

PAS 24:2016

Annex C



Test of: SPW600 Tilt & Turn Inward Opening (AluPilot Gearing)

Enhanced security performance requirements for windows

A Report To:
Senior Architectural Systems
Eland Road, Denaby Main, Doncaster, DN12 4HA

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WIL 509165

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TEST CONCLUSIONS

Samples of:
 Manufacturer Senior Architectural Systems
 Product Window
 Model SPW600 Tilt & Turn Inward Opening (AluPilot Gearing)

have been tested in accordance with: PAS24:2016 Annex C.
 By Element Materials Technology, a UKAS accredited Testing Laboratory (No. 0621)

At Unit 3 Wednesbury One, Black Country New Road, Wednesbury, WS10 7NZ.
 Results and comments as detailed below:

Clause No.	Description	Compliance
4	Enhanced security performance requirements	No
4.1.1	Classification of use	No
4.2	Infill medium	N/A
4.3	Letterplates	N/A
4.4	Classification	W
5	Marking	No
6	Design and general requirements	No
Annex C	Enhanced security performance for windows	Yes
C.4.3	Manipulation test	Yes
C.4.4.2	Infill manual test	Yes
C.4.4.3	Infill mechanical test	Yes
C.4.5	Mechanical loading test	Yes
C.4.6	Manual check test	Yes
C.4.7	Additional mechanical loading test	N/A

No inferences can be made regarding performance against other requirements of this standard

Tests marked N/A are not applicable to the sample under test.
 Tests marked N/T were not applied to the sample under test

AUTHORISATION

Tests performed by: Reece Devey, Trainee Test Engineer
Brett Devey, Test Engineer

Report issued by: Brett Devey, Test Engineer

Signed



Date 30th November 2021

For and on behalf of Element Materials Technology

Report authorised by: Mark Garfield, Door & Window Laboratory Manager

Signed



Date 13/12/2021

For and on behalf of Element Materials Technology

Report issued: 14 December 2021



0621

NOTE.

Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.

The laboratory has tested the product supplied by the client as sampled in accordance with their own requirements

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TEST DETAILS

CLIENT DETAILS

Company name Senior Architectural Systems
Address Eland Road
Denaby Main
Doncaster
DN12 4HA

Contact Andrew Phillips

ORDER DETAILS

Order number 7304
Dated 28/09/2021

SAMPLE DETAILS

Outer frame 1555 x 1555 x 75mm
Opening casements 1500 x 1500 x 75mm
Configuration Inward-opening tilt & turn window
Material Aluminium
Details of Hardware
Hinges Senior Architectural Systems Tilt & Turn Gearing
Lock Senior Architectural Systems ST81705 Tilt & Turn Base Set Locking Keeps & ST21050 Locking Keeps
Handles Senior Architectural Systems Tilt & Turn Locking Handle. Ref: SPWTTHB

TEST DETAILS

Test specification PAS 24:2016
Full test Yes
Test to clauses Annex C

Sample received 15/11/2021
Test started 17/11/2021
Test completed 17/11/2021

Special Test requirements
Other reports to be used in conjunction with this report

Test rig used Testing carried out in PAS24 test rig reference WYC

TEST PROCEDURE

Introduction	<p>This test report should be read in conjunction with the Standard PAS 24:2016 Enhanced security performance requirements for doorsets and windows in the UK.</p> <p>The specimens were judged on their ability to comply with the performance criteria as required in PAS24:2016 Annex C.</p>
Instruction To Test	<p>Initial requirement was for a classification of W for windows.</p>
Test Specimen Construction	<p>A description of the test construction is given in the Schedule of Components. The description is based on a detailed survey of the specimens and information supplied by the sponsor of the test.</p>
Installation	<p>The window was supplied mounted within an aluminium sub-frame of nominal section 75 x 100mm fitted flush with the exterior face, in accordance with the clients fitting instructions.</p>
Sampling	<p>The samples were not independently witnessed or selected and were provided direct from the test sponsor.</p>
Test Climate	<p>The sample was conditioned in the laboratory in the range 15-30 °C and 25-75% humidity for at least 12 hours.</p> <p>The temperature and humidity in the lab was maintained in the range 17.4-21.1°C and 34.6-40% humidity for the duration of the test.</p>

INITIAL OBSERVATIONS

**The internal face
of the sample**



**The external face
of the sample**



Sample hinge



Sample handle



**Sample locking
cam**

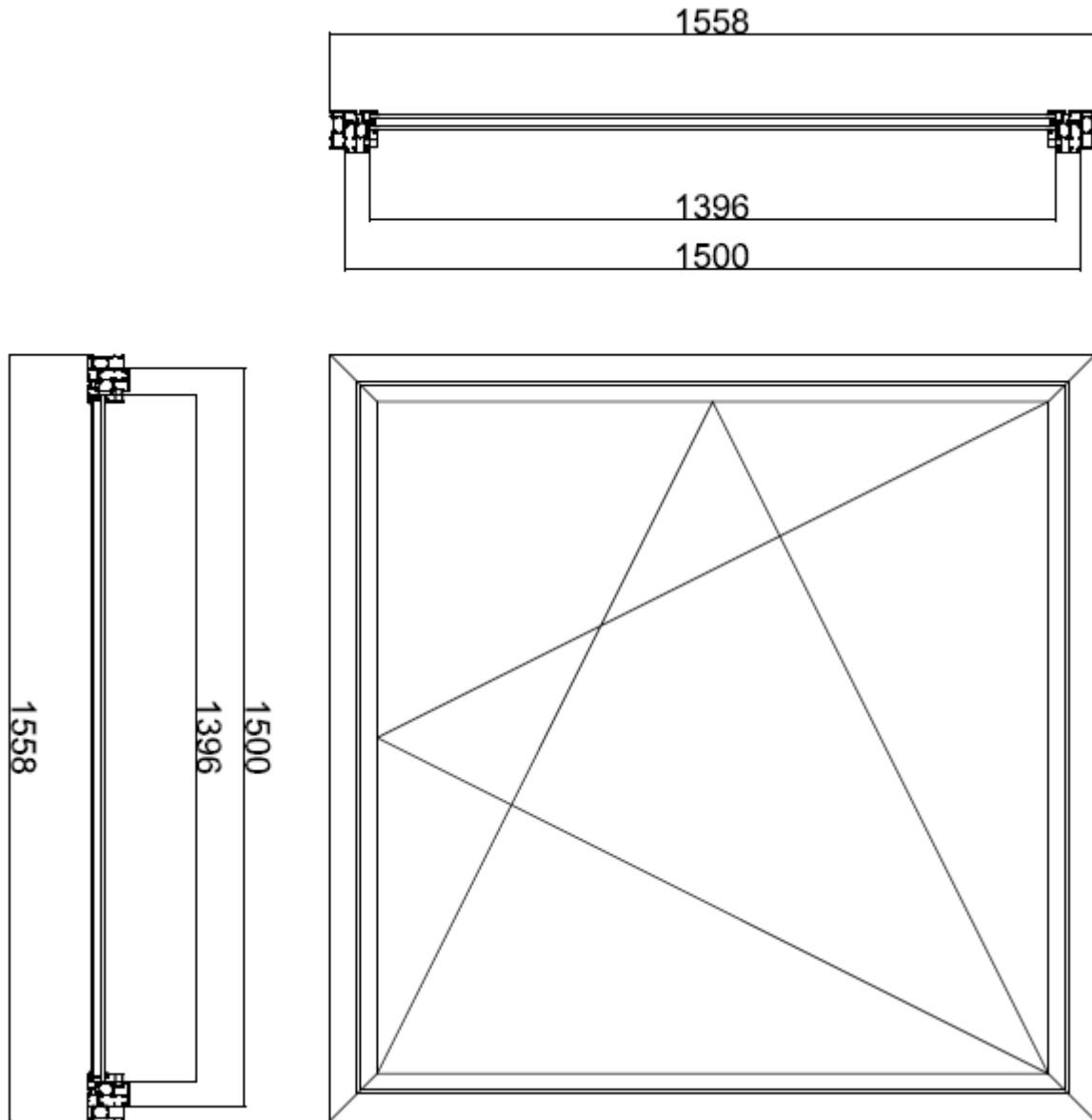


Sample keep



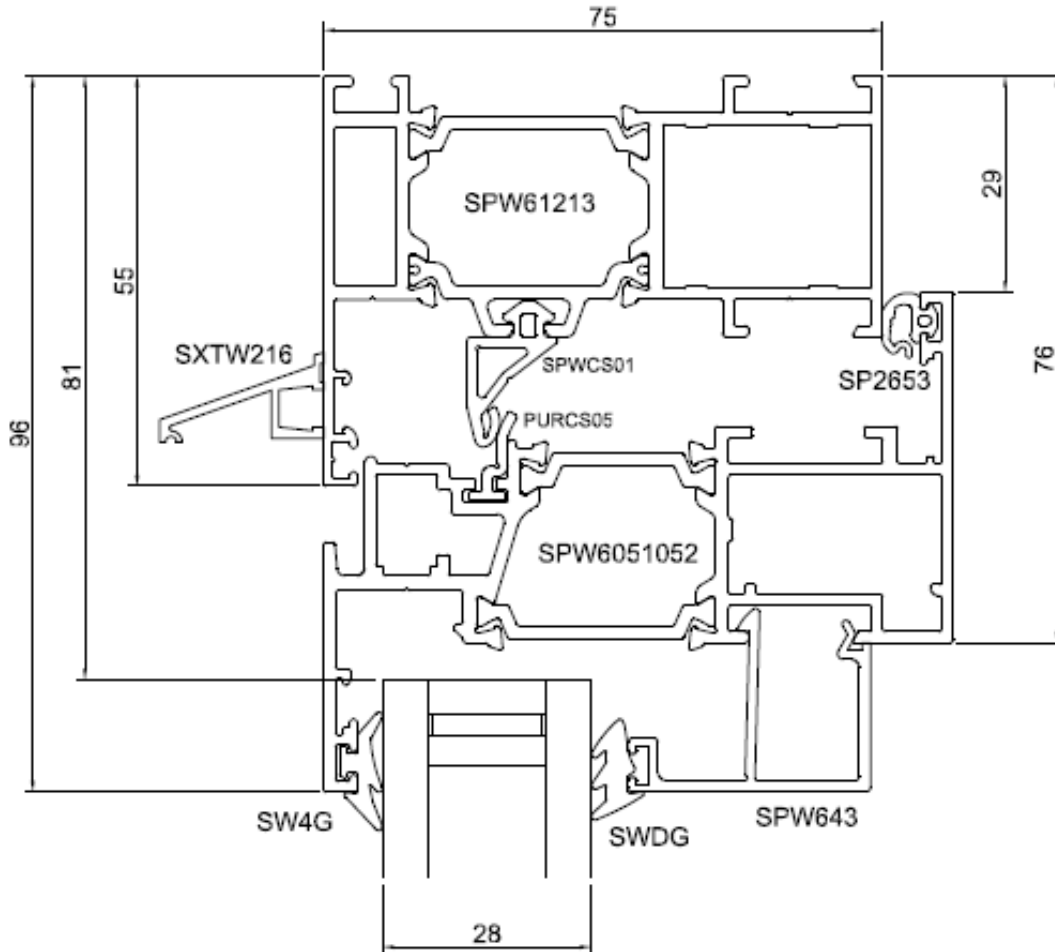
TEST SPECIMEN

Figure 1- General Elevation of Test Specimen (External Face)



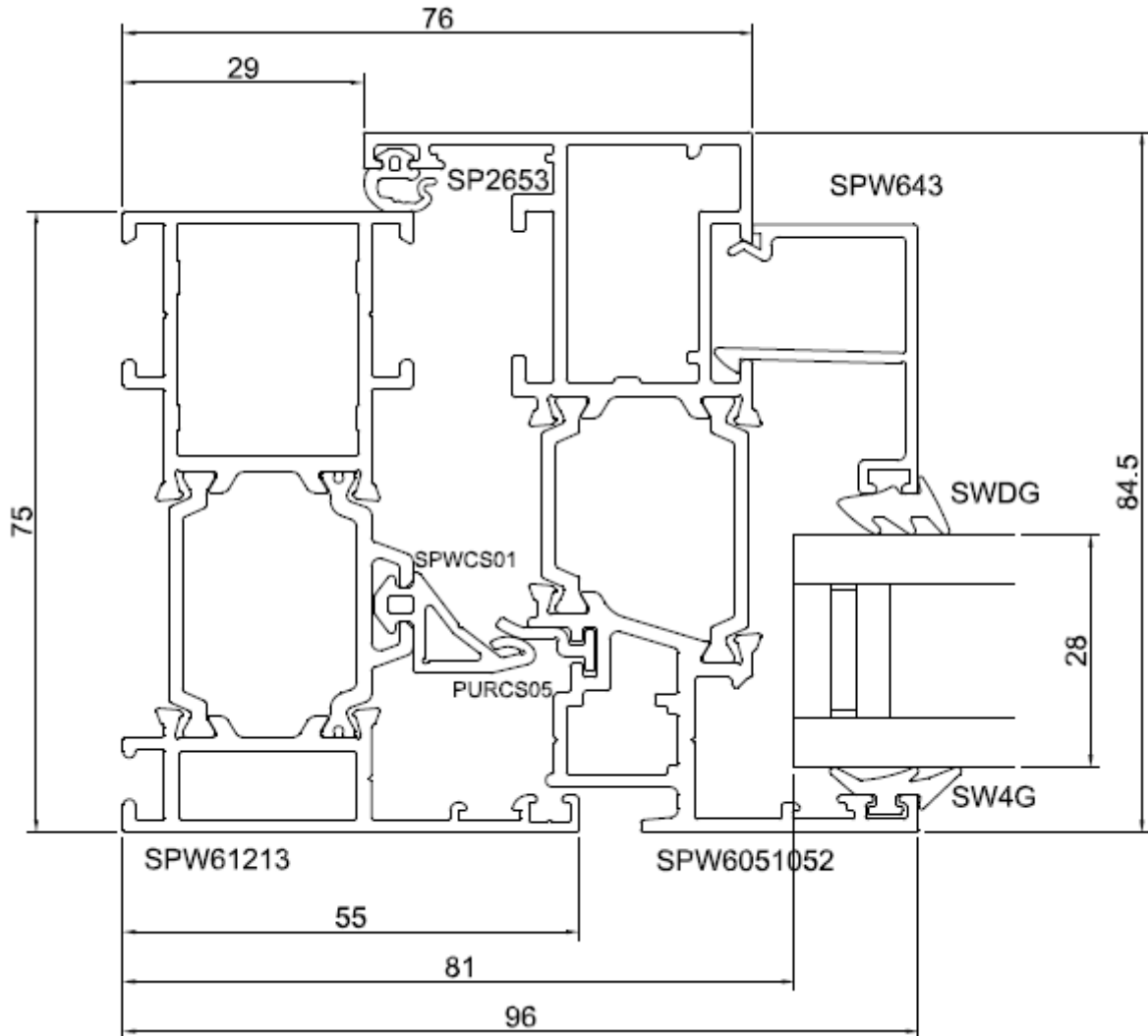
Do not scale. All dimensions are in mm

Figure 2 – Head detail



Do not scale. All dimensions are in mm

Figure 3 – Jamb detail



Do not scale. All dimensions are in mm

SCHEDULE OF COMPONENTS

(Refer to Figures 1 to 3)
 (All values are nominal unless stated otherwise)
 (All other details are as stated by the sponsor)

Variants

None

<u>Item</u>	<u>Description</u>
1. Window frame	Head, Cill & Jambs Are Identical Sections
Supplier	: Senior Architectural Systems
Profile code	: SPW61213
Material	: Aluminium
Grade	: 6063 T6
Gauge / wall thickness	: 1.6mm
Thermal break material / method	: Polyamide
Rebate size	: 70.5 x 20mm
Section size	: 75 x 55mm
Fixing jamb to head joints	Crimped Corners
i. type	: 1No. SW445CT8
	: 1No. SW445CT28
	: 1No. SW4CH7
ii. quantity	: 1No. of each of the above Per Corner
Details of adhesive	
i. supplier	: Senior Architectural Systems
ii. reference	: COSMOPUR 819 - 3COS0073
2. Window frame Centre seal	
Supplier	: Senior Architectural Systems
Reference	: SPWCS01
Material	: EPDM
Fixing method	: Push Fit

<u>Item</u>	<u>Description</u>
3. Window casement (s)	
Overall Size	
i. Tilt before Turn Open In Window	: 1500 x 1500mm
Supplier	: Senior Architectural Systems
Profile codes	
i. stile profile code	: SPW6051052
ii. rail profile code	: SPW6051052
Material	: Aluminium
Grade	: 6063 T6
Gauge / wall thickness	: 1.5mm
Thermal break material / method	: Polyamide
Glazing rebate size	: 20mm
Casement framing section size	
i. rail	: 84.5mm x 82mm
ii. stile	: 84.5mm x 82mm
Corner fixing method	: Crimped Corners
i. type	: 1No. SPW645CT28 : 1No. SXTW281CT8 : 1No. SW4CH7 : 1No. SW4CH15
ii. quantity	: Per Corner
Adhesive	:
i. supplier	: Senior Architectural Systems
ii. reference	: COSMOPUR 819 - 3COS0073
4. Window casement glass	
Supplier	: Senior Architectural Systems
Thickness / configuration	: 28mm 6-16-6 Toughened
Overall size	
i. Tilt before Turn Open In Window	: 1396 x 1396mm
Nominal edge clearance	: 6mm
5. Glazing setting blocks	
Supplier	: Senior Architectural Systems
Material	: Plastic
Thickness	: Various
Section size	: 28 x 100mm
6. Weathering Gasket	
Supplier	: Senior Architectural Systems
Reference	: SP2653
Material	: EPDM
Fixing method	: Push Fit

Item

Description

7. Vent Centre Seal

Supplier : Senior Architectural Systems
Reference : PURCS05
Material : EPDM
Fixing method : Slide Fit

8. Glazing gasket

Supplier : Senior Architectural Systems
Reference : Outer Captive Inner Wedge
Reference : SW4G SWDG
Fixing method : Push Fit

9. Glazing beads

Glazing method : Internally beaded
Supplier : Senior Architectural Systems
Profile code : SPW643
Material : Aluminium
Grade : 6063 T6
Gauge / wall thickness : 1.5mm
Section size : 32.5 x 20mm
Fixing method : Clip Fit

10. Tilt and turn hardware

Supplier : Senior Architectural Systems
Description : Tilt & Turn Gearing
Reference : 1No. ST81705 Tilt & Turn Base Set
: 1No. ST24346 Rod 113mm
: 1No. ST24347 Rod 188mm
: 1No. ST24348 Rod 263mm
: 1No. ST24349 Rod 338mm
: 3No. ST24352 Rod 450mm
: 1No. ST24351 Rod 488mm
: 1No. ST24353 Single Cam Rod
: 2No. ST21050 Locking Keep
: 1No. ST16503 Gear Box 2 Cams
: 1No. ST43141 Turn Limiter

11. Lock Keeps Fixings

Supplier : Senior Architectural Systems
Description : ST81705 Tilt & Turn Base Set Locking Keeps &
: ST21050 Locking Keeps
Reference : SFSCS30
Fixing keeps to frame
i. Type : Stainless Steel Countersunk Screws
ii. Size : No.8 x 25mm
iii. Quantity : 2No. per Keep fixing to frame

Item

Description

12. Lever handles

Supplier	:	Senior Architectural Systems
Description	:	Tilt & Turn Locking Handle
Reference	:	SPWTTTB
Material	:	Die Cast Zinc
Fixings	:	
i. Type	:	Machine Screws through Handle base plate into ST16503 Gearbox
ii. size	:	M5 x 35mm
iii. quantity	:	2No. per Handle

PERFORMANCE CRITERIA & TEST RESULTS

Clause	Result	Compliance
4.1.1 Classification of use	Windows shall be classified according to their intended use for all relevant characteristics in accordance with BS 6375 and the relevant material specific standard.	Performance not assessed. Further test evidence required. No
4.1.3 Windows	Windows must meet the requirements of Annex C of PAS24:2016 or RC2N of BS EN 1627	Window meets the requirements of Annex C of PAS24. Yes
4.2 Infill medium requirements	Where non-key locking hardware is fitted each glazed area shall include at least one pane of laminated glass meeting the requirements of BS EN 356:2000 Class P1A.	Window is fitted with key locking hardware, not applicable. N/A
4.3 Letterplates	Window not fitted with a letterplate, not applicable.	N/A
4.4 Classification	Following testing to Annex C the final classification shall be determined as W for a window.	Window classified as W for windows. CLASSIFIED
5 Marking	Window assembly shall be permanently marked, in a position that is visible and accessible when the window is open, with the following information: <ul style="list-style-type: none"> The number and date of the specification and the classification, i.e. PAS24:2016 W. The date of manufacture (at least year and quarter) The name or trade mark or other means of identifying the manufacturer 	Pre-certification prototype only. No labels supplied as yet. Customer advised of labelling requirements for production windows. No

Clause	Result	Compliance
6.2 Installation instructions	The manufacturer shall supply full instructions for assembly, installation and maintenance	Pre-certification prototype only. No installation instructions supplied as yet. Customer advised of installation instruction requirements for production windows.

Clause	Result	Pass / Fail
Annex C: Enhanced security performance requirements for windows		
C.4.3 Manipulation test	<p>Attacks were made to the top hinge using 2 paint scrapers to lever between the casement and frame, in an attempt to lever out the hinge but with no success. Total attack time was 1 minute 30 seconds. Entry not achieved.</p> <p>Attacks were made to locking cam 1 along the top edge using 2 paint scrapers to lever between the casement and frame, in an attempt to lever out the locks but with no success. Total attack time was 2 minutes. Entry not achieved.</p> <p>Attacks were made to locking cam 3 along the locking edge using 2 paint scrapers to lever between the casement and frame, in an attempt to lever out the locks but with no success. Total attack time was 3 minutes. Entry not achieved.</p> <p>Attacks were made to the bottom hinge using 2 paint scrapers to lever between the casement and frame, in an attempt to lever out the hinge but with no success. Total attack time was 3 minutes. Entry not achieved.</p>	Pass
C.4.4.2 Manual test on infill	Attacks were made to the glazed infill using a craft knife to remove the gasket, in an attempt to free up the glass. Once the gasket was removed, attacks were made using the palm of the hand to strike the glass in various locations, in an attempt to free up the interior beading but with no success. Total attack time was 3 minutes. Entry not achieved.	Pass
C.4.4.3 Mechanical test on infill	<p>2.0kN loads were applied to the top left, top right, bottom right and bottom left corners of the glazing.</p> <p>All loads were held and no entry was achieved.</p>	Pass
C.4.5 Mechanical loading test	<p>Attempts to apply Mechanical loads to all the hinge points and locking points were made with the following results obtained.</p> <p>Point 1: Top hinge 1kN parallel load (down) and 3kN perpendicular load held for 10s.</p> <p>Point 2: Locking cam 1 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s. 1kN parallel load (down) and 3kN perpendicular load held for 10s.</p> <p>Point 3: Locking cam 2 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s. 1kN parallel load (down) and 3kN perpendicular load held for 10s.</p>	Pass

Clause	Result	Pass / Fail
	<p>Point 4: Top free corner of casement 1kN parallel load (down) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>Point 5: Locking cam 3 1kN parallel load (down) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>Point 6: Locking cam 4 1kN parallel load (down) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>Point 7: Bottom hinge 1kN parallel load (up) and 3kN perpendicular load held for 10s.</p> <p>Point 8: Locking cam 5 1kN parallel load (up) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>Point 9: Locking cam 6 1kN parallel load (up) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>Point 10: Locking cam 7 1kN parallel load (down) and 3kN perpendicular load held for 10s. 1kN parallel load (horizontal) and 3kN perpendicular load held for 10s.</p> <p>All loads were held and no entry was achieved.</p>	
C.4.6 Manual check test	<p>Attacks were made between the top hinge and locking cam 1 of the top edge using a screwdriver and nail bar to lever between the casement and frame, in an attempt to lever out the locks but with no success. Total attack time was 3 minutes. Entry not achieved.</p> <p>Attacks were made between locking cams 2 and 3 along the locking edge using a screwdriver and nail bar to lever between the casement and frame, in an attempt to lever out the locks but with no success. Total attack time was 3 minutes. Entry not achieved.</p> <p>Attacks were made between locking cams 4 and the bottom hinge using a screwdriver and nail bar to lever between the casement and frame, in an attempt to lever out the locks but with no success. Total attack time was 3 minutes. Entry not achieved.</p>	NO VULNERABILITY IDENTIFIED
C.4.7 Additional mechanical loading test	Testing was not required as no vulnerabilities were identified in the manual check test.	NOT REQUIRED

CONCLUSIONS

Evaluation against objective The windows as provided by the client were subjected to enhanced security testing in accordance with PAS24:2016 Annex C and achieved the requirements for a classification of W for windows.

Observations & comments

LIMITATIONS

Limitations The results relate only to the behaviour of the specimens of the element of construction under the particular conditions of test. They are not intended to be the sole criteria for assessing the potential performance of the element in use, nor do they reflect the actual behaviour in use.

Uncertainty of Measurement The uncertainties of measurements calculated for a confidence level of 95% throughout these tests are within the limits of these tolerances.

REVISION HISTORY

This issue of the report replaces all previous issues that are now withdrawn.

Issue No :	Re - Issue Date :
Revised By:	Approved By:
Reason for Revision:	

END OF REPORT