WINTECH
TESTING & CERTIFICATION

Technical Report

Report No	**R19024**
Product Tested:	**Ultraline Style 422 Sliding Door**
Test Conducted for:	**Greenways Contemporary Ltd** **5a Grammar School Lane** **Halesowen** **West Midlands** **B63 3SW** **United Kingdom**
Standard Specified:	**BS 6375 Part 2:2009** **BS EN 12046-2:2000,** **BS EN 12217:2003,** **BS EN 947:1999,** **BS EN 948:1999,** **BS EN 949:1999,** **BS EN 950:1999,** **BS EN 1191:2000 and** **BS EN 1192:2000**
Project No:	**19024**
Date Samples Received:	**27th February 2018**
Date of Test:	**10th April 2018– Mechanical Strength** **15th March – 29th March 2018 – Repeated Opening and Closing**
Test Conducted at:	**Wintech Engineering Limited** **Halesfield 2** **Telford** **Shropshire** **TF7 4QH**
Test Conducted by:	**D Knight** Laboratory Technician **D Adams** Senior Laboratory Engineer
Report Compiled by:	**S Ward** Laboratory Apprentice
Authorised by:	**M Witkowska** Quality Engineer

Contents

1. Introduction

This report describes tests conducted at the test laboratory of Wintech Engineering Ltd to a Door sample on behalf of Greenways Contemporary Ltd.

The test sequence was conducted between 15th March and 10th April 2018 in order to determine the durability of the sample with respect to operating forces, mechanical strength and resistance to repeated operation. The test methods were in accordance with the following standards as per the request of Greenways Contemporary Ltd.

BS 6375 Part 2: 2009	Performance of Windows & Doors, Classification for operation and strength characteristics and guidance on selection and specification
BS EN 12046-2:2000	Operating forces test method
BS EN 12217:2003	Operating forces classification
BS EN 947:1999	Resistance to vertical load test method
BS EN 948:1999	Resistance to static torsion test method
BS EN 949:1999	Resistance to soft and heavy body impacting test method
BS EN 950:1999	Resistance to hard body impacting test method
BS EN 1192:2000	Doors classification of strength requirements
BS EN 1191:2000	Windows and doors – Resistance to repeated opening and closing – Test method

Wintech Engineering Ltd is accredited by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 2223.

2. Summary of Results

The following summarises the results of testing carried out, in accordance with the relevant testing & classification standards.

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 3
BS EN 947:1999 BS EN 1192:2000	Vertical load	N/A
BS EN 948:1999 BS EN 1192:2000	Static torsion	N/A
BS EN 949:1999 BS EN 1192:2000	Soft & heavy impacting	120 J
BS EN 950:1999 BS EN 1192:2000	Hard body impacting	N/A
BS EN 1191:2000	Repeated opening and closing	Class 4

More comprehensive details are reported in Section 6.

Note: These results are valid only for the conditions under which the test was conducted

Note: All measurement devices, instruments and other relevant equipment were calibrated and traceable to National Standards.

3. Description of Test Sample

Product range name:	Ultraline Sliding Door
Configuration:	Style 422
Opening direction:	Left – Right (viewed outside)

Outer Frame

Outer frame width:	2980mm	Outer frame material:	Aluminium
Outer frame height:	2765mm	Outer frame gasket	
Outer frame Part Numbers		Gasket type:	GAS-77 (5.5mm Brush)
Top:	GAS-101	Manufacturer:	Schlegal
Bottom:	GAS-101	Product name:	4.8 / 5.5mm Brush
Lock side:	GAS-101	Product code:	GAS-77
Hinge side:	GAS-101	Threshold	
Outer frame section size		Manufacturer:	N/A
Width:	50mm	Product name:	
Depth:	77.5mm	Product code:	
Reinforcing:		Material:	
Manufacturer:	N/A	Outer frame joint method	
Product name:		Head:	45° mitre screwed
Product code:		Foot:	45° mitre screwed
Material:			

Leaf

Leaf width:	1545mm	Leaf material:	Aluminium
Leaf height:	2690mm	Leaf gasket	
Leaf Part Numbers		Gasket type:	Brush
Top:	GAS-103	Manufacturer:	Schlegal
Bottom:	GAS-102	Product name:	4.8/15 Brush & weather vane
Lock side:	GAS-104	Product code:	GAS-73
Hinge side:	GAS-105	Leaf midrail:	
Leaf section size		Manufacturer:	Cortizo
Width:	20mm	Product name:	Interlock
Depth:	58mm	Product code:	GAS-105
Reinforcing:		Material:	Aluminium
Manufacturer:	N/A	Leaf joint method	
Product name:		Head:	45° mitre screwed
Product code:		Foot:	45° mitre screwed
Material:			

Glazing

Glass unit		Glazing gasket	
Manufacturer:	Carey's Glass	Gasket type:	Wedge Gasket
Inner thickness:	6mm	Manufacturer:	Reddiplex
Spacer material:	Warm Edge Thermobar	Product name:	4mm Wedge Gasket
Outer thickness:	6mm	Product code:	GAS-73
Unit sizes:	36mm (6 / 24 / 6)	Glazing clip	
Bead		Manufacturer:	N/A
Manufacturer:	N/A	Product name:	
Product name:		Product code:	
Product code:		Glazing tape details	N/A
Bead size:		Manufacturer:	
Bead material:		Product name:	
		Product code:	

Hardware

	Manufacturer:	Product description:	Product code:	Quantity:
Rollers:	J Banks Hardware	Greenways sliding door runner	GAS 180 'C'	-
Hinge fixing:	N/A			
Hinge protectors:	N/A			
Hinge protector fixings:	N/A			
Door lock:	Gianni Industries Inc	Electric Deadbolt	EB-260	1
Door lock fixings:				2
Cylinder:	N/A			
Cylinder fixing:	N/A			
Handle:	N/A			
Handle fixings:	N/A			
Touch Bar	N/A			
Cylinder Support	N/A			
Cylinder Escutcheon	N/A			
Keeps:	Newbrel	5mm Lock Keep	GAS-191	1
Keep fixings:				6

The description of the test sample in this section has been supplied by Greenways Contemporary Ltd and has not been verified by Wintech Engineering Limited.

See Section 7 for test sample drawings as supplied by Greenways Contemporary Ltd.

4. Test Arrangement

4.1 Test Rig

The test sample was mounted in to a 100 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 Time

A calibrated stop watch was used to measure/record time

4.2.3 Torque

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

4.2.4 Scales

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

4.2.5 Measuring Tape

A measuring tape and rule accurate to +/- 0.5mm were used

4.2.6 Impactor

4.2.6.1 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

4.2.6.2 Hard body Impactor

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

4.2.7 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 4 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, reducing the number of impact points.

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 1191:2000, the sample was subject to 5 manual operations before the following initial measurements were taken:

a) **The dead load applied by the operating equipment on the casement, sash or leaf**
b) **The stroke of the casement, sash or leaf in degrees or millimetres**
c) **Dimensions at datum points were taken in order to establish a nominal set of dimensions**
d) **The operating forces, measured in accordance with BS EN 12046-2:2000**

The cylinders were 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 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 to 25% of the specified total test cycles (or less if specified by the manufacturer for lubrication) the test was stopped and the test specimen examined. The test was continued and paused at the examination periods throughout its duration as defined above.

5.7.3 Following the test

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

a) **The dead load applied by the operating equipment on the casement, sash or leaf**
b) **The stroke of the casement, sash or leaf in degrees or millimetres**
c) **Dimensions at datum points were taken in order to establish a nominal set of dimensions**
d) **The operating forces, measured in accordance with BS EN 12046-2:2000**

6. Test Results

6.1 Lab Conditions

The conditions measured inside the laboratory were as follows:

Temperature - °C	Humidity - %rh
19.2	45.5

6.2 Operating forces

The results of the tests carried out are as follows:

	Result	Class
Closing Force (N)	47.4	2
Commence Opening (N)	38.27	2
Maintain Opening (N)	38.20	2

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

The overall classification for operating forces is: CLASS 2

6.3 Mechanical Strength

6.3.1 Resistance to vertical load

This part of the test was not carried out due to the sample being a sliding door meaning it was not possible to carry out this test.

6.3.2 Resistance to static torsion

This part of the test was not carried out due to the sample being a sliding door meaning it was not possible to carry out this test.

6.3.3 Resistance to soft and heavy body impacting

Inside Face of Doorset

		Sliding Leaf		Fixed Light	
	Energy (J)	Deviation in flatness (mm)	Damage caused to the sample	Deviation in flatness (mm)	Damage caused to the sample
Impact 1	120	0.25	None	0.02	None
Impact 2	120	0.53	None	0.05	None
Impact 3	120	0.36	None	0.08	None

Following the test, there were no signs of any damage to the test sample and it remained functional.

Weather Face of Doorset

		Sliding Leaf		Fixed Light	
	Energy (J)	Deviation in flatness (mm)	Damage caused to the sample	Deviation in flatness (mm)	Damage caused to the sample
Impact 1	120	1.49	None	1.13	None
Impact 2	120	1.30	None	0.22	None
Impact 3	120	1.09	None	0.08	None

Following the test, there were no signs of any damage to the test sample and it remained functional.

6.3.4 Resistance to hard body impacting

This part of the test was not carried out due to the sample being mostly glass and there being no sufficient area to impact.

6.4 Overall Classification for Mechanical Strength

Resistance to:	Class 1	Class 2	Class 3	Class 4
Soft and heavy body impact (J)	30	60	120	180

The overall classification for mechanical strength is: CLASS 3

6.5 Resistance to Repeated Opening and Closing

6.5.1 Initial Measurements

Weight of casement (kg)	95.0
Dead load applied by the operating equipment (kg)	0.035
Stroke of casement	1120mm

	Result	Class
Closing Force (N)	35.4	2
Commence Opening (N)	35.0	2

The locking of the sample is done by an electronic lock operated by a pressure switch. The locking system completed 50,000 cycles by operating the pressure switch

6.5.2 Cycle Test

The number of cycles completed by the sample was 50,000 as required by Class 4 of the standard.

6.5.3 Datum Measurements

Observations and measurement of the datum points were measurement from a point 50mm from each edge of the casement in relation to the outer frame.

	Dimension in mm							
Description	1	2	3	4	5	6	7	8
Before cyclic test	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
After cyclic test	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Difference	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

6.5.4 Final Measurements

	Result	Class
Closing Force (N)	45.6	2
Commence Opening (N)	38.3	2

6.5.6 Variation in Performance

The following calculation is used to assess the variation in performance as a result of the repeated opening and closing test

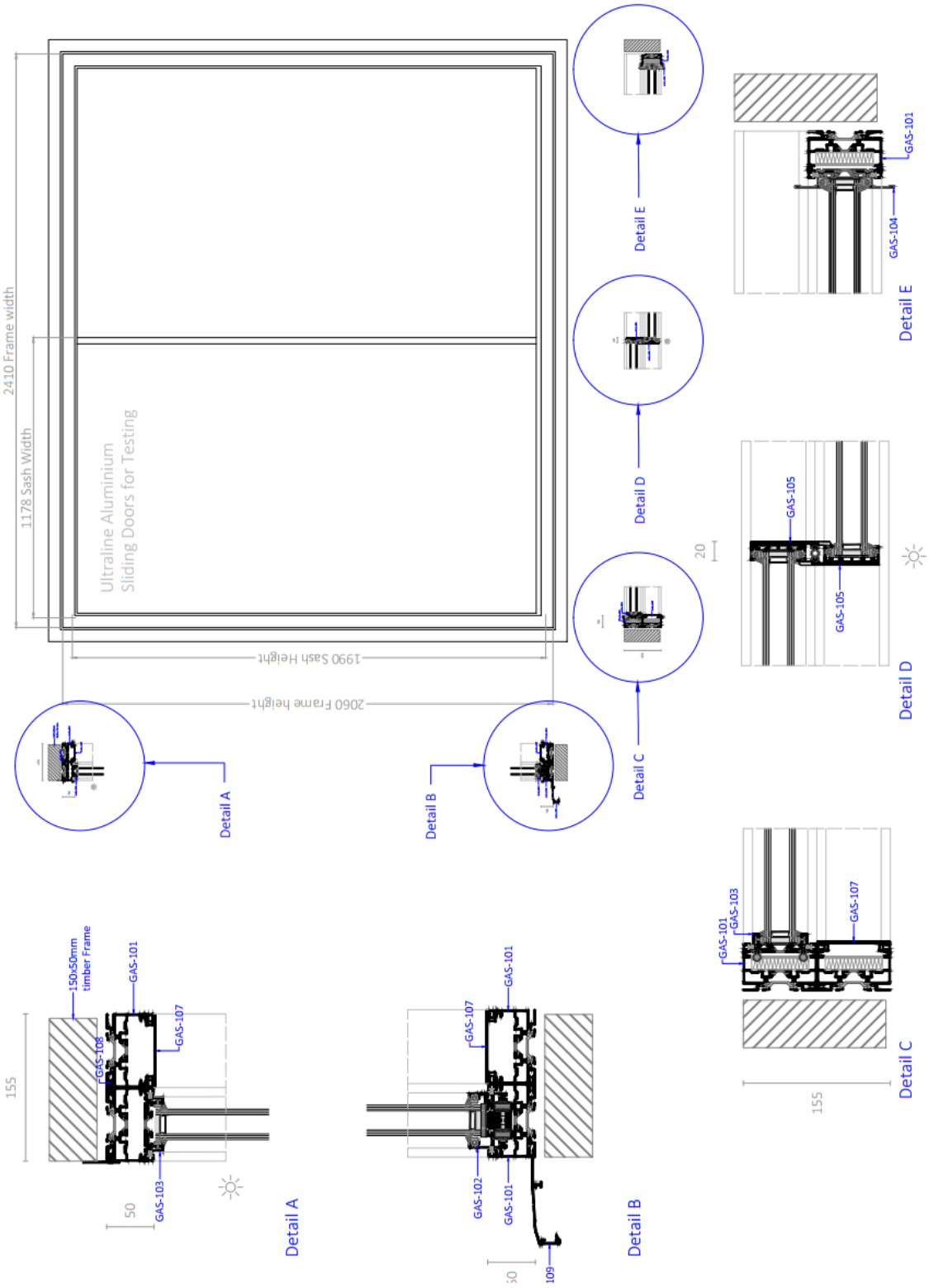
$$V(\%) = 100\left(\frac{Pe}{Pi} - 1\right)$$

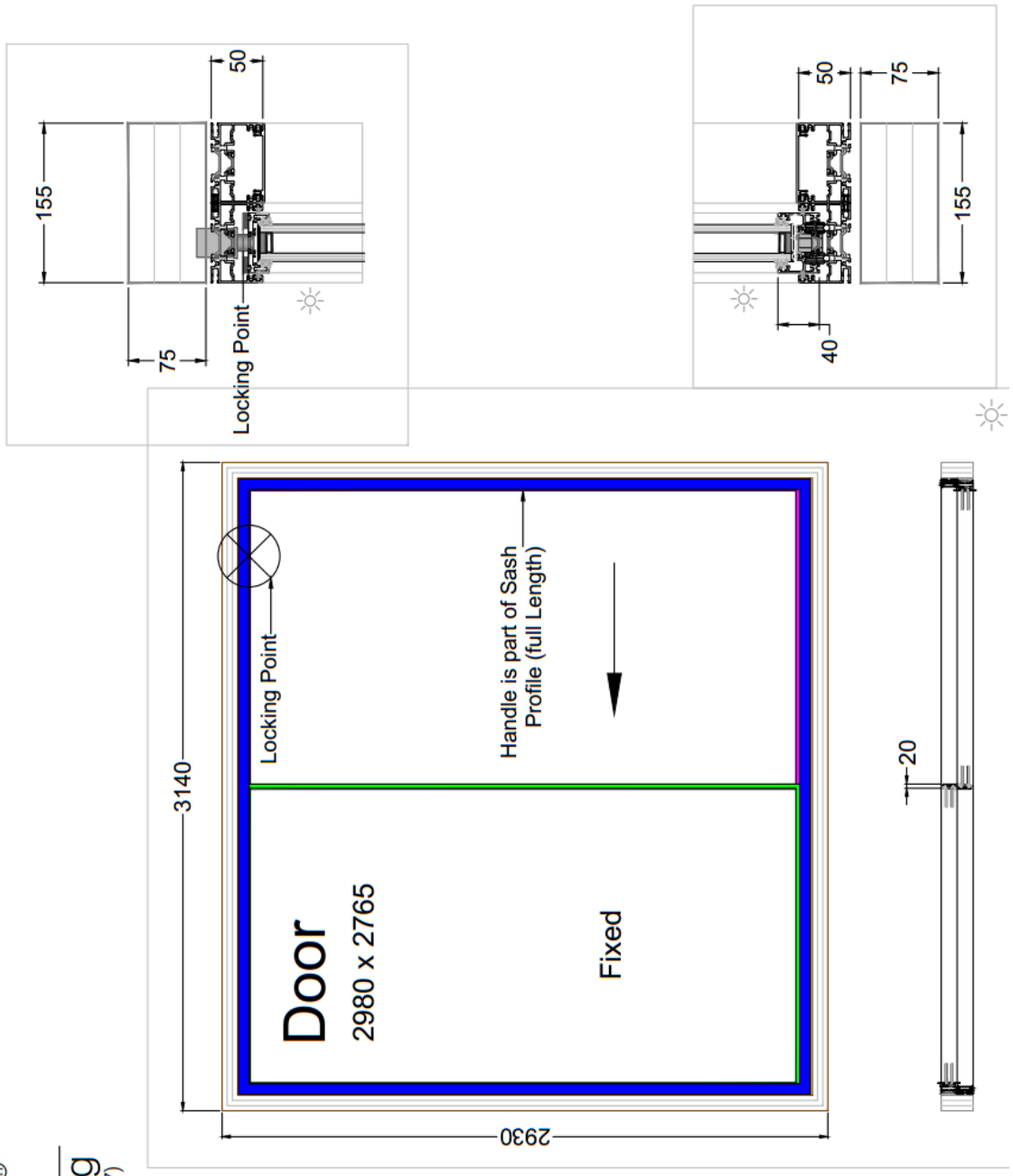
***V* is the percentage variation in performance**
***Pe* is the operating forces measured after the test**
***Pi* is the operating forces measure before the test**

Description	Variation in performance %
Closing Force	28.81
Commence Opening	9.43

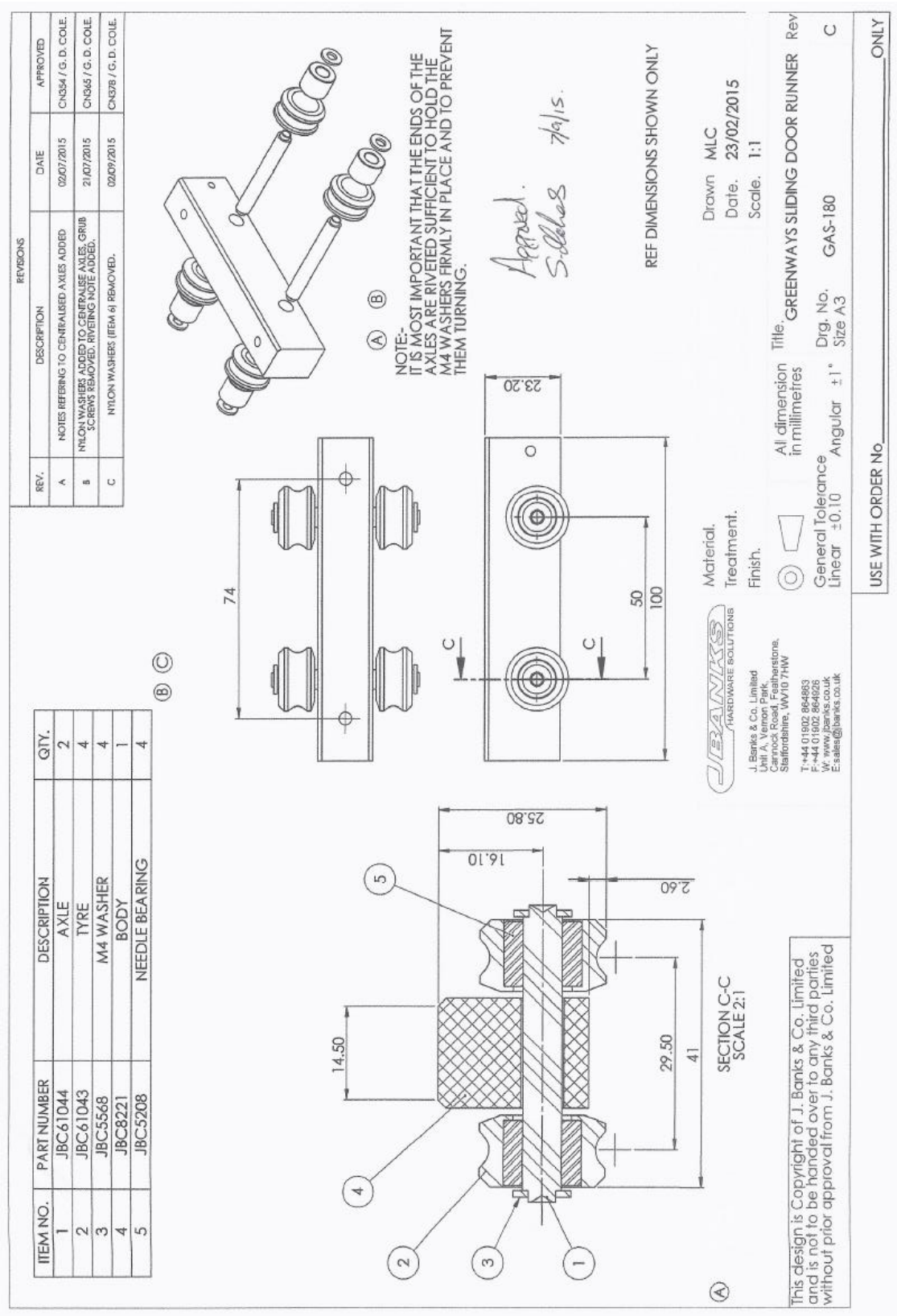
The overall classification for repeated opening and closing is: **CLASS 4**

7. System Drawings





ultraline® sliding
Security Test Doors (Mar 17)
Style 422 Viewed
Outside


REVISIONS
REV. DESCRIPTION DATE APPROVED
A NOTES REFERRING TO CENTRALISED AXLES ADDED 02/07/2015 CN3554 / G. D. COLE.
B NYLON WASHERS ADDED TO CENTRALISE AXLES, GRUB SCREWS REMOVED, RIVETING NOTE ADDED. 21/07/2015 CN3565 / G. D. COLE.
C NYLON WASHERS (ITEM 6) REMOVED. 02/09/2015 CN3578 / G. D. COLE.
ITEM NO. PART NUMBER DESCRIPTION QTY.
1 JBC61044 AXLE 2
2 JBC61043 TYRE 4
3 JBC5568 M4 WASHER 4
4 JBC8221 BODY 1
5 JBC5208 NEEDLE BEARING 4
NOTE-
IT IS MOST IMPORTANT THAT THE ENDS OF THE AXLES ARE RIVETED SUFFICIENT TO HOLD THE M4 WASHERS FIRMLY IN PLACE AND TO PREVENT THEM TURNING.
Approved. Sales 7/9/15.
REF DIMENSIONS SHOWN ONLY
74
23.20
50
100
25.80
16.10
2.60
14.50
29.50
41
SECTION C-C
SCALE 2:1
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E: sales@jbanks.co.uk
Material.
Treatment.
Finish.
All dimension in millimetres
General Tolerance
Linear ±0.10 Angular ±1°
Drawn MLC
Date. 23/02/2015
Scale. 1:1
Title. GREENWAYS SLIDING DOOR RUNNER Rev
Drg. No. GAS-180 C
Size A3
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----- END OF REPORT -----