

TEST REPORT

ISSUED BY Chirag Patel
DATE OF ISSUE 01/12/2017



ERA
i54 Valiant Way
Wolverhampton
West Midlands WV9 5GB

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Approved Signatory
Name Wayne Pearson
Signature <i>W Pearson</i>

Client Name: Kitson Windows

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

Test Report Number: 1736

System Tested: Side Hung Next To Fixed

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

Test Standard: PAS 24 :2016 - Enhanced Security Performance Requirements for Doorsets and Windows in the UK

	Clause
Manipulation Test a) & b)	C.4.3
Infill Medium Removal Manual Test	C.4.4.2
Infill Medium Removal Mechanical Test	C.4.4.3
Mechanical Loading Test	C.4.5
Manual Check Test	C.4.6
Additional Mechanical Loading Test	C.4.7

Testing Conducted By: Adrian Stokes

(ERA)

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

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Sample Specification

System Manufacturer: Kitson Windows

Model: Profile 22 Optima C Casement

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

Fixings:

Handle: Fab & Fix White

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

See test sample drawings as supplied by

Kitson Windows

This report and the results shown within are based upon the information, drawings, samples and tests referred to in the report. The results are valid only for the conditions under which the test was conducted and for the specific range of windows. The results obtained do not necessarily relate to samples from the production line of the above named company.

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Test Descriptions

Test Specimens

Windows supplied for testing were fitted with toughened glass with all glazing carried out in accordance with the manufacturer's specification. The window specimens were fixed in a timber sub-frame (nominal 100 mm x 50 mm in section) in accordance with the defined installation requirements. For open-out windows and vertical sliders, the opening face of the outer frame was mounted flush with the timber sub-frame. For open-in windows, one sample was mounted with the non-opening face of the outer frame flush with the timber sub-frame. The sub-assembly was mounted into the test apparatus square and without twist.

During the test the hardware was locked and, where applicable, the key was removed.

The test specimens were stored for a minimum of 12 h prior to testing and tested in a non-destructive environment within the ranges of 15 °C to 30 °C.

The test specimens were mounted into a test rig which is sufficiently rigid to withstand the test loads without the deflection which could influence the test result.

Apparatus

The following **calibrated** test instruments were available;

- Articulated Pad
- Load Cells & Digital Indicators
- 500mm Long Cylindroid of Diameter 50mm
- Digital Count Down/Up Timers
- 5m Measuring Tape

Tools Group A	Tools Group B
Mild Steel Wire	25 mm Wood Chisel
Credit Card	6 mm Wood Chisel
Paint Scraper	200 mm Flat Blade Screwdriver
Craft Knife	Brick Bolster
150 mm Flat Blade Screwdriver	Crosspoint Screwdriver
	Cross Head Screwdriver

Test Procedures

Manipulation Test

The manipulation test was conducted prior to the infill medium removal test. The overall attack time of 15 min was used, although no single test technique was used for more than 3 min.

The manipulation test was repeated after the mechanical loading test, if appropriate, the manual check test. The overall attack time was 3 min with the primary intention of releasing threaded fasteners exposed as a result of the mechanical load tests.

Tools specified in group A and where applicable, one brick bolster, one crosspoint and one cross head screwdriver.

Various methods of manipulation was attempted, such as removal of trim sections, insertion of a tool to slide latches or bolts, undoing threaded fasteners in externally fixed hardware, blows by hand to dislodge locking devices.

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Infill Medium Removal Test

General - Where the infill medium retention varies within a window, each variation was subjected to infill manual and mechanical test.

Infill Manual Test - This test was conducted using the tools specified in group A and group B.

Attempted to remove gaskets, beads, security devices (if applicable) and the infill medium from the exterior face of the glazing system, for a period of 3 min.

Infill Mechanical Test - A perpendicular-to-plane load of 2.0 kN was applied to each corner of the infill medium in turn and in a direction towards the inside, progressively and without shock over a period of 10 s to 20 s and within 5° perpendicular to the plane. The load was applied via an articulated pad secured to a nominal 150 mm x 150 mm plywood block of 25 mm minimum thickness, and maintained until it has been held for 8 s to 12 s. If failure of the glazing system is exhibited at the corners then the loading test was continued along each of the section in an attempt to deglaze the window.

Mechanical Loading Test

General - Applied and removed the loads at each loading point within a 5 min period (at each loading point).

The loading consisted of an application of parallel-to-plane load which was maintained until a perpendicular-to-plane load has been applied and removed.

The required loads were applied to each designated loading point in turn until all loading points have been subjected to test. If, during the loading, primary component failure occurs, the effect this failure has on the security of the product was assessed by loading all designated points up to but not including the loading point that exhibited this primary component failure. If further primary component failure occurs the process was repeated with all designated loading points up to, but not including, the loading point that exhibited this primary component failure being subjected to test, including those that may have been previously loaded. If secondary component failure occurs a further sequence was not initiated but the present sequence was completed. Loading was continued until there has been a complete sequence of loading with no further primary component failure.

Parallel-to-plane loading

Windows, not including vertical sliding windows - A parallel-to-plane load of 1.0 kN was applied progressively and without shock over a period of not more than 30 s. This parallel-to-plane load was maintained until either the perpendicular-to-plane loading is completed and removed or a perpendicular-to-plane movement of 150 mm was achieved. The load was removed without shock over a period not exceeding 30 s.

The load was applied through suitable bracket(s). The bracket was located on the opening face of the vent frame.

For loads that are parallel-to-plane along the edge, The force was applied at the corner of the vent with a line of action which is parallel to the edge and directed towards the adjacent corner.

For loads that are parallel-to-plane at right angles to edge, a force was applied at the vent frame between the corners and with a line of action which is at right angles to the edge and directed towards the opposite edge. On multilights only, an opposing force was applied to the mullion or transom (fixed or non-fixed) on the opposite side to the opening face, where the locking point is between the vent frame and the mullion or transom.

Vertical sliding windows - For parallel-to-plane loads of 1.0 kN applied in directions other than the normal vertical opening direction, these loads were applied as detailed above.

For parallel-to-plane loads of 3.0 kN applied vertically in the normal direction of opening, the loads depending

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The load was applied through suitable bracket(s). The bracket was located on the opening face of the vent frame.

A load of 3.0 kN was applied progressively and without shock over a period of between 10 s and 20 s until either it has been held for between 8 s and 12 s or until entry has been gained.

Perpendicular-to-plane loading

Non-vertical sliding window - A perpendicular-to-plane load was applied to the face of the vent frame and in the direction of opening for an opening vent or in the direction of removal for a dummy vent and fixed light. It was ensured that the line of force of this load passes as closely as possible through the centre of the contact area of the locking point within a radial tolerance of 50 mm. The load was applied within 5° perpendicular to the plane. Where two adjacent loading points are within 100 mm, a single loading point was used midway between the original loading

In multilight windows, the mullion or transom was prop to prevent movement adjacent to the point where the perpendicular-to-plane load is applied (note - propping is only carried out when loading vent to mullion/transom locking points).

A load of 3.0 kN was applied progressively and without shock over a period of between 10 s and 20 s until either it has been held for between 8 s and 12 s or until entry has been gained.

If the 3.0 kN load is held, the load was removed without shock over a period not exceeding 20 s.

Vertical sliding window - The perpendicular-to-plane loading was applied directed from the exterior of the sample towards the interior. In the loading cases given in PAS 24:2016 table C.1, 11) and 12), an equal and opposite force was applied to the outer meeting rail. Where two adjacent loading points are within 100 mm, a single loading point midway between the original points was used. The load was applied as closely to the outer edge of the vent frame as is practicable.

For loads exerting a force of 1.0 kN, the perpendicular-to-plane load was applied progressively and without shock over a period of not more than 30 s. This load was maintained until either the parallel-to-plane loading is completed and removed or a parallel-to-plane movement of 150 mm was achieved. The load was removed without shock over a period not exceeding 30 s. The load was applied through suitable bracket(s).

For loads exerting a force of 3.0 kN, the load was applied in accordance with the procedures below, depending on the type of locking hardware fitted to the window.

A load of 3.0 kN was applied progressively and without shock over a period of between 10 s and 20 s until either it has been held for between 8 s and 12 s or until entry has been gained.

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Manual Check Test

Tools specified in PAS 24:2016 B.4.6.2 were used, attempt was made to gain entry by levering at any location and in any direction such that the combined direction and location of the forces exhibited by the standard loading cases are not replicated.

Attempts were made to gain entry by defeating any hinge, locking point, fixing point or other potentially vulnerable locations. All attempts were made from the exterior face of the sample.

The overall attack time limit for this test was 15 min. No single technique was used for more than 3 min and no location was attacked for more than 6 min.

The test was conducted with any one or two of the tools specified for each technique.

If entry was gained, the method was recorded, the direction of applied loads noted, new loading positions and directions defined for parallel-to-plane and perpendicular-to-plane loads. An additional mechanical loading test was performed in accordance with additional mechanical loading test.

Where entry was gained in the manual check test and a mechanical loading test cannot be devised to replicate the mode of loading, such windows is considered as outside the scope of the specification.

Additional Mechanical Loading Test

This additional mechanical loading test was carried out in accordance with testing method, using the loading configurations as defined by the manual check test.

Where entry was gained in the manual check test and a mechanical loading test cannot be devised to replicate the mode of failure, such windows shall be considered to be outside the scope of this specification.

Test Results

Manipulation Test a)

Location	Attack Method	Tools	Time
MNA1	Removal of trim sections	Paint Scraper	03:00
MNA2	Removal of trim sections	Craft Knife	03:00
MNA3	Insertion of a tool to slide latches or bolts		03:00
MNA4	Removal of trim sections	Paint Scraper Paint Scraper	03:00
MNA5	Insertion of a tool to slide latches or bolts	Paint Scraper Paint Scraper	03:00

Result	Pass
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Infill Medium Removal Manual Test

Location*	Sash	Attack Method	Tools	Time
IM1	Side Hung	Attempt to remove gaskets Attempt to remove beads	Craft Knife 6 mm Wood Chisel	03:00
IM2	Fixed	Attempt to remove gaskets Attempt to remove beads	Craft Knife 6 mm Wood Chisel	03:00

Result	Pass
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Manual Check Test

Location*	Attack Method	Tools	Time
MCH1	Attempt to gain entry by levering in any direction such that the combined direction & location of the forces exhibited by the standard loading cases are not replicated.	Nail Bar	03:00
MCH2	Attempt to gain entry by levering in any direction such that the combined direction & location of the forces exhibited by the standard loading cases are not replicated.	Nail Bar	03:00
MCH3	Attempt to gain entry by levering in any direction such that the combined direction & location of the forces exhibited by the standard loading cases are not replicated.	Flat Bladed Screwdriver	03:00
MCH4	Attempts made to gain entry by defeating any hinge, locking point & fixing point or other potentially vulnerable locations.	Nail Bar Flat Bladed Screwdriver	03:00
MCH5	Attempts made to gain entry by defeating any hinge, locking point & fixing point or other potentially vulnerable locations.	Nail Bar Nail Bar	03:00

Result	Pass
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Mechanical Test on Infill

Sash	Location	Load (kN)	Result
Side Hung	Top Left Corner	2.0	Pass
Side Hung	Top Right Corner	2.0	Pass
Side Hung	Bottom Right Corner	2.0	Pass
Side Hung	Bottom Left Corner	2.0	Pass
Fixed	Bottom Left Corner	2.0	Pass
Fixed	Bottom Right Corner	2.0	Pass
Fixed	Top Right Corner	2.0	Pass
Fixed	Top Right Corner	2.0	Pass

Result	Pass
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Mechanical Loading Testing

Location*	Standard Loading Case	Parallel to Plane Load	Equal & Opposite	Perpendicular to-Plane	Propping Condition	Direction of Load	Result
ML1	Variable geometry stay and top swing sash guide fixed to outer frame	1.0 kN towards the other stay	None	3.0 kN at the corner	None	→ ↓	Pass
ML1	Dog bolts or other hardware specifically to provide security where hardware is fixed to outer frame	First test: 1.0 kN at right angles to the edge. Second test: 1.0 kN along the edge towards the opposite edge.	First test: None Second test: None	First test: 3.0 kN centred over the hardware. Second test: 3.0 kN centred over the hardware.	First test: None Second test: None		Pass
ML2	Bolts, mushroom bolts, cams and roller cams with or without mushroom restraints where keep is fixed to transom, mullion or opening vent	First test: 1.0 kN along the edge in the direction to disengage the bolt. Second test: 1.0 kN at right angles to the edge towards the opposite edge	First test: None Second test: 1.0 kN at right angles to the edge away from the opposite edge	First test: 3.0 kN centred over the bolt Second test: 3.0 kN centred over the bolt	First test: Propped on transom, mullion or opening vent Second test: Propped on transom, mullion or opening vent	↓ ←	Pass

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Location*	Standard Loading Case	Parallel to Plane Load	Equal & Opposite	Perpendicular to-Plane	Propping Condition	Direction of Load	Result
ML3	Bolts, mushroom bolts, cams and roller restraints where keep is fixed to transom, mullion or opening vent	First test: 1,0 kN along the edge in the direction to disengage the bolt. Second test: 1,0 kN at right angles to the edge towards the opposite edge	First test: None Second test: 1,0 kN at right angles to the edge away from the opposite edge	First test: 3,0 kN centred over the bolt Second test: 3,0 kN centred over the bolt	First test: Propped on transom, mullion or opening vent Second test: Propped on transom, mullion or opening vent	↓	Pass
ML4	Bolts, mushroom bolts, cams and roller cams with or without mushroom restraints where keep is fixed to transom, mullion or opening vent	First test: 1,0 kN along the edge in the direction to disengage the bolt. Second test: 1,0 kN at right angles to the edge towards the opposite edge	First test: None Second test: 1,0 kN at right angles to the edge away from the opposite edge	First test: 3,0 kN centred over the bolt Second test: 3,0 kN centred over the bolt	First test: Propped on transom, mullion or opening vent Second test: Propped on transom, mullion or opening vent	↓	Pass
ML5	Bolts, mushroom bolts, cams and roller cams with or without mushroom restraints where keep is fixed to transom, mullion or opening vent	First test: 1,0 kN along the edge in the direction to disengage the bolt. Second test: 1,0 kN at right angles to the edge towards the opposite edge	First test: None Second test: 1,0 kN at right angles to the edge away from the opposite edge	First test: 3,0 kN centred over the bolt Second test: 3,0 kN centred over the bolt	First test: Propped on transom, mullion or opening vent Second test: Propped on transom, mullion or opening vent	↓	Pass
ML6	Bolts, mushroom bolts, cams and roller cams with or without mushroom restraints where keep is fixed to transom, mullion or opening vent	First test: 1,0 kN along the edge in the direction to disengage the bolt. Second test: 1,0 kN at right angles to the edge towards the opposite edge	First test: None Second test: 1,0 kN at right angles to the edge away from the opposite edge	First test: 3,0 kN centred over the bolt Second test: 3,0 kN centred over the bolt	First test: Propped on transom, mullion or opening vent Second test: Propped on transom, mullion or opening vent	↑	Pass
ML7	Variable geometry stay and top swing sash guide fixed to outer frame	1,0 kN towards the other stay	None	3,0 kN at the corner	None	↑	Pass

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Location*	Standard Loading Case	Parallel to Plane Load	Equal & Opposite	Perpendicular to-Plane	Propping Condition	Direction of Load	Result
ML7	Dog bolts or other hardware specifically to provide security where hardware is fixed to outer frame	First test: 1.0 kN at right angles to the edge. Second test: 1.0 kN along the edge towards the opposite edge.	First test: None Second test: None	First test: 3.0 kN centred over the hardware. Second test: 3.0 kN centred over the hardware.	First test: None Second test: None		Pass

Result	Yes
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Manipulation Test b)

Result	Pass - No Exposed Threaded Fasteners
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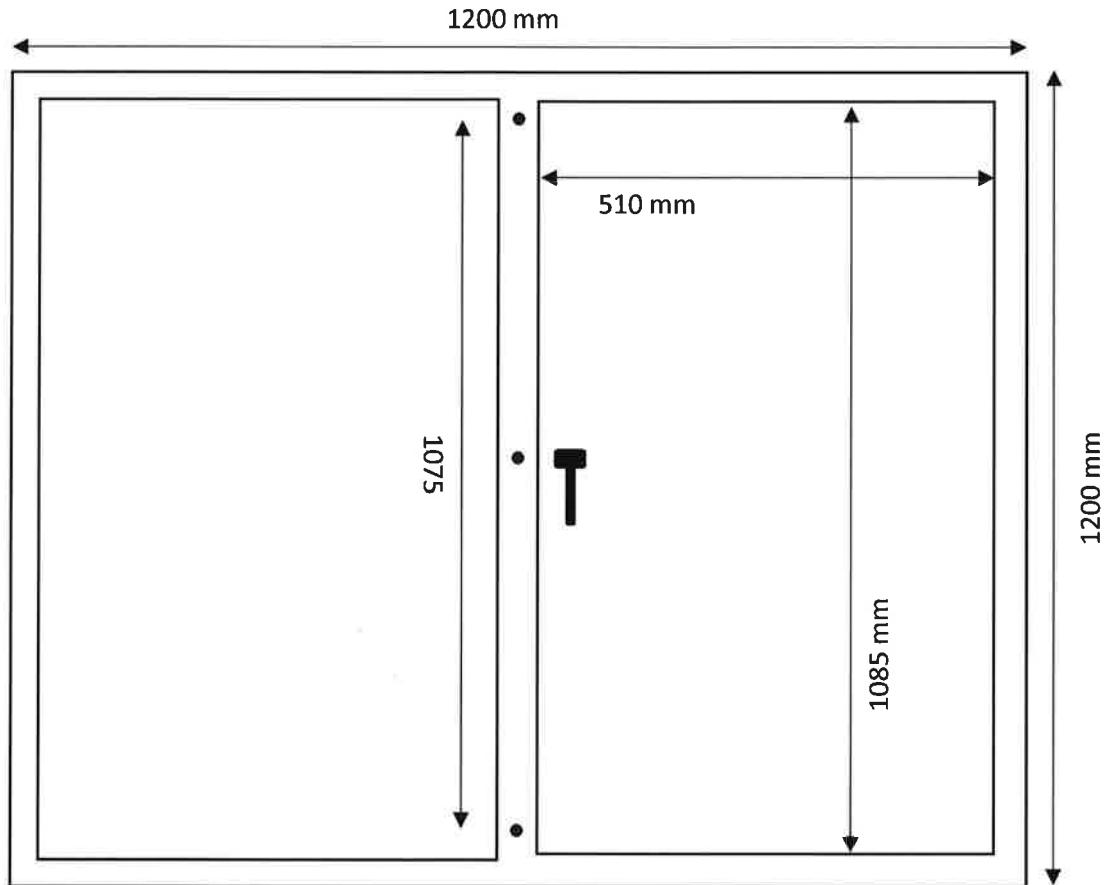
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Drawing of Test Sample



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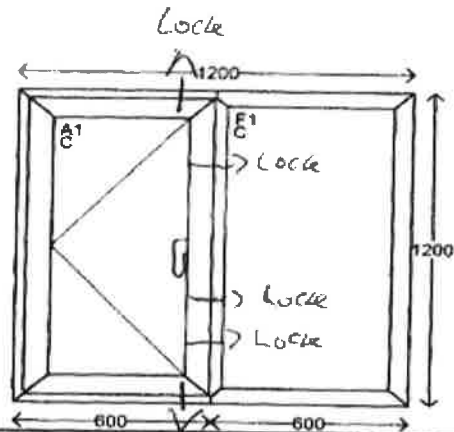
Customer: KITSON WINDOWS	Glazed	Input Info: 11-09-2017 darrin.jobling
Reference: TEST	Supply only	In Production
Job No. : 99547 (Item: 1)	Page 1 of 1	Print Info: 22-09-2017 1:40 pm

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



Aperture Options: Locke **Ref:** (A1)(E1)

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	1/-		
Hor Frame	QC02 60mm Outerframe	3	605	1/-*		
Hor Frame	QC02 60mm Outerframe	3	605	1/1		
Hor Frame	QC02 60mm Outerframe	3	605	1/1*		
Ver Frame	QC02 60mm Outerframe	3	1205	1/1		
Ver Frame	QC02 60mm Outerframe	3	1205	1/1*		
Ver Mullion	QC11 66mm Z Section	3	1217	<->	QX10 Transom RCM	1070
Hor Sash	QC30 Casement T Sash	6	569	1/1*		
Ver Sash	QC30 Casement T Sash	3	1142	1/1*	QR315 Steel	977
Ver Sash	QC30 Casement T Sash	3	1142	1/1*	QX30 RCM	977

Bead type	QC50. Glazing Bead	18888	* Denotes bar reversed
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Accessories Required:		Qty	Length	
9366 12" Egress		3		Pairs
OB140 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