test report

Bodycote

Report No: 181947

Test of:

Reversible aluminium/timber window

Tested to:

BS 6375-2:2009
Performance of windows & doors
Part 2: Operation & strength

For:

A/S Peder Nielsen Beslagfabrik
Norregade 25
Bronderslev
Denmark
DK9700

warrington apt
ARCHITECTURAL PRODUCT TESTING

TEST CONCLUSIONS

Samples of:
Manufacturer PN Beslag
Product AM Profiles window
Model Reversible timber window
have been tested in accordance with: BS 6375-2:2009
By Bodycote Warrington apt [A UKAS accredited Testing Laboratory (No. 0621) and EC Notified Body number 1104]
At Key Industrial Park, Fernside Rd., Willenhall. West Midlands. WV13 3YA.
Results and comments as detailed below:

Clause No.	Description	Compliance
5.1	Operating forces – Class 1	Yes
5.2	Mechanical strength – Class 3	Yes
5.2.1	Static torsion – Class 3	Yes
5.2.2	Racking – Class 3	Yes
5.3	Load bearing capacity of safety devices – 350N	Yes
5.4	Impact resistance – Class 0	Yes
5.5	Resistance to repeated opening and closing – Class 2	Yes

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: Mark West, Assistant Operations Manager
Chris Bryan, Laboratory Technician

Report issued by: Mark West, Assistant Operations Manager

Signed 

Date 06/07/2009

For and on behalf of Bodycote Warrington APT

Report authorised by: Ian Keeling, Operations Manager

Signed 

Date 06/07/2009

For and on behalf of Bodycote Warrington APT

Report issued: 06 July 2009

UKAS TESTING 0621

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

Tests marked NT were not tested
Tests marked NA are not applicable to the product on test.

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

Bodycote Warringtonapt is an EC Notified Body Number 1104

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TEST DETAILS

CLIENT DETAILS

Company name	PN Beslag,
Address	A/S Peder Nielsen Beslagfabrik Norregade 25 Bronderslev Denmark
Post code	DK9700
Contact	Norman Berrill

ORDER DETAILS

Order number	PF-1957
Dated	

SAMPLE DETAILS

Product	Reversible Timber/aluminium window
Model	
Manufacturer	AM Profiles
Sample Dimensions	1100 x 1700mm
Material	Aluminium clad timber window
Details of Hardware fitted	
Hinges	PN Uni Topswing hardware for reversible windows
Lock	Roto TSL Twin cam espag
Handles	LSH Cego Maxim 3
Seals	Trelleborg/linear/pal
Markings	
Date of Manufacture	February 2009
Other information	

TEST DETAILS

Test specification	BS 6375-2 :2009
Full test	Yes
Test to clauses	
Test method for operating forces	BS EN 12046-1:2003
Test method for static torsion	BS EN 14609:2004
Test method for racking	BS EN 14608:2004
Test method for soft body impact	BS EN 13049:2003
Test method for safety devices	BS EN 14609:2004
Test method for repeated opening	BS EN 1191:2000
Date sample received	30th March 2009
Date test started	31st March 2009
Date test completed	30th April 2009
Special Test requirements	Cyclic operation testing was carried out to a distance of 300mm (7 degrees) as it was not possible to cycle the window to 90 degrees with the current test apparatus
Other reports to be used in conjunction with this report	

OPERATION AND STRENGTH OF WINDOWS TO BS6375-2:2009

TEST PROCEDURE

Introduction

This test report should be read in conjunction with the Standard BS 6375-2:2009 Performance of windows and doors – Part 2: Classification for operation and strength characteristics and guidance on selection & specification

The specimens were judged on their ability to comply with the performance criteria as required in BS 6375-2:2009, with test methods BS EN 12046-1, BS EN 14609, BS EN 14608, BS EN 13049, BS EN 14609 & BS EN 1191.

Instruction To Test

The test was conducted from 31st March to 30th April 2009 on behalf of PN Beslag.

Norman Berrill, a representative of PN Beslag witnessed part of the test.

Test Specimen Construction

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.

Installation

The sample was supplied mounted within a timber sub-frame of nominal section 75mm x 100mm fitted flush with the exterior face, in accordance with the clients fitting instructions. The sample was then installed into the test apparatus by a representative of Bodycote warringtonapt on the 31st March 2009

Test Climate

The sample was conditioned in the laboratory in the range 10-30 °C and 25-75% humidity.

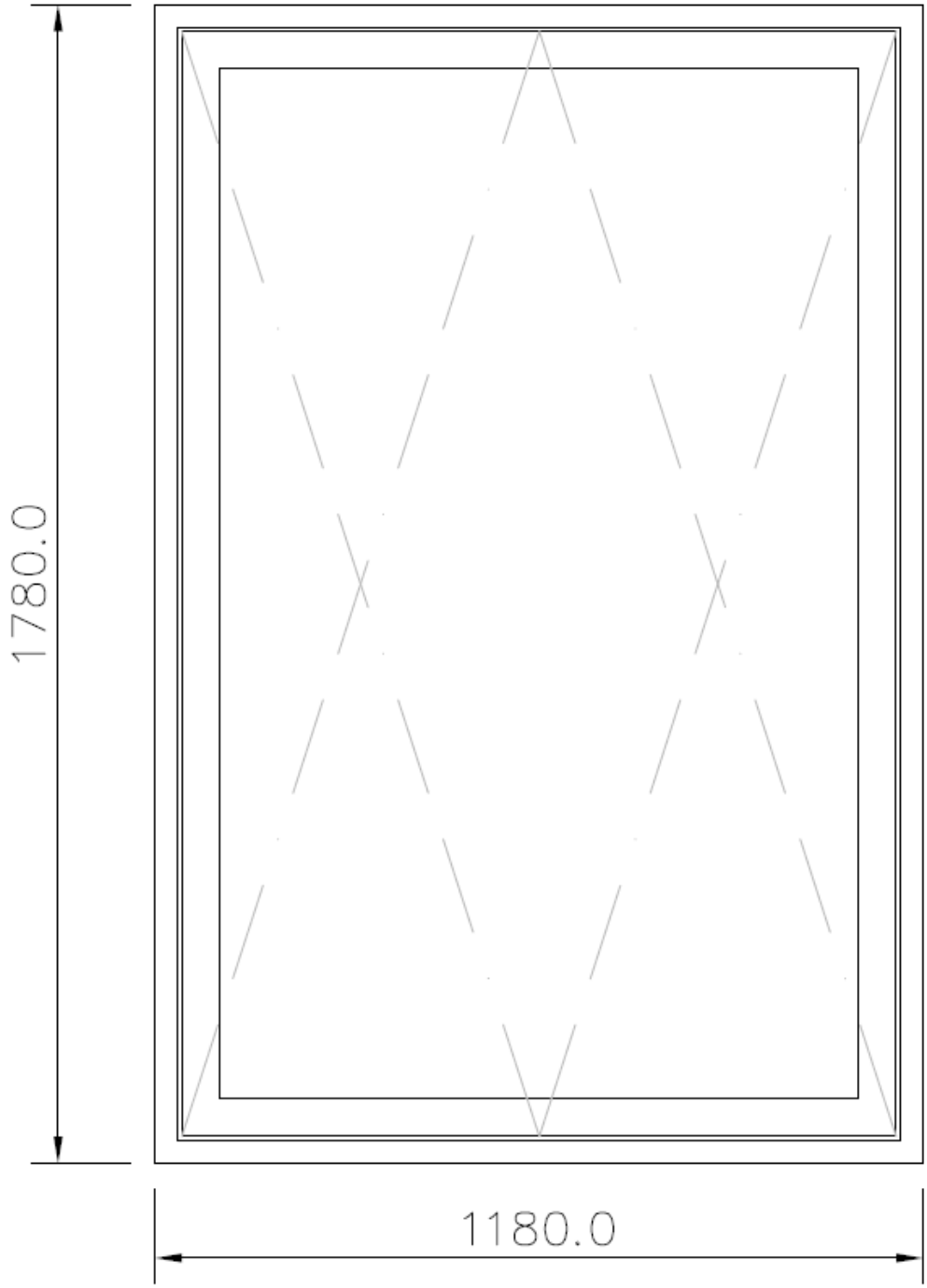
The temperature and humidity in the lab was maintained in the range 16.1-21.5°C and 20-41 % humidity for the duration of the test.

INITIAL OBSERVATIONS

The external face of the sample

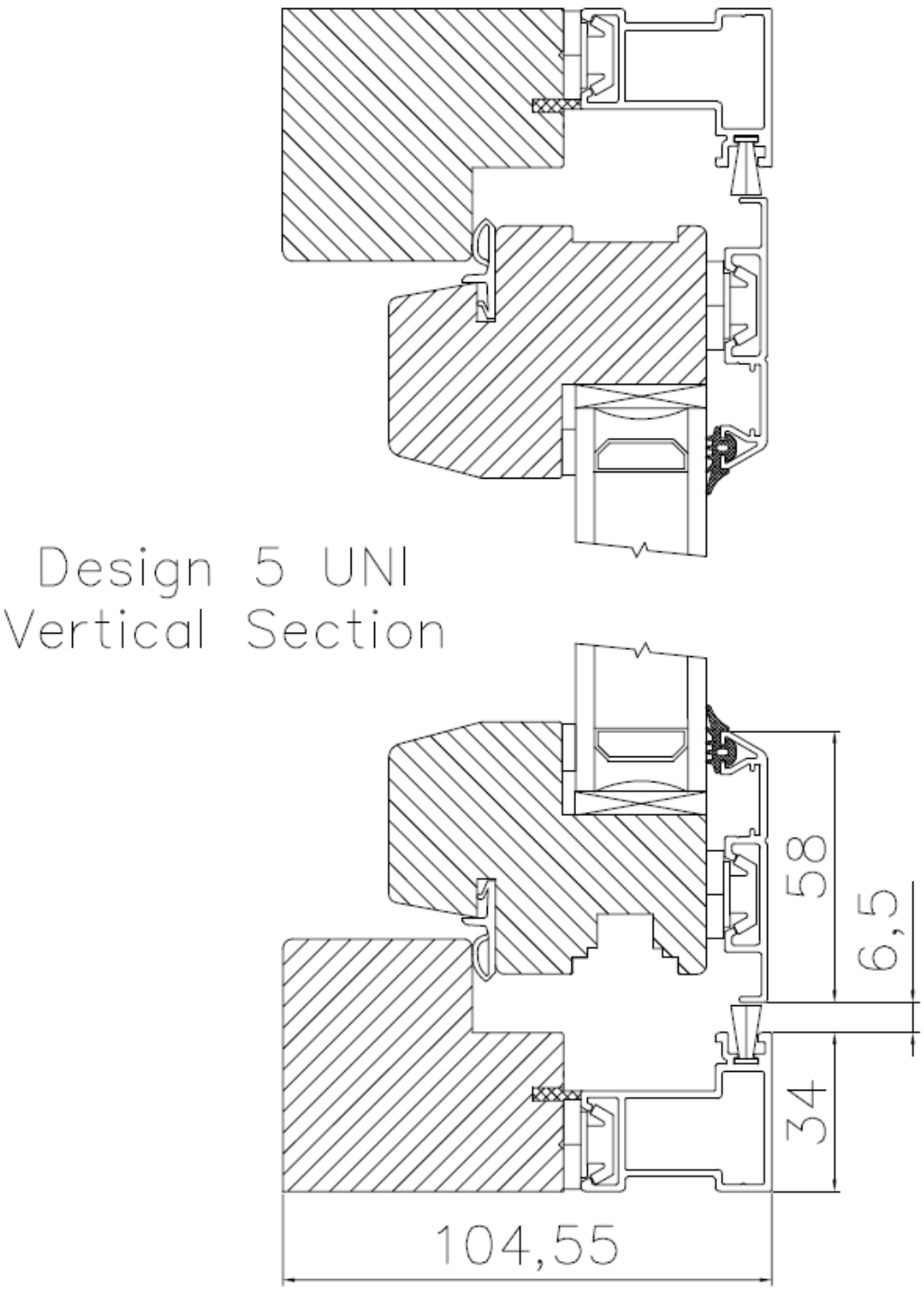
TEST SPECIMEN

Figure 1- General Elevation of Window



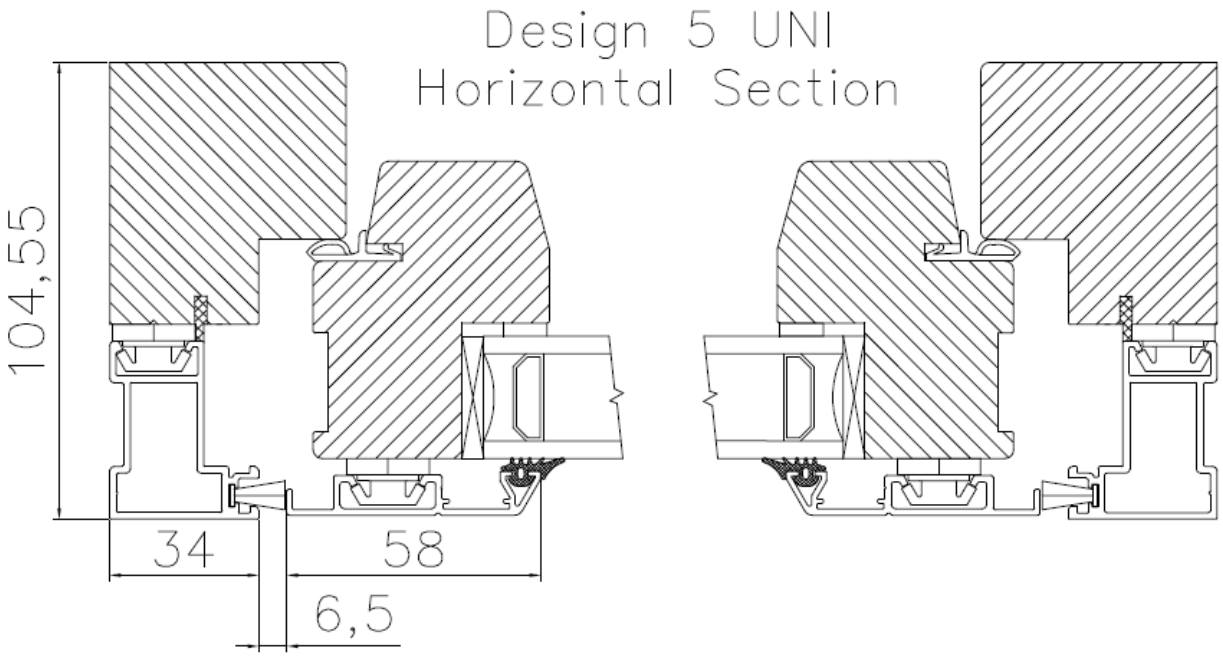
Do not scale. All dimensions are in mm

Figure 2 – Vertical cross section



Do not scale. All dimensions are in mm

Figure 3 – Horizontal cross section



Do not scale. All dimensions are in mm

SCHEDULE OF COMPONENTS

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

Item		Description
1. Window Frame		
Material	:	Engineered timber(gluelam)/ Aluminium cladding
Timber density	:	510 kg/m^3 nominal (stated)
Timber section size	:	60mm x 54mm
Cladding profile supplier	:	AM Profiles
Cladding profile reference	:	D5-B37957M-5
Rebate	:	20mm x 31mm
Fixing jamb to head joints	:	Mortise and tenon / Mechanical crimp. Staple and glue
Details of adhesive		
i. supplier	:	Rakoll / Plexus
ii. reference	:	GXL4 / MA310 2 part
Fixings		
i. type	:	Stainless Steel Staple ST2408
ii. size	:	30mmx6.5mm 18 gauge
iii. quantity	:	8
2. Frame Weather Seal		
Manufacturer	:	Trelleborg / Linear / PAL
Reference	:	D5-7009052062 / FP048-1250BL / RA3-5064
Material	:	EPDM / Polypropylene / EPDM
Fixing method	:	Friction / Grooved rebate / Grooved rebate
3. Reversible Casement		
Material	:	Engineered timber(gluelam)/ Aluminium cladding
Timber density	:	N/A
Timber section size	:	68mm x 54mm
Cladding profile supplier	:	AM Profiles
Cladding profile reference	:	D5-B37954M-5
Glazing rebate	:	20mm x 20mm
Corner fixing method	:	Mortise and tenon / Mechanical crimp. Staple and glue
Details of adhesive		
i. supplier	:	Rakoll / Plexus
ii. reference	:	GXL4 / MA310 2 part
Fixings		
i. type	:	Stainless Steel Staple ST2408
ii. size	:	30mmx6.5mm 18 gauge
iii. quantity	:	8
4. Glass (IGU)		
Supplier	:	Solaglas
Thickness	:	28mm
Overall size	:	1610mm x 1010mm
Nominal edge clearance	:	5mm

5. Setting blocks

Supplier	:	Protrim
Material	:	PVC
Thickness	:	6mm

6. Glazing Beads

Material	:	Aluminium
Fixing method	:	Nylon Clip / Foam security tape
Fixings		
i. type	:	Stainless steel wood screw / double sided self adhesive
ii. size	:	2.9*25mm CSK Pozi / 4mm x 12mm
iii. fixing centres	:	80mm from corner then 230mm centres

7. Lock

Description	:	TSL Twin Cam Espag
Supplier	:	Roto
Reference lock	:	367 141
Reference keep	:	01092
Fixing method fastener to casement		
i. type	:	Stainless Steel wood screw
ii. size	:	4.0x30mm
iii. quantity	:	10
Fixing method keep to frame		
i. type	:	Stainless Steel wood screw
ii. size	:	4.0x30mm
iii. quantity	:	2

8. Window handles

Manufacturer	:	LSH
Reference	:	Cego Maxim 3
Material	:	Zinc alloy casting
Fixings	:	2 x M5x 40mm screw

9. Hinges

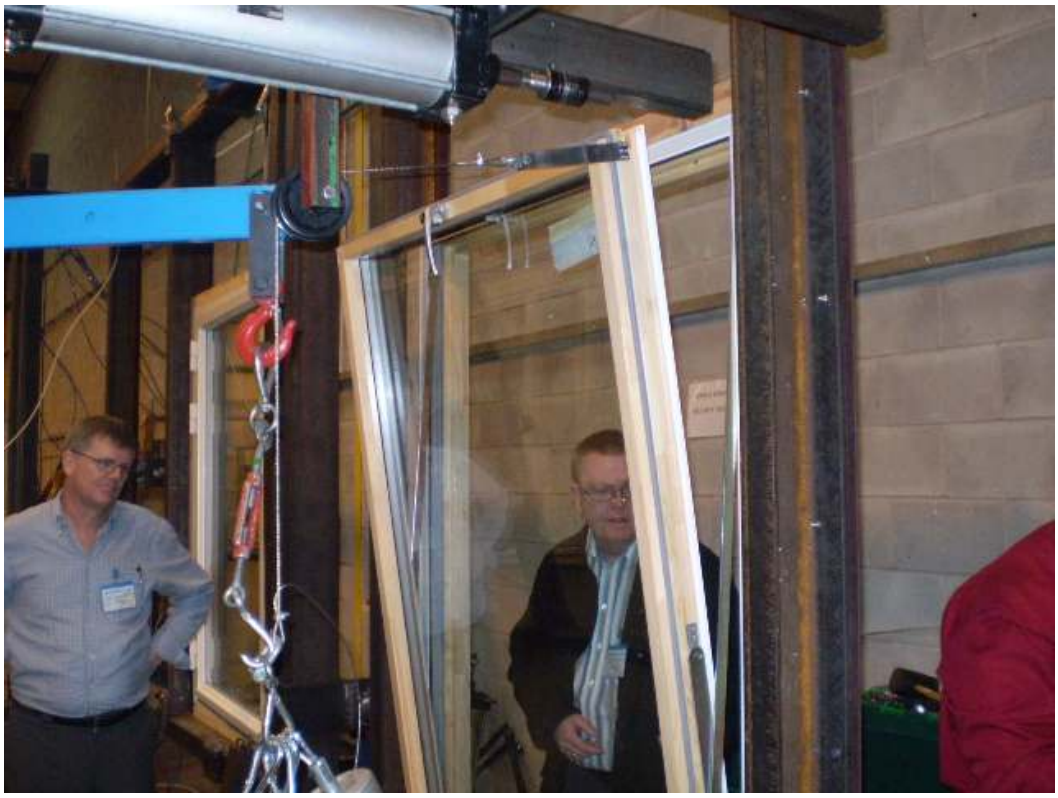
Description	:	PN UNI Module 18 gearing
Supplier	:	A/S Peder Nielsen Beslagfabrik
Reference	:	PN Uni Topswing hardware for reversible windows
Fixing method hinge to casement		
i. type	:	Stainless Steel Wood Screw
ii. size	:	4.0x30mm
iii. quantity	:	8
Fixing method hinge to frame		
i. type	:	Stainless Steel SDST Screw
ii. size	:	3.9x16mm
iii. quantity	:	10

PERFORMANCE CRITERIA AND TEST RESULTS

Clause	Result	Pass/Fail
5.1 Operating forces	The window was tested in accordance with EN 12046-1. The average force or torque required to disengage & engage the hardware must not exceed those defined for the Class 1 of EN 13115, which requires less than 100N/10Nm for hand operated fasteners, and 50N/5Nm for finger operated fasteners. The average force required to commence and maintain motion up to 100mm must not exceed those defined for Class 1 of EN 13115, which requires a force less than 100N An average torque of 2.9Nm was required to disengage the handle, 27.33N was required to commence motion up to 100mm in the opening direction, 41.99N was required to commence closing from 100mm up the engagement of the locking hardware. A 40N force was applied to hold the casement closed against the weatherseal, and 3.51Nm was required to engage the handle.	**PASS CLASS 1**
5.2.1 Static torsion	The window was tested in accordance with EN 14609, under a load of 300N as required by Class 3 of EN 13115, with a preload of 30N. The load was applied, no damage was observed, and the window continued to operate normally. The deflection under full load was 54.4mm, with a residual deflection of 7.1mm. The hinge stiffened slightly as a result of the loading.	**PASS CLASS 3**
Deflection of the window during static torsion test		

Clause	Result	Pass/Fail
	Following the test an average torque of 2.78Nm was required to disengage the handle, 19.39N was required to commence motion up to 100mm in the opening direction, 44.88N was required to commence closing from 100mm up the engagement of the locking hardware. A 40N force was applied to hold the casement closed against the weatherseal, and 3.24Nm was required to engage the handle.	
5.2.2 Racking	The window was tested in accordance with EN 14609, under a load of 600N as required by Class 3 of EN 13115, with a preload of 60N . The load was applied, no a slight deformation of the casement was observed, but the window continued to operate normally. The deflection under full load was 22.8mm, and the residual deflection was 6.9mm.	**PASS CLASS 3**
Deflection of the window during racking test		
	Following the test an average torque of 2.66Nm was required to disengage the handle, 14.35N was required to commence motion up to 100mm in the opening direction, 38.43N was required to commence closing from 100mm up the engagement of the locking hardware. A 45N force was applied to hold the casement closed against the weatherseal, and 3.33Nm was required to engage the handle.	

Clause	Result	Pass/Fail
5.3 Load-bearing capacity of safety devices	This test was carried out on the restriction devices integrated in the hinge at position 1 & 2 (initial opening) and at position 3 & 4 (reversed) , with a 350N load applied at the bottom right (restrictor) corner and at the bottom left (non restrictor) corner. All loads were held without the restrictor failing, and the restrictor continued to function normally.	**PASS 350N**
Loading of initial opening restrictor at restrictor-side corner		

Clause	Result	Pass/Fail
Loading of reversal restrictor at restrictor-side corner		
Loading of reversal restrictor at non-restrictor-side corner		

Clause	Result	Pass/Fail
5.4 Impact resistance	The recommended class for the UK is Class 0, no performance is required.	**PASS CLASS 0**
5.5 Resistance to repeated opening and closing	Prior to the cyclic operation test, when tested in accordance with EN 12046-1, the sample met the requirements of Class 1. An average torque of 3.22Nm was required to disengage the handle, 14.17N was required to commence motion up to 100mm in the opening direction, 43.9N was required to commence closing from 100mm up the engagement of the locking hardware. A 44.6N force was applied to hold the casement closed against the weather seal, and 4.26Nm was required to engage the handle.	**PASS CLASS 1**
	The number of cycles completed by the window was 10,000, as required by Class 2 of the standard, for medium duty. The stroke of the doorleaf was 7 degrees, an opening distance of 300mm. Observations and measurement of the datum points 50mm from each edge of the casement were carried out. No lubrication or adjustment was specified by the client.	**PASS CLASS 2**
	Following the cyclic operation test, when tested in accordance with EN 12046-2, the sample continued to meet the requirements of Class 1. An average torque of 4.11Nm (representing a variation in performance of V = +27.5%) was required to disengage the handle, 12.6N (representing a variation in performance of V = -14.2%) was required to commence motion up to 100mm in the opening direction, 56.47N (representing a variation in performance of V = +28.5%) was required to commence closing from 100mm up the engagement of the locking hardware. A 55.26N (representing a variation in performance of V = +23.8%)force was applied to hold the casement closed against the weather seal, and 4.06Nm (representing a variation in performance of V = -4.8%) was required to engage the handle.	**PASS CLASS 1**

CONCLUSIONS

Evaluation against objective

The sample as provided by the client was subjected to operational & strength testing in accordance with BS 6375-2:2009 and achieved the requirements.

Observations & comments

LIMITATIONS

Limitations

The results are valid only for the conditions under which the test was conducted and for the specific range of window assemblies as detailed below.

Range of window assemblies covered by this report

It is our opinion that the range of window assemblies covered by this report are limited to the following

- Assemblies with identical hardware fitted no further apart than in the tested assembly
- Assemblies of the same or smaller overall dimensions to the tested assembly

Uncertainty of Measurement

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

The standard specifies the following tolerances

- Forces: ±2%
- Distances: ±1mm for tape measures ± 0.01mm for dial gauges
- Times: ±5s

END OF REPORT