BS 6375-2:2009 - Performance of Windows and Doors, Classification for operation and strength characteristics and guidance on selection and specification

Gretch Unitas Limited

Test Report No. R4791475629-2

30 January 2025

UL Solutions

UKAS TESTING
5772

Table of contents

Contents

1. Introduction

Test Details	
Customer:	Gretch Unitas Limited 5 Spitfire Close Coventry Business Park COVENTRY, CV5 6UR GB
Test witnessed by:	S Golder *Gretch Unitas Limited*
Product tested:	Composite door with GU Secury LogIQ Automatic Hardware
Date(s) sample(s) received:	21st October 2024
Date of test:	29th October 2024 9th December 2024 to 29th January 2025
Test conducted at:	UL International (UK) Limited Halesfield 2 Telford Shropshire TF7 4QH
Test conducted by:	C Holden *Senior Laboratory Technician*

Report Authorisation	
Report compiled by:	E Round *Laboartory Engineer*
Authorised by:	J Ratcliffe *Laboratory Engineer*

UL International (UK) Limited, Unit 1-3 Horizon, Kingsland Business Park, Wade Road, Basingstoke, Hampshire RG24 8AH, is accredited by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 5772.

This report and the results shown within are based upon the information, drawings, samples and tests referred to in the report. The results obtained only apply to the sample tested and do not necessarily relate to samples from the production line of the above-named company and in no way constitute any form of representation or warranty as to the performance or quality of any products supplied or to be supplied by them. UL International (UK) Limited or its employees accept no liability for any damages, charges, cost or expenses in respect of or in relation to any damage to any property or other loss whatsoever arising either directly or indirectly from the use of the report.

UL International (UK) Telford Laboratory is authorised to act as a UK Approved/Notified Laboratory n. 0843 under the UKCA system and Norther Ireland provisions for the activities covered by this Report according to EN 13830:2003. The Approved/Notified Body number shall be used only when and, in the manner, authorized by the Approved/Notified Body. The Customer agrees that the Approved/Notified Body shall retain the right to control the use of the Report and Approved/Notified Laboratory number. If copies of Report documentation are provided to others it shall be reproduced in their entirety. Customer agrees that the promotion of its product utilizing the name, Report, or Approved/Notified Laboratory number of UL would mislead the public if such product is not covered by a Report issued by the Notified Laboratory; does not comply with the Applicable Requirements and applicable laws, regulations, and standards; or is used in any way not authorised by UL.

2. Summary of Results

The table below summarises the results of testing carried out to the relevant standard and compared to the relevant criteria:

Test Method & Classification Standard	Description	Classification
BS EN 12046-2:2000 BS EN 12217:2003	Operating forces	Class 2
BS EN 1192:2000	Mechanical Strength	Class 2
BS EN 947:1999 BS EN 1192:2000	Vertical load	600 N
BS EN 948:1999 BS EN 1192:2000	Static torsion	250 N
BS EN 949:1999 BS EN 1192:2000	Soft & heavy impacting	60 J
BS EN 950:1999 BS EN 1192:2000	Hard body impacting	3 J
BS EN 1191:2012	Repeated opening and closing	Class 2

More comprehensive details are reported in Section 6.

Note: *These results are valid only for the conditions under which the test was conducted*
All measurement devices, instruments and other relevant equipment were calibrated and traceable to National Standards.

2.1 Decision Rule

Classifications reported in Section 5 indicate that the product conforms with the relevant accuracy requirements of the testing standards (as summarised below) and the expanded measurement uncertainty (k= 2 for approximately 95% coverage probability) is no greater in magnitude than the accuracy requirements defined in Section 2 of BS EN 947 - 1999,BS EN 948 - 1999, BS EN 949 - 1999, BS EN 950 - 1999, and Section 5 of BS EN 12046-1 - 2003 and/or BS EN 12046-2 - 2000.If the measured value is on the limit, the result is defined as a pass. This means that the risk of a false positive is 50%. For further information regarding risk assessment refer to ILAC G8: 2019.

2.2 Measurement Uncertainty

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%, and for the operating forces is +/- 0.76%, for mechanical strengths is +/- 1.8% and for indentation during impacting is +/- 0.05%.

3. Description of Test Sample

The details shown in section 3 and drawings shown in section 7 have been supplied by and confirmed as typical of normal production by Gretch Unitas Limited and have not been verified by UL International (UK) Limited.

See Section 7 for sample drawings as supplied by Gretch Unitas Limited

Product range name:	Composite door with GU Secury LogIQ Automatic Hardware
Project name to appear on front page of the test report:	Composite door with GU Secury LogIQ Automatic Hardware
Configuration:	Single composite door
Opening direction:	Inward opening
Is the sample typical of normal production?	Yes
Please define the closing condition of the sample:	Active leaf locked & key removed

Outer Frame			
Outer frame width:	1000mm	**Outer frame material:**	UPVC
Outer frame height:	2100mm	**Outer frame gasket**	
Outer frame Part Numbers		Gasket type:	X
Top:	Liniar LSW016	Manufacturer:	Liniar
Bottom:	Stormguard threshold	Product name:	Repair Gasket Black
Lock side:	Liniar LSW016	Product code:	LGA401
Hinge side:	Liniar LSW016	**Threshold**	
Outer frame section size		Manufacturer:	Stormguard Allamd Smith
Width:		Product name:	Stormguard
Depth:	70mm	Product code:	AM3-70
Reinforcing:		Material:	Aluminium
Manufacturer:	Liniar	**Outer frame joint method**	
Product name:		Head:	Outer frame corners welded
Product code:	LSR016	Foot:	Threshold mechanical fixed
Material:	Steel	**Surface Finish**	White

Leaf			
Leaf/Casement width:	850	**Leaf/ Casement material:**	GRP 68mm composite slab
Leaf/ Casement height:	1970	**Leaf/ Casement gasket**	
Leaf/ Casement Part Numbers		Gasket type:	X
Top:	n/a	Manufacturer:	Rotoc/Diventer
Bottom:	n/a	Product name:	Black Weatherseal
Lock side:	n/a	Product code:	M5108 6mm
Hinge side:	n/a	**Leaf midrail:**	n/a
Leaf/ Casement section size		Manufacturer:	[redacted]
Width:	850	Product name:	[redacted]
Depth:	1970	Product code:	X
Reinforcing:		Material:	X
Manufacturer:	n/a	**Leaf/Casement joint method**	
Product name:	n/a	Head:	n/a
Product code:	n/a	Foot:	n/a
Material:	n/a	**Surface Finish**	Acryllic Capped Renolit Foil Finish with a 1.5mm abs sheet bonded to a monocoque structure

Hardware				
	Manufacturer:	**Product description:**	**Product code:**	**Quantity:**
Hinges:	[redacted]	[redacted] composite door hinge		4no
Hinge fixing:	Rapier Star	5.0 x 40 wood screw		8
Hinge protectors:	Mila	Dog Bolt		4
Hinge protector fixings:				4
Locking hardware:	GU	Secury LogIQ Automatic		
Locking hardware fixing:	UK Fasteners	4.0 x 40 screws		
Cylinder:	Mila	Apecs 3 Star		1no
Cylinder fixing:	Mila			
Handle:	n/a			
Handle fixings:	n/a			
Touch Bar	n/a			
Cylinder Support				
Cylinder Escutcheon	Mila	Supa Finger pull		1no
Keeps:	GU	Centre Keep / Remote Deadbolt Keep.	L-10000-12-L/R-1 / L-10000-20-0-1A	1no / 3no
Keep fixings:	Rapierstar	4.3 x 30 PVC screws / 3.9 x 45 Self drilling steel screws		

Customer is to confirm that the samples provided for testing are representative of standard production. Please note: the details given above, as well as the drawings supplied by the customer as confirmed as typical of normal production are not verified by UL International (UK) Limited.

Company:	GU Ltd
Name:	Simon Golder
Position:	Technical Manager
Date:	28.10.24

4. Test Arrangement

4.1 Test Rig

The test sample was mounted into a 95 x 75 mm timber sub-frame in accordance with manufacturer's installation requirements and was secured into the test rig ready for testing.

4.2 Instrumentation

4.2.1 Force Measurement

Calibrated force gauges and load cells were used to measure operation forces to +/- 5%.

4.2.2 Loading equipment

Weights and/or load cells were used to apply the Mechanical Strength loading with an accuracy of ±2%.

4.2.3 Time

A calibrated stopwatch was used to measure/record time

4.2.4 Scales

The mass of the opening leaf was measured using scales accurate to +/- 2%

4.2.5 Torque

A calibrated torque meter was used for recording forces required to operate any finger operated hardware with an accuracy of +/- 5%

4.2.6 Measuring equipment

Where relevant the following measuring equipment was used:

- A measuring tape and rule accurate to ±0.5mm.
- A dial or digital gauge accurate to ±0.01mm.

4.2.7 Impactor

4.2.7.1 Soft & heavy Impactor

A spherical leather bag with a total body mass of 30 Kg ± 0.6Kg of an approximately 350mm diameter was used for soft and heavy body impacts

4.2.7.2 Hard body Impactor

A 50mm ±1mm steel ball was used for hard body impacts

4.2.8 Temperature & Humidity

A digital data logger capable of measuring temperature with an accuracy of ± 1°C and humidity with an accuracy of ± 5 %Rh was used.

5. Test Procedures

5.1 Sequence of Testing

Sample 1

1. Operating Forces
2. Vertical Load
3. Static Torsion
4. Soft & Heavy Body Impact Resistance
5. Hard Body Impact Resistance

Sample 2

6. Operating Forces
7. Resistance to Repeated Opening and Closing
8. Operating Forces

5.2 Operating forces

5.2.1 Dynamic closing

Prior to testing the door, all moving parts were manually operated 5 times as required by the test standard

A pulley system used together with a nylon cord and a series of weights was attached adjacent to the door handle in order to create a dynamic closing action.

The weight was adjusted in 1N increments in order to determine the minimum force required to latch the door from a distance of 200mm.

This method was repeated three times with the results averaged to obtain the final value.

5.2.2 Operating hardware

The minimum force to engage the latch, lock and unlock the hardware before finally unlatching the hardware was recorded.

The sequence was repeated three times with the results averaged to obtain the final value.

5.2.3 Opening forces

The minimum force to commence and maintain the motion of the door leaf to a distance of 200mm was recorded.

The sequence was repeated three times with the results averaged to obtain the final value

5.3 Resistance to vertical load

Without any vertical restraint, the door leaf was positioned at an angle of 90° to the plane of the frame and the diagonal measurement of the door leaf recorded.

A pre-load was applied vertically to the upper lock side corner and held for a period of 60 secs, the load was removed and following a rest period of 60 secs the location of the lower lock side corner recorded.

The test force was then applied to the upper lock side corner and held for a period of 5 mins. On completion of the 5 mins, a measurement of the location of the lower lock side corner of the door leaf was recorded and the load was then removed.

Following a 3 min period with no load applied to the sample, further measurements of both the lower lock side corner location and the diagonal of the door leaf were recorded.

5.4 Resistance to static torsion

Without any vertical restraint, the door leaf was positioned at an angle of 90° to the plane of the frame, with the top lock side corner secured.

A pre-load was applied horizontally to the plane of the leaf to the lower lock side corner and held for a period of 60 secs, the load was then removed and following a rest period of 60 secs the location of the lower lock side corner recorded.

The test force was then applied to the same loading point and held for a period of 5 mins. On completion of the 5 mins a measurement of the location of the lower lock side corner was recorded then the load removed.

Following a 3 min period in which no load was applied to the sample, a further measurement of the lower lock side corner location recorded.

5.5 Soft and heavy impacting

With the door leaf closed, and where applicable secured in accordance with its normal operating mode, the centre of the door was identified as the impact point.

Using a reference bar and Digital depth gauge, any deviation in the flatness of the door leaf was recorded. The Impactor was then suspended so that it made light contact with the surface of the door leaf, and its centre of gravity was positioned on a line perpendicular to the door leaf.

The Impactor was released, and the door leaf impacted following which the reference bar and Digital depth gauge were used to determine any change to the flatness of the door leaf.

This procedure was conducted 3 times with the flatness being recorded following each impact.

The same sequence of impacting was then repeated on the other face of the door sample.

5.6 Hard body impacting

With the door leaf positioned horizontally and supported under its two longest edges, pattern 1 was selected from the four aiming patterns shown in the test standard. The impact positions contained within this pattern were deemed to coincide with theoretically the weakest points on the door leaf, with any glazed areas being omitted from the test,

The impactor was dropped on each impact point and any indentation measured and recorded for diameter, depth and cracking.

5.7 Resistance to Repeated Opening and Closing

5.7.1 Prior to the test

The mass of the casement, sash or leaf was measured prior to any testing.

With the test sample installed in accordance to clause 6 of EN 1191:2012, the sample was subject to 5 manual operations before the following initial measurements were taken:

a) The operating forces, measured in accordance with BS EN 12046-2:2000
b) The mass of the leaf
c) The dead load applied by the operating equipment on the leaf

The operating equipment was adjusted in accordance with the operation of the hardware its reference velocity and attainment of forces within the specified limits, the rest times and strokes.

5.7.2 Cyclic test

The sample was subject to repeated opening and closing as outlined in Annex H of BS EN 1191:2012. Throughout the test, the operating hardware was subject to the required number of cycles as was the sash/sashes.

The test was configured for the correct amount of cycles according to the required classification as outlined in BS EN 12400:2002.

At every period equal 2500 cycles or 25% of the specified total test cycles, whichever is the greater, the test was halted and the test specimen was examined and the operating forces were measured and if necessary, lubrication and adjustment was carried out in accordance with the manufacturers maintenance instructions. The test was continued in the defined conditions for the next period.

The test was continued until the defined number of cycles was completed.

5.7.3 Following the test

Following the completion of the defined number of cycles, the following measurements were taken:

a) The operating forces, measured in accordance with BS EN 12046-2:2000
b) The mass of the leaf
c) The dead load applied by the operating equipment on the leaf

6. Test Results

6.1 Lab Conditions

The conditions measured inside the laboratory were as follows:

	Temperature (°C)	Humidity (%RH)
At start of test	19.2	36.5
At completion of test	19.7	35.8

6.2 Operating forces

The results of the tests carried out are as follows:

	Operating force	Class
Closing Force (N)	47.5	2
Latch Hardware (N)	N/A	N/A
Lock Hardware (Nm)	30.7	4
Unlock Hardware (Nm)	32.0	4
Unlatch Hardware (N)	32.0	4
Commence Opening (N)	3.3	4
Maintain Opening (N)	3.6	4
Overall Classification according to BS EN 12217:2003		2

Following testing the sample was opened, closed and all hardware operated to ensure the sample remained fully functional.

The overall classification for operating forces is: **CLASS 2**

6.3 Mechanical Strength

6.3.1 Resistance to vertical load

	Door leaf
Test Load (N)	600
Deformation Under Load (mm)	1.56
Residual Deformation Following Test	
Vertical Deformation (mm)	0.55
Diagonal Deformation (mm)	0.00

Following the test there were no signs of damage to the sample or loss of functionality.

6.3.2 Resistance to static torsion

	Door leaf
Test Load (N)	250
Deformation Under Load (mm)	16.01
Residual Deformation Following Test (mm)	0.05

Following the test there were no signs of damage to the sample or loss of functionality.

6.3.3 Resistance to soft and heavy body impacting

6.3.3.1 Inside Face of Doorset

Impact Ref	Energy (J)	Deviation in flatness (mm)	Damage caused to the sample
Impact 1	60	0.00	None
Impact 2	60	0.01	None
Impact 3	60	0.01	None

Following the test there were no signs of damage to the sample or loss of functionality.

6.3.3.2 Weather Face of Doorset

Impact Ref	Energy (J)	Deviation in flatness (mm)	Damage caused to the sample
Impact 1	60	0.02	None
Impact 2	60	0.01	None
Impact 3	60	0.02	None

Following the test there were no signs of damage to the sample or loss of functionality.

6.3.4 Resistance to hard body impacting

Aiming pattern		1	
Impact Energy (J)		3	
Impact Number	Depth of Indent (mm)	Diameter of Indent (mm)	Diameter of cracking (mm)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
Mean	0.0	0.0	0.0
Co-efficient of variation	0.00	0.00	0.00

Following the test there were no signs of damage to the sample or loss of functionality.

6.4 Overall Classification for Mechanical Strength

The classification for Mechanical Strength according to BS EN 1192:2000 is: **CLASS 2**

6.5 Resistance to Repeated Opening and Closing

6.5.1 Initial measurements

Description	Door leaf
Mass of leaf (kg)	39.8
Dead load applied by the operating equipment (kg)	0.07
Stroke of casement (°)	90

The operating forces measured before the test are as follows:

Description	Operating force	Classification
Closing Force (N)	69.1	1
Latch Hardware (N)	N/A	N/A
Lock Hardware (cNm)	50.0	4
Unlock Hardware (cNm)	50.0	4
Unlatch Hardware (cNm)	35.0	2
Commence Opening (N)	17.9	3
Overall Classification according to BS EN 12217:2003		1

6.5.2 Cycle test

The number of cycles completed by the sample was **100,000** on the Primary Leaf as required by **Class 5** of the standard.

The sample was lubricated as specified by the manufacturer at each period equal to 2500 cycles or 25% whichever the greater and adjustments were carried out as follows:

Hardware checked and lubricated

Throughout and immediately following the test, the sample was checked and there were no signs of damage or loss of functionality.

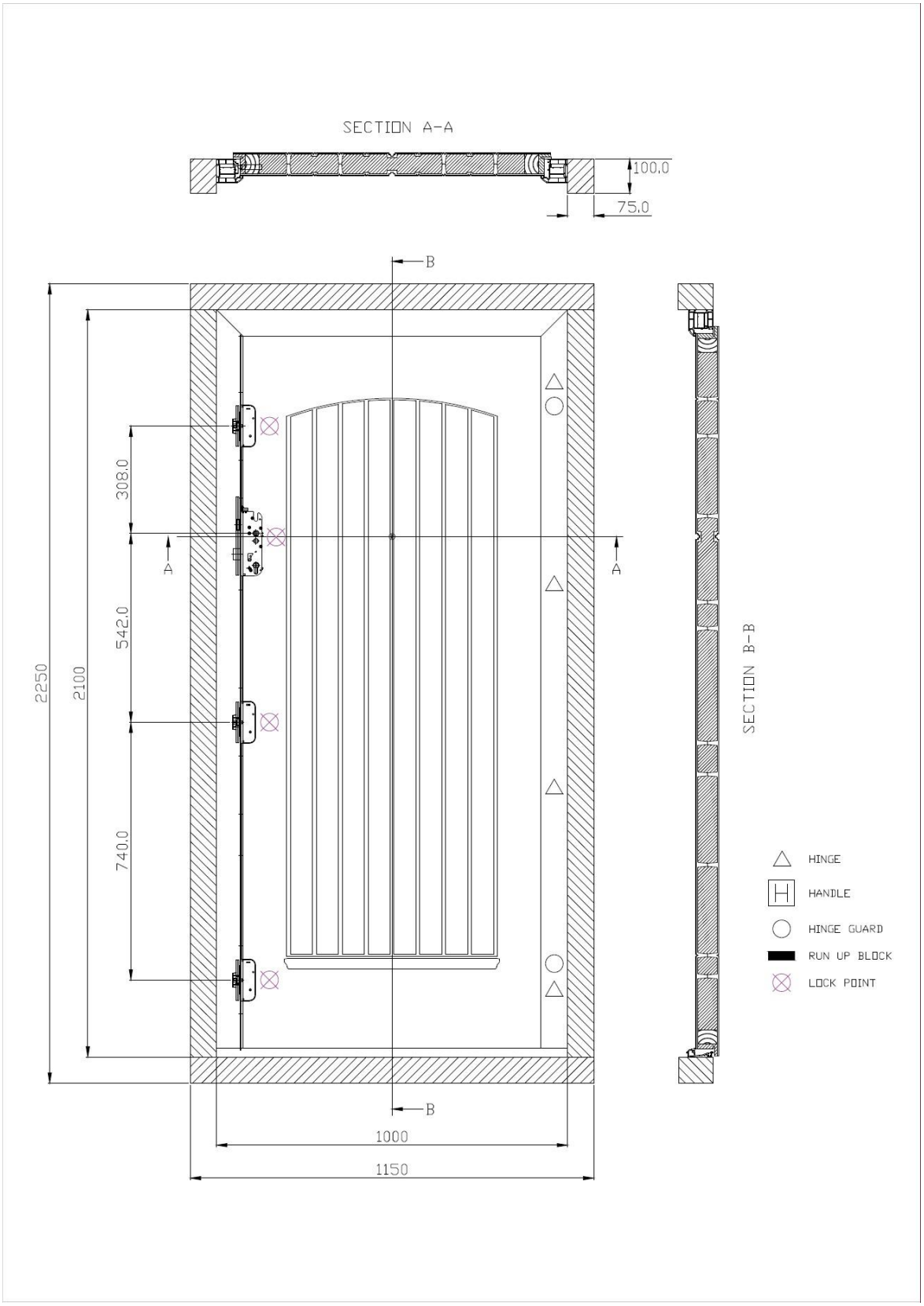
6.5.3 Final Measurements

Description	Door leaf
Mass of leaf (kg)	39.8
Dead load applied by the operating equipment (kg)	0.07
Stroke of casement (°)	90

The operating forces measured before the test are as follows:

Description	Operating force	Classification
Closing Force (N)	9.5	4
Latch Hardware (N)	N/A	N/A
Lock Hardware (cNm)	10.0	4
Unlock Hardware (cNm)	10.0	4
Unlatch Hardware (cNm)	40.0	2
Commence Opening (N)	8.5	4
Overall Classification according to BS EN 12217:2003		2

7. System Drawings



----- END OF REPORT -----