

23 October 2019

**WINTECH**  
TESTING & CERTIFICATION  
by UL



# Technical Report – R20605 PAS 24:2016 - Enhanced security performance requirements for doorsets and windows in the UK

**Smart Systems Ltd  
Double Doors- Open In**





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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:	Smart Systems Ltd Arnolds Way Yatton North Somerset BS49 4QN
Product Tested:	Double Door-Open In
Date of Test:	16 <sup>th</sup> October 2019
Test Conducted at:	Wintech Engineering Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	D Knight – Senior Laboratory Technician D Adams – Engineering Technician

Report Authorisation	
Report Compiled by:	D Price Senior Engineering Associate 
Authorised by:	M Witkowska Deputy Quality Manager 

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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 below standards. The results as reported will be used to determine the conformance or non-conformance with the specification without making any consideration of the uncertainty.

<i>Test Description</i>	<i>Result</i>
A.3 – Security hardware & cylinder test	Pass
B.4.6 - Manual check test	Pass
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

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

The details shown in Section 3 and drawings shown in Section 7 have been supplied by and confirmed as typical of normal production by Smart Systems Limited and have not been verified by Wintech Engineering Limited.

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

<b>Project number:</b>	20605
<b>Product range name:</b>	Alitherm Heritage
<b>Configuration:</b>	Double door
<b>Opening direction:</b>	Open In
<b>Product manufacturer:</b>	Smart systems
<b>Is the sample typical of normal production?</b>	Yes
<b>Please define the closing condition of the sample</b> i.e. closed, fastened, latched, locked and secured etc.	Locked

#### Outer Frame

<b>Outer frame width:</b>	1800mm	<b>Outer frame material:</b>	Aluminium
<b>Outer frame height:</b>	2215mm	<b>Outer frame gasket</b>	
<b>Outer frame Part Numbers</b>	W20015	Gasket type:	EDPM
Top:	W20015	Manufacturer:	Smarts
Bottom:	W20270	Product name:	Bubble Gasket
Lock side:		Product code:	ACVL031N
Hinge side:	W20015	<b>Threshold</b>	
<b>Outer frame section size</b>		Manufacturer:	SMARTS
Width:	33mm	Product name:	Alitherm Heritage
Depth:	47mm	Product code:	W20270
<b>Reinforcing:</b>	NA	Material:	Aluminium
Manufacturer:		<b>Outer frame joint method</b>	
Product name:		Head:	Glue and Crimp
Product code:		Foot:	Screw Joint with bracket
Material:		<b>Surface Finish</b>	Powder coat

**Leaf**

<b>Leaf/Casement width:</b>	883mm	<b>Leaf/ Casement material:</b>	Aluminium
<b>Leaf/ Casement height:</b>	2182mm	<b>Leaf/ Casement gasket</b>	
<b>Leaf/ Casement Part Numbers</b>		Gasket type:	EDPM
Top:	W20129	Manufacturer:	Smarts
Bottom:	W20129	Product name:	Flipper Gasket
Lock side:	W20129	Product code:	ACET160
Hinge side:	W20129	<b>Leaf Transom and lockbox</b>	
<b>Leaf/ Casement section size</b>		Manufacturer:	Smarts
Width:	54mm	Product name:	Alitherm Heritage
Depth:	59mm	Product code:	W20135, W20038
<b>Reinforcing:</b>	NA	Material:	Aluminium
Manufacturer:		<b>Leaf/Casement joint method</b>	
Product name:		Head:	Glue and Crimp
Product code:		Foot:	Glue and Crimp
Material:		<b>Surface Finish</b>	Powder Coating

**Glazing**

<b>Glass unit</b>		<b>Glazing gasket</b>	
Manufacturer:	Ashton Glass	Gasket type:	Glazing gasket
Inner thickness:	6mm	Manufacturer:	Smarts
Spacer material:	Aluminium	Product name:	Alitherm Heritage
Outer thickness:	6mm	Product code:	ACET 843 E Gasket ACET 840 Wedge Gasket
Unit sizes:	798mm x 789mm 731mm x 281mm 798mm x 986mm	<b>Glazing clip</b>	NA
<b>Bead</b>		Manufacturer:	
Manufacturer:	Smarts	Product name:	
Product name:	Alitherm Heritage	Product code:	
Product code:	W20171	<b>Glazing tape details</b>	NA
Bead size:	15.5mm x 8.5mm	Manufacturer:	
Bead material:	Aluminium	Product name:	
		Product code:	

**Hardware**

	Manufacturer:	Product description:	Product code:	Quantity:
Hinges:	Banks	Open in Hinge	ACW20162	8
Hinge fixing:	Banks	M4 X 20MM M4 Riv Nut	Supplied with hinge	
Hinge protectors:	Fuhr		ACW20375	8
Hinge protector fixings:		M4 x 20MM M4 Riv Nut		
Locking hardware:	Fuhr	Primary Door Lock	ACW20465	1
		Secondary Door Lock	ACW20466	1
		Top Shoot bolt	ACDV738	2
		Bottom Shootbolt	ACDV737	2
Locking hardware fixing:	Smarts	M4 x 25MM M4 Insert		16
Cylinder:	ERA	45/40 Three Star Cylinder	ACCY3045S3	2
Cylinder fixing:		M5 X 100MM		2
Handle:	Trojan		ACW20061	2
Handle fixings:		M5X70mm	Supplied with handles	6
Touch Bar	NA			
Cylinder Support	NA			
Cylinder Escutcheon	NA			
Keeps:	Fuhr	Supplied with locks		
Keep fixings:	Smarts	Lock keeps	No .8 x 32mm	15
		ShootBolt Keeps	No.7 x 25mm	12
Drip bar:	Smarts	Alitherm Heritage		2
Drip bar fixings:	Smarts	Revett	AcvI061	6
Additional Hardware:				

**Confirmation**

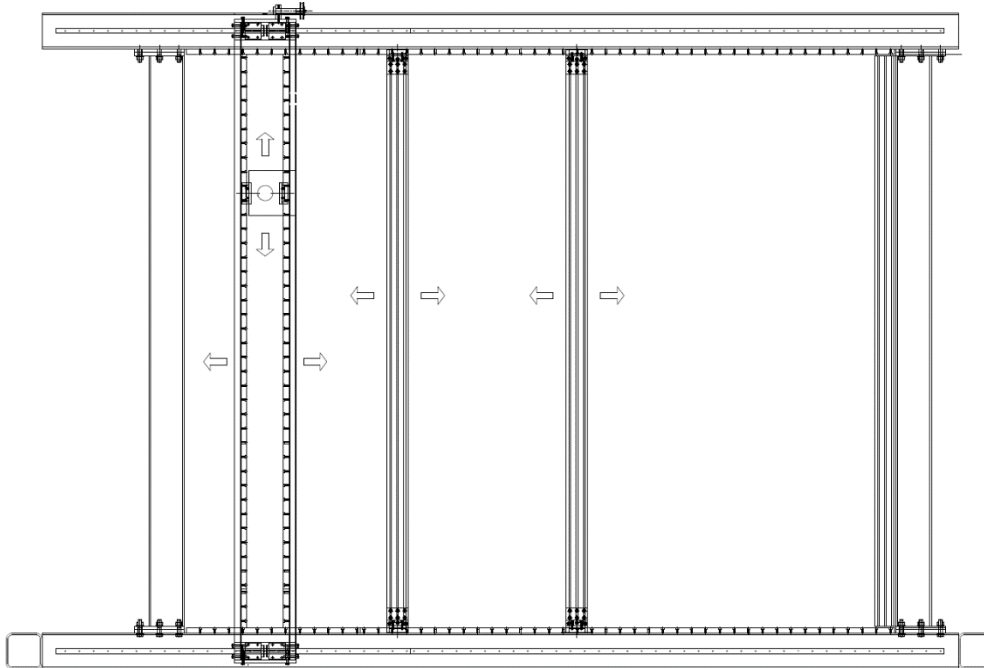
Please confirm that the samples provided for testing are representative of standard production?	Yes.
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#### 4. Test Arrangement

##### 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

###### Tools 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

###### Tools 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

##### 4.3 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 24:2012. The test was broken in to 2 parts as follows:

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

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 – determine additional mechanical loading**

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 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:

Temperature (°C)	18.8
Humidity (% RH)	59.2

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 window was closed and locked and any keys were removed.

### 6.2 A.3 – 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.

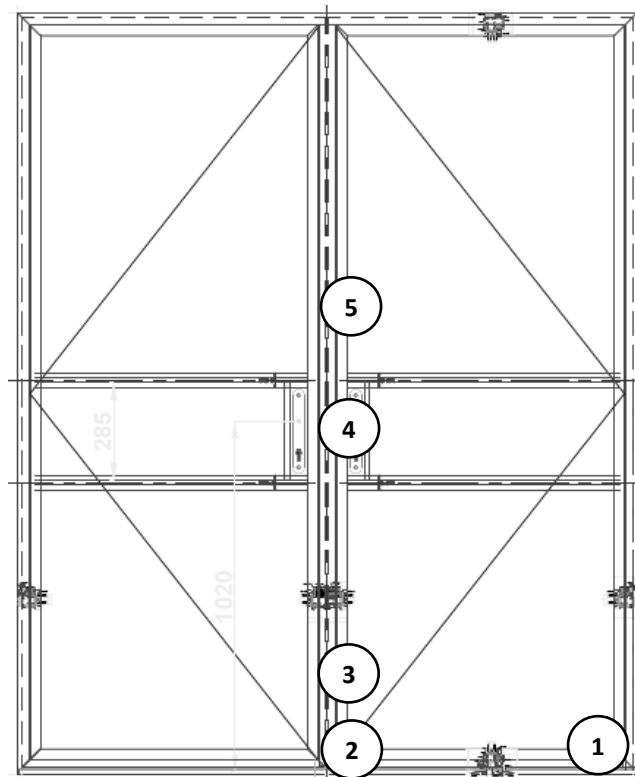
### 6.5 Manipulation test (a)

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
Point 1 – Hinge/ dog bolt	2 paint scrapers	Used 2 paint scrapers in an attempt to manipulate the hinge/dogbolt. No entry gained.	03:00
Point 2 – Shoot bolt	2 paint scrapers	Used 2 paint scrapers in an attempt to manipulate the shoot bolt. No entry gained.	03:00
Point 3 - Cam	2 paint scrapers	Used 2 paint scrapers in an attempt to manipulate the cam. No entry gained.	03:00
Point 4 – Dead bolt	2 paint scrapers	Used 2 paint scrapers in attempt to manipulate the dead bolt. No entry gained.	03:00
Point 5 - Cam	2 paint scrapers	Used 2 paint scrapers in attempt to manipulate the cam. No entry gained.	03:00

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.

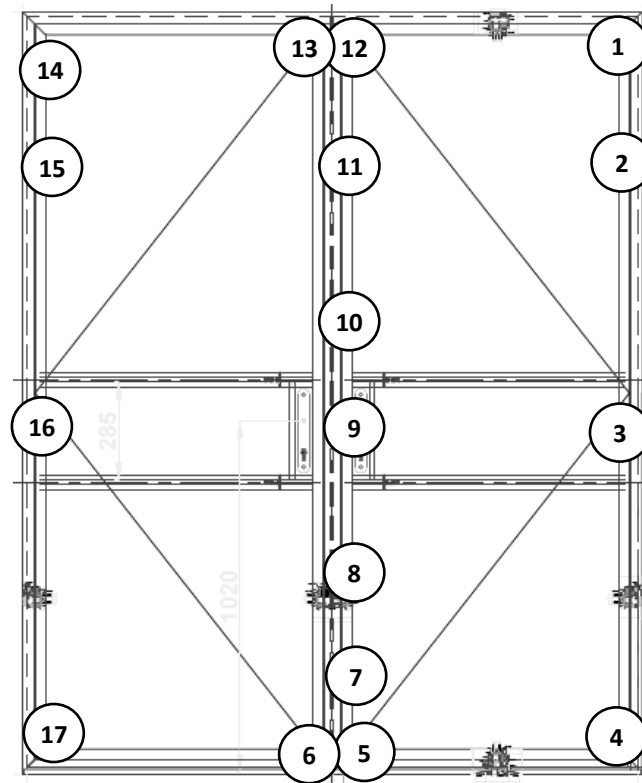
## 6.7 Mechanical loading test

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	Direction	Load	Direction	
1 – Hinge/dog bolt	1.5	←	4.5	-	Pass
2 – Hinge/dog bolt	1.5	←	4.5	-	Pass
3 – Hinge/dog bolt	1.5	←	4.5	-	Pass
4 – Hinge/dog bolt	1.5	←	4.5	-	Pass
5 – Shoot bolt	1.5	↑	4.5	-	Pass
6 – Shoot bolt	1.5	↑	4.5	-	Pass
7 – Cam	1.5	↑	4.5	-	Pass
7 – Cam	1.5	↔	4.5	-	Pass
8 – Cam	1.5	↑	4.5	-	Pass
8 – Cam	1.5	↔	4.5	-	Pass
9 – Dead bolt	1.5	↔	4.5	-	Pass
10 – Cam	1.5	↑	4.5	-	Pass
10 – Cam	1.5	↔	4.5	-	Pass
11 – Cam	1.5	↑	4.5	-	Pass
11 – Cam	1.5	↔	4.5	-	Pass
12 – Shoot bolt	1.5	↓	4.5	-	Pass
13 – Shoot bolt	1.5	↓	4.5	-	Pass
14 - Hinge/dog bolt	1.5	→	4.5	-	Pass
15 - Hinge/dog bolt	1.5	→	4.5	-	Pass
16 - Hinge/dog bolt	1.5	→	4.5	-	Pass
17 - Hinge/dog bolt	1.5	→	4.5	-	Pass

Figure 3 – Loading points



### 6.8 Infill manual test

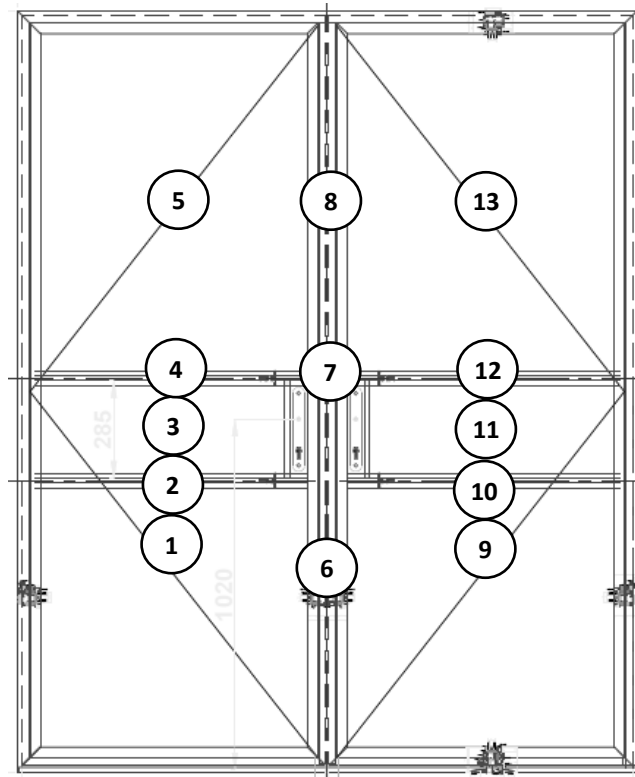
Attempts were made from the external face to remove gaskets and beading in order to gain access to and remove the infill using tools A.2.1 & A.2.2 in accordance with Section B.4.4.2 of PAS 24:2016.

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.

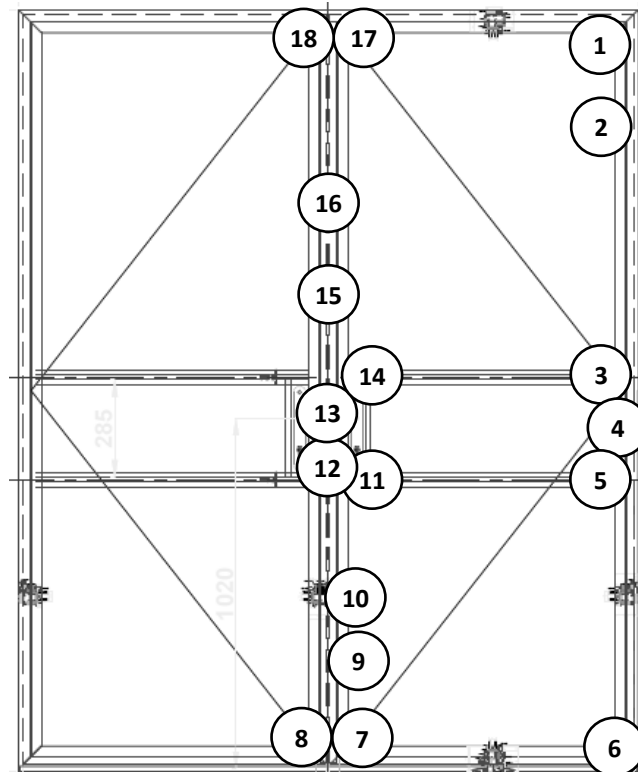
Figure 4 – Impact locations



### 6.10 Hard body impact test

The test sample was subject to hard body impacts on the external face as shown in Figure 5. Each of the impact locations was subject to 3 impacts from a drop height of 165 mm following which no entry was gained through the sample.

Figure 5 – Impact locations





7. System Drawings

**Notes:**

- 3No. required for testing.
- New items on this item are:
  - W20270 Low Threshold
  - ACW20270 Low Threshold Bracket
  - W20274 Low Threshold Adaptor
  - ACW20292 End Caps for W20274
  - W20149 Meeting Stile
  - ACW20149 Meeting Stile End Cap for Low Threshold
  - ACW20148 Top End Cap for W20149
  - ACW20465 65mm Backset Lock (primary)
  - ACW20466 65mm Backset Lock (secondary)
  - ACW20384 Keep Packer (Part of ACW20385 Kit)
  - ACW20381 Keeps (Part of ACW20385 Kit)
  - ACW20375 Hinge Protector
  - ACCY3045S3

SECTION AREA	DRAWN	DATE	SCALE	ULTIMATE FINISH	PART NUMBER
OUTSIDE PERIMETER	2019	2019	AS SHOWN	MILL FINISH ONLY	Alitherm Heritage Open In Double
EST. WEIGHT PER METRE				POWDER COATED	Door with Eurogroove & Low T/hold
Material : 6063 T6	Copyright Smart Systems Ltd.			ANODISED	
Generally to BS EN 755 - 9, Tests to BS EN 12020					

**smart**  
architectural aluminium

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

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