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CONFIDENTIAL

TEST REPORT TR1419/A - PAS24 (WINDOWS)

Customer: Hansen Group Ltd.

Address: Greengate Industrial Park
Greenside Way
Middleton
Manchester
M24 1SW

Product ID: Millennium Open-In Turn-Tilt Aluminium Window with Fixed Sidelight.

Date of report: October 2014.

Test performed to (specification):

- **PAS24: 2012**
Enhanced security performance requirements for doorsets and windows in the UK.
External door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk.

Test element(s):

- C.4.3, C.4.4.2, C.4.4.3, C.4.5 and C.4.6.

Window classification:

- WK

Issue 1	16 / 10 / 2014	PDF copy
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TEST REPORT TR1419/A - PAS24 (WINDOWS)

1. INTRODUCTION

Following enquiries from Mr. Tomas Andersen of Hansen Group Ltd, Winkhaus Laboratory was commissioned to undertake the testing of 2No. Millennium Open-In Turn-Tilt Aluminium Windows with Fixed Sidelight to PAS24: 2012, having been issued Laboratory reference TR1419/A.

- Entry criteria: 3.9. Removable key from inside Creation of an aperture through which a 500mm long cylindroid with an elliptical section of 225mm x 380mm can pass freely.
- Test(s) performed on: Mechanical loading test rig WL118 / WL119.
- Date of Manufacture: April 2014.
- Date Samples received: 12 / 05 / 2014.
- Date of Test: Started 12 / 05 / 2014 and Completed 15 / 05 / 2014.
- Test Engineers: Mr. Ade Collins and Mr. Ross Howitt-page.

2. OBJECTIVE

Test 2No. Windows to:

PAS24: 2012

Enhanced security performance requirements for doorsets and windows in the UK.
External door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk.

3. SECTION & DESCRIPTION OF TEST

Sample 1 Open-In Turn-Tilt Aluminium Window with Fixed Sidelight.

- C.4.3 Manipulation Test.
- C.4.4.2 Manual Test - Infill.
- C.4.6 Manual Check Test.

Sample 2 Open-In Turn-Tilt Aluminium Window with Fixed Sidelight.

- C.4.4.3 Mechanical Test - Glass.
- C.4.5 Mechanical Test - Hardware.

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4. WINDOW CONSTRUCTION

Window manufactured by: Hansen Group Ltd.

Frame: Hansen profile systems 42, code: 421113.

Frame size: 1600mm (W) x 2210mm (H) x 76mm (T).

Frame joint: Mechanical joint.

Frame joint fixings:

- Adhesive: Kent, Quick-seal QS-b or Rotabond 2000, code: black 92951, white 92961, grey 92941.
- 2No. (Per joint) SAPA Corner connector cleat, code: 182311.
- 2No. (Per joint) Zinc, CSK, Gimlet point screws 4.8mm x 32mm, code: 95651.

Frame gasket: Primo a/s, Black flipper gasket, code: 160363.

Frame rebate: Sapa a/s, code: 425413.

Frame rebate fixings: (per 200mm) 13mm x 3.5mm screws, code: 95101.

Frame rebate gasket: Lynddahl a/s black bubble gasket, code: 161271.

Mullion: Hansen profile systems 42, code: 422083.

Mullion joint: Mechanical joint.

Mullion joint fixings: 2No. (Per joint) Zinc, CSK, Gimlet point screws 4.8mm x 32mm, code: 95651.

Sash: Hansen profile systems 42, code: 423153.

Sash size(s): 1091mm (W) x 2194mm (H) x 40mm (T).

Sash joint: Mechanical joint.

Sash joint fixings:

- Adhesive: Kent, Quick-seal QS-b or Rotabond 2000, code: black 92951, white 92961, grey 92941.
- 1No. (Per joint) SAPA Corner connector cleat, code: 183871
- 1No. (Per joint) SAPA Corner connector cleat, code: 183971.
- 1No. (Per joint) SAPA punched corner connector, code: 180081.

Sash gasket: Primo a/s, Black rubber bubble gasket: 160171.

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WINDOW CONSTRUCTION - continued

Glazing Manufacturer: Scanglas A/S.

Glazing sizes: (29mm), 8.6mm Laminated, 12mm Silver Aluminium Spacer, 8.6mm Laminated.

- Sash, 1No. 1033mm (W) x 2135mm (H) x 29mm (T).
- Sidelight, 1No. 470mm (W) x 2170mm (H) x 29mm (T).

Glazing gasket:

- Internal, Norton band PUR-Foam strip, 4.8mm code: 90961, 6.4mm code: 90971.
- Internal, Dow corning 895 1 part silicone rubber, code: 91000010 or GE SSG4400, code: 91000030.
- External, Primo a/s large black flipper gasket, code: 161101.

Glazing packer plastic:

- For sash: Pode plast a/s, code: 94521.
- For fixed lights: Carl Ras a/s, code: 151411.

Glazing packer metal:

- For sash: Lem Beslag a/s, code: 425233.
- For fixed lights: Lem Beslag a/s, code: 151361.

WINDOW CONSTRUCTION - HARDWARE

All sash hardware fixings: 21.8mm x 3.8mm zinc drill point CSK screws, code: 98741.

Winkhaus select sash hardware from bottom hinge round the sash in a clockwise direction.

- FL. SE, code: 38561.
- FLS. SE, code: 38551.
- VAK 450-1, code: 60078.
- MK500, code: 39261.
- MK500, code: 39261.
- MK PA250, code: 60077.
- E1, code: 39101.
- OS.V-OS.VV 1250-1 FFB 1000-12510 V1, code: 32951.
- E2, code: 32651.
- Failsafe, code: 60079.
- GAM 2300 D7.5 FFH 1800-2300, code: 39421.
- E2, code: 32651.
- MK250, code: 39251.
- VAK 450-1, code: 60078.

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WINDOW CONSTRUCTION - HARDWARE

Frame hardware

Single mushroom keeps: 12No. Winkhaus, J-RS Security keeps, code: 60075.

Single mushroom keep fixings: 2No. 20mm x M4 through frame into weld nut, fixing code: 94211, weld nut code: 96251.

Double mushroom keep: 1No. Winkhaus, J-RS Security keeps, code: 60073.

Double mushroom keep fixings: 3No. 20mm x M4 through frame into weld nut, fixing code: 94211, weld nut code: 96251.

Tilt keep: Winkhaus, J-RS Security keeps, code: 60074.

Tilt keep fixings: 2No. 20mm x M4 through frame into weld nut, fixing code: 94211, weld nut code: 96251.

Top hinge: Winkhaus, G4075204, code: 60065.

Top hinge fixings: 4No. 13mm x 3.9mm zinc drill point CSK screws, code: 98711.

Bottom hinge: Winkhaus, 20-9R, code: 60067.

Bottom hinge fixings: 8No. 13mm x 3.9mm zinc drill point CSK screws, code: 98711.

Sash to frame 90° restrictor: Winkhaus, DB.SE.1, code: 38601.

Sash to frame 90° restrictor fixings: 3No. 13mm x 3.9mm zinc drill point CSK screws, code: 98711.

Handle: FKS OKUCIA A DRZWIOWE Sp. Zo.o, code: 1003 A.

Handle screws: 2No. 30mm x M5 fixings as supplied with the handle.

Run-up block: Winkhaus, code: 32081.

Run-up block packer: Lem Beslag a/s, code: 152291.

Run-up block fixings: 2No. 19.5mm x 3.8mm zinc drill point CSK screws, code: 98731.

Sub frame: 44mm (H) x 94mm (W) PSE.

Sub frame screws:

- 2No. (per corner) 82mm x 6mm pan head gimlet point timber screws.
- 8No. (per side) 42mm x 4.8mm pan head gimlet point timber screws.
- 4No. (top / bottom) 42mm x 4.8mm pan head gimlet point timber screws.

Note: Sub-frame & sub-frame fixings used for testing purposes only.

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5. TEST PROCEDURE

SAMPLE 1 TR1419/1 WAS TESTED TO THE FOLLOWING CLAUSES

Clause C.4.3 Manipulation test

The object of this test is to establish that there is no inherent vulnerability in the design which, from the outside, would permit entry by the hardware being operated, released or disengaged. This test shall be carried out with knowledge of the sample and the hardware installed.

Although there is no overall time limit for this test, no one technique shall be used for more than 3 minutes.

The results are recorded in Appendix 1.

Clause C.4.4.2 Infill manual test

Conduct this test on any infill medium, including glazing.

Attempt 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 minutes.

The results are recorded in Appendix 2.

Clause C.4.6 Manual Check test

The objective of the manual check test is to explore the possibility that vulnerability other than that covered by the standard cases exists.

The overall attack time for this test shall be one 15 minute continuous period; no one test technique shall be used for more than 3 minutes.

The results are recorded in Appendix 3.

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Test procedures continued

SAMPLE 2 TR1419/2 WAS TESTED TO THE FOLLOWING CLAUSES

Clause C.4.4.3 Mechanical test - Infill

Apply a load of 2.0 kN progressively and without shock to every corner of any infill medium and each corner of the boundaries of components within the infill medium in turn and in a direction towards the inside, over a period of 10 s to 20 s and within 5° of the perpendicular to plane and maintain until it has been held for 8 s to 12 s. If local failure of the infill medium retention system is exhibited, repeat the loading test at points along the remainder of the retention system in an attempt to gain entry.

The results are recorded in Appendix 4.

Clause C.4.5 Mechanical loading test

The object of this test is to assess whether the sample can withstand a specified sequence of loading without creating an entry.

The loading shall consist of an application of a parallel to plane load which is applied and maintained until a perpendicular to plane load has been applied and removed.

Apply a parallel to plane load of 1kN progressively and without shock over a period of between 10 & 20 seconds.

Apply a perpendicular load of 3kN progressively and without shock over a period of between 10 & 20 seconds until either:

For removable key lock:

- a) it has been held for between 8 to 12 seconds or
- b) a deflection of 150mm of the sash relative to its frame adjacent to the loading point is achieved.

If a deflection of 150mm is achieved apply a load of 1kN until it has been held for a further 8 to 12 seconds or entry has been gained.

The results are recorded in Appendix 5.

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6. TEST RESULTS

Specification: PAS24: 2012.

Section	Description of Test	Sample Tested	Pass
C.4.3	Manipulation Test	TR1419/1	YES
C.4.4.2	Manual Test - Infill	TR1419/1	YES
C.4.6	Manual Check Test	TR1419/1	* N/A
C.4.4.3	Mechanical Loading Test - Infill	TR1419/2	YES
C.4.5	Mechanical Loading Test	TR1419/2	YES

These results are valid only for the conditions under which the tests were conducted and for the specific window assembly stated.

12 / 05 / 2014

Ambient Temperature during test was Maximum = 24.8deg Cent / Minimum = 23.2deg Cent.
Relative Humidity during test was Maximum = 39%rh / Minimum = 37%rh.

15 / 05 / 2014

Ambient Temperature during test was Maximum = 25.8deg Cent / Minimum = 22.0deg Cent.
Relative Humidity during test was Maximum = 38%rh / Minimum = 37%rh.

* Comments:

C.4.6 manual check test could not be conducted by the test engineer due to the construction of the test sample, the sash has exposed glass edges and therefore attempting to insert the tools between sash and outerframe would result in glass breakage.

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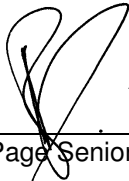
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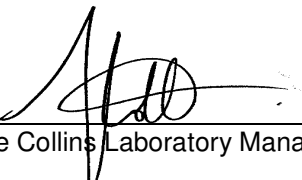
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Testing performed on behalf of Hansen Group Ltd.

PAS24: 2012

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External door sets and windows intended to offer a level of security suitable for dwellings and other buildings exposed to comparable risk.

Signed on behalf of Winkhaus Laboratories: 
Mr. Ross Howitt-Page Senior Laboratory Technician.

Signed on behalf of Winkhaus Laboratories: 
Mr. Ade Collins Laboratory Manager.

Date: 16 / 10 / 2014

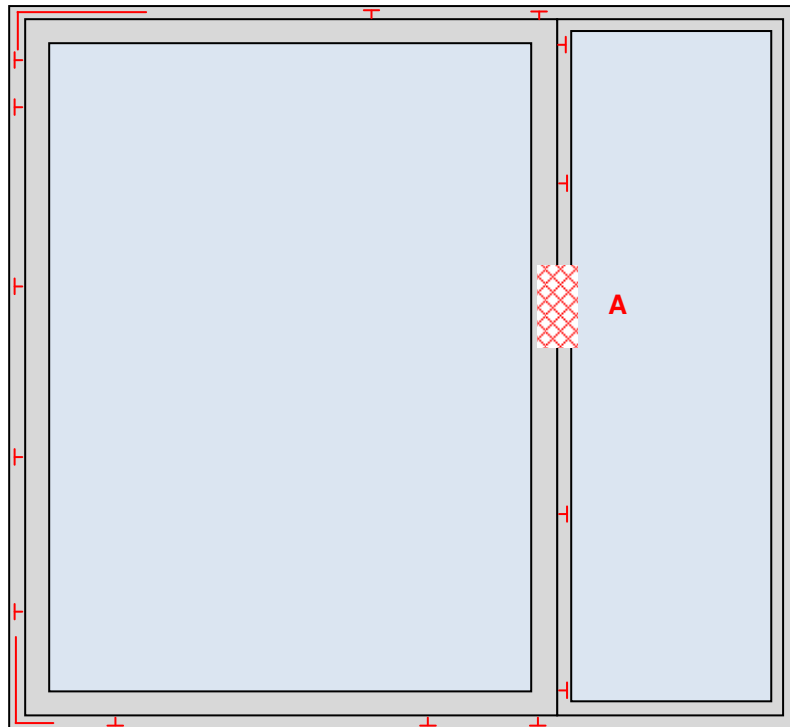
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APPENDIX 1

C.4.3 MANIPULATION TEST - Attack area.

Test carried out on sample TR1419/1.



Sample viewed from outside

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C.4.3. MANIPULATION TEST - Test data.

Tools	Area	Time	Methods	Comment
Paint scraper Craft knife	A	3.00 Minutes	Attempt to expose and manipulate the hardware.	Used the paint scraper to attempt to get between the sash and mullion, but unable to gain any access and no advantage was gained. Changed tool and used the craft knife to slice and cut the mullion gasket in an attempt to gain access, but unable to gain any access and no advantage was gained. Continued with the craft knife using a slicing motion in an attempt to remove material from the mullion upstand to expose the gasket, but time ran out with no advantage being gained.

RESULT: ENTRY NOT GAINED - PASS.

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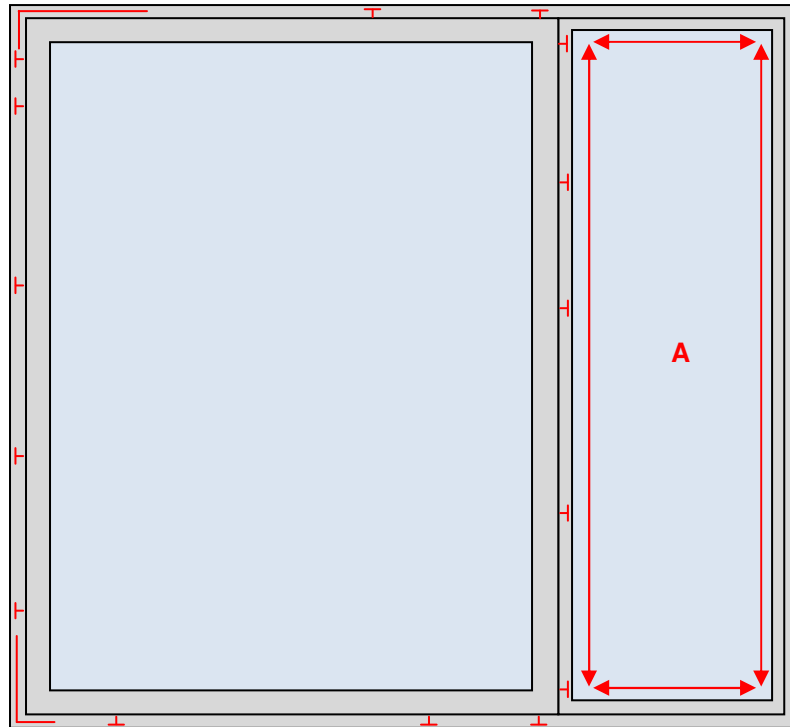
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APPENDIX 2

C.4.4.2. MANUAL TEST INFILL - Attack areas.

Test carried out on sample TR1419/1.



Sample viewed from outside

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C.4.4.2. MANUAL TEST INFILL - Test data.

Tools	Area	Time	Methods	Comment
Paint scraper Craft knife	A	3.00 Minutes	Attempt to remove glass infill panel.	Used the pant scraper in an attempt to pick out the glazing gasket, but no advantage could be gained. Changed tool and used the craft knife to slice and cut the side glazing gasket, causing the gasket to fall out of the sidelight and then pulled the glazing gasket by hand and removed it from all four sides. Used blows by hand to the surface of the glazing unit in an attempt to dislodge the glazing unit, which may cause the internal glazing gasket and glazing beads to release, but time ran out with no advantage being gained.

RESULT: ENTRY NOT GAINED - PASS.

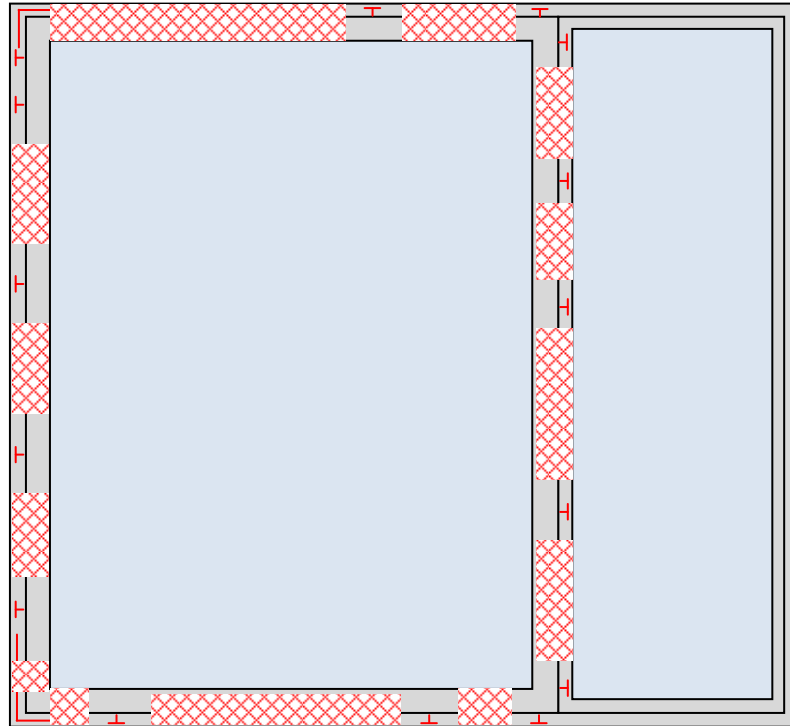
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APPENDIX 3

C.4.6. MANUAL CHECK TEST - Attack area.



Sample viewed from outside

 Areas that could have potentially been assessed.

C.4.6. MANUAL CHECK TEST - Test data.

Observation:

C.4.6 manual check test could not be conducted by the test engineer due to the construction of the test sample, the sash has exposed glass edges and therefore attempting to insert the tools between sash and outerframe would result in glass breakage.

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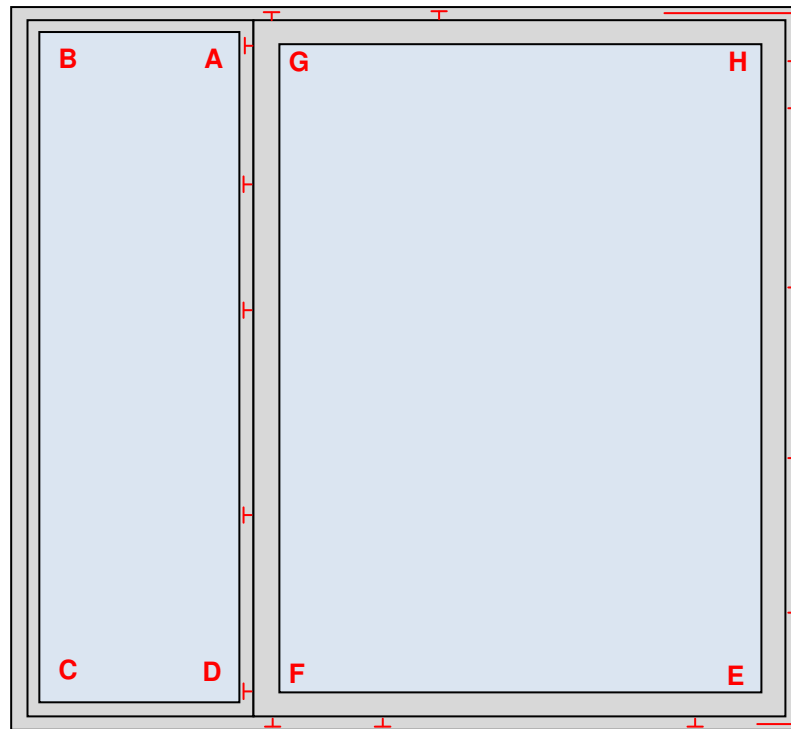
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APPENDIX 4

C.4.4.3. MECHANICAL LOAD INFILL - Attack areas.

Test was carried out on sample TR1419/2.



Sample viewed from inside.

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C.4.4.3. MECHANICAL LOAD INFILL - Test data.

Test Position	Perpendicular Load Applied N	Time Held In Seconds	Entry Gained
Fixed Light			
A	2001	10	NO
B	2005	10	NO
C	2003	10	NO
D	2006	10	NO
Sash			
E	2004	10	NO
F	2010	10	NO
G	2009	10	NO
H	2004	10	NO

RESULT: ENTRY NOT GAINED - PASS.

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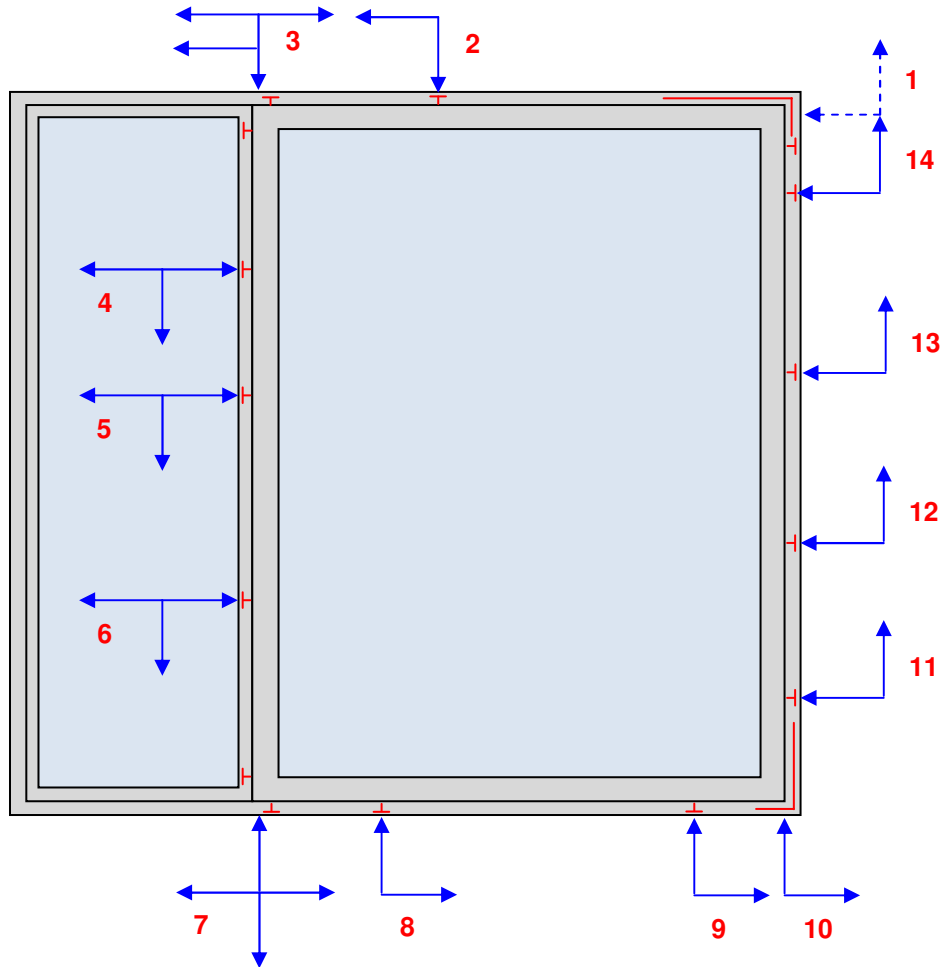
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APPENDIX 5

C.4.5 MECHANICAL LOADING TEST LOADNG POINTS DIAGRAM.

Test was carried out on sample TR1419/2.



Sample viewed from Inside.

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C.4.5 MECHANICAL LOADING TEST - Test data.

Test Position	Type Of Parallel Load	Parallel Load	Perpendicular Load	Time Held	Deflection Achieved	Component Failure	Entry Gained
1	A	1003	3011	10	5	NO	NO
	B	991	3003	10	5	NO	NO
2	A	1010	3004	10	3	NO	NO
	B	1011	3001	10	2	NO	NO
3	A	1006	3003	10	2	NO	NO
	B	1007	3016	10	2	NO	NO
	B	1010	3002	10	3	NO	NO
	C	1007	3002	10	3	NO	NO
4	A	995	3005	10	4	NO	NO
	B	1006	3008	10	4	NO	NO
	C	997	3008	10	4	NO	NO
5	A	1006	3003	10	9	NO	NO
	B	1004	3004	10	9	NO	NO
	C	999	3004	10	9	NO	NO
6	A	1006	3003	10	5	NO	NO
	B	1004	3005	10	6	NO	NO
	C	1006	3005	10	6	NO	NO
7	A	1010	3003	10	2	NO	NO
	A	1001	3001	10	2	NO	NO
	B	1004	3002	10	3	NO	NO
	C	1006	3002	10	3	NO	NO
8	A	1003	3002	10	2	NO	NO
	B	1008	3006	10	2	NO	NO
9	A	1001	3006	10	2	NO	NO
	B	997	3006	10	1	NO	NO
10	A	998	3004	10	6	NO	NO
	B	1006	3007	10	5	NO	NO
11	A	1003	3010	10	2	NO	NO
	B	1008	3000	10	2	NO	NO

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C.4.5 MECHANICAL LOADING TEST - Test data - continued.

Test Position	Type Of Parallel Load	Parallel Load	Perpendicular Load	Time Held	Deflection Achieved	Component Failure	Entry Gained
12	A	1008	3006	10	6	NO	NO
	B	1000	2999	10	4	NO	NO
13	A	1004	3005	10	5	NO	NO
	B	1006	3006	10	4	NO	NO
14	A	1010	3002	10	4	NO	NO
	B	1006	3007	10	3	NO	NO

RESULT: ENTRY NOT GAINED - PASS.

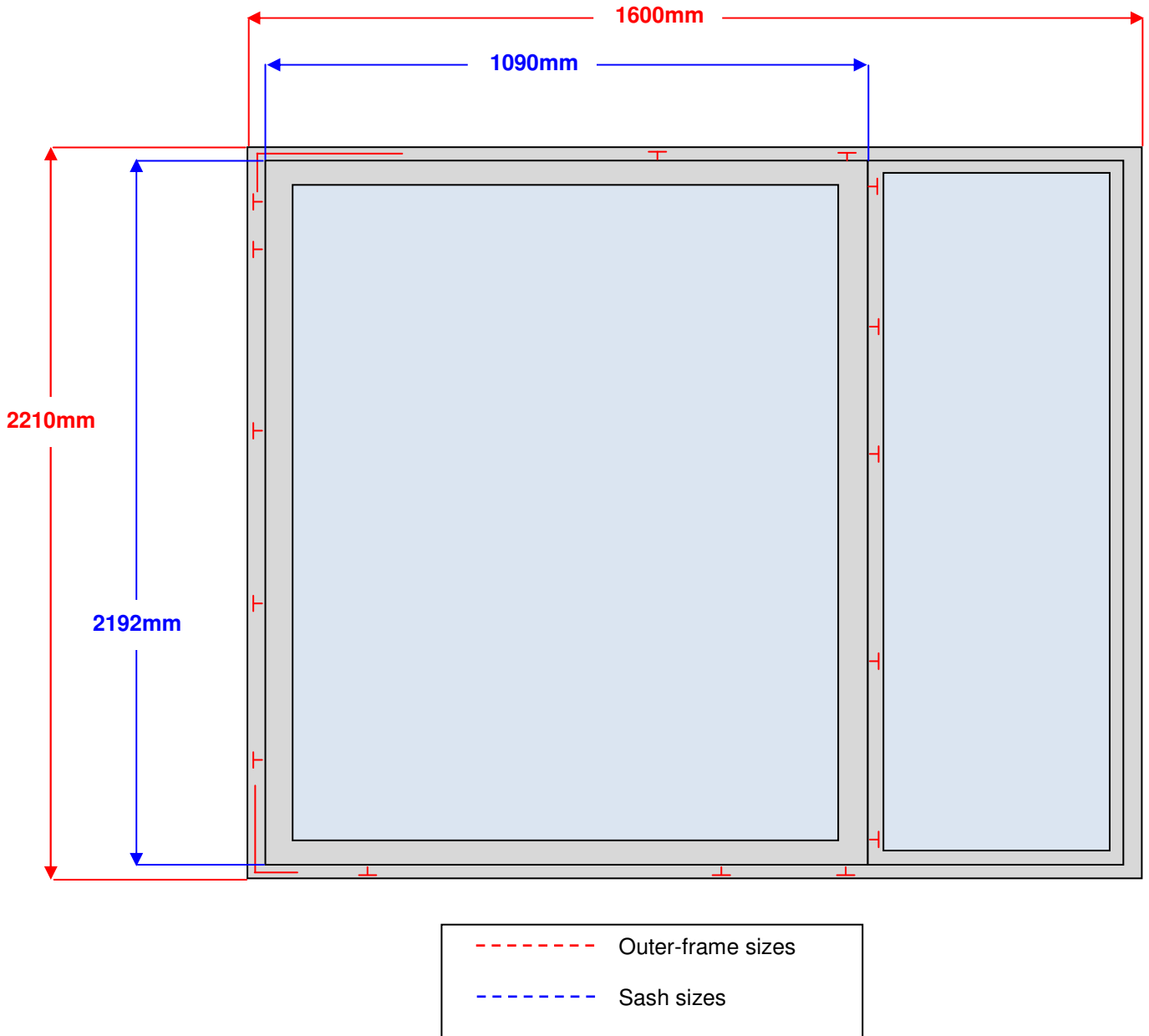
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APPENDIX 6

OVERALL DIMENSIONS OF WINDOW.



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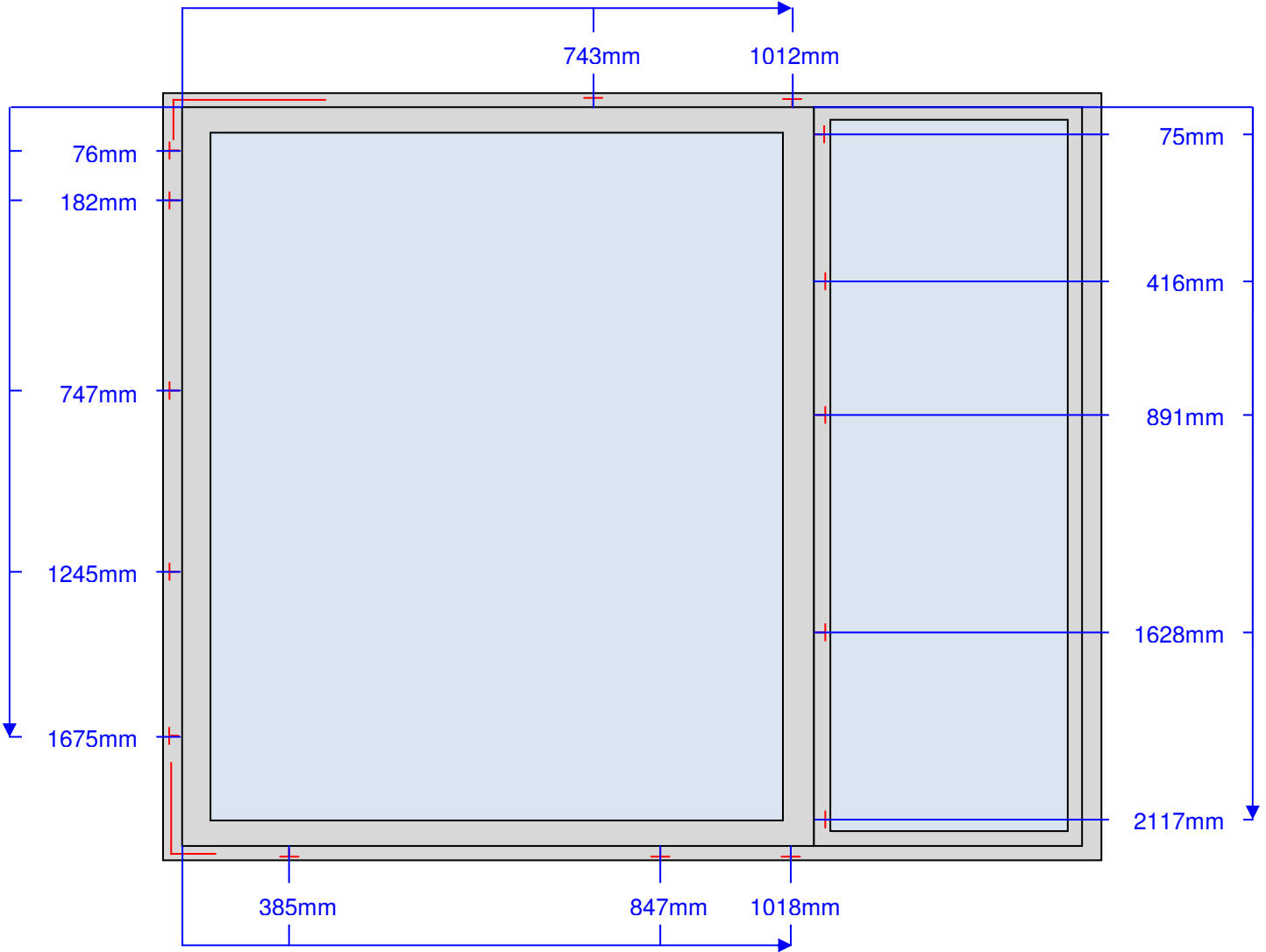


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APPENDIX 7

COMPONENT LOCATIONS: Measurements taken from edges of the sash.



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APPENDIX 8

PHOTOGRAPH OF SAMPLE: Internal view of TR1419/2.



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APPENDIX 9

PHOTOGRAPH OF SAMPLE: External view of TR1419/1.



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APPENDIX 10

LIST OF TESTING APPARATUS.

Ref No	Description
WL114/2A & 2B	2 No. Paint scrapers 75mm wide
WL114/3	1 No. Craft knife (Stanley type) 180mm long, 28mm +/- 7mm blade length
WL118	Hydraulic control system for WL119
WL119	Mechanical loading test rig
WL129	Stopwatch
WL141/A	Measuring tape

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