

Test Report

ISSUED BY Chirag Patel
DATE OF ISSUE 27/11/2017



ERA
i54, Valiant way,
Wolverhampton
West Midlands WV9 5GB

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Version TH50B
Approved Signatory
Name W. Pearson
Signature <i>W. Pearson</i>

Client Name: Kitson Windows

Address: Kitson House
South Road, Alnwick
Northumberland
NE66 2PD

Test Report Number: 1737

System Tested: Side Hung Next to Fixed

System Tested By: ERA
i54, Valiant Way
Wolverhampton
West Midlands
WV9 5GB

Test Standard: BS 6375-1:2015 - Performance of Windows and Doors

	Test Method	Classification
Air Permeability	BS EN 1026:2016	BS EN 12207:2000
Watertightness	BS EN 1027:2016	BS EN 12208:2000
Resistance to Wind Load	BS EN 12211:2016	BS EN 12210:2016

Testing Conducted By: Chirag Patel & Adrian Stokes

Date of Test: 22/11/2017

Test Preliminaries: The ambient temperature and humidity close to the sample was within the range 10° to 30° and 25% to 75% RH and the sample was conditioned for at least 4h immediately before testing.

Airflow Measurement

Device: Mini Air 60Mini 0,5-40 m/s & Flügelrad 100 Bi

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Test Results Summary

Test Type	Classification Achieved
Overall Air Permeability (Up to 300 Pa)	4
Watertightness	3A
Resistance to Wind Load	A2
Exposure Category and Classification	800 X

Test Conditions:

Temperature °C	20.0
Relative Humidity %	51.5
Atmospheric Pressure kPa	100.1

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Sample Specification

System Manufacturer: Kitson Windows

System Type: Side Hung Next To Fixed

System Size: 1200mm x 1200mm

Method of Jointing: Welded

Materials & Surface

Treatment: UPVC

Profile Part Number: Outer Frame Sash QC 02 & QC 30
Reinforcement QX30

Reinforcing Part Number: Mullian Cell Reinforcing QX10

Glazing Description: 4-20-4 Toughened

Locking System: V-S1 Extreme ERA
Screws 4.3x25

Hinges: Horizon ERA
Screws 4.8 x 25 Pan Head

Handle: Fab & Fix White

Other Hardware Details: G.T. Hinge Guard
Screws 4.8 x 25 Pan Head

Presence of Ventilation: No

Exposed Face: Opening Outwards

Closing Conditions: Locked

See test sample drawings as supplied by:

Kitson Windows

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Air Permeability Test Description & Results

Air Permeability of Test Chamber

The air permeability of the test chamber was measured by sealing all joints in the test specimen. The air permeability of the test chamber with negative test pressures were measured, but without pressure pulses.

Overall Air Permeability of Test Specimen and the Test Chamber

All opening parts of the specimen were opened and closed before securing in the closed position in accordance with manufacturer's requirements. To commence testing, three pressure pulses each 10% greater than the maximum test pressure to be used in the test or 500Pa (150 Pa for internal pedestrian doorsets), whichever is greater was applied. The time to reach the maximum test pressure was not less than 1 s and the pressure was sustained for at least 3 s. Positive test pressure was applied in steps of 50 Pa up to 300 Pa and from 300 Pa in steps of 150 Pa. The air permeability at each step was measured and recorded. The duration of each step was sufficient to allow the test pressure to stabilise before the air permeability was measured. The procedure was repeated for negative pressures.

Test Results

The air flow measurements are adjusted at each step to calculate the air flow at normal conditions. The air permeability in terms of the length of the opening joint ($\text{m}^3/\text{h}\cdot\text{m}$) and overall area ($\text{m}^3/\text{h}\cdot\text{m}^2$) are calculated.

Positive Pressures

Pressure in Pascals (Pa)	Air Flow m^3/h	Window Area		Seal Length	
		$\text{m}^3/\text{h}\cdot\text{m}^2$	Class	$\text{m}^3/\text{h}\cdot\text{m}$	Class
50	0.72	0.50	4	0.23	4
100	0.79	0.55	4	0.25	4
150	0.97	0.67	4	0.30	4
200	1.08	0.75	4	0.34	4
250	1.19	0.82	4	0.37	4
300	1.36	0.95	4	0.43	4

Negative Pressures

Pressure in Pascals (Pa)	Air Flow m^3/h	Window Area		Seal Length	
		$\text{m}^3/\text{h}\cdot\text{m}^2$	Class	$\text{m}^3/\text{h}\cdot\text{m}$	Class
-50	0.79	0.55	4	0.25	4
-100	1.08	0.75	4	0.34	4
-150	1.42	0.99	4	0.45	4
-200	1.72	1.19	4	0.54	4
-250	2.07	1.43	4	0.65	4
-300	2.45	1.70	4	0.77	4

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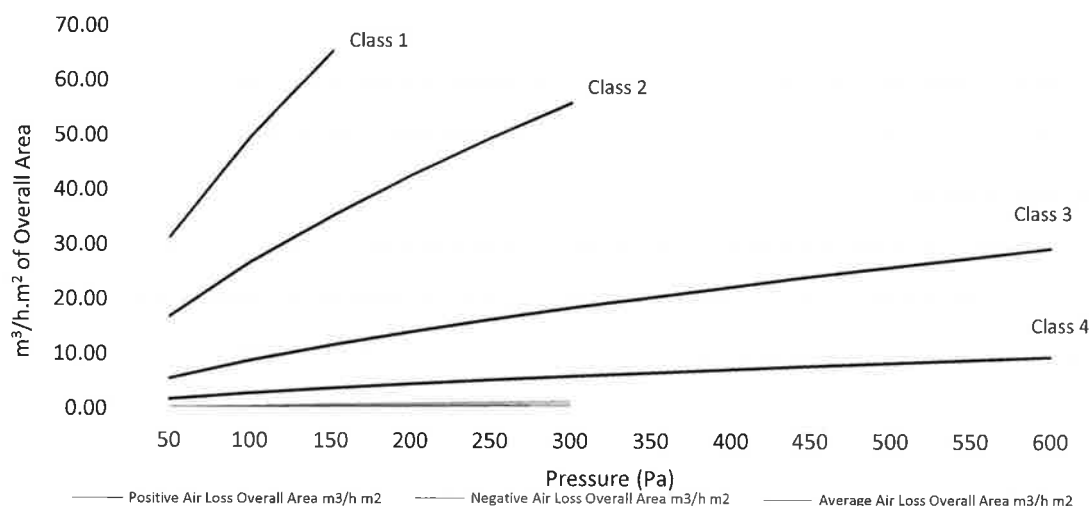
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Average Pressures

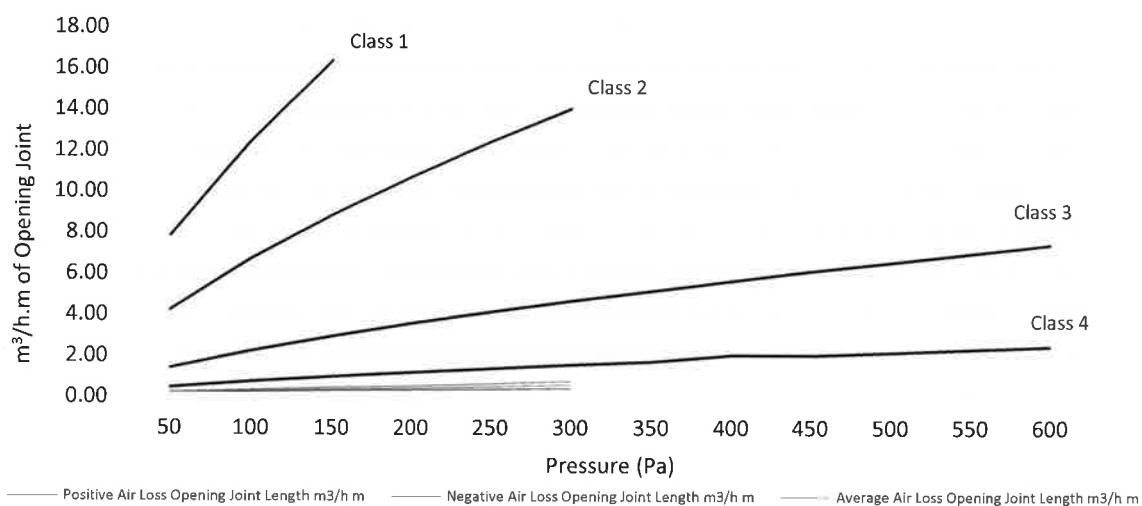
Pressure in Pascals (Pa)	Air Flow m ³ h	Window Area		Seal Length	
		m ³ /h.m ²	Class	m ³ /h.m	Class
50	0.76	0.52	4	0.24	4
100	0.93	0.65	4	0.29	4
150	1.20	0.83	4	0.37	4
200	1.40	0.97	4	0.44	4
250	1.63	1.13	4	0.51	4
300	1.91	1.32	4	0.60	4

Graphs

A Graph of Air Permeability Rate vs Pressure Difference (Overall Area)



A Graph of Air Permeability Rate vs Pressure Difference (Opening Joint)



Classification:	Overall Area	4	Length of Opening Joints	4
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Watertightness Test Description & Results

Spraying Phase

Spraying was applied first with the test pressure at 0 Pa for 15 min then the test pressure was increased every 5 min. The test pressures was applied in steps of 50 Pa up to 300 Pa and from 300 Pa in steps of 150 Pa. Prior to testing the flow of each row of nozzles were adjusted in accordance with BS EN 1027:2016 clause 5.6.

Test Results

The location and pressure at which any water penetrated the specimen and the time for which the maximum pressure was maintained before water penetrated was record.

The positioning of the spraying system was recorded and shown below.

Specification	Results
Angle of Nozzles (°)	24.1, 24, 24
Distance Between Outer Edge & Outermost Nozzles (mm)	Left Edge 125, Right Edge 165
Distance Between Nozzles (mm)	400, 400, 400
Nozzle Line from External Face (mm)	250
Nozzle Line from Topmost Joint Line (mm)	70
Spraying Method	1A

Maximum Pressure At Which Any Water Penetrated The Specimen (Pa)	150
Time For Which The Maximum Pressure Was Maintained Before Water Penetrated	05:00
The Location At Which Water Penetrated	No Leakage Observed

Resistance to Wind Load Test Description & Results

Principles of Test

Application of a defined series of positive and negative test pressures at which measurements and inspections are made to assess relative frontal deflection and resistance to damage from wind loads.

Deflection Test

Measuring devices were fixed in position at each end and at the centre of the frame member to be measured

Test Pressure P1 (Pa)	800
-----------------------	-----

Three positive pressure pulses were applied, each 10% greater than the test pressure P1. The time to reach the maximum pressure was not less than 1 s and it was sustained for at least 3 s. All the gauges were zeroed.

After the test pressure was applied for 30 s, the required frontal deflection(s) and frontal displacement(s) were recorded.

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The test pressure was reduced to 0 Pa, at a rate not greater than 100 Pa/s and the residual frontal deflection(s) and frontal displacement(s) were recorded.

The positive pressure procedure was repeated using negative test pressures.

Measuring Point	Positive Pressure		Negative Pressure	
	At Test Pressure (mm)	Residual (mm)	At Test Pressure (mm)	Residual (mm)
A ₀	-0.4	0	0.4	0
M ₀	-2.1	0	1.9	0
B ₀	-0.6	-0.1	1.5	0

Relative Frontal Deflections (Positive Pressure)	≤ 1/-645
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Relative Frontal Deflections (Negative Pressure)	≤ 1/1121
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Repeated Pressure Test

The test specimen was subjected to 50 cycles including negative and positive pressures with the following features:

Test Pressure P2 (Pa)	400
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- test pressure equal P2
- first step was negative, next was positive as is the last of the sequence of 50 impulses;
- variation from -P2 to +P2 and the reverse took (7 ± 3) s;
- value P2 was maintained at least for (7 ± 3) s

After completion of the 50 cycles, the moving parts of the specimen were opened and closed and any damage or functioning defects were noted

Any damage or functioning Defects	None
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The test for air permeability was repeated in accordance with BS EN 1026:2016.

Positive Pressures

Pressure in Pascals (Pa)	Air Flow m ³ h	Window Area		Seal Length	
		m ³ /h.m ²	Class	m ³ /h.m	Class
50	-0.13	-0.09	4	-0.04	4
100	0.04	0.03	4	0.01	4
150	-0.13	-0.09	4	-0.04	4
200	-0.23	-0.16	4	-0.07	4
250	-0.29	-0.20	4	-0.09	4
300	-0.37	-0.25	4	-0.11	4

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Negative Pressures

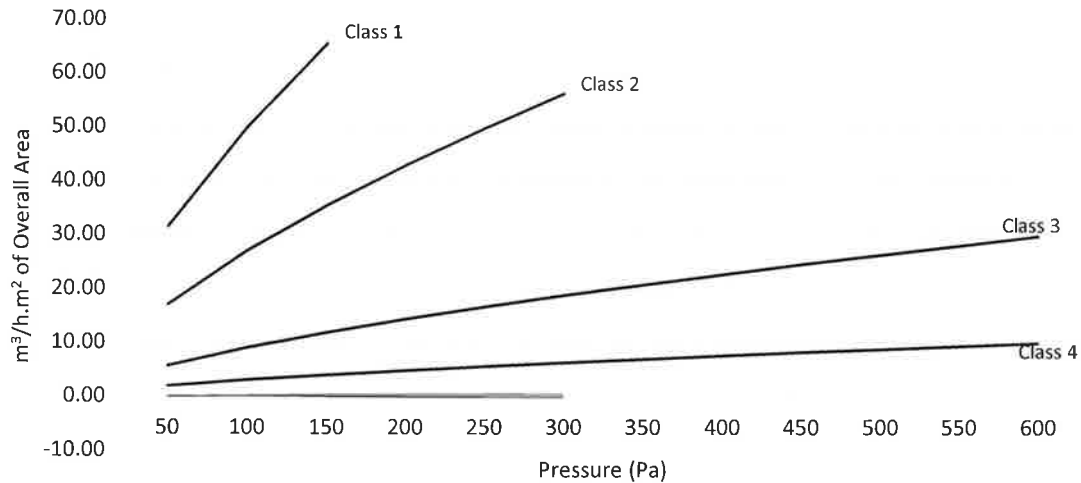
Pressure in Pascals (Pa)	Air Flow m ³ h	Window Area		Seal Length	
		m ³ /h.m ²	Class	m ³ /h.m	Class
-50	0.16	0.11	4	0.05	4
-100	0.32	0.22	4	0.10	4
-150	0.44	0.31	4	0.14	4
-200	0.52	0.36	4	0.16	4
-250	0.60	0.42	4	0.19	4
-300	0.75	0.52	4	0.24	4

Average Pressures

Pressure in Pascals (Pa)	Air Flow m ³ h	Window Area		Seal Length	
		m ³ /h.m ²	Class	m ³ /h.m	Class
50	0.01	0.01	4	0.00	4
100	0.18	0.12	4	0.06	4
150	0.16	0.11	4	0.05	4
200	0.15	0.10	4	0.05	4
250	0.16	0.11	4	0.05	4
300	0.19	0.13	4	0.06	4

Graphs

A Graph of Air Permeability Rate vs Pressure Difference (Overall Area)



Positive Air Loss Overall Area m³/h m² Negative Air Loss Overall Area m³/h m² Average Air Loss Overall Area m³/h m²

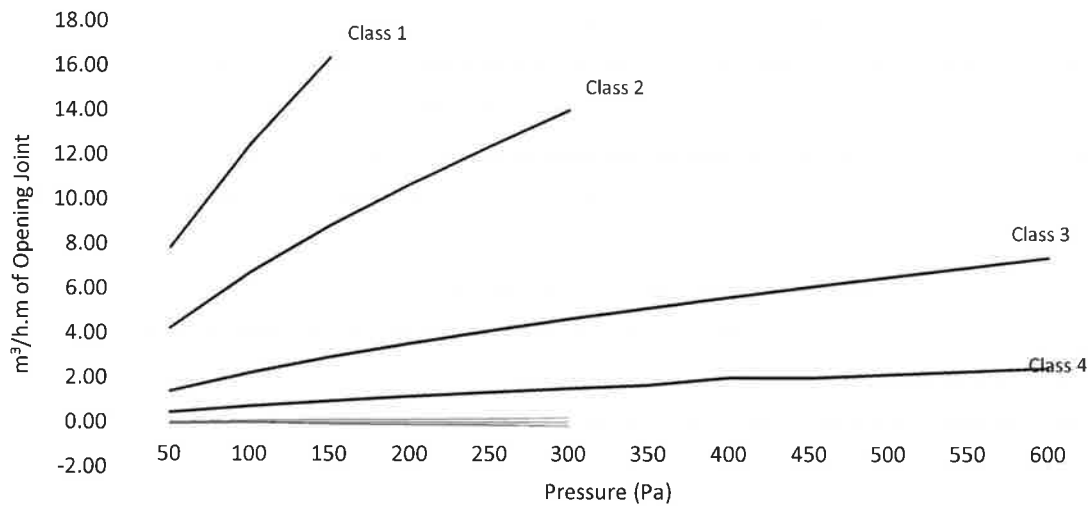
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A Graph of Air Permeability Rate vs Pressure Difference (Opening Joint)



Positive Air Loss Opening Joint Length m³/h m Negative Air Loss Opening Joint Length m³/h m Average Air Loss Opening Joint Length m³/h m

Classification:	Overall Area	4	Length of Opening Joints	4
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Safety Test

The specimen was subjected to one cycle including negative and positive test pressure with the following features:

Test Pressure P3 (Pa)	1200
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- test pressure equal P3
- negative test pressure was applied first;
- variation from 0 Pa to -P3 and back from -P3 to 0 took (7 ± 3) s, the maximum test pressure P3 was maintained for (7 ± 3) s;
- positive test pressure was applied after (7 ± 3) s rest at 0 Pa;
- variation from 0 Pa to +P3 and back to 0 Pa was the same duration as for the negative test pressure -P3.

Any Damage and Failure or Operating Difficulties	None
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Total Uncertainty of Measurement \pm 5.10 m³/h.m

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

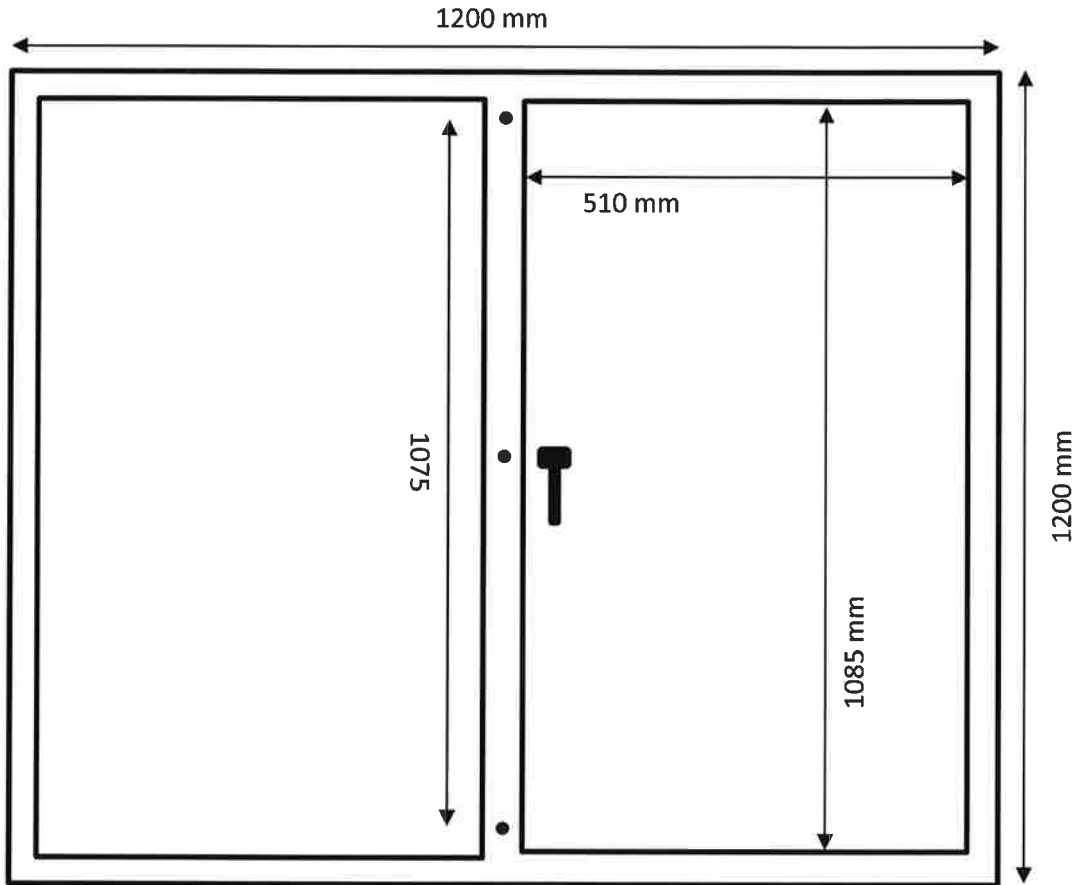
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Drawing of Test Sample



● Transducer Probes



Water Leakage

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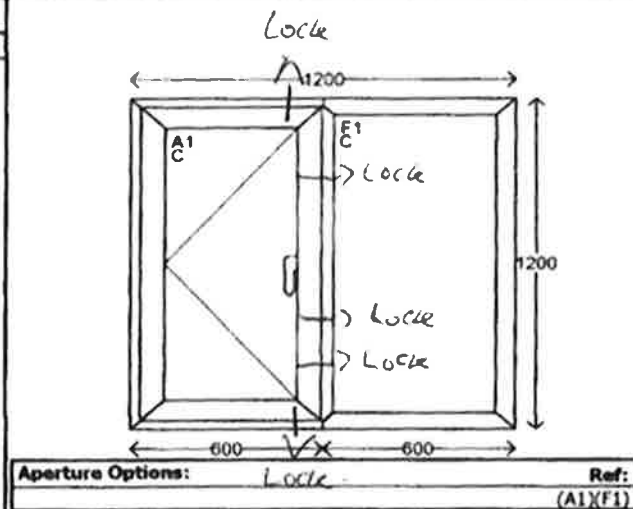
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Drawing of Test Sample

Customer: KITSON WINDOWS	Glazed	Input Info: 11-09-2017 damin.jobling
Reference: TEST	Supply only	In Production
Job No.: 99547 (Item: 1)	Page 1 of 1	Print Info: 22-09-2017 1:40 pm

Manufacturing Units: 36.00	
Main Options:	
Product	Optima C Casement
Size	1200 x 1200
Quantity	3
Design	24
Colour	White
Sash colour	White
Mullion	QC10/11 66mm T/Z
Sash	QC30 Casement Sash
Drainage	None
Add-on (Head)	No add-on
Add-on (Cill)	No add-on
Add-on (Left jamb)	No add-on
Add-on (Right jamb)	No add-on
Frame drip bar	No drip bar
Sash drip bar	No drip bar
Bead type	Chamfered Bead
Handle	F+F White Handle
Casement locking	NO LOCK
Friction stay	Standard Stay
Ventilator (Head)	No ventilator
Ventilator (Sash)	No ventilator
Ventilator (Frame)	No ventilator
Open in/out	Open out
Reinforcing rule	Normal Reinforcing
Dummy Stays	No Dummy Stay
Location: TEST	



Glass Required:		Qty	Width	Height		
A1	4-20-4 Clear Planitherm Argon Filled TGH : 20mm Silver Spacer	3	446	1019		
F1	4-20-4 Clear Planitherm Argon Filled TGH : 20mm Silver Spacer	3	539	1112		
Sections required:		Qty	Length	End prep	Reinforcing	Length
Hor Frame	QC02 60mm Outerframe	3	605	\-/\		
Hor Frame	QC02 60mm Outerframe	3	605	\-/*		
Hor Frame	QC02 60mm Outerframe	3	605	\-/\		
Hor Frame	QC02 60mm Outerframe	3	605	\-/*		
Ver Frame	QC02 60mm Outerframe	3	1205	\-/\		
Ver Frame	QC02 60mm Outerframe	3	1205	\-/*		
Ver Mullion	QC11 66mm Z Section	3	1217	<->	QX10 Transom RCM	1070
Hor Sash	QC30 Casement T Sash	6	569	\-/*		
Ver Sash	QC30 Casement T Sash	3	1142	\-/*	QR31S Steel	977
Ver Sash	QC30 Casement T Sash	3	1142	\-/*	QX30 RCM	977
Bead type	QC50. Glazing Bead	18888			* Denotes bar reversed	
Accessories Required:		Qty	Length			
9366	12" Egress	3		Pairs		
0B140	R/H White Casement Handle	3		Items		
P4420	Optima Staymate	6		Items		
QM01	White Riser Block	3		Items		
QM02	White Cavity Locking Block	3		Items		
QM03	White Cavity Locking Block	3		Items		
QM04	Glazing Packer	24		Items		