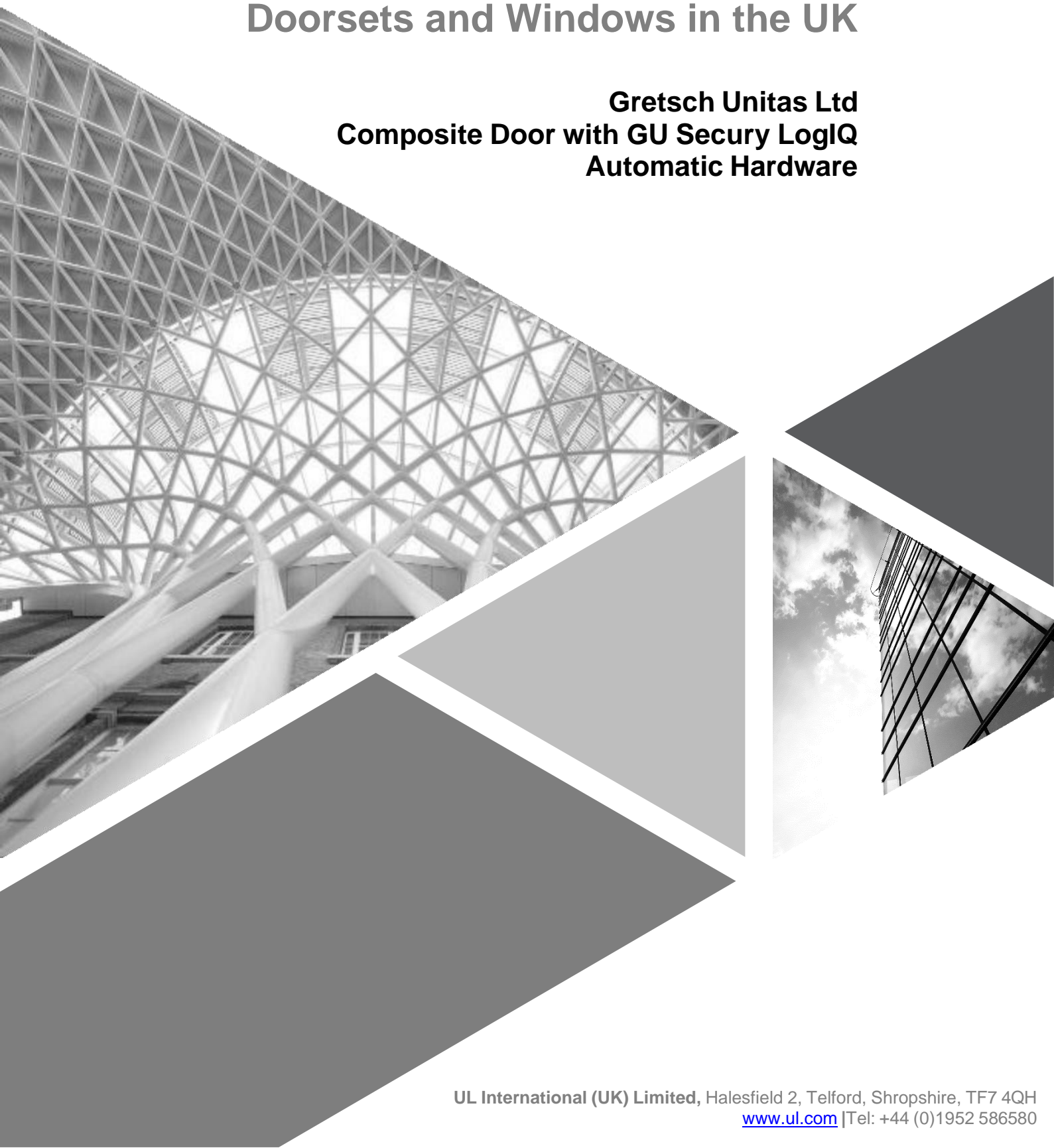


Technical Report – R4791475629-3 PAS 24:2022 - Enhanced Security Performance Requirements for Doorsets and Windows in the UK

**Gretsch Unitas Ltd
Composite Door with GU Secury LogIQ
Automatic Hardware**





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1. Introduction

Test Details	
Customer:	Gretsch Unitas Ltd 5 Spitfire Close Coventry Business Park Coventry CV5 6UR GB
Test Witnessed By:	S Golder <i>Gretsch Unitas Ltd</i> 29 th October 2024 & 21 st November 2024
Product Tested:	Single inward opening composite door with GU Secury LogIQ Automatic hardware
Date(s) Sample(s) Received:	21 st October 2024
Date of Test:	29 th October & 21 st November 2024
Test Conducted at:	UL International (UK) Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	D Adams <i>Senior Engineering Technician</i> C Holden <i>Laboratory Technician</i>

Report Authorisation	
Report Compiled by:	J Ratcliffe <i>Engineering Project handler</i> 
Authorised by:	R Cadwallader <i>Engineer</i> 

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2. Summary of Results

The table below summarises the results of testing carried out, in accordance with PAS 24:2022:

Test Description	Sample Tested (ID No.)	Test Sheet reference	Result	Test Date
A.3.1 – Security hardware & cylinder test – Part 1	1	TS 001	Pass	29 th October 2024
A.3.2 – Security hardware & cylinder test – Part 2	3	TS 001	Pass	29 th October 2024
A.3.3 – Security hardware & cylinder test – Part 3	1	TS 001	Pass	29 th October 2024
B.4.6 – Manual check test	1	TS 001	No entry gained	29 th October 2024
B.4.3 – Manipulation test (a)	2	TS 001	Pass	29 th October 2024
B.4.4.4 – Manual cutting test	2	TS 001	Pass	29 th October 2024
B.4.5 – Mechanical loading test	2	TS 002	Pass	21 st November 2024
B.4.8 – Soft body impact test	3	TS 001	Pass	29 th October 2024
B.4.9 – Hard body impact test	3	TS 001	Pass	29 th October 2024
Overall classification in accordance with PAS 24:2022			D	

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 6 indicate that the product conforms with the relevant accuracy requirements of section B.3 and C.3 of PAS 24:2022.

2.2 Measurement uncertainty

The results as reported in this test report are not accounting measurement of uncertainty as no numerical values were recorded during the test.

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 Gretsch Unitas Ltd and have not been verified by UL International (UK) Limited.

See Section 7 for sample drawings as supplied by Gretsch Unitas Ltd.

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:	██████████
Width:	850	Product name:	██████
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	Acrylic Capped Renolit Foil Finish with a 1.5mm abs sheet bonded to a monocoque structure

Hardware				
	Manufacturer:	Product description:	Product code:	Quantity:
Hinges:	██████	██████ 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		

Confirmation

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

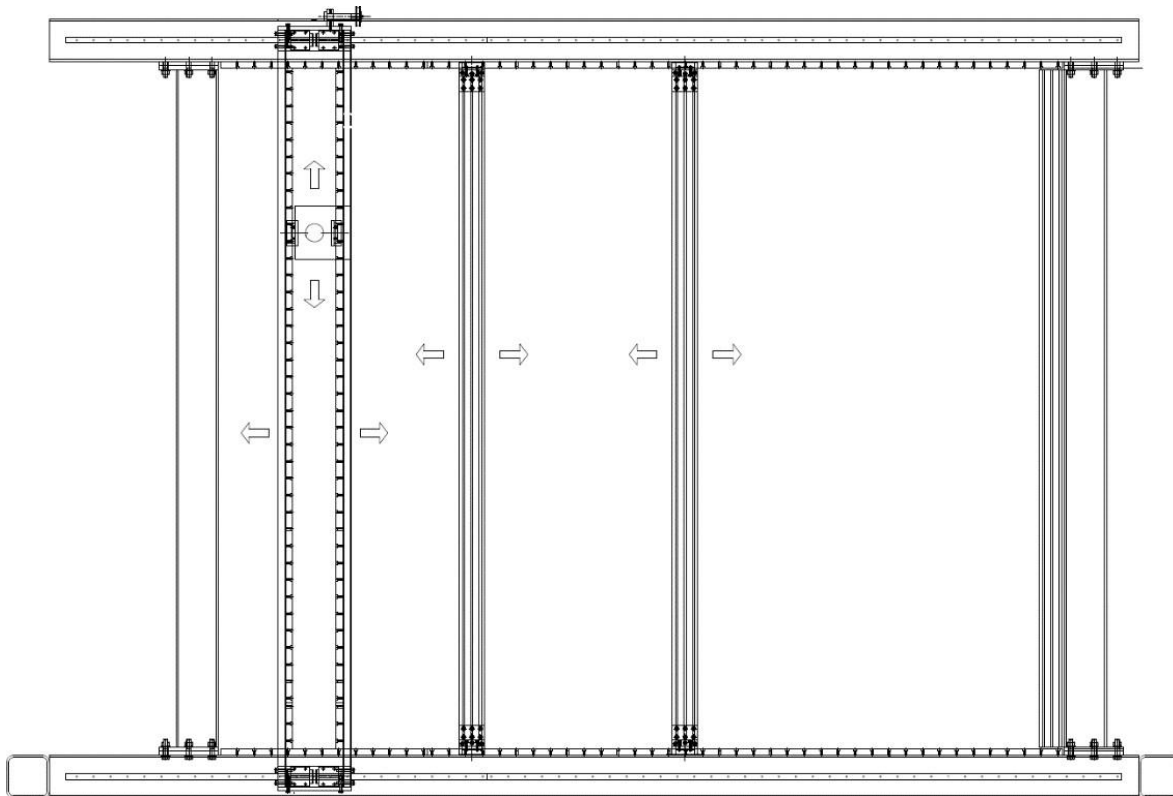
4.1 Environmental conditioning

The test samples were stored in a non-destructive laboratory environment at a temperature of between 15 – 30°C and between a humidity of 25 – 75% RH for a minimum of 12 hours before, and during, the testing.

4.2 Test rig

The test sample was supplied mounted in a 100 x 75 mm timber sub-frame in accordance with manufacturer's installation requirements. The sample was installed into the test rig, which was constructed to meet the requirements of the test specification, and was installed plumb, square and without twist or bends.

Figure 1 – Test rig used for testing



4.3 Mechanical load application

A series of parallel to plane loads and perpendicular to plane loads were applied to the products using hydraulic cylinders. The loads parallel and perpendicular to the plane of the test sample were applied to within a measured accuracy of $\pm 2\%$. Perpendicular-to-plane loads were controlled to an accuracy of $\pm 5\%$, and they were applied within 5° perpendicular to the plane of the sample.

Mechanical loading to the door leaf was applied by a pad with a nominal area of $1,000\text{mm}^2$ with a minor dimension of not less than 20mm.

Mechanical loading to the infill was applied with a pad (as described above) centrally attached to a $150 \times 150 \pm 5$ mm plywood pad with a thickness of not less than 25mm.

4.4 Attack tool groups

The following list of tools were available for use during the relevant manual attack tests.

The tools were not used to strike the test sample, or strike one another, nor were they connected in any way to increase the leverage available during any of the manual attack tests.

4.4.1 Tool group A

Section reference	Tool description
A.2.2.1	Assorted mild steel wire
A.2.2.2	Two credit cards
A.2.2.3	Two paint scrapers
A.2.2.4	One craft knife
A.2.2.5	Two flat blade screwdrivers, 150mm length

4.4.2 Tool group B

Section reference	Tool description
A.2.3.1	One 25mm wood chisel
A.2.3.2	One 6mm wood chisel
A.2.3.3	One flat blade screwdriver, 200mm length
A.2.3.4	One brick bolster
A.2.3.5	One cross point screwdriver, 200mm length
A.2.3.6	One cross head screwdriver, 200mm length
A.2.3.7	One interchangeable bit screwdriver, 200mm length, PH1 to PH3, PZ1 to PZ3, T5 to T30, H2 to H6, Hexagon heads range from 4mm to 10mm and slotted 3.5mm to 6.5mm bits. This screwdriver was only used for removal of exposed fixings if applicable.

4.4.3 Tool group C

Section reference	Tool description
A.2.4.1	One pair of self-gripping pliers
A.2.4.2	One torque gauge
A.2.4.3	One shallow curve head attachment
A.2.4.4	One hooked head attachment
A.2.4.5	A selection of steel self-cutting traction screws with deep thread and gimlet point, self-tapping thread with drill point, single and twin start.

4.5 Soft body impactor

The soft body impact energy was applied by the pendulum fall of a leather spheroconical bag of approximately 1100 ±80 mm circumference filled with fine dry sand to a total mass of 30 ±0.05 kg (this corresponds to a sand density of 1 500 kg/m³ and a grain size of <2 mm). The impactor was suspended by a cable of at least 1.5 m in length, such that the movement of the impactor is in a vertical plane perpendicular, ±5°, to the impacted face of the component.

4.6 Hard body impactor

The hard body impact energy was applied by the pendulum fall of a cylindrical steel block having a mass of 50 ±0.05 kg. The nose of the impactor was 50 ±0.5 mm in diameter and 175 ±35 mm in length. The overall length of the impactor was 820 ±10 mm. The impactor was arranged to swing in an arc normal to the plane of the door and its longitudinal axis was horizontal at the moment of impact.

4.7 Entry cylindroids

4.7.1 Entry definition cylindroid

A 500±25mm long cylindroid of a diameter 50±0.5mm was used to confirm that any aperture created did not satisfy the entry definition as of section 3.9 in PAS 24:2022, for any relevant tests.

4.7.2 Entry definition ellipsoid

A 500±25 mm long cylindroid with an elliptical section of 225±2 mm minor and 380±2 mm major diameters was used to confirm that any aperture created during the Manual cutting test in zone 2 did not satisfy the entry definition as of section 3.10 in PAS 24:2022.

5. Test Procedures

5.1 Security hardware & cylinder test

The objective of this test was to assess the lock and cylinder and its resistance to manual attack when using the tools as described in section A.2 of PAS 24:2022.

The test was broken into 3 separate parts which are as follows:

5.1.1 Part 1

The hardware was attacked for a total of 3 minutes which consisted of the following activities:

- i. Attempts to remove, dislodge or otherwise gain access to the cylinder and lock by attacking any protective item.
- ii. Attempts to break or defeat the cylinder by applying a twisting or bending force.
- iii. Attempts to operate any accessible mechanism in order to gain entry.

5.1.2 Part 2

The hardware was attacked for a total of 3 minutes which consisted of the following activities:

- i. Attempts to remove, dislodge or otherwise gain access to the cylinder and lock by attacking any protective item.
- ii. Attempts to screw self-cutting screws into the exposed part of the cylinder in order to provide a suitable fixing force for activity iii.
- iii. Attempts to break and defeat the cylinder by applying a nominally axial force to the screw using a hooked head crowbar attachment.
- iv. Attempts to operate any accessible mechanism in order to gain entry.

5.1.3 Part 3

The hardware was attacked for a total of 3 minutes which consisted of the following activities:

- i. Attempts to remove, dislodge or otherwise gain access to the lock mechanism by attacking any item protecting the lock mechanism.
- ii. Attempts to defeat the lock and expose mechanisms within the lock case.
- iii. If access to the internal workings of the hardware, cylinder or lock is gained, then attempts to defeat the lock and gain entry by operating any accessible mechanism.

5.2 Manual check test

The objective of the manual check test is to explore the possibility that there might be weaknesses and vulnerabilities in the product that are not covered in the standard loading cases.

The objective of this test was to assess any vulnerabilities of the sample that are not covered by the standard loading cases assessed in the mechanical loading test B.4.5. The tools described in section B.4.6.2 of PAS 24:2022 were used for a maximum period of 15 minutes in an attempt to gain entry through the sample. No single location was tested for more than 6 minutes with no single attack technique being used for more than 3 minutes.

5.4 Manipulation test (a)

The objective of this test was to highlight any inherent vulnerability in the design of the door which, from the outside, would permit entry by the hardware being operated, released or disengaged when tested using all of tools group A from section A.2.1 of PAS 24:2022 and, where applicable, tools specified in A.2.3.3, A.2.3.5 and A.2.3.6 in tools group B from section A.2.3.7 of PAS 24:2022. The overall attack time was limited to 15 minutes, with unlimited rest time and with no single test technique being used for more than 3 minutes.

5.5 Manual cutting test

The objective of this test was to cut an aperture in the infill or fabric of the door leaf in order to gain entry using the tools described in section A.2.2.3, A.2.2.4, A.2.3.1 and A.2.4.2. Two tests were conducted: An attack in Zone 1 and a second in Zone 2. The overall attack time for each test was 3 minutes.

Zone 1 is a horizontal band with an upper limit 400 mm (+0 mm / -10 mm) above the centre of rotation of the upper hardware unlocking point and a lower limit 400 mm (+0 mm / -10 mm) below the centre of the rotation of the lower unlocking point as shown below. In the case of a single hardware unlocking point zone 1 is a horizontal band with limits 400 mm (+0 mm / -10 mm) above and below the centre of rotation of the hardware unlocking point. Zone 2 covers any point of the doorset not in zone 1.

5.6 Mechanical loading test

The objective of this test was to assess whether the sample is capable of withstanding a specified sequence of mechanical loads without creating an entry.

Parallel-to-plane loads were applied progressively and without shock over a period of 10 and 20 seconds. The parallel-to-plane loads were applied until the perpendicular-to-plane loading, which was held between 8 and 12 seconds, was completed and removed. The loads were removed without shock over a period which did not exceed 20 seconds.

The loads and loading sequence were in accordance with section B.4.5 of PAS 24:2022.

5.7 Soft body impact test

The objective of this test was to assess the ability of the sample to resist impacts using a soft body impactor as shown in figure B.11 of PAS 24:2022 and at various impact locations specified in section B.4.8.2 of PAS 24:2022.

5.8 Hard body impact test

The objective of this test was to assess the hardware, infill medium and its retention system to hard body impacts using the impactor as shown in figure B.12 of PAS 24:2022. Impacts were conducted at various locations specified in section B.4.9.2 of PAS 24:2022.

5.9 Entry definitions

The performance of the door was measured against the entry definitions as described in 3.10 PAS 24:2022.

For the manual cutting test in zone 2 an attempt was made to pass the 500 mm long cylindroid with an elliptical section of 225 mm minor and 380 mm major diameters through any aperture created.

For all other tests attempts were made to pass the 500 mm long cylindroid of diameter 50 mm through any aperture(s) created.

6. Test Results

6.1 Laboratory conditions

Prior to the start of the test, the laboratory conditions were measured as follows:

Date	29 th October 2024	21 st November 2024
Temperature (°C)	19.6	17.1
Humidity (% RH)	58.4	46.5

Note: *The test samples were stored in a non-destructive environment at a temperature of 15 – 30°C for a minimum of 12 hours, testing was also conducted at those conditions.*

6.2 Locking condition

Before testing, the door was closed and locked in the most onerous condition based on its intended use and any keys were removed.

Tested locking condition	Locked / key removed
--------------------------	----------------------

6.3 Security hardware & cylinder test

Attempts were made from the external face to operate, release and disengage the system hardware to gain entry through the sample in accordance with section A.3 of PAS 24:2022.

No entry was gained during the attack time.

6.4 Manual check test

Attempts were made from the external face to gain entry through the sample by applying load combinations not covered by the standard loading cases for the mechanical loading test. The overall attack time was limited to 15 minutes with no single attack technique being used for more than 3 minutes and no single location being attacked for more than 6 minutes.

No entry was gained during this test.

6.5 Infill – mechanical test

A series of loads were applied to the external face of the infill as defined in section B.4.4.3 of PAS 24:2022. A perpendicular-to-plane load of 2.0kN was applied and held for 8-12 seconds at each corner of the infill. Starting in the top left corner and working clockwise in turn and in a direction towards the inside.

No entry was gained during this test.

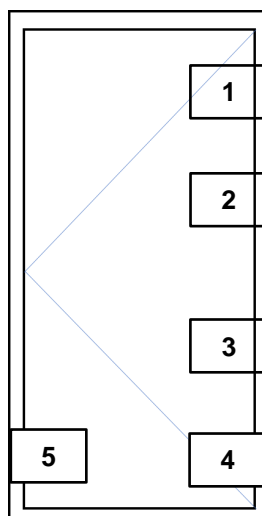
6.6 Manipulation test (a)

Attempts were made from the external face to operate, release and disengage the system hardware to gain entry through the sample in accordance with section C.4.3 of PAS 24:2022. The results are as follows:

Table 1 – Manipulation test (a)

Location	Tools used	Method	Time	Entry gained
1. Shoot bolt	x2 Paint scrapers	Attacks were made with the two paint scrapers to try and manipulate the hardware open.	03:00	No
2. Dead bolt	x2 Paint scrapers	Attacks were made with the two paint scrapers to try and manipulate the hardware open.	03:00	No
3. Shoot bolt	x2 Paint scrapers	Attacks were made with the two paint scrapers to try and manipulate the hardware open.	03:00	No
4. Shoot bolt	x2 Paint scrapers	Attacks were made with the two paint scrapers to try and manipulate the hardware open.	03:00	No
5. Hinge	x2 Paint scrapers	Attacks were made with the two paint scrapers to try and manipulate the hardware open.	03:00	No

Figure 2 – Attack locations



6.7 Manual cutting test

Attempts were made from the external face to cut an aperture in the infill or fabric of the door leaf to gain access using tools as described in section A.2.2.3, A.2.2.4, A.2.3.1 and A.2.3.2 of PAS 24:2022. Two tests were carried out; An attack in zone 1 and a second in zone 2 as defined in section B.4.4.4 of PAS 24:2022. The overall attack time for each test was 3 minutes.

No entry was gained during this test.

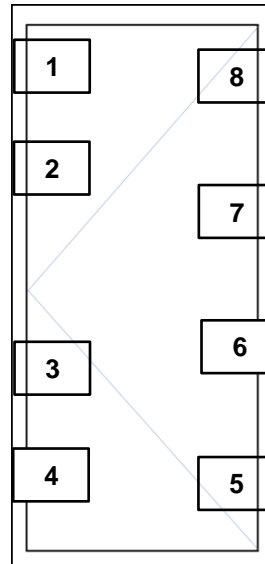
6.8 Mechanical loading test

A series of loads were applied to the door leaf as defined in section B.4.5 of PAS 24:2022. The loading combinations used were as defined in table B.1 to table B.6 of PAS 24:2022 for the applicable door type and were applied as shown in table 2. The results are as follows:

Table 2 – Mechanical loading details

Loading point	Parallel-to-plane load			Perpendicular-to-plane load			Result
	Targeted (kN)	Applied (kN)	Direction	Targeted (kN)	Applied (kN)	Direction	
1. Hinge / dog bolt	1.500	1.452	→	4.500	4.504	-	Pass
2. Hinge	1.500	1.504	→	4.500	4.488	-	Pass
3. Hinge	1.500	1.504	→	4.500	4.486	-	Pass
4. Hinge / dog bolt	1.500	1.525	→	4.500	4.522	-	Pass
5. Shoot bolt	1.500	1.504	→	4.500	4.488	-	Pass
6. Shoot bolt	1.500	1.502	←	4.500	4.502	-	Pass
7. Deadbolt	1.500	1.510	←	4.500	4.462	-	Pass
8. Shoot bolt	1.500	1.490	←	4.500	4.482	-	Pass

Figure 3 – Loading points



6.9 Infill manual test

Attempts were made from the external face to remove gaskets and beading to gain access to and remove the infill using tools A.2.1 & A.2.2 in accordance with section B.4.4.2 of PAS 24:2022.

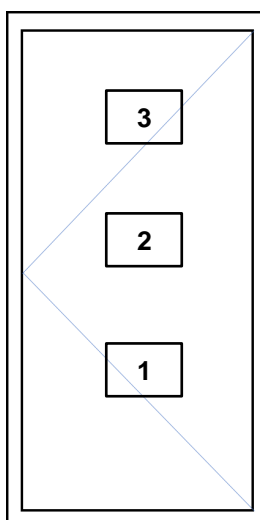
No entry was gained during this test.

6.10 Soft body impact test

The test sample was subject to soft body impacts on the external face as shown in figure 4. Each of the locations was subject to 3 impacts from a drop height of 800mm.

No damage was observed nor was entry gained during the test.

Figure 4 – Impact locations

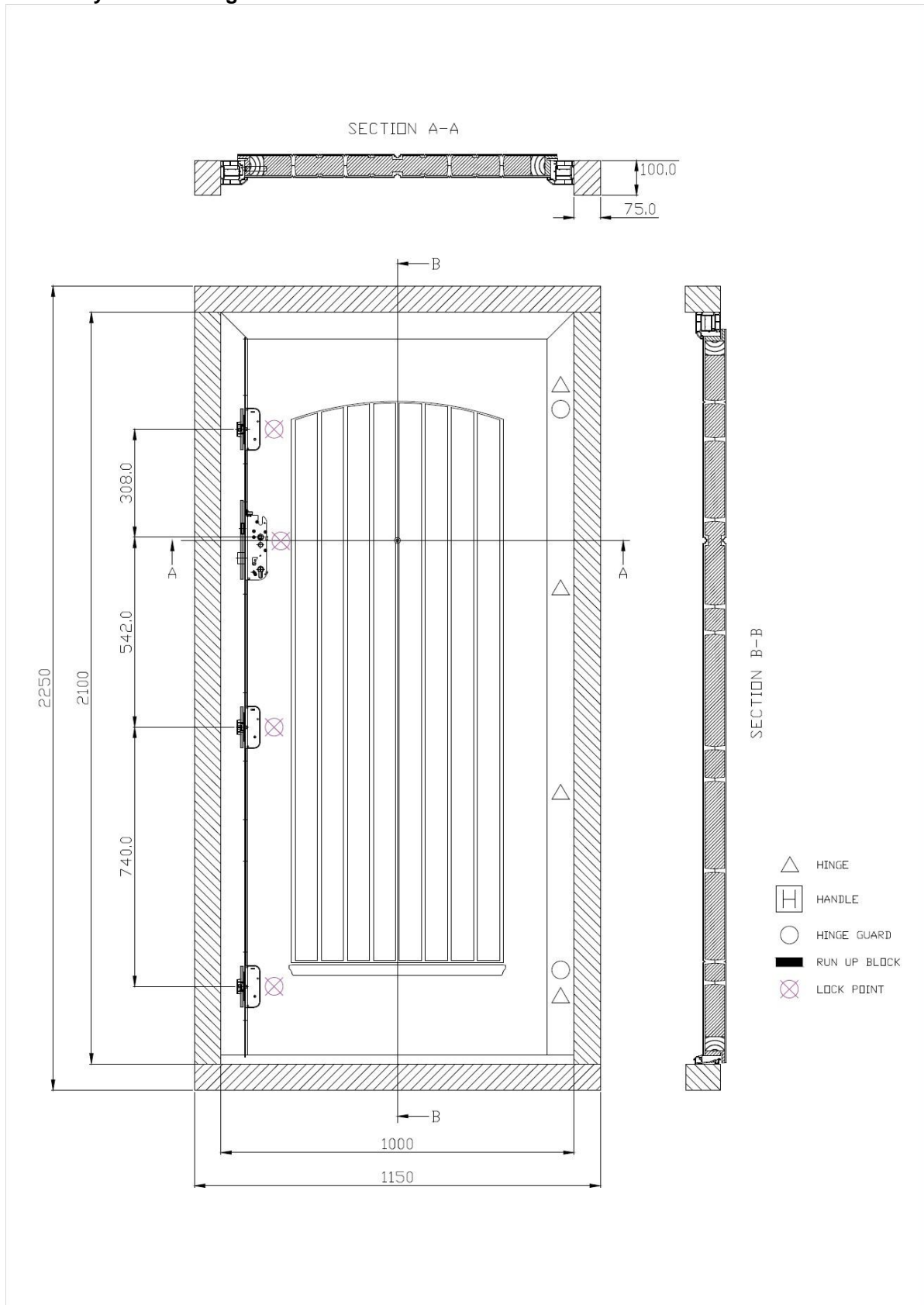


6.11 Hard body impact test

The test sample was subject to hard body impacts on the external face in accordance with section B.4.9.2 of PAS 24 2022. Each of the impact locations was subject to 3 impacts from a drop height of 165 mm and the result compared with the relevant entry definition.

No damage was observed nor was entry gained during the test.

7. System Drawings





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