WINTECH
TESTING & CERTIFICATION

Technical Report

Report No	R16711
Product Tested:	VEKA Halo – IMAGINE Patio Doors with Low Threshold
Test Conducted for:	MI Products 4020 Siskin Parkway East Middlemarch Business Park Coventry CV3 4SU
Standard Specified:	BS 6375 Pt 1:2009 BS EN 1026: 2000 BS EN 12207:2000 BS EN 1027:2000 BS EN 12208:2000 BS EN 12210:2000 BS EN 12211:2000
Project No:	16711
Date of Test:	24th & 25th November 2016
Test Conducted at:	Wintech Engineering Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	D Woodcock — Laboratory Technician D Adams — Senior Test Engineer
Report Compiled by:	S Tawn Laboratory Apprentice
Authorised by:	M Wass Technical Director

Contents

		Page No.
1.	Introduction	3
2.	Summary of Test Results	3
3.	Description of Test Sample	4
4.	Test Arrangement	5
5.	Test Procedures	7
6.	Test Results	9
7.	System Drawings	14

1. Introduction

This report describes tests conducted at the test laboratory of Wintech Engineering Ltd to a door sample on behalf of MI Products.

The test sequence was conducted on the 24th & 25th November 2016 in order to determine the weather tightness of the sample. The test methods were in accordance with the following standards as per the request of MI Products.

Windows & Doors, Air Permeability test method	BS EN 1026: 2000
Windows & Doors, Air Permeability classification	BS EN 12207: 2000
Windows & Doors, Watertightness test method	BS EN 1027: 2000
Windows & Doors, Watertightness classification	BS EN 12208: 2000
Windows & Doors, Wind Resistance test method	BS EN 12211: 2000
Windows & Doors, Wind Resistance classification	BS EN 12210: 2000
Performance of Windows & Doors, Classification and Guidance for Weather Tightness	BS 6375 Part 1: 2009

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	***Achieved Max. Test Pressure***	***Classification***
Air Permeability	BS EN 1026: 2000 BS EN 12207: 2000	300 Pa	2
Water Tightness	BS EN 1027: 2000 BS EN 12208: 2000	100 Pa	3A
Wind Resistance	BS EN 12211:2000 BS EN 12210: 2000	800 Pa	A2

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

Name Of System –	VEKA Halo IMAGINE Patio Doors with Low Threshold
Manufactured By –	VEKA Technical Department
Sample Size –	3000 x 2400
Door Material Type –	PVC Frame and Sashes Aluminium Low Threshold 2002324 Steel Reinforcing
Joining Method –	Mitre and welded top frame sashes Mechanical joint btm frame to threshold
Locking Points –	Mila Fearkess 6 point lock to slider 108305 Mila 3 point mush cam espag to interlock 109000 MI Secure 4 Life interlock protectors and corner bolt 2002333/109020
Glass Make Up & Thickness –	28mm clear 4/20/4 toughened glass
Gasket –	Co-extruded seals to all glazing VSW401G aluminium thresh brush seal
Hardware Used –	Mila – locks handle and cylinder (30-30) 108305/108908/4040ETMNF6 MI Products – top corner bolt, aluminium interlock and protectors 109020/2002333 Mila – handle to interlock mechanism 109048
Drainage –	2 slots bottom of each sash 5 x 25 1 centre of threshold 30 x 30 1 each end of connecting blocks
Sealants Used –	Low modulus sealant around ends of connecting blocks at threshold frame joints
Sub Frame Fixings –	5 x 80mm screw fixings for frame 4.3 x 25 screw fixings for threshold
Hardware Fixings –	4.3 x40 gimlet point screws for lock 3.9 x 45 drill point for strikers 3.9 x 32 drill point for interlock protectors

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

See Section 7 for test sample drawings as supplied by MI Products.

4. Test Arrangement

4.1 Test Chamber

A window specimen, supplied for testing in accordance with the relevant British and European Standards, was mounted into a rigid test chamber. The pressure within the chamber was controlled by means of a centrifugal fan and a system of ducting and valves. The static pressure difference between the outside and inside of the chamber being measured by means of a liquid manometer.

4.2 Instrumentation

4.2.1 Static Pressure

A liquid manometer capable of measuring rapid changes in pressure to an accuracy within 2%, was used to measure the pressure differential across the sample.

4.2.2 Air Flow

An air flow meter, mounted in the air system ducting was used to measure the airflow required to obtain pressures within the test chamber. The system has the capability of measuring airflow through the sample to an accuracy of ± 5%.

4.2.3 Water Flow

An in line flow meter, mounted in the spray frame water supply system, was used to measure water flow to the test sample to an accuracy of ± 5%.

4.2.4 Deflection

DTI's with an accuracy of 0.1mm were used to measure deflection of principle framing members. These measurement devices were mounted at mid span and as near to the supports of the members and located in such a way that any measurement was not influenced by the application of any loading to the sample. The gauges were mounted as shown in Figure 3.

4.2.5 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.

4.3 Pressure Generation

4.3.1 Static Air Pressure

The air supply system comprised of a centrifugal fan assembly and associated ducting and control valves and was used to create both positive and negative static pressure differentials. The fan provided a constant airflow at the required pressure and period required for the tests.

Note: References are made to both positive and negative pressures in this document, it should be noted that in these instances, positive pressure is when pressure on the weather face of the sample is greater than that on the inside face and vice versa.

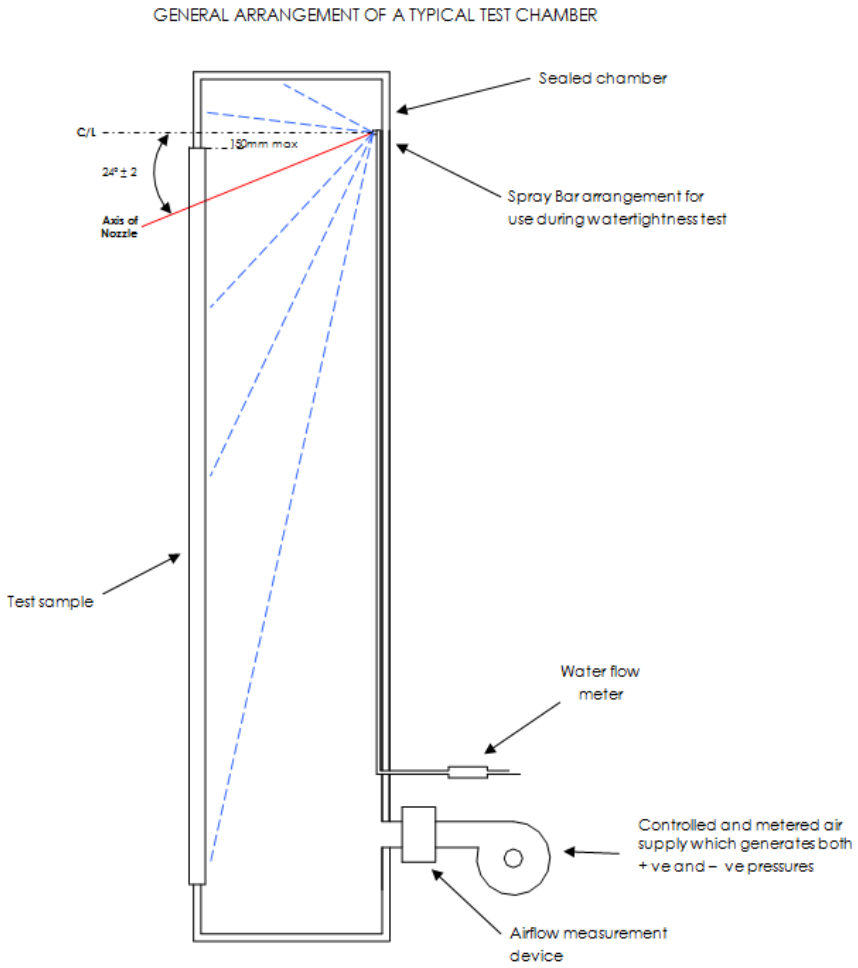
4.4 Water Spray System

The spray nozzles have a circular full cone spray pattern and a spray angle of 120° (+0°/–10°) at working pressure of 2 – 3 bar and a flow rate of 2 litres/min (± 0.2 litres/min) per nozzle. The nozzles were spaced at 400 mm (± 10mm) along the axis of the spraybar and the nozzles were arranged so that the lateral distance between the outer edge of the surround and the outermost nozzles shall be greater than 50mm but not exceeding 250mm.

The nozzle line was located not more than 150mm above the topmost horizontal joint line of any moving frame or the glazing line of any fixed glazing, in order to provide complete wetting of the adjacent

horizontal frame member(s). The nozzle line was also located at a distance of 250mm (+10mm/- 0mm) from the external face of the specimen as defined by the outermost external joint plane of moving parts or the glazing plane of fixed parts.

Figure 1 – Test arrangement



5. Test Procedures

5.1 Sequence of Testing

1. Air Permeability – Infiltration
2. Air Permeability – Exfiltration
3. Watertightness
4. Wind Resistance - P1
5. Wind Resistance - P2
6. Repeat Air Permeability – Infiltration
7. Repeat Air Permeability – Exfiltration
8. Wind Resistance - P3

Note: Prior to all testing the sample was conditioned for at least 4 hours at between 10 – 30°C & 25 – 75% RH, as required by the relevant testing standards.

5.2 Air Permeability - Infiltration

Three (3) preparatory pulses of 500 Pa positive pressure were applied to the test sample and any opening lights opened and closed at least once.

The test results were determined by measuring the rate of air flow through the test chamber whilst subjecting the sample to positive pressure differentials as follows: 50, 100, 150, 200, 250 and 300 Pa, each step being held for at least 10 seconds.

Leakage through the test chamber and joints between the chamber and test sample was determined by sealing the sample with adhesive tape and polythene sheeting and measuring the air flows at the above pressures. The preparation pulses and test sequence were then repeated with the sample unsealed and the difference between readings being the air leakage through the test sample.

5.3 Air Permeability - Exfiltration

Three (3) preparatory pulses of 500 Pa negative pressure were applied to the test sample and any opening lights opened and closed at least once.

The test results were determined by measuring the rate of air flow through the test chamber whilst subjecting the sample to positive pressure differential as follows: 50, 100, 150, 200, 250 and 300 Pa, this step being held for at least 10 seconds.

Leakage through the test chamber and joints between the chamber and test sample was determined by sealing the sample with adhesive tape and polythene sheeting and measuring the air flows at the above pressures. The preparation pulses and test sequence were then repeated with the sample unsealed and the difference between readings being the air leakage through the test sample.

5.4 Watertightness

Any opening lights were opened and closed at least once before testing. Water was then sprayed on to the sample as per section 4.4, for 15 minutes at 0 Pa. The water spray continued and the pressure was increased in the following increments: 50 and 100 Pa (each stage being held for 5 minutes).

The interior face of the sample was continuously monitored for water ingress throughout the test.

5.5 Wind Resistance

5.5.1 Wind Resistance – P1

Three pressure pulses were applied to the test sample equal to 880 Pa positive pressure (Pressure P1 + 10%) and each peak held for at least 3 seconds. After returning to zero pressure, all sensors were then zeroed.

Peak test of 800 Pa was applied at a rate not exceeding 100 Pa/sec, either incrementally or continuously. Once the peak pressure was reached, it was maintained for a period of 30 seconds, and the required frontal deflections were recorded. The pressure was then reduced to 0 Pa, at a rate not greater than 100 Pa/sec, and the residual deformation was recorded within 60 ± 5 secs of returning to 0 Pa.

The test was then repeated at Negative pressure.

After each of the above tests, the sample was checked for damage in a manner described in the test standard.

5.5.2 Wind Resistance – P2

The sample was subjected to 50 cycles including negative & positive pressures.

The first step was at a test pressure of 400 Pa negative pressure and followed by 400 Pa positive pressure, as was t`he last of the sequence of 50 cycles. The time in which the variation from – 400 Pa and + 400 Pa and the reverse was 7 secs (± 3 secs), with each peak being maintained for 7 secs (± 3 secs).

Following completion of the required 50 cycles, all moving parts of the test sample were opened and closed and note was taken of any damage or defects.

The standard then requires that a repeat air permeability test is conducted prior to a Safety test.

5.5.3 Wind Resistance – P3

The safety test consisted of one cycle of a negative and positive test pressures, with the peak test pressure being 1200 Pa and negative test pressure applied first.

The time in which the variation from 0 Pa to –1200 Pa and back to 0 Pa was 7 secs (± 3 secs) between each stage, with the peak being maintained for 7 secs (± 3 secs).

Positive test pressure was applied following a 7 secs (± 3 secs) rest at 0 Pa. Variation from 0 Pa to + 1200 Pa and back to 0 Pa was the same duration as for the negative test pressure P3.

Following completion of the test, the sample was checked to ensure it stayed closed and any parts of the sample which had come detached were recorded.

6. Test Results

6.1 Lab Conditions

The conditions measured inside the laboratory were as follows:

Temperature °C	Humidity %rh	Atmospheric Pressure kPa
23.5	33	100.9

6.2 Air Permeability

6.2.1 Reference Air Permeability

Class	Reference air permeability @ 100 Pa based on Area ($m^3/h/m^2$)	Reference air permeability @ 100 Pa based on length of opening joint ($m^3/h/m$)
0	*Not Tested*	*Not Tested*
1	50	12.50
2	27	6.75
3	9	2.25
4	3	0.75

The required air permeability figures for all additional pressure steps in all classifications were calculated using the equation given in BS EN 12207: 2000.

6.2.2 Air Permeability – Results

Calculated area of test sample 6.72 m^2
Measured length of opening joints 7.47 m

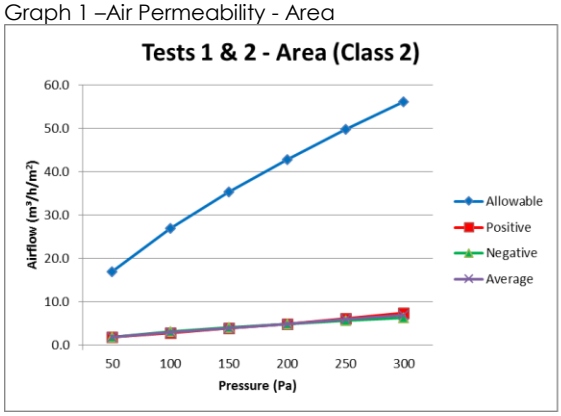
6.2.2.1 Initial Air Permeability Tests 1 & 2

Pressure Differential Pa	Air Permeability Rate Infiltration & Exfiltration Tests **$m^3/hr/m^2$ - Area**			Air Permeability Rate Infiltration & Exfiltration Tests **$m^3/hr/m$ - Length of Joint**		
	Test No. 1	**Test No. 2**	**Average**	**Test No. 1**	**Test No. 2**	**Average**
50	1.86	1.90	1.88	1.67	1.71	1.69
100	2.90	3.09	3.00	2.61	2.78	2.69
150	3.88	4.17	4.03	3.49	3.76	3.62
200	4.95	4.95	4.95	4.45	4.45	4.45
250	6.18	5.70	5.94	5.56	5.13	5.34
300	7.47	6.36	6.91	6.72	5.72	6.22

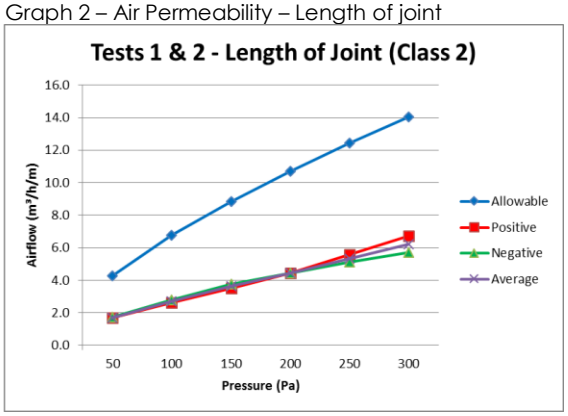
6.2.2.1 Repeat Air Permeability Tests 6 & 7

Pressure Differential Pa	Air Permeability Rate Infiltration & Exfiltration Tests **$m^3/hr/m^2$ - Area**			Air Permeability Rate Infiltration & Exfiltration Tests **$m^3/hr/m$ - Length of Joint**		
	Test No. 6	**Test No. 7**	**Average**	**Test No. 6**	**Test No. 7**	**Average**
50	1.77	1.45	1.61	1.60	1.31	1.45
100	2.69	2.54	2.62	2.42	2.29	2.35
150	3.68	3.48	3.58	3.31	3.13	3.22
200	4.77	4.23	4.50	4.29	3.81	4.05
250	6.08	4.89	5.48	5.47	4.40	4.93
300	6.85	5.47	6.16	6.16	4.92	5.54

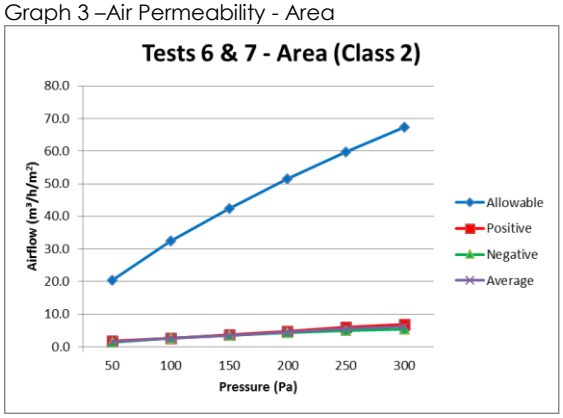
Graph 1 –Air Permeability - Area



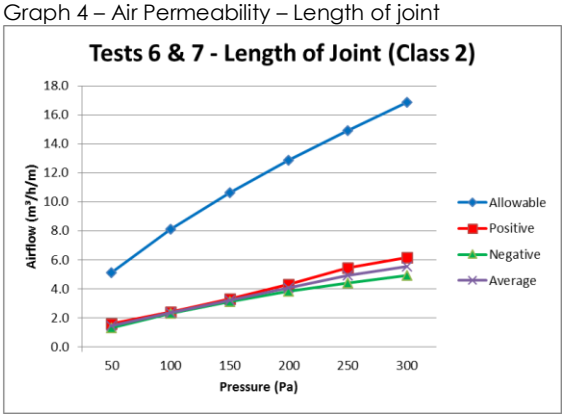
Graph 2 – Air Permeability – Length of joint



Graph 3 –Air Permeability - Area



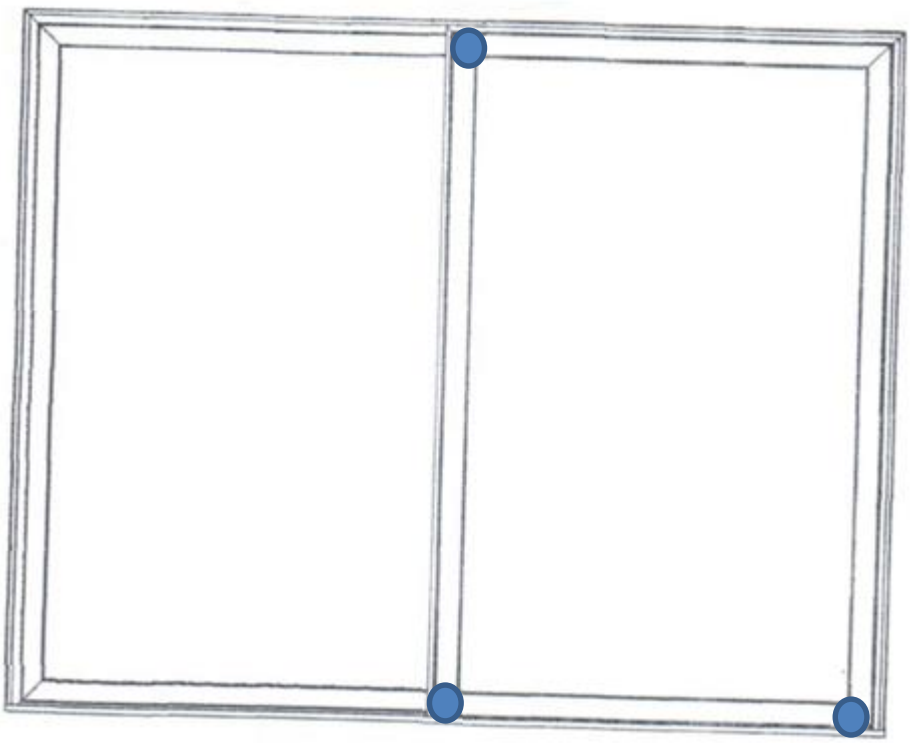
Graph 4 – Air Permeability – Length of joint



6.2.3 Areas of Significant Leakage

During the test, there were significant areas of air leakage identified; the locations of which are shown Figure 2.

Figure 2 – Areas of significant leakage



6.2.4 Air Permeability – Classification

Based on Area	Based on Length of Opening Joint
2	2

Note: The standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%, for the above measurements is ± 6.86 % of the result

6.3 Watertightness Testing

6.3.1 Reference Watertightness Classification

Test Pressure (Pa)	Classification	Specifications
-	0	No Requirement
0	1A	Water Spray for 15 mins
50	2A	As Class 1 + 5 mins
100	3A	As Class 2 + 5 mins
150	4A	As Class 3 + 5 mins
200	5A	As Class 4 + 5 mins
250	6A	As Class 5 + 5 mins
300	7A	As Class 6 + 5 mins
450	8A	As Class 7 + 5 mins
600	9A	As Class 8 + 5 mins
>600	Exxxx	Above 600 Pa, in steps 150 Pa (each step 5 mins)

6.3.2 Watertightness – Results

Water Temperature °C	20
Spray method used	1A

Observations	
Air Pressure (Pa)	**Comments**
0 x 15 mins	No Leakage Observed
50 x 5 mins	No Leakage Observed
100 x 5 mins	No Leakage Observed

6.3.3 Watertightness - Classification

Overall Classification
3A

6.4 Wind Resistance

6.4.1 Reference Wind Resistance Classification

Classification of Wind Load

Class	Test Pressures (Pa)		
	P1	P2	P3
0	Not Tested		
1	400	200	600
2	800	400	1200
3	1200	600	1800
4	1600	800	2400
5	2000	1000	3000
Exxxx	xxxx	xxxx (x 0.5)	xxxx (x 1.5)

Note The test pressure, P2, is repeated 50 times. Specimens tested with wind loads above class 5 are classification Exxxx, where xxxx is the actual test pressure P1.

Classification of Deflection

Class	Relative Frontal Deflection
A	<L/150
B	<L/200
C	<L/300

Overall Wind Load Classification

Wind Load Class	Relative Frontal Deflection Class		
	A	B	C
1	A1	B1	C1
2	A2	B2	C2
3	A3	B3	C3
4	A4	B4	C4
5	A5	B5	C5
Exxxx	AExxxx	BExxxx	CExxxx

6.4.2 Test 4 – Wind Resistance – P1 Results

Member Under Test	Test Pressure Pa	Maximum Deflection mm	Residual Deformation mm	Deflection Class	Relative Frontal Deflection
Member A	800	12.9	0.1	Class A	1/181
	-800	11.6	0.0	Class A	1/200

Note Calculation of deformation was conducted using formula (02-(03+01)/2). Following the above tests, there was no visible damage to the test sample when viewed as required by the test standard.

The standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%, for the above measurements is + 2.4 % of the result.

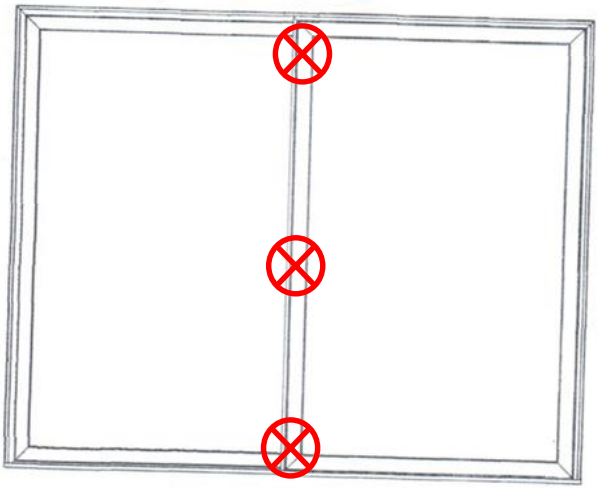
6.4.3 Test 5 – Wind Resistance – P2 Results

An inspection carried out following Test 5 – Wind Resistance, P2, after 50 cycles at both positive and negative pressure testing at 400 Pa, showed no evidence of any permanent deformation or damage to the test sample.

6.4.4 Test 8 – Wind Resistance – P3 Results

An inspection carried out following Test 8 – Wind Resistance, P3, after both positive and negative pressure testing at 1200 Pa, showed no evidence of any permanent deformation or damage to the test sample.

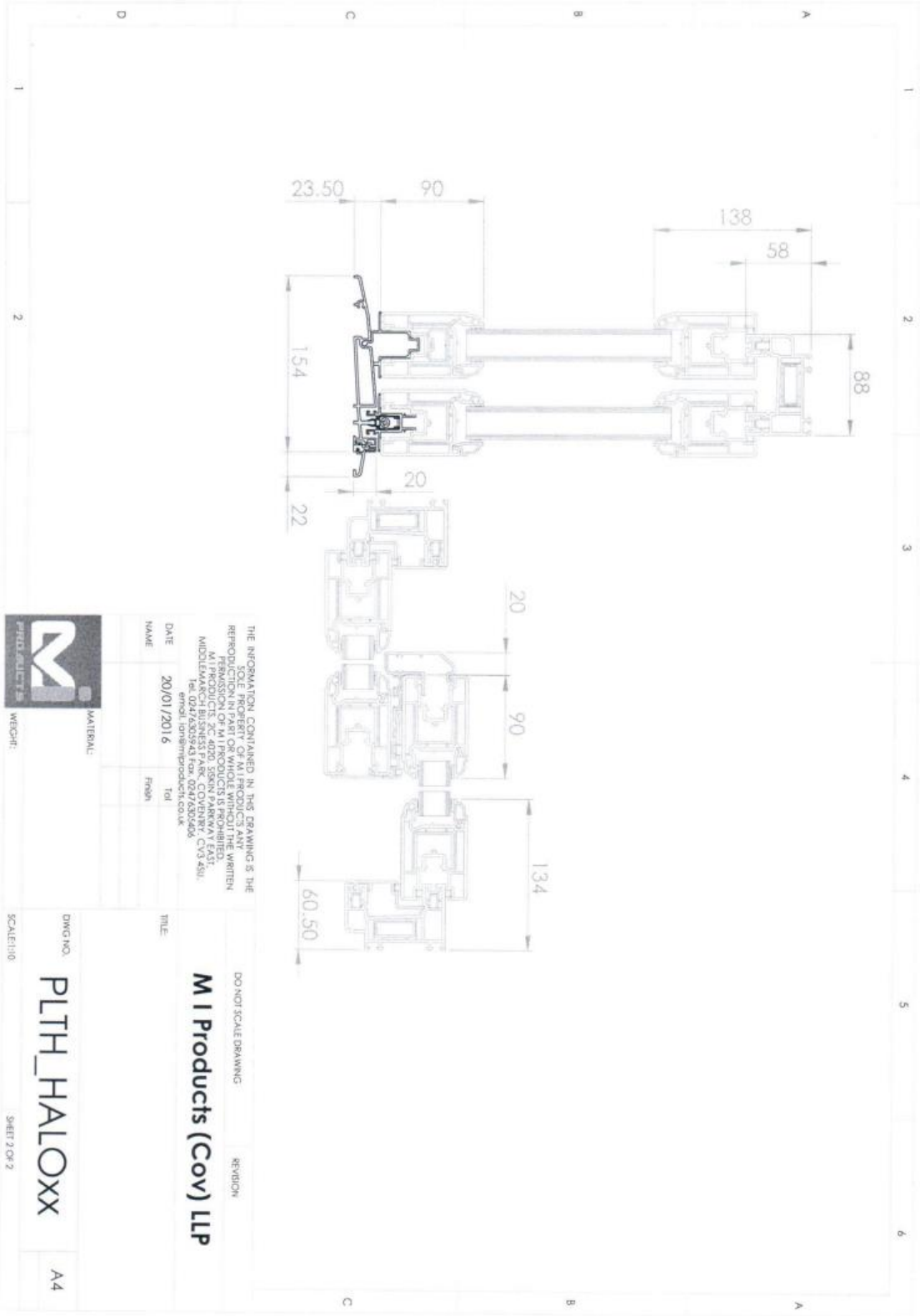
Figure 3 – Position of deflection measurement sensors

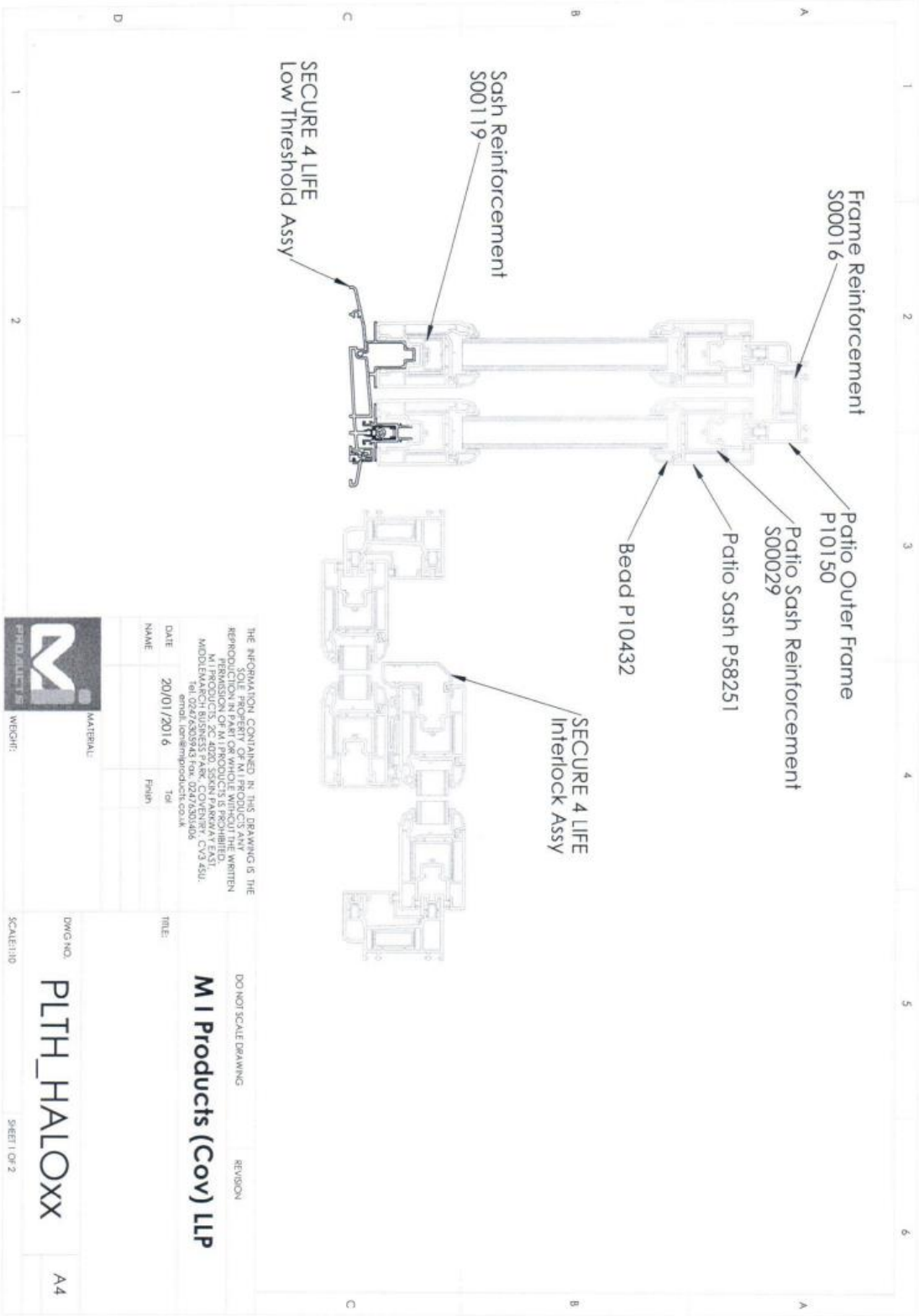


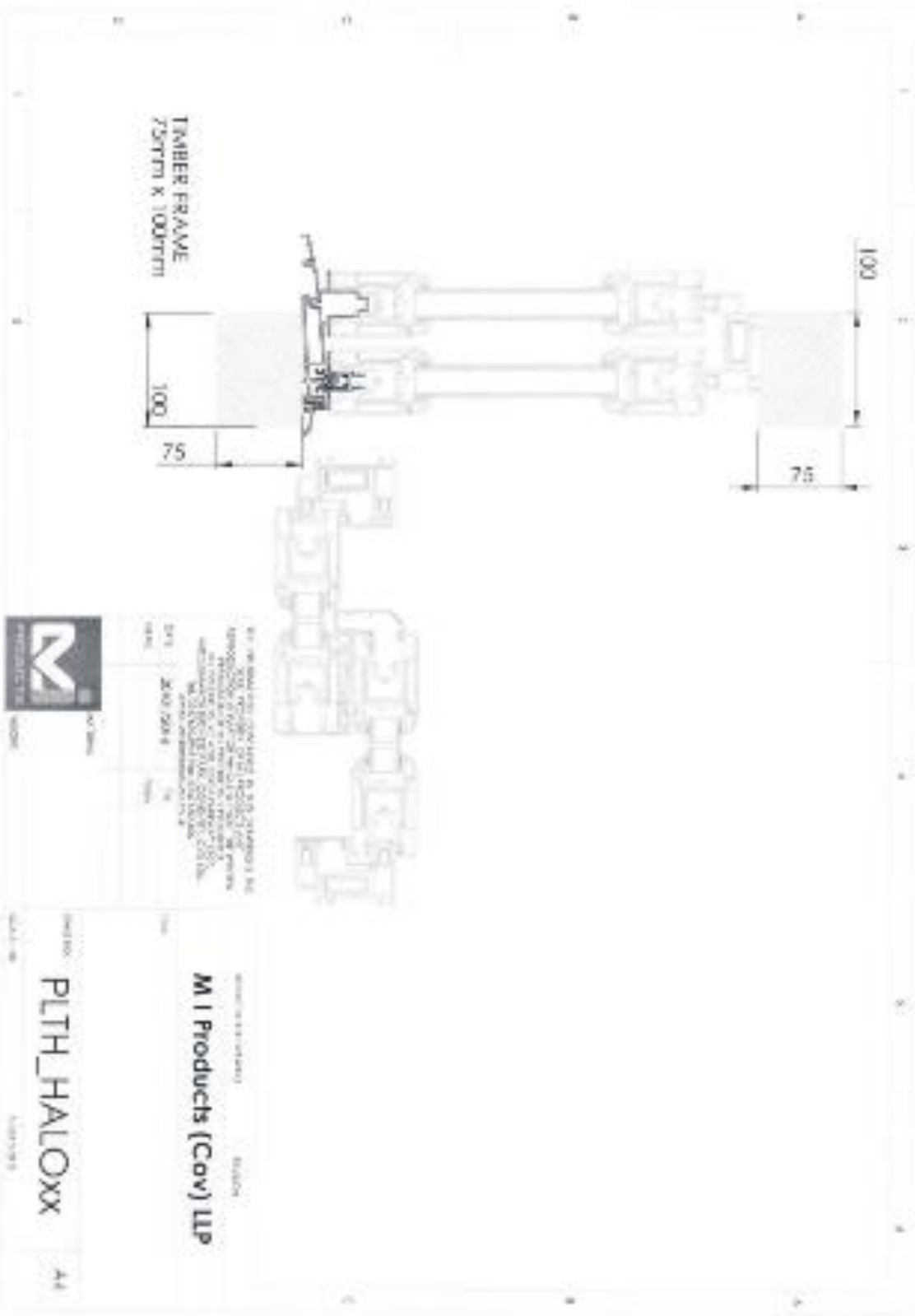
6.4.5 Wind Resistance - Classification

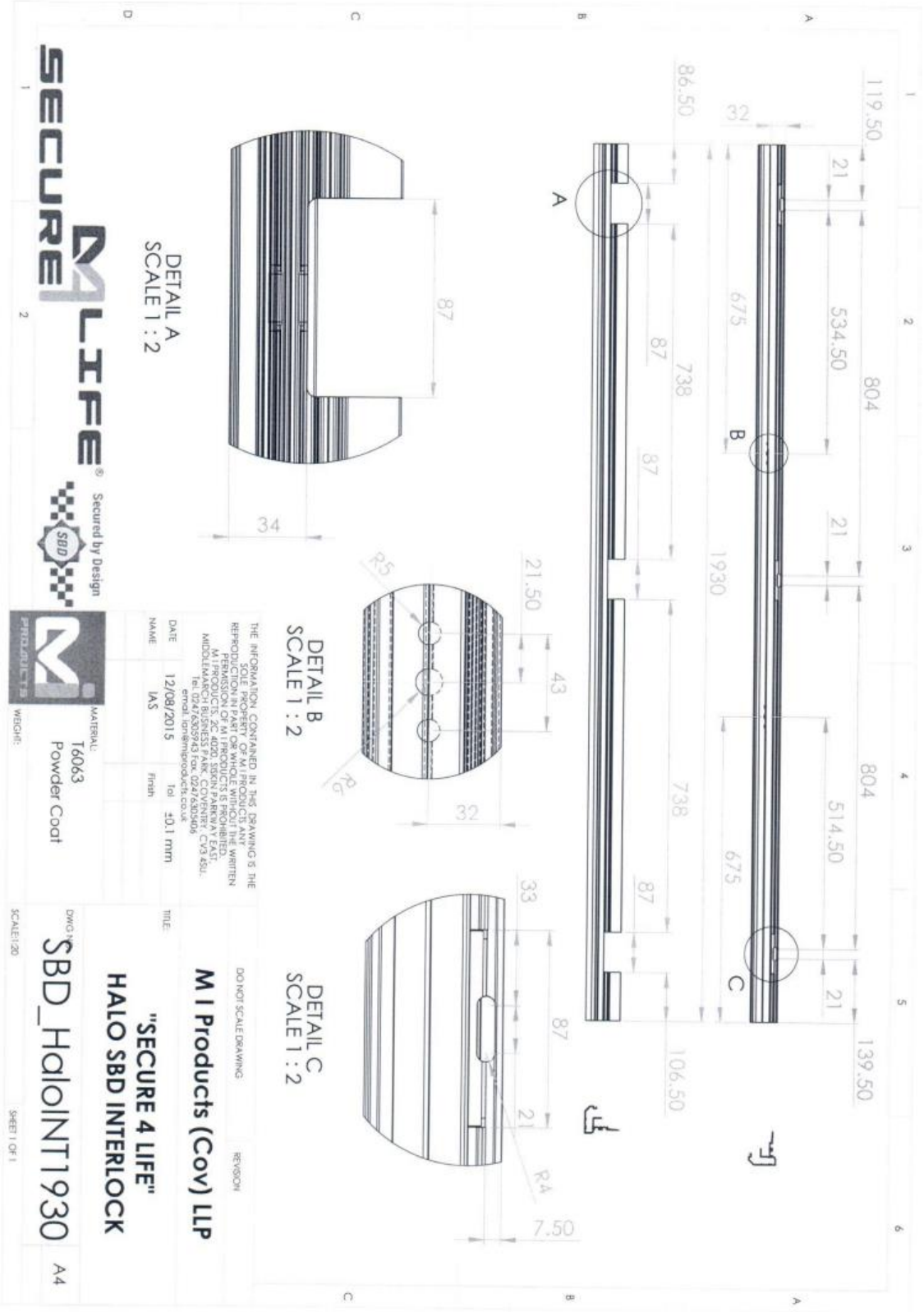
Overall Classification
A2

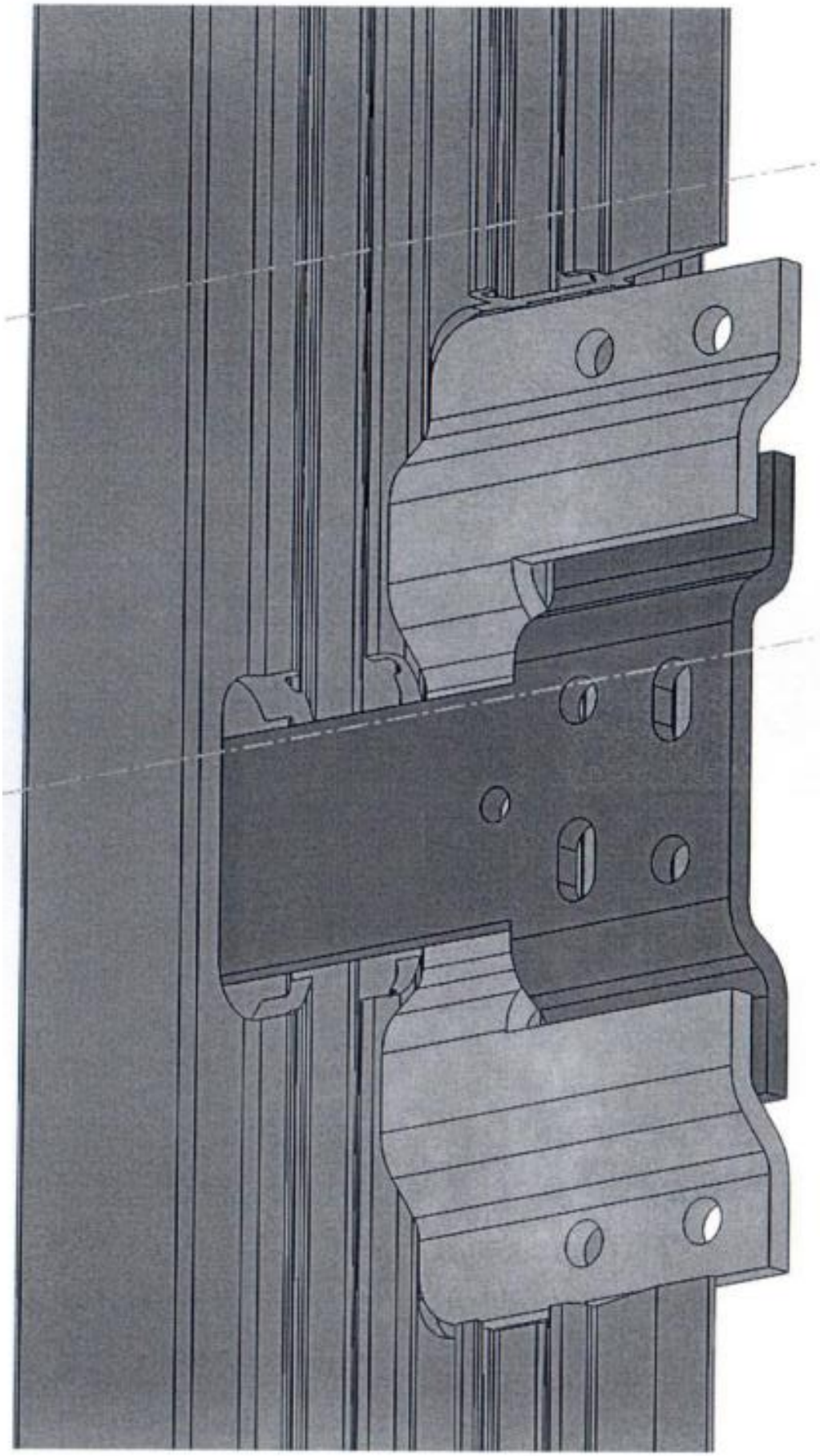
7. System Drawings



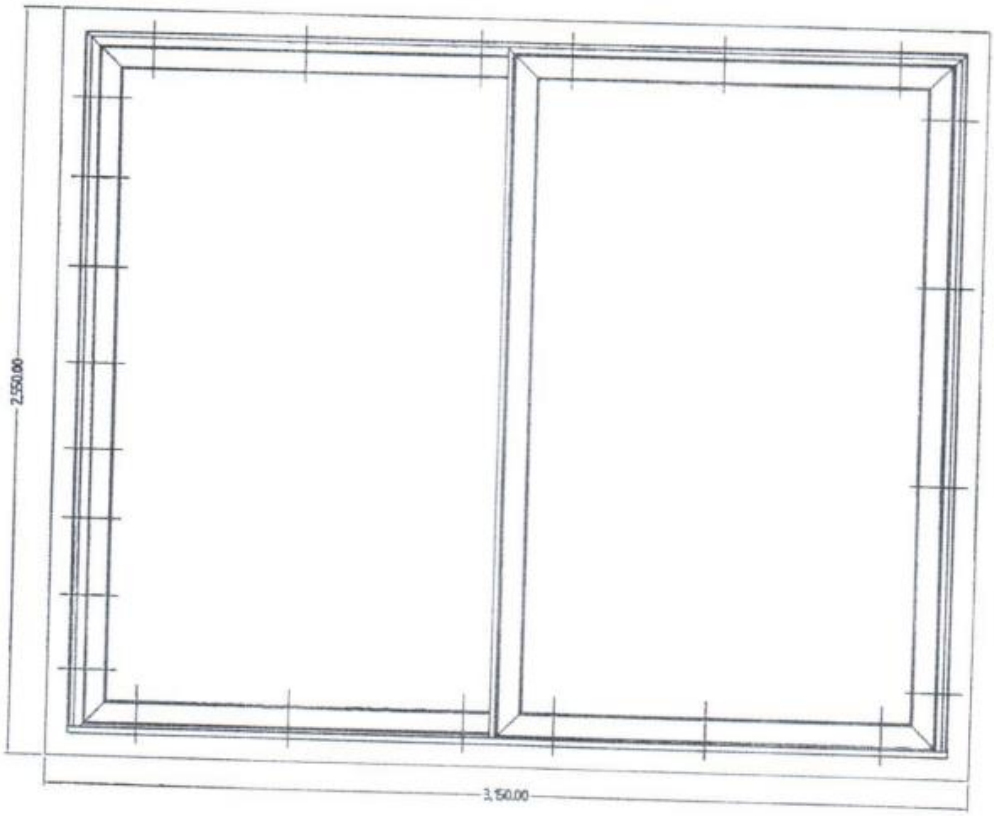

Frame Reinforcement
S00016
Patio Outer Frame
P10150
Patio Sash Reinforcement
S00029
Patio Sash P58251
Bead P10432
SECURE 4 LIFE
Interlock Assy
Sash Reinforcement
S00119
SECURE 4 LIFE
Low Threshold Assy
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF M I PRODUCTS. REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF M I PRODUCTS IS PROHIBITED.
M I PRODUCTS, 2C 4020, SOKIN PARKWAY EAST, MIDDLEMARCH BUSINESS PARK, COVENTRY, CV3 4SU.
Tel. 02476535943 Fax. 02476531406
email. ian@mproducts.co.uk
DATE
20/01/2016
NAME
Tol
Finish
MATERIAL:
WEIGHT:
DO NOT SCALE DRAWING
REVISION
M I Products (Cov) LLP
TITLE:
DWG NO.
PLTH_HALOxx
A4
SCALE:1:10
SHEET 1 OF 2


100
75
TIMBER FRAME
75mm x 100mm
100
75
M I Products (Cov) LLP
PLTH_HALOxx
A4

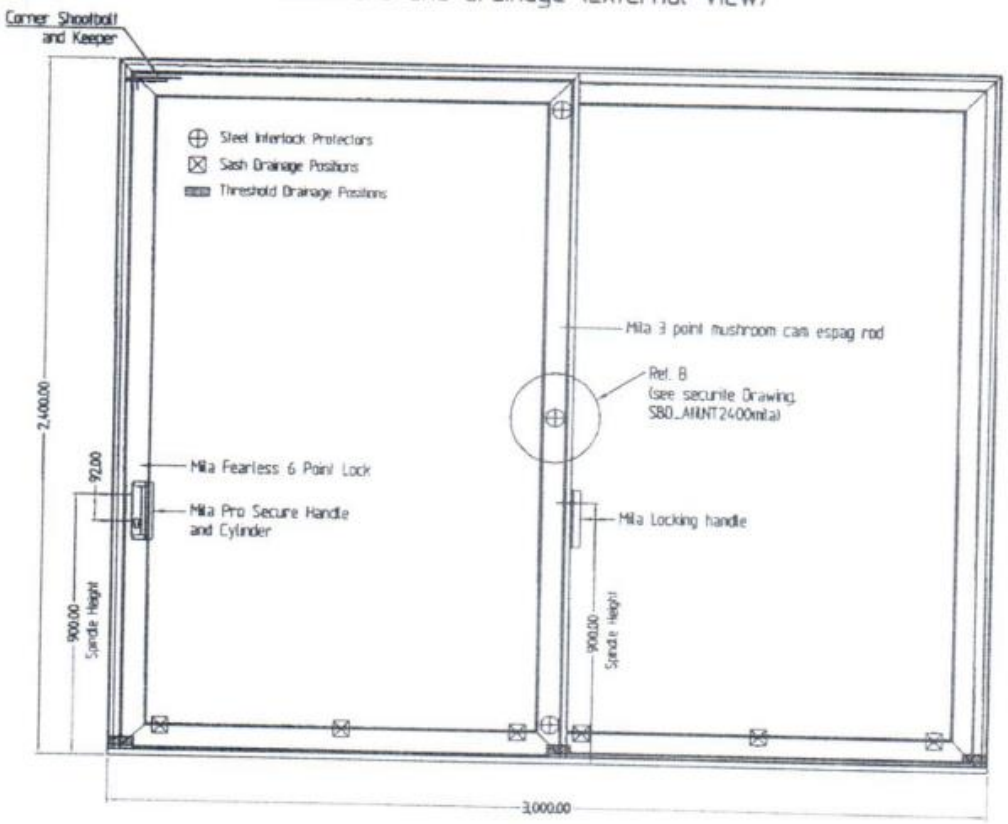

119.50
21
534.50
804
21
139.50
32
675
514.50
804
675
21
86.50
738
87
87
1930
738
87
106.50
A
B
C
DETAIL A
SCALE 1 : 2
87
34
DETAIL B
SCALE 1 : 2
R5
21.50
43
32
DETAIL C
SCALE 1 : 2
33
87
21
R4
7.50
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF M I PRODUCTS. ANY REPRODUCTION IN PART OR WHOLE WITHOUT THE WRITTEN PERMISSION OF M I PRODUCTS IS PROHIBITED.
M I PRODUCTS, 2C 4020, SIXKIN PARKWAY EAST, MIDDLEMARCH BUSINESS PARK, COVENTRY, CV3 4GJ.
Tel: 01926 333333 Fax: 01926 330406
email: tom@midoors24.co.uk
DO NOT SCALE DRAWING
REVISION
DATE
NAME
12/08/2015
IAS
Tol ±0.1 mm
Finish
MATERIAL:
T6063
Powder Coat
WEIGHT:
TITLE:
M I Products (Cov) LLP
"SECURE 4 LIFE"
HALO SBD INTERLOCK
DWG No
SBD_HaloINT1930
A4
SCALE:1:20
SHEET 1 OF 1
SECURE 4 LIFE®
Secured by Design
SBD
M I PRODUCTS



Subframe Fixing (Internal View)



Hardware and drainage (External View)



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