Pass
5)	Lock - 38N	Unlock - 22N	(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 - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
2)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
3)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
4)	Lock - 0.1Nm	Unlock - 0.1Nm	(maximum allowed 2Nm)	Pass
5)	Lock - 0.1Nm	Unlock - 0.1Nm	(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 was applied, without shock, to the operating point to initiate movement in the opening direction of the door leaf and did not exceed 50N.

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

END OF REPORT