Test Report 9788519.

Smart Systems Limited

Incorporating Smart Extrusions

Introduction.

This report has been prepared by David Vinyard and relates to the activity detailed below:

Job/Registration Details		Client Details
Job number:	**9788519**	Smart Systems Limited Incorporating Smart Extrusions Arnolds Way Yatton BS49 4QN United Kingdom
Job type:	Testing Samples Submitted	
Start Date:	03/07/2019	
Test type:	Direct	
Sample ID:	10184006	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	
Registration:	**NA**	
Protocol:	NA	
Quality system:	NA	

The report has been approved for issue by Chris Rayment – Team Manager

Approved For Issue	
	Issue Date: 25 September 2019

Objectives.

Direct test

Product Scope.

Smart Systems Visofold 1000 aluminium bi-folding door

Report Summary.

The sample was received on 25 June 2019 and the testing was started on 3 July 2019.

The sample submitted complied with the requirements of the test work conducted.

PAS24:2016 Direct Test.

1 off three leaf open in glaze in bi-folding door assembly with full glass infill and a low threshold

(Sample ID No 10184006)

Date sample received: 25 June 2019

Test Results.

1.	Mechanical loading	The test sample met the requirements of the Specification in respect of B.4.5
2.	Manipulation B	The test sample met the requirements of the Specification in respect of B.4.3
3.	Manual check test	The test sample met the requirements of the Specification in respect of B.4.6

B.2 Sample Selection.

The sample submitted for tests were selected using the criteria in B.2 of the Specification. The sample was submitted for test mounted in a 75mm x 100mm timber subframe in accordance with the manufacturer's installation requirements. The test sample was manufactured by the client. Sample description provided by client and not verified by BSI.

The results within this test report are valid only for the conditions under which the testing was carried out, and for the specified products only.

B.3 Requirements for Test Apparatus.

The test apparatus for the manual and mechanical tests is shown in figures B.2 to B.5.

B.4 Test Methods.

The method of testing the samples followed the sequence detailed in B.4 of the Specification.

Description of Sample.

Sample Type -	Three leaf open in glaze in bi-folding door assembly with full glass infill and a low threshold
Material -	Aluminium
Construction -	Cleated
Fittings	**Master** - a seven-point locking (two cams, two hook bolts, two shoots and one dead bolt) Fuhr espagnolette system, handle with a key lockable 3* cylinder and four pin hinges **Slaves** - a two-point locking (two shoot bolts) Fuhr espagnolette system, eight pin hinges and one roller
Glass -	Double glazed 6-16-6mm toughened glass sealed units
Panel -	Not applicable
Glass Retention System -	Internal beads and gaskets

Sample dimensions -			
	Overall length:	2700mm	Height: 2500mm
	Master length:	880mm	Height: 2440mm
	Slave length:	880mm	Height: 2440mm

Visofold 1000 Three Pane. Open In. Low Threshold.

Outer Frame width	2700mm	**Outer Frame Material**	Aluminium
Outer Frame height	2500mm	**Outer Frame Gaskets**	
Outer Frame Part Numbers		Gasket Type	EDPM
Top	DV14	Manufacturer	Reddiplex
Bottom	DV171	Product Name	Sealing gasket
Lock Side	DV14	Product Codes	ACDV 272, ACDV244
Hinge Side	DV14	**Threshold**	
Outer Frame section dimensions		Manufacturer	Smart Systems
Width	51.5mm	Product name	Low Threshold
Depth	82mm	Product Code	DV171
Weather strip carrier		Materials	Aluminium
Manufacturer	Smart Systems	**Outer Frame Joint Method**	
Product Name	Weather strip adaptor.	Head	Glue and mech cleat.
Product code	DV62	Foot	Screw port.
Material	Aluminium		

Leaf		**Leaf Material:**	Aluminium
Leaf Width:	863mm	**Leaf Gasket**	
Leaf Height:	2433mm	Gasket type:	EDPM
Leaf Part Numbers:		Manufacturer:	Reddiplex
Top:	DV23	Product Name:	Sealing Gaskets
Bottom:	DV23	Product Code	ACDV272
Lock side:	DV23	**Lock Packer**	
Hinge Side	DV23	Manufacturer:	Smart Systems
Leaf section size		Product name:	Lock Packer
Width:	60.5mm	Product code:	PCX36
Depth:	74.5mm	Material:	PVC.
Rebate Adaptor		**Leaf joint method**	
Manufacturer:	Smart Systems	Head:	Glue and Mech Cleat
Product Name:	Rebate Adaptor	Foot:	Glue and Mech Cleat
Product Code:	DV76		
Material: Gasket	Aluminium ACVL 032.		
Bead			
Manufacturer:	Smart Systems		
Product Name:	Glazing Bead		
Product Code:	DV67		
Material:	Aluminium		
Bead Size:	22mm x 17mm		
Woolplie Adaptor Wool Pile	DV62 ACDV249.		

Visofold 1000 Three Pane. Open In. Low Threshold.

Glazing Unit		**Glazing Gasket**	
Manufacturer:	Ashton Glass , Bristol	Gasket Type:	EDPM
Inner Thickness:	6mm	Manufacturer:	Aliplast Senteri
Spacer Material:	Aluminium	Product Name:	E Gasket Wedge
Outer Thickness:	6mm	Product Code	ACVG31 ACVG34
Unit Sizes:	766mm x 2336mm	**Glazing Clip**	
Glazing Tape Details		Manufacturer:	NA
Manufacturer:	NA	Product Name:	NA
Product Name:	NA	Product Code	NA
Product Code	NA		

Hardware			**Fixings**	**Quantity**
Hinges:	ACDV331	Intermediate Hinge.	M5 Machine Screws ACIM062 . NO 10 CSK	4 Hinges Per leaf
Handles	ACET480	Lever/ lever. Pas 24	With handle	1 PAIR
Lock:	ACDV722	Multi point lock and Keep	M4x45mm. ACDV241	1 Lock set
Cylinder:	ACDV258	Standard Cylinder	M5 Machine Screw	1
Shoot bolt rods Guides	ACDV328 ACDV229	Nylon coated rods Shootbolt rod guide blocks	 ACET 060	2 2
Top roller	ACDV333	Retained top roller	M5 machine screws ACIM 062. NO 10 CSK	1
Bottom roller	ACDV232	Standard bottom roller	M5 machine screws ACIM062 NO 10 CSK	1
Internal half cylinder	ACMX01604	Cylinder to operate shoot bolt	M5 machine screws	1
Keeps:	ACDV722 ACDV396	Supplied with lock. Fixing plates	ACDV 264 Machine Screws.	1 Keep Set
Bridge Packer	ACDV157	Bridge Packer		8 per sash
Shootbolts	ACDV737 ACDV738	Top and bottom shootbolts Fitted main door lock	M4 x 45mm Machine Screws.	2 no shoot bolts.
Shootbolt Extension	ACDV742	200mm TO Main Door	M4 x 45mm. ACDV241	1
Shootbolt handle	ACD225	Handle with cylinder	M5	1
Shootbolt Keeps to Main traffic door	ACET396.	Fitted to head and cill	ACET 060	2 no Keeps.
Shoot bolt Gearbox	ACDV227	Shoot bolt gearbox to folding elements.	M5	1
Run up BlockS Anti lift blocks	ACDV080 ACDV081	Fitted to Head and Cill Fitted to Head and cill	ACET 060 ACET 060	4 4

Note – parts list supplied by client but not verified by BSI

Test Results (Continued).

Clause B.4.4.4 Manual Cutting Test

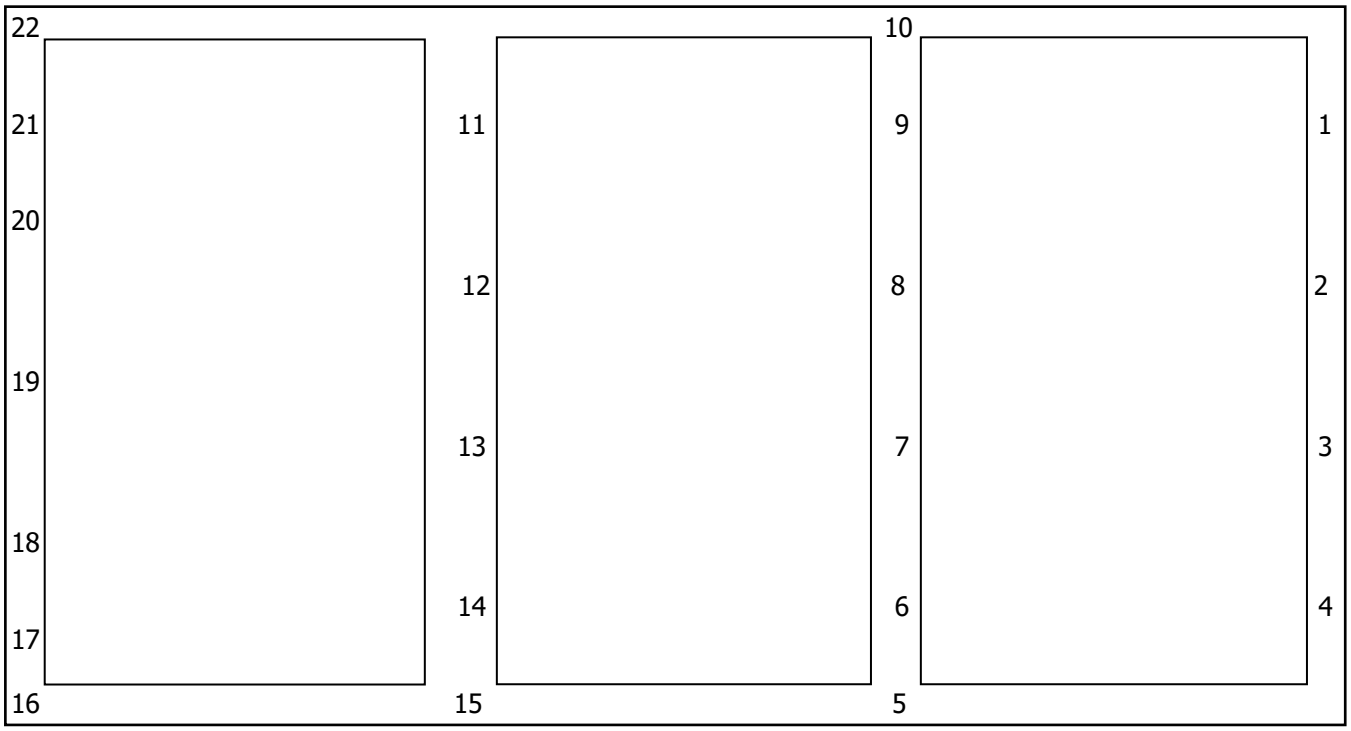
Not applicable

B.4.5 Mechanical Loading Test

The sample was mounted, vertically and square, in the test rig.

The test was carried out in accordance with the procedures detailed in B.4.5, using loading cases B.1 to B.6 and Figures B.12 for loading sequence, and using the test apparatus detailed in Figures B.6 to B.6.

Diagram of load points



Test Results (Continued).

B.4.5.2 Loading Procedure

Point of application of load

First Sequence

1. Hinge (upper right jamb)

   Standard loading case used: 1

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

2. Hinge (upper right jamb)

   Standard loading case used: 1

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

3. Hinge (lower right jamb)

   Standard loading case used: 1

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

4. Hinge (lower right jamb)

   Standard loading case used: 1

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

5. Shoot Bolt (threshold of slave leaf)

   Standard loading case used: 5

   Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
   Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

Point of application of load

First Sequence (continued)

6. Hinge (lower slave & slave leaf)

   Standard loading case used: 2

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   1.5kN to oppose the above load

7. Hinge (lower slave & slave leaf)

   Standard loading case used: 2

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   1.5kN to oppose the above load

8. Hinge (upper slave & slave leaf)

   Standard loading case used: 2

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   1.5kN to oppose the above load

9. Hinge (upper slave & slave leaf)

   Standard loading case used: 2

   Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
   1.5kN to oppose the above load

10. Shoot Bolt (head of slave leaf)

    Standard loading case used: 5

    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

Point of application of load

First Sequence (continued)

11. Hinge (upper slave & slave leaf)

    Standard loading case used: 2

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    1.5kN to oppose the above load

12. Hinge (upper slave & slave leaf)

    Standard loading case used: 2

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    1.5kN to oppose the above load

13. Hinge (lower slave & slave leaf)

    Standard loading case used: 2

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    1.5kN to oppose the above load

14. Hinge (lower slave & slave leaf)

    Standard loading case used: 2

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    1.5kN to oppose the above load

15. Roller (threshold of slave leaf)

    Standard loading case used: 11

    Load applied in plane: 1.5kN centred over loading point and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued)

Point of application of load

First Sequence (continued)

16. Shoot Bolt (threshold of master leaf)

    Standard loading case used: 5

    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

17. Cam (lower left jamb)

    Standard loading cases used: 7

    Load applied in plane: 1.5kN along edge in a direction to disengage the cam
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

18. Hook Bolt (lower left jamb)

    Standard loading cases used: 7

    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

19. Dead Bolt (centre left jamb)

    Standard loading case used: 5

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

20. Hook Bolt (upper left jamb)

    Standard loading cases used: 7

    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

Test Results (Continued).

B.4.5.2 Loading Procedure (continued) Assessment

Point of application of load

First Sequence (continued)

21. Cam (upper left jamb)

    Standard loading cases used: 7

    Load applied in plane: 1.5kN along edge in a direction to disengage the cam
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

    Load applied in plane: 1.5kN at right angles to the edge and towards the opposite edge
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

22. Shoot Bolt (head of master leaf)

    Standard loading case used: 5

    Load applied in plane: 1.5kN along edge in a direction to disengage the bolt
    Load applied perpendicular to plane: 4.5kN applied for 10 seconds

    No entry gained Pass

Date of test – 3 July 2019
Test engineer(s) – Jason Sparrow & David Vinyard
Laboratory temperature – 19.3°C

Clause 4.3 Manipulation Test B

No fixing were exposed during mechanical loading. Pass

Date of test – 3 July 2019
Test engineer(s) – Jack Nicholls & David Vinyard
Laboratory temperature – 19.3°C

Test Results (Continued).

Performance Requirements (continued).

B.4.6 Manual Check Test

The sample was mounted, vertically and square, in the test rig as described in B.3.1.

The test was carried out in accordance with the given objective of this Clause using the procedure detailed in B.4.6.3 and the tools described in B.4.6.2.

Two nail bars were used for three minutes. No alternative method of entry was found.

Date of test – 3 July 2019
Test engineer(s) – Jack Nicholls & David Vinyard
Laboratory temperature – 19.3°C

Test Sample.

Sample Id	ER Number	Description
1	10184006	Aluminium bi-folding door

Description of Test Sample.

Sample Description
1 off three leaf glaze in open in hinged bi-folding door assembly with full glass infill and a low threshold

Test Requirements.

PAS24 door direct test

Clause	Requirements
As required	PAS24 door direct test

Glossary of Terms.

PASS: Complies. Tested by BSI engineers at BSI laboratories.

PASS1: Complies. Witnessed by BSI engineers in manufacturers laboratory.

PASS2: Complies. Tests carried out by third party lab; results accepted by BSI.

PASS*: Report resulted in uncertainty and states that Compliance is more probable than non-compliance.

FAIL: Non compliance – Product does not meet the requirements of this clause.

FAIL*: Report resulted in uncertainty and states that Non-compliance is more probable than compliance.

N/A: Not applicable to design under consideration.

N/T: Not tested due to similarity to previously tested item; reference earlier test report.

Conditions of Issue.

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

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End of Report