



Technical Report – R4790002205-4 PAS 24:2016 - Enhanced security performance requirements for doorsets and windows in the UK

Alumil Group
SD77 Open Out Single Door



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1. Introduction

This report describes tests carried in order to determine compliance with PAS 24:2016 of the test specimen supplied as follows:

Test Details	
Customer:	Alumil Group Industrial Area Stavrochori KILKIS 61100 GR
Product Tested:	SD77 – Open Out Single Door
Date of Test:	17 th September 2021
Test Conducted at:	UL International (UK) Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	D Knight Senior Laboratory Technician S Ward Laboratory Technician

Report Authorisation	
Report Compiled by:	Sam Ward Laboratory Technician <i>S. Ward</i>
Authorised by:	D Potts Engineering Leader <i>[Signature]</i>

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2. Summary of Results

The following summarises the results of testing carried out, in accordance with PAS 24:2016.

The performance of the sample tested has been assessed against the criteria described in the standards below.

Test Description	Result
A.3 – Security hardware & cylinder test	Pass
B.4.6 - Manual check test	No entry gained
B.4.4.3 - Infill – mechanical test	Pass
B.4.3 - Manipulation test (a)	Pass
B.4.4.4 - Manual cutting test	Pass
B.4.5 - Mechanical loading test	Pass
B.4.4.2 - Infill – manual test	Pass
B.4.8 - Soft body impact test	Pass
B.4.9 - Hard body impact test	Pass
Overall Classification in accordance with PAS 24:2016	D

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.

2.1 Decision Rule

Classifications reported in Section 5 indicate that the product conforms with the relevant accuracy requirements of Section B.3 and C.3 of PAS 24:2016.

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.

More comprehensive details are reported in Section 6.



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 Alumil Group and have not been verified by UL International (UK) Limited.

See Section 7 for test sample drawings as provided by the customer.

Project number: (Please refer to all projects applicable)	
Product range name:	SD77
Project name to appear on front page of the test report:	SD77
Configuration:	
Opening direction:	Outwards
Product manufacturer:	Alumil SA
Is the sample typical of normal production?	Yes
Please define the closing condition of the sample: i.e. closed, fastened, latched, locked and secured etc.	Locked and secured
Weight of Sample including subframe (kg):	143 kg
Weight of Sash (kg)- applicable for sample tested with accordance with BS 6375-2:2009	76 kg

Outer Frame			
Outer frame width:	77 mm	Outer frame material:	Aluminium profile with thermal break
Outer frame height:	71 mm	Outer frame gasket	
Outer frame Part Numbers		Gasket type:	EPDM
Top:	S77586	Manufacturer:	Alumil SA
Bottom:	-	Product name:	
Lock side:	S77586	Product code:	220-11-001-01
Hinge side:	S77586	Threshold	
Outer frame section size		Manufacturer:	Alumil SA
Width:	77 mm	Product name:	
Depth:	71 mm	Product code:	S77774
Reinforcing:		Material:	Aluminium profile with thermal break
Manufacturer:		Outer frame joint method	
Product name:		Head:	Mitred and bonded using corner cleats
Product code:		Foot:	Screw- fastened to frame on sides
Material:		Surface Finish	Powder coated



Leaf			
Leaf/Casement width:	77 mm	Leaf/ Casement material:	Aluminium profile with thermal break
Leaf/ Casement height:	109 mm	Leaf/ Casement gasket	
Leaf/ Casement Part Numbers		Gasket type:	EPDM
Top:	S77584	Manufacturer:	Alumil SA
Bottom:	S77584	Product name:	Central gasket
Lock side:	S77584	Product code:	210-95-001-03
Hinge side:	S77584	Leaf midrail:	
Leaf/ Casement section size		Manufacturer:	
Width:	77 mm	Product name:	
Depth:	109 mm	Product code:	
Reinforcing:		Material:	
Manufacturer:		Leaf/Casement joint method	
Product name:		Head:	Mitred and bonded using corner cleats
Product code:		Foot:	Mitred and bonded using corner cleats
Material:		Surface Finish	Powder coated
Glazing			
Glass unit		Glazing gasket	
Manufacturer:	Amperiadis	Gasket type:	EPDM
Inner thickness:	7	Manufacturer:	Alumil SA
Spacer material:	Aluminium	Product name:	
Outer thickness:	7	Product code:	200-70-005-03
Unit sizes:	821 x 1958,5 mm	Glazing clip	
Bead		Manufacturer:	
Manufacturer:	Alumil SA	Product name:	
Product name:		Product code:	
Product code:	S60433	Glazing tape details	
Bead size:	21,8 x 34,5 mm	Manufacturer:	
Bead material:	aluminium	Product name:	
		Product code:	



Hardware				
	Manufacturer:	Product description:	Product code:	Quantity:
Hinges:	Alumil SA	Concealed entrance door hinge	360-24-700-00	2
Hinge fixing:				
Hinge protectors:				
Hinge protector fixings:				
Locking hardware:	Alumil SA	Door lock sec Aut4 40/92/08	450-51-113-01	1
Locking hardware fixing:				
Cylinder:	Alumil SA	Safety cylinder 90mm 25-10-55	460-53-060-00	1
Cylinder fixing:				
Handle:	Alumil SA	Door Handle with oval rosette	380-97-610-61	1
Handle fixings:				
Touch Bar				
Cylinder Support				
Cylinder Escutcheon	Alumil SA	Defender rosette against drilling	380-50-104-00	1
Keeps:				
Keep fixings:				
Drip bar:				
Drip bar fixings:				
Additional Hardware:				

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:	ALUMIL SA
Name:	ATHANASIADIS THANASIS
Position:	R&D CUSTOM ENGINEERING DEPARTMENT COORDINATOR
Date:	14/7/2021

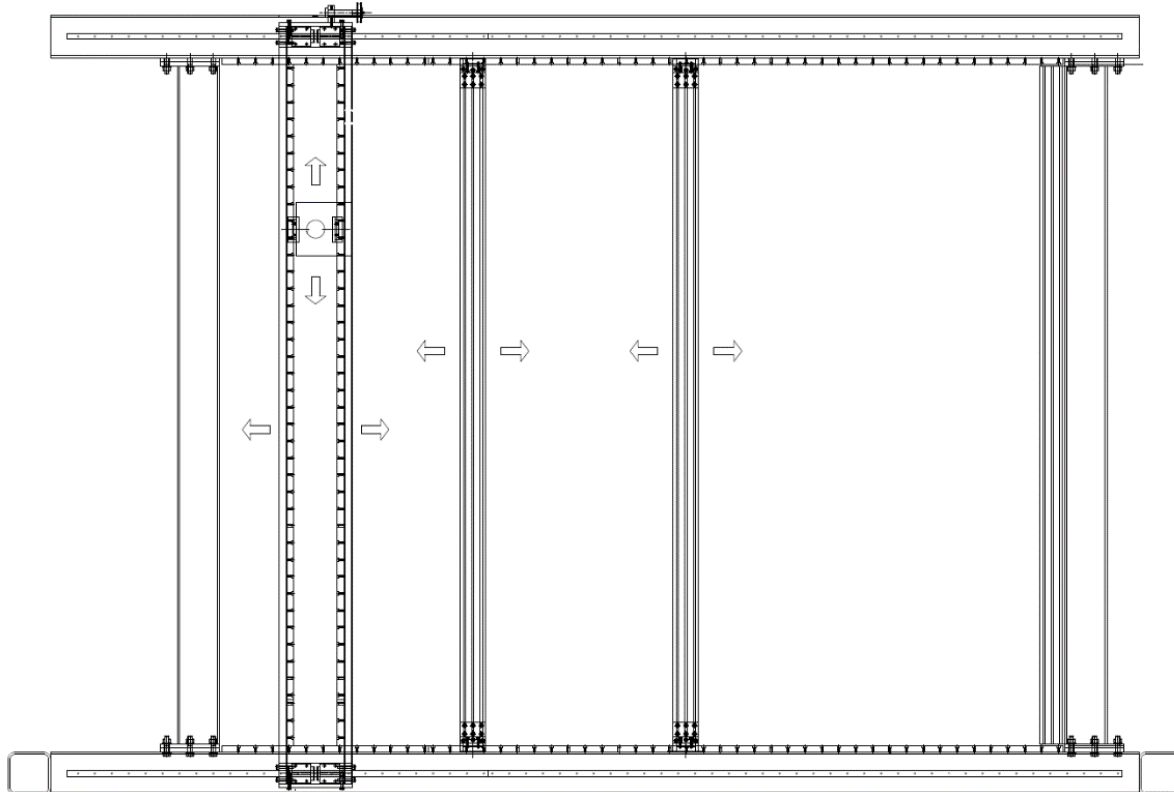


4. Test Arrangement

4.1 Test Rig

The test sample was supplied mounted in 100 x 50 mm timber sub-frame in accordance with manufacturer's installation requirements. It was fitted into the test rig, shown below which was constructed to meet the requirements of the test specification and was fitted plumb, square and without twist or bends.

Figure 1 – Test rig used for testing



4.2 Attack Tool Groups

4.2.1 Tool group A

- A.2.1.1 Assorted mild steel wire
- A.2.1.2 Two credit cards
- A.2.1.3 Two paint scrapers
- A.2.1.4 One craft knife
- A.2.1.5 Two flat blade screwdrivers, 150mm length

4.2.2 Tool group B

- A.2.2.1 One 25mm wood chisel
- A.2.2.2 One 6mm wood chisel
- A.2.2.3 One flat blade screwdriver, 200mm length
- A.2.2.4 One brick bolster
- A.2.2.5 One crosspoint screwdriver, 200mm length
- A.2.2.6 One cross head screwdriver, 200mm length

4.2.3 Tool Group C

- A.2.3.1 One pair of self-gripping pliers
- A.2.3.2 One torque gauge
- A.2.3.3 One shallow curve head attachment
- A.2.3.4 One hooked head attachment
- A.2.3.5 A selection of steel self-cutting traction screws with deep thread and gimlet point, self-tapping thread with drill point, single and twin start.

4.3 Mechanical Load Application

A series of parallel to plane loads and perpendicular to plane loads were applied to the products using hydraulic cylinders.



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 24:2016. The test was broken in to 2 parts 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 in to 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

5.2 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 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 24:2016 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.

5.3 Infill – Mechanical test

The objective of this test was to assess the ability of the infill to withstand a specified sequence of loading without gaining entry through the sample. The loads and loading sequence were in accordance with Section B.4.4.3 of PAS 24:2016.

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 24:2016 and, where applicable, tools specified in A.2.2.3, A.2.2.5 and A.2.2.6 in Tools group B from Section A.2.2 of PAS 24:2016. The overall attack time was limited to 15 minutes 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.2.1.3, A.2.1.4, A.2.2.1 and A.2.2.2. Two tests were conducted: one 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 the ability of the sample to withstand a specified sequence of loading without gaining entry through the sample. The loads and loading sequence were in accordance with Section B.4.5 of PAS 24:2016.

5.7 Infill – Manual test

The objective of this test was to attempt to remove gaskets, beads, security devices (if applicable) and the infill, using Tools group A and Tools group B described in section A.2.1 & A.2.2 of PAS 24:2016 for a maximum period of 3 minutes.

5.8 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 24:2016 and at various impact locations specified in Section B.4.8.2 of PAS 24:2016.

5.9 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 24:2016. Impacts were conducted at various locations specified in Section B.4.9.2 of PAS 24:2016.



6. Test Results

6.1 Laboratory Conditions

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

Date	17 th September 2021
Temperature (°C)	19.6
Humidity (% RH)	61.3

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. Prior to testing, the door was closed and locked and any keys were removed.

6.2 Security Hardware & Cylinder Test

Attempts were made from the external face to operate, release and disengage the system hardware in order to gain entry through the sample in accordance with Section A.3 of PAS 24:2016.

No entry was gained during the attack time, and as such the product has passed this part of the test.

6.3 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.

6.4 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 24:2016. A perpendicular-to-plane load of 2.0kN was applied and held for 8-12 seconds at each corner of the infill.

No entry was gained during this test.



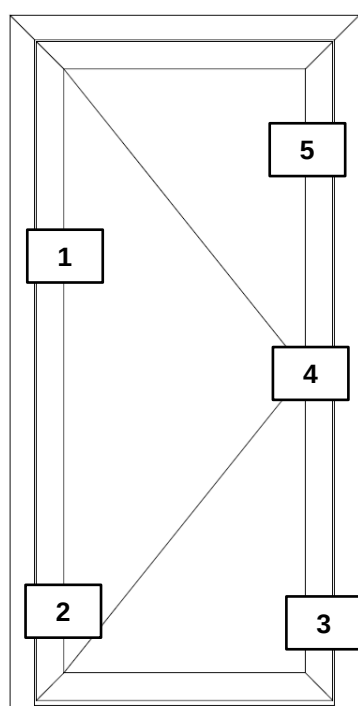
6.5 Manipulation test (a)

Attempts were made from the external face to operate, release and disengage the system hardware in order to gain entry through the sample in accordance with Section C.4.3 of PAS 24:2016. The results are as follows:

Table 1 – Manipulation test (a)

Location	Tools Used	Method	Time	Entry gained
1 - Hinge	1x paint Scraper	Used the paint scraper to lever between the frame and the sash in an attempt to manipulate the hardware.	3:00	No
2 - Hinge	1x paint Scraper	Used the paint scraper to lever between the frame and the sash in an attempt to manipulate the hardware.	3:00	No
3 – Hook/Shoot	1x paint Scraper	Used the paint scraper to lever between the frame and the sash in an attempt to manipulate the hardware.	3:00	No
4 - Deadbolt	1x paint Scraper	Used the paint scraper to lever between the frame and the sash in an attempt to manipulate the hardware	3:00	No
5 – Hook/Shoot	1x paint Scraper	Used the paint scraper to lever between the frame and the sash in an attempt to manipulate the hardware.	3:00	No

Figure 2 – Attack locations



6.6 Manual cutting test

Attempts were made from the external face to cut an aperture in the infill or fabric of the door leaf in order to gain access using tools as described in section A.2.1.3, A.2.1.4, A.2.2.1 and A.2.2.2 of PAS 24:2016. Two 3 minutes tests were carried out; one in Zone 1 and one in Zone 2 as defined in Section B.4.4.4 of PAS 24:2016.

No entry was gained during this test.

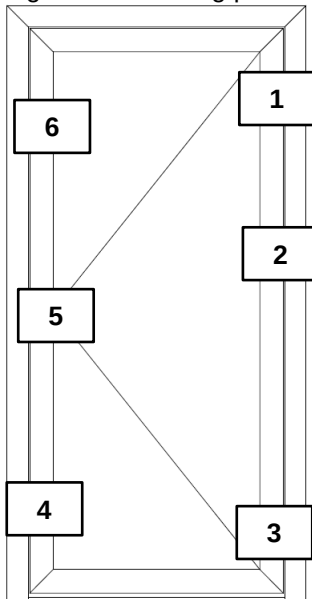
6.7 Mechanical loading test

A series of loads were applied to the internal face of the sample as defined in Section B.4.5 of PAS 24:2016. The loading combinations used were as defined in Table B.1 to Table B.6 of PAS 24:2016 for the applicable door type and as shown in Table 2. The results are as follows:

Table 2 – Mechanical Loading

Loading Point	Parallel-to-plane Load		Perpendicular-to-plane Load		Result
	Load (kN)	Direction	Load (kN)	Direction	
1 – Hinge	1.5	←	4.5	-	Pass
2 – Hinge	1.5	←	4.5	-	Pass
3 – Hinge	1.5	←	4.5	-	Pass
4 – Hook/Shoot	1.5	↓	4.5	-	Pass
4 – Hook/Shoot	1.5	→	4.5	-	Pass
5 – Dead bolt	1.5	→	4.5	-	Pass
6 - Hook/Shoot	1.5	↓	4.5	-	Pass
6 – Hook/Shoot	1.5	→	4.5	-	Pass

Figure 3 – Loading points



6.8 Infill manual test

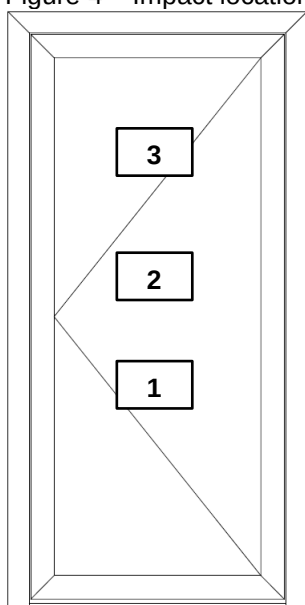
Attempts were made from the external face to remove gaskets and beading in order to gain access to and remove the infill using tools A.2.1 & A.2.2 in accordance with Section B.4.4.2 of PAS 24:2016.

No entry was gained during this test.

6.9 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, following which no damage was observed.

Figure 4 – Impact locations

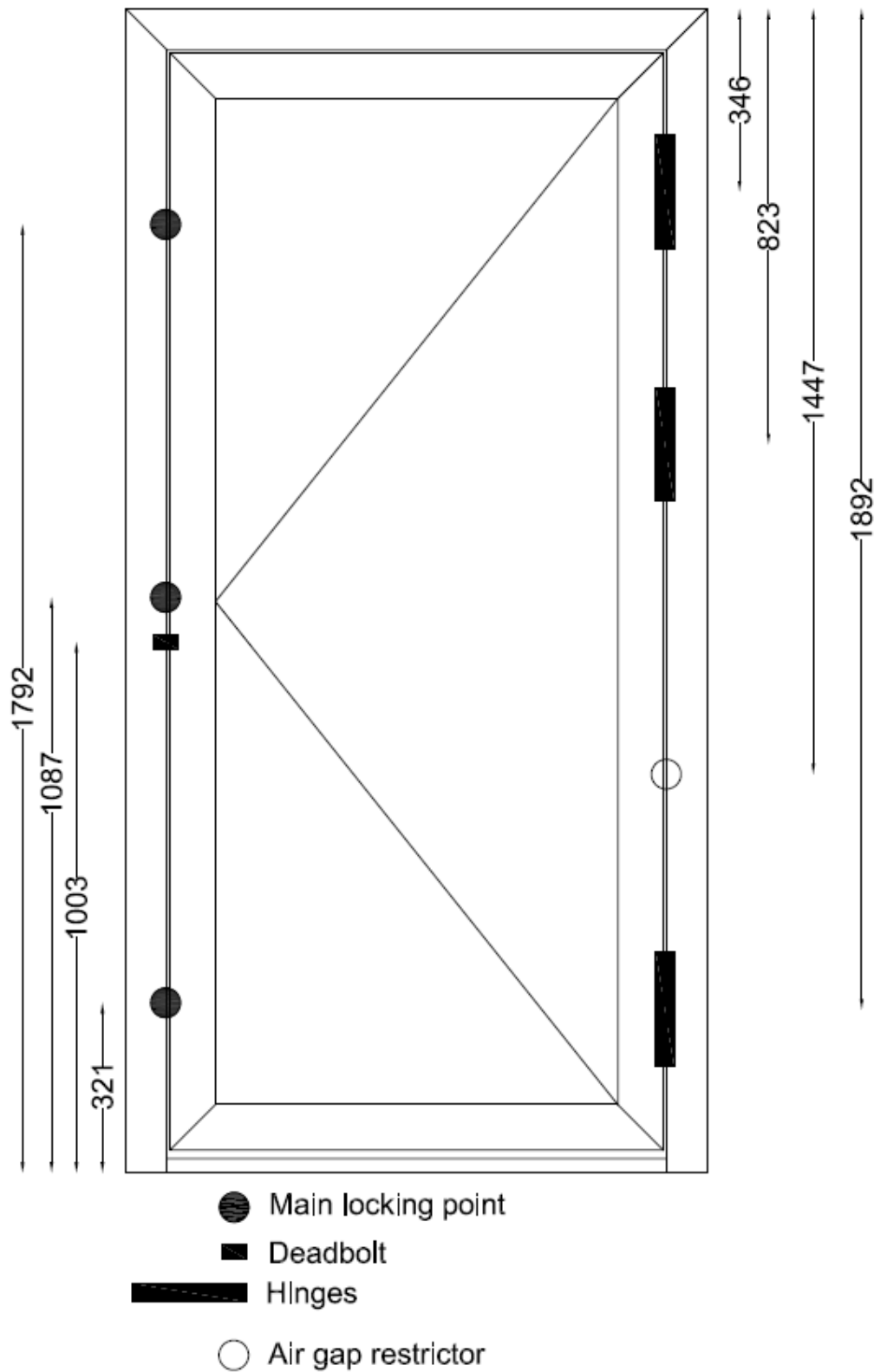


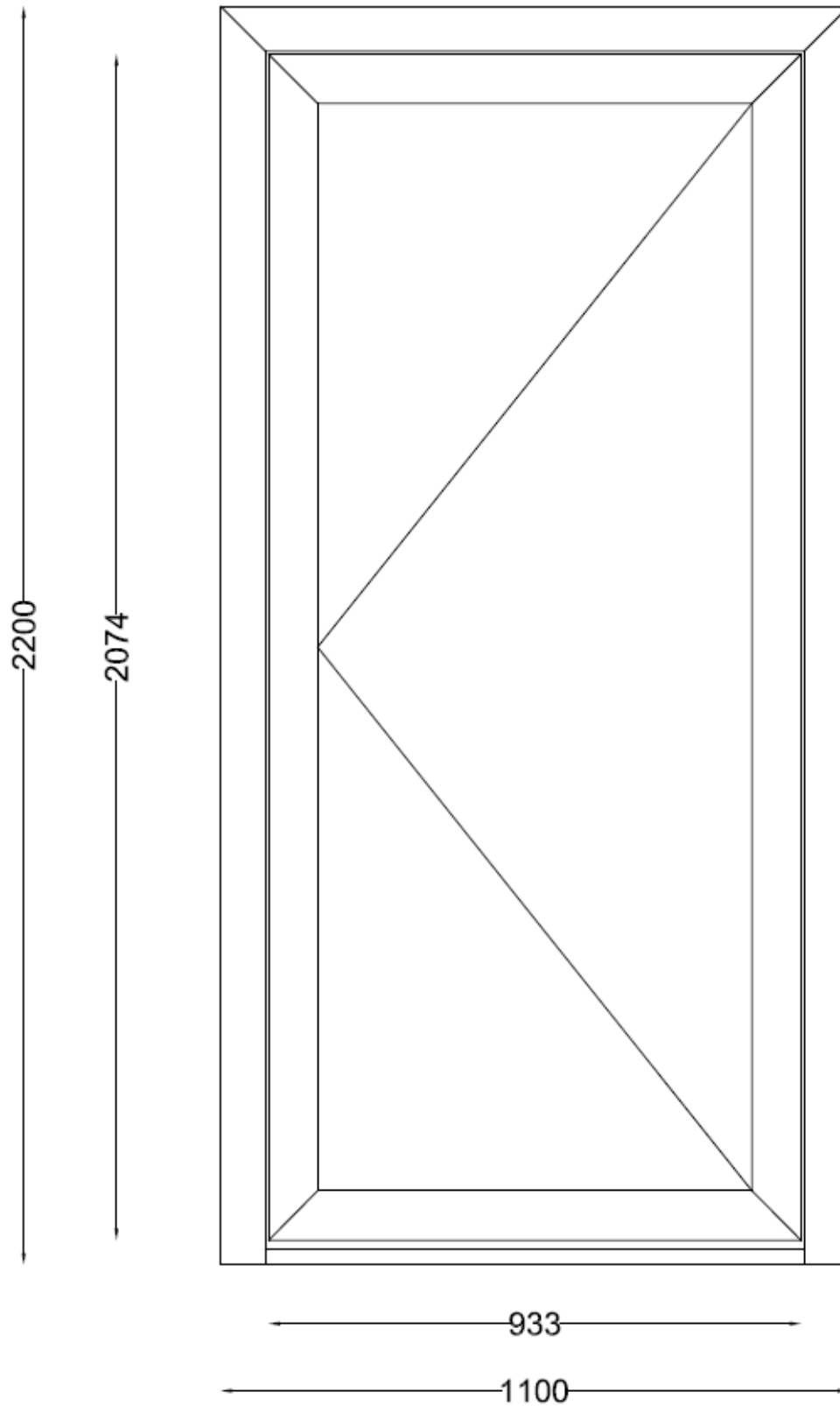
6.10 Hard body impact test

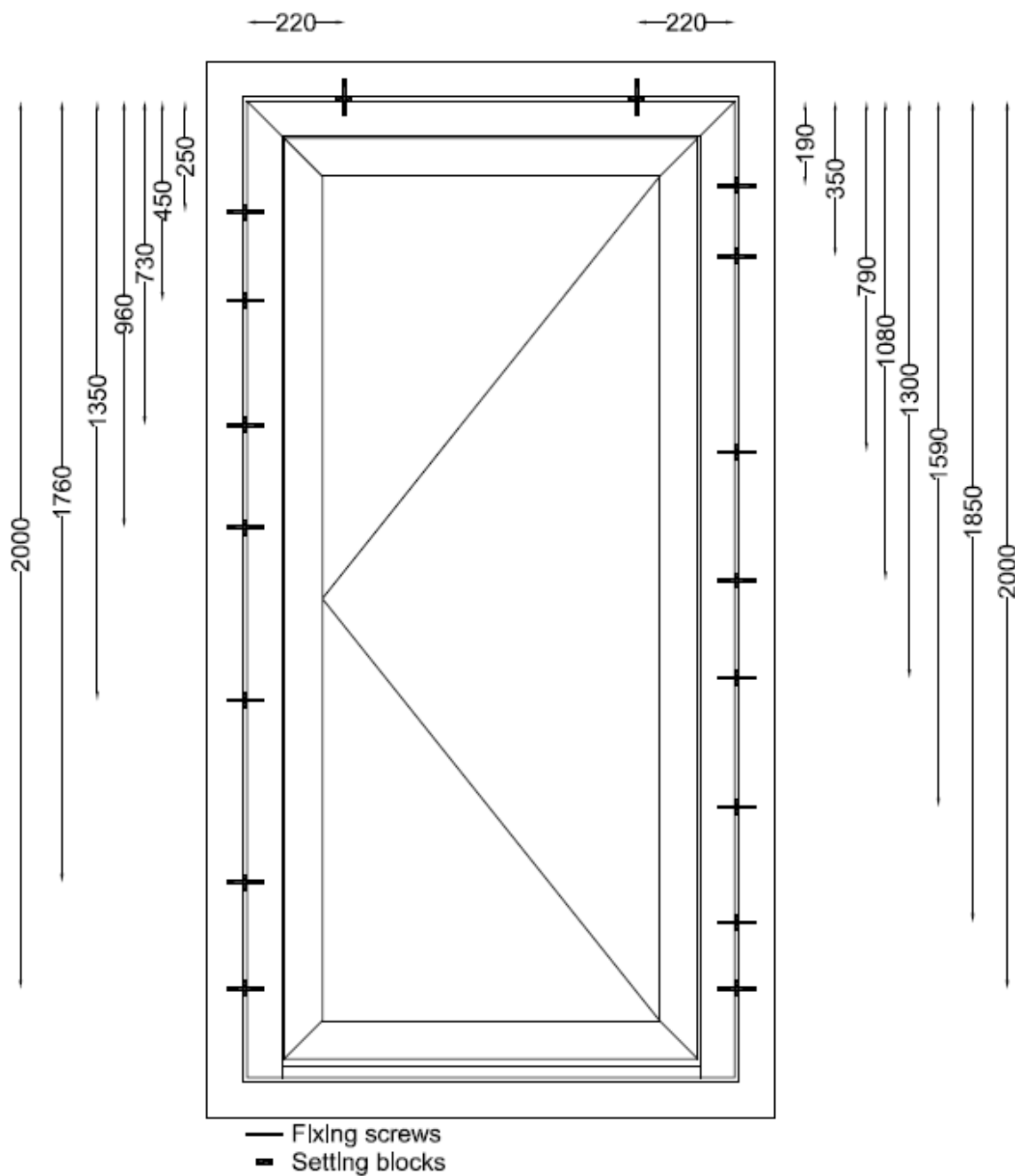
The test sample was subject to hard body impacts on the external face in accordance with section B.4.9.2 of PAS 24 2016. Each of the impact locations was subject to 3 impacts from a drop height of 165 mm and the result compared with the relevant entry definition.

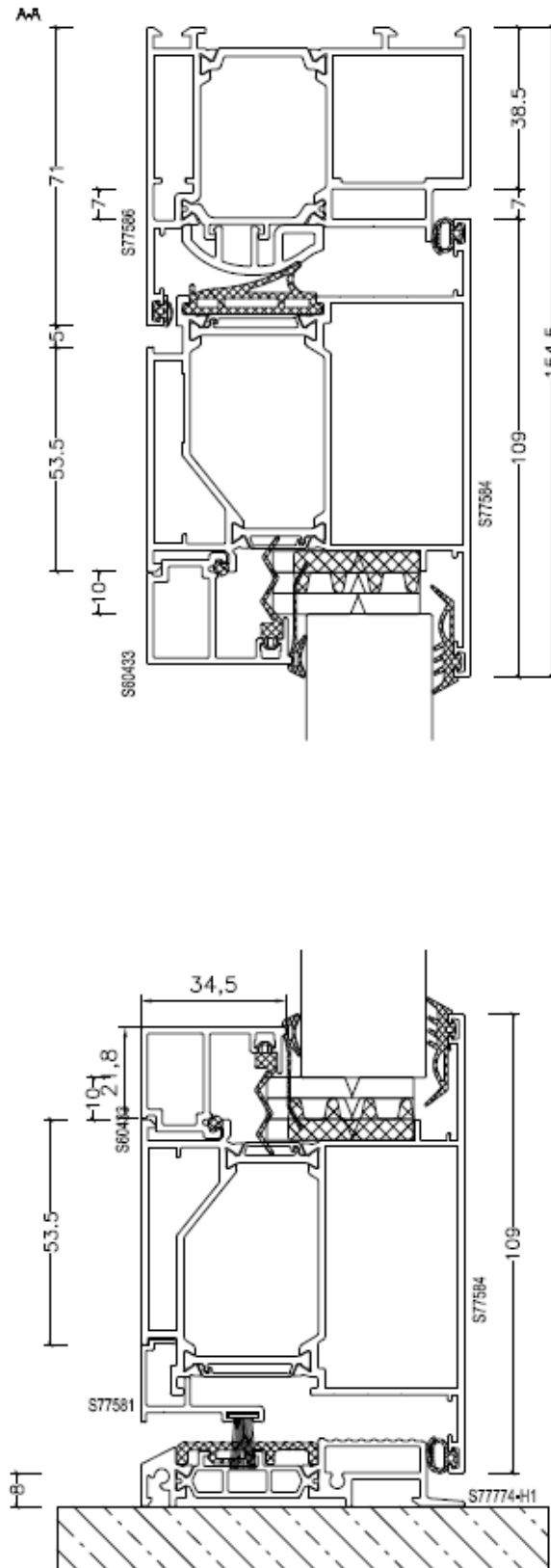
No entry was gained during this test.

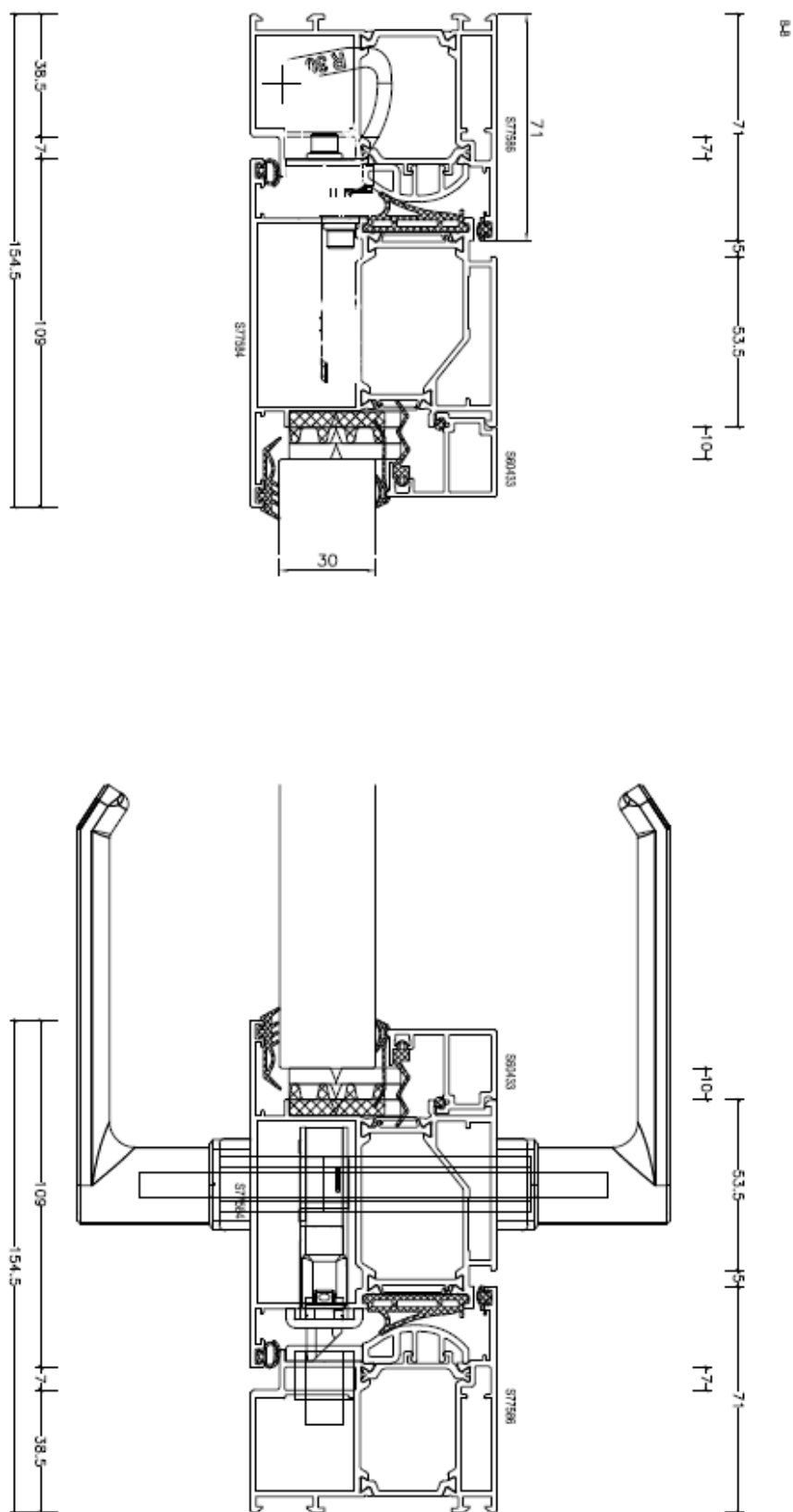
7. System Drawings











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Facade Testing



Onsite Testing



Product Certification



Window & Door Testing

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 +44 (0) 1952 586580

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