Evaluation of ‘Smart Wall’ single leaf bidirectional doorset to the requirements contained in prEN 1627: May 2009

Prepared for:
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28 September 2010

Test report number 264828

Protecting People, Property and the Planet

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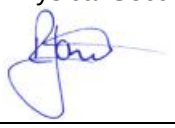
Signature 

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Contents

1 Introduction

1.1 Background

In February 2010, Smart Systems Limited requested BRE Global Limited to evaluate their 'Smart Wall' single leaf bidirectional glazed aluminium doorsets to the following standards:

- LPS 1175: Issue 7[1]; and
- prEN 1627: May 2009[2].

The results of the tests conducted on a series of specimen 'Smart Wall' single leaf bidirectional glazed aluminium doorsets in accordance with the performance requirements contained within LPS 1175: Issue 7[1] are detailed in BRE Global Limited report 264827a[3].

The results of the tests conducted on a series of specimen 'Smart Wall' single leaf bidirectional glazed aluminium doorsets in accordance with the requirements contained within prEN 1627: May 2009[2] are detailed in this report.

Following the completion of the above test programmes, Smart Systems Limited requested the range of 'Smart Wall' single leaf bidirectional glazed aluminium doorsets detailed in Table 1 to Table 4, defined on the documents listed in Table 5, be assessed in accordance with the following classifications:

- Security Rating 2 to LPS 1175: Issue 7[1]; and
- Resistance Class 3 to prEN 1627: May 2009[2].

The results of the assessment conducted in accordance with the requirements contained in LPS 1175: Issue 7[1] for a Security Rating 2 classification are detailed in BRE Global Limited report 264827b[4].

The results of the assessment conducted in accordance with the requirements contained in prEN 1627: May 2009[2] for a Resistance Class 3 classification are detailed in this report.

Table 1 Doorset configurations

Trade Name	Type	Minimum Doorset Height (m)	Maximum Doorset Height (m)	Minimum Doorset Width (m)	Maximum Doorset Width (m)	Target Security Rating
'Smart Wall'	Glazed[i] single leaf bidirectional aluminium doorset with anti-finger trap hinges and two deadlocks on the leading edge	1.9	2.5	0.75	1.2	2

Table 2 Locking options

Lock Positions	Manufacturer	Model	Type	Compatible Cylinders		
				Manufacturer	Model	Type
Upper and lower locks on leading edge[ii]	Adams Rite	Sentinel 6 hooked deadlock	Hook lock fitted with the Adams Rite Sentinel security escutcheon and lock face plate	Yale	KM3535-NP G35x35	Double europrofile cylinder (key:key)

Table 3 Other hardware

Type	Manufacturer	Model	Description
Closer/pivot hinge	Adams Rite	ARC-51N	Overhead door closer for end load anti-finger trap applications and an end load bottom pivot assembly. These were formed from the following components: • Cast iron body (Part. No. FC20) • Steel top arm (Part No. S20C) • Steel top channel (Part No. SC20C) • Aluminium bottom pivot (Part. No. ADC10).
Escutcheon kit	Adams Rite	Adams Rite Sentinel 6 *(ACIM440B)*	Cylinder escutcheon. This was formed from the following components: • EN36 steel external escutcheon • Mild steel sandwich plate • Mild steel internal plate • 75 mm long M5 pozi countersunk stainless steel machine screws.
Keep	Smart systems	ACIM012	Strike plate assembly.
Pull handles	Smart systems	ACVL123	Set of PVC 'D' shaped pull handles, one internal and one external.

[i] 'Fully glazed' or with rails running horizontally across the leaf to form a series of glazed panels.

[ii] The top lock was orientated such that the tip of the hook shaped bolt and the bible of the cylinder both pointed upwards while the bottom lock was orientated such that the tip of the hook shaped bolt and the bible of the cylinder both pointed downwards.

Table 4 Compatible glazing materials

Type	Manufacturer	Model	Description
37 mm thick sealed glazing unit	Essex Safety Glass Limited	ESG Secure LPS 1270 Level 1.1.2	37 mm[iii] thick sealed glazing unit configured as follows: • 17 mm[iii] thick composite glazing panel on the attack face, formed from: - 4 mm thick toughened glass on the attack side. - 1.52 mm thick PTU interlayer - 6 mm thick polycarbonate interlayer - 1.52 mm thick PTU interlayer - 4 mm thick float glass inner face. • 16 mm wide cavity. • 4 mm thick toughened glass inner pane.

Table 5 Documentation submitted by Smart Systems Limited following completion of the test programme.

Document Reference	Title / Contents	Revision / Issue
F415.9	Complete application for certification and Red Book listing	Signed 23/7/10
-	Smart Wall Accessories *(List of Smart item codes)*	Rec'd 13/7/10
-	Smart Wall Extrusions *(List of Smart extrusion codes)*	Rec'd 13/7/10
-	Specification sheet for Adams Rite Sentinel 6 deadlock *(2 sides)*	8/2/09
-	Yale cylinder order code sheet	Rec'd 13/7/10
ACIM001	Top rail cleat	A 3/8/10
ACIM002	Bottom rail cleat	A 3/8/10
ACIM003	Midrail cleat	A 3/8/10

[iii] This is the nominal thickness due to slight variances in thicknesses of each layer and methods by which they are bonded.

Document Reference	Title / Contents	Revision / Issue
ACIM005A	Bottom bracket	A 16/7/09
ACIM006A	Top bracket	B 3/8/10
ACIM009	Anti-finger trap end cap	27/4/09
ACIM010	Master stile end cap	27/4/09
ACIM012	Hook bolt keep for IMP212/213	May 2009
ACIM018	Pre drilled closer plate	A 3/8/10
ACIM021	Foam infill block	A 3/8/10
ACIM024	Fixing plate	Nov 2009
ARC-51 N	Specification sheet for Adams Rite 'ARC-51 N' overhead concealed closer and springless pivot' *(2 sides)*	8/4/09
CFC152MFZ	Shopline door transom fixing bracket	Aug 2000
IMP	Smart Wall technical manual *(106 pages)*	December 2009
SWL1608	Extrusion XIMP213	4/2/09
SWL1614	Extrusion XIMP120A	3/2/09
SWL1615	Extrusion XIMP120B	3/2/09
SWL1616	Extrusion XIMP027A	3/2/09
SWL1617	Extrusion XIMP027B	3/2/09
SWL1618	Extrusion XIMP039	3/2/09
SWL1620	Extrusion XIMP010	12/2/09
SWL1624	Extrusion XIMP035	3/2/09
SWL1625	Extrusion XIMP034A	3/2/09
SWL1626	Extrusion XIMP034B	3/2/09
SWL1635	Extrusion XIMP036	3/2/09
SWL1637	Extrusion XIMP011	3/2/09
SWL1638	Extrusion XIMP411A	4/2/09
SWL1639	Extrusion XIMP411B	4/2/09
SW-LPS/ENV C02 *(Page 02)*	Elevations - LPS 1175 Level 2 & ENV 1627 Level 3	July 10
SW-LPS/ENV C03 *(Page 03)*	Elevations - Detail 1 *(Vertical cross-section through header jamb and transom)*	July 10 (Rec'd 8/9/10)
SW-LPS/ENV C04 *(Page C04)*	Elevations - Detail 2 *(Vertical cross-section through midrail)*	July 10 (Rec'd 8/9/10)
SW-LPS/ENV C05 *(Page 05)*	Elevations - Detail 3 *(Vertical cross-section through bottom of leaf and low level threshold)*	July 10 (Rec'd 8/9/10)
SW-LPS/ENV 06 *(Page 06)*	Elevations - Detail 4 *(Horizontal cross-section through lock stile and jamb)*	July 10
SW-LPS/ENV C07 *(Page 07)*	Elevations - Detail 5 *(Horizontal cross-section through anti-finger trap trailing edge stile and jamb)*	July 10 (Rec'd 8/9/10)
SW-LPS/ENV E01 *(Page E01)*	Construction drawing - LPS1175 & ENV1627 single door lock prep	July 10

Document Reference	Title / Contents	Revision / Issue
SW-LPS/ENV E02 *(Page E02)*	Construction drawing - Closer preparation	July 10 (Rec'd 8/9/10)
SW-LPS/ENV E01 *(Page 03)*	Installation guide	Aug 10
SW-LPS/ENV Poly	Smart Wall Polyamide	4/2/09
UTL039	15 x 15 mm 'L' shaped channel	8/7/97
XVL72	Aliplast extrusion VL72	B 18/8/06
XVL562	Maxibel extrusion VCL562	B 24/5/05
-	Email from G Gunn at ESG containing details of the construction of the '112' double glazing unit used.	24/9/10

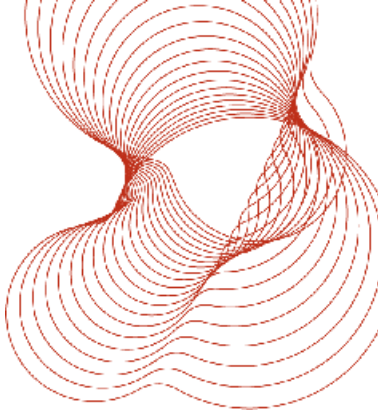
1.2 Objective

The objective of the assessment was to determine whether the 'Smart Wall' single leaf bidirectional glazed aluminium doorsets falling within the scope detailed in Table 1 to Table 4, met the requirements of a Resistance Class 3 classification defined in prEN 1627: May 2009[2] when manufactured and installed in accordance with the documents listed in Table 5.

1.3 Origin of assessment request

The assessment of the 'Smart Wall' single leaf doorsets in accordance with the requirements contained in prEN 1627: May 2009[2] was covered by quotation Q4507 issued on 29 July 2010. The quotation was accepted by Mr Anthony Murray of Smart Systems Limited on 3 August 2010.

The assessment was completed under BRE Global Limited's project number 264828 and BRE Global Limited's Standard Terms and Conditions of Testing and Assessment (PN145/06)[5].



2 Assessment method

The specimens submitted by Smart Systems Limited, detailed in section 3.1, were tested to determine their resistance to attack in accordance with the performance requirements defined in LPS 1175: Issue 7[1] for a Security Rating 2 classification. The results of those tests are detailed BRE Global test report 264827a[3].

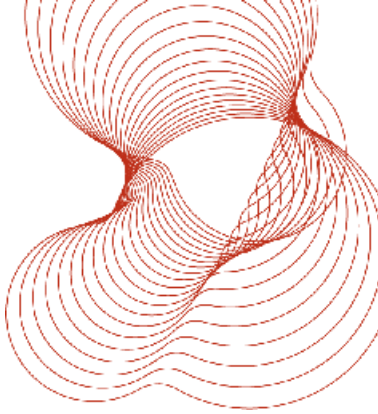
Those results were then used to plan a series of tests conducted in accordance with the following standards to determine the specimens' resistance classification in accordance with prEN 1627: May 2009[2]:

- prEN 1628: May 2009[6]
- prEN 1629: May 2009[7]
- prEN 1630: May 2009[8]

The results of the tests conducted in accordance with those standards are detailed in section 5 of this report.

The documents listed in Table 5; which were received following completion of the test programme; were then checked to confirm whether the doorsets falling within the scope defined in Table 1 to Table 4 met the requirements contained within the following clauses of prEN 1627: May 2009[2]:

- Clause 5 - Infillings.
- Clause 6 - Hardware.
- Clause 7 - Mechanical strength
- Clause 8 - Manual burglary attempts



3 Test specimens and data examination

3.1 Specimens submitted for test

The following specimens were submitted for test.

3.1.1 Specimens 260634/01 and 260634/04

Configuration: 1200 mm wide by 2500 mm high 'Smart Wall' single leaf double swing thermally broken glazed aluminium doorsets.

The doorsets were configured as detailed on drawings LPS-1L (February 2010) and ENV-2 (February 2010).

The doorsets were fully glazed, i.e. they did not incorporate any mid-rails or lay-bars, and both incorporated a low threshold (IMP411).

Glazing: The doorsets incorporated 'ESG Secure LPS 1270 Level 1.1.2' sealed glazing units supplied by Essex Safety Glass Limited. The glazing was internally beaded with aluminium snap in beads. The glazing compromised:

- 17 mm thick composite glazing panel on the attack face;
- 16 mm thick Argon filled gap; and
- 4 mm thick toughened glass inner pane.

The glazing was attributed a 112 classification in accordance with LPS 1270. However, there was no evidence available at the time of the test programme that the glazing met the P6B classification defined in BS EN 356: 2000[9] recommended in Table E.1 in prEN1627: May 2009[2].

Hardware: Each doorset was fitted with:

- Two Adams Rite Sentinel 6 hooked deadlocks with cylinder guards (ACIM440B), Smart Systems keeps (ACIM012), Yale KM3535-NP G35x35[iv] double key-operated europrofile cylinders (ACIM442). The bolts on the Sentinel 6 deadlocks were fully thrown by inserting a key into the cylinder and turning it through 360 degrees.
- An Adams Rite 65 mm door closer (ACIM424) and associated bottom pivot.
- A 'D' handle (ACVL123).

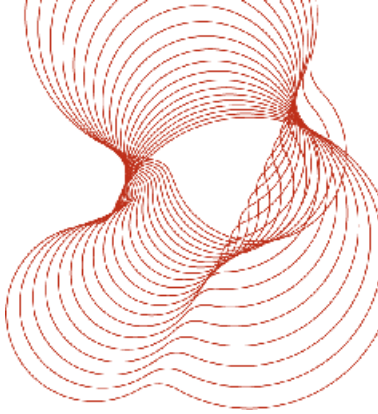
[iv] The Yale KM3535-NP G35x35 cylinder was covered by BSI certificate KM 532920 to BS 1303 under the trade name 'Who Yuet'.

Locked conditions: The following locked conditions existed on the two specimens:

Minimum locked condition	One hook lock thrown and the key removed
Optimum locked condition	Both hook locks thrown and the keys removed

Specimen installation: The doorsets were fitted into 100 mm by 50 mm timber sub-frames using 3" long No 12 woodscrews at 400 mm maximum centres. The timber sub-frames were clamped into the BRE security test rig.

Figure 1 Specimen 260634/01 mounted in BRE test rig, and detail of upper hook lock and escutcheon *(lower hook lock was oriented in opposite direction)*



3.1.2 Specimen 260634/02

Configuration: 750 mm wide by 1900 mm high 'Smart Wall' single leaf double swing thermally broken glazed aluminium doorset.

The doorset was configured as detailed on drawing LPS-2S (February 2010).

The doorset incorporated two mid-rails, forming three glazed areas, and a low threshold (IMP411).

Glazing: The doorset incorporated 'ESG Secure LPS 1270 Level 1.1.2' sealed glazing units supplied by Essex Safety Glass Limited. The glazing was internally beaded with aluminium snap in beads. The glazing compromised:

- 17 mm thick composite glazing panel on the attack face;
- 16 mm thick Argon filled gap; and
- 4 mm thick toughened glass inner pane.

The glazing was attributed a 112 classification in accordance with LPS 1270. However, there was no evidence available at the time of the test programme that the glazing met the P6B classification defined in BS EN 356: 2000[9] recommended in Table E.1 in prEN1627: May 2009[2].

Hardware: Each doorset was fitted with:

- Two Adams Rite Sentinel 6 hook locks with cylinder guards (ACIM440B), Smart Systems keeps (ACIM012), Yale KM3535-NP G35x35[v] double key-operated europrofile cylinders (ACIM442).
- An Adams Rite 65 mm door closer (ACIM424) and associated bottom pivot.
- A 'D' handle (ACVL123).

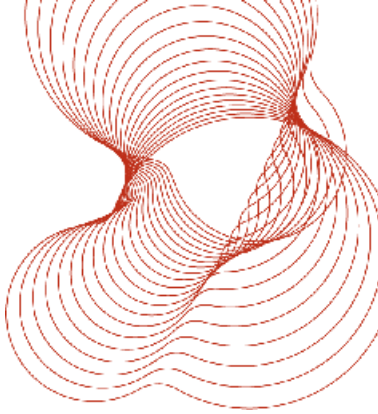
Locked conditions: The following locked conditions existed on the two specimens:

Minimum locked condition	One hook lock thrown and the key removed
Optimum locked condition	Both hook locks thrown and the keys removed

Specimen installation: The doorsets were fitted into 100 mm by 50 mm timber sub-frames using 3" long No 12 woodscrews at 400 mm maximum centres. The timber sub-frames were clamped into the BRE security test rig.

[v] The Yale KM3535-NP G35x35 cylinder was covered by BSI certificate KM 532920 to BS 1303 under the trade name 'Who Yuet'.

Figure 2 Specimen 260634/02 (left) and 260634/03 (right) mounted in the BRE test rig



3.1.3 Specimen 260634/03

Configuration: 1200 mm wide by 2500 mm high 'Smart Wall' single leaf double swing thermally broken glazed aluminium doorset.

The doorset was configured as detailed on drawing ENV-1 (February 2010).

The doorset incorporated two mid-rails, forming three glazed areas, and a low threshold (IMP411).

Glazing: The doorsets incorporated 'ESG Secure LPS 1270 Level 1.1.2' sealed glazing units supplied by Essex Safety Glass Limited. The glazing was internally beaded with aluminium snap in beads. The glazing compromised:

- 17 mm thick composite glazing panel on the attack face;
- 16 mm thick Argon filled gap; and
- 4 mm thick toughened glass inner pane.

The glazing was attributed a 112 classification in accordance with LPS 1270. However, there was no evidence available at the time of the test programme that the glazing met the P6B classification defined in BS EN 356: 2000[9] recommended in Table E.1 in prEN1627: May 2009[2].

Hardware: Each doorset was fitted with:

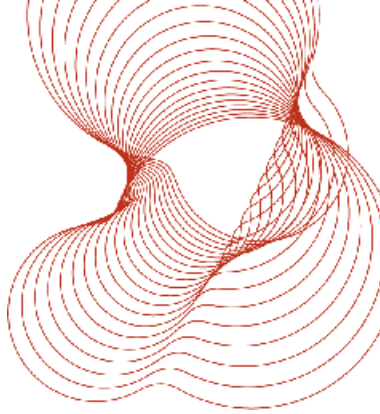
- Two Adams Rite Sentinel 6 hook locks with cylinder guards (ACIM440B), Smart Systems keeps (ACIM012), Yale KM3535-NP G35x35[vi] double key-operated europrofile cylinders (ACIM442).
- An Adams Rite 65 mm door closer (ACIM424) and associated bottom pivot.
- A 'D' handle (ACVL123).

Locked conditions: The following locked conditions existed on the two specimens:

Minimum locked condition	One hook lock thrown and the key removed
Optimum locked condition	Both hook locks thrown and the keys removed

Specimen installation: The doorsets were fitted into 100 mm by 50 mm timber sub-frames using 3" long No 12 woodscrews at 400 mm maximum centres. The timber sub-frames were clamped into the BRE security test rig.

[vi] The Yale KM3535-NP G35x35 cylinder was covered by BSI certificate KM 532920 to BS 1303 under the trade name 'Who Yuet'.



3.1.4 Specimen 260634/05

Configuration: Single point lock stile to be considered in place of the twin lock stiles fitted to specimens 260634a/01 to 04.

This took the form of a reinforced locking style fitted with a single Adams Rite mortise hook lock.

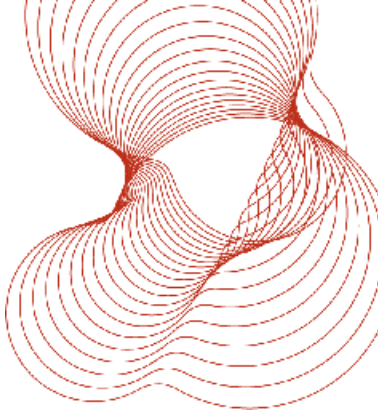
Specimen installation: The stile was clamped directly onto BRE test rig with the cylinder escutcheon orientated in the vertical plane such that an attempt could be made to remove the escutcheon from the attack face of the stile.

3.2 Data

The following specification documents were received by BRE Global Limited in advance of conducting the test programme:

Table 6 Documentation submitted by Smart Systems Limited in advance of the test programme

Document Reference	Title / Contents	Revision / Issue
LPS-1L	Smart Wall sample for LPS1175 level 2 security test *General arrangement and cross-sections of 1200 mm wide by 2500 mm high thermally broken fully glazed commercial doorset*	Feb 2010
LPS-2S	Smart Wall sample for LPS1175 level 2 security test *General arrangement and cross-sections of 750 mm wide by 1900 mm high thermally broken commercial doorset with two mid-rails*	Feb 2010
ENV-1	Smart Wall sample for LPS1175 level 2 security test *General arrangement and cross-sections of 1200 mm wide by 2500 mm high thermally broken commercial doorset with two mid-rails*	Feb 2010
ENV-2	Smart Wall sample for LPS1175 level 2 security test *General arrangement and cross-sections of 1200 mm wide by 2500 mm high thermally broken fully glazed commercial doorset*	Feb 2010
TC 115-08	Assa Abloy Limited test report *Tests conducted on Adams Rite Sentinel 6 deadlock to EN 12209: 2003*	18/10/08
KM532920	BSI Kitemark licence *Certificate covering various cylinders to EN 1303: 2005*	13/8/08
TC090-09	Assa Abloy Limited test report *Tests conducted on Adams Rite Sentinel escutcheon and Wah Yeut kitemarked cylinders to clauses 5.9.2 and 5.9.3 of EN 1303: 2005*	20/7/09



3.3 Specimen design conformity checks

Specimens 260634/01 to 260634/04 generally conformed to the documents listed in Table 6, except for the following aspects:

- Additional nuts were present on the bottom pivots (i.e. four in total on each).

The equipment listed in Table 7 was used to check the construction of the specimens submitted for test.

Table 7 Equipment used to check the construction of the specimens submitted for test

Article Number	Description
IN4075	Tape
IN3363	Digital Vernier

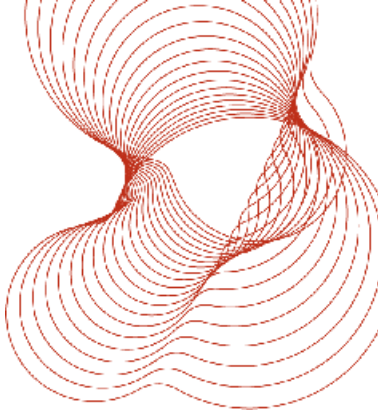
A subsequent review of the documents listed in Table 5 confirmed that those documents reflected the construction of the specimens tested. Furthermore, those documents accurately defined the construction of the specimens.

4 Test objective and methodology

4.1 General

The objective of the test programme was to determine the resistance class achieved by the specimens submitted in accordance with the performance requirements defined in prEN 1627: May 2009[2]. That involved conducting the following tests:

- Specimens representing the largest doorsets in the range defined in Table 1 to Table 4 were tested in accordance with the following standards to determine their conformity with the mechanical strength requirements contained in clause 7 of prEN 1627: May 2009[2]:
  - prEN 1628: May 2009[6]
  - prEN 1629: May 2009[7]
- Specimens representing the largest and smallest doorsets in the range defined in Table 1 to Table 4 were tested in accordance with prEN 1630: May 2009[8] to determine their conformity with the manual burglary requirements contained in clause 8 of prEN 1627: May 2009[2].



Furthermore, the following checks were conducted to determine whether the doorsets met the requirements contained in clauses 5 and 6 of prEN 1627: May 2009[2]:

- Specification literature for the infillings proposed by the manufacturer, and fitted within the specimens submitted for test, were reviewed to determine their conformity with the requirements contained in clause 5 of prEN 1627: May 2009[2].
- Specification literature for the locksets and cylinders fitted to the doorsets were reviewed to determine their conformity with the hardware requirements contained in clause 6 of prEN 1627: May 2009[2].

4.2 Methodology

The methods used to determine the specimens' resistance to dynamic and static loads were those defined in prEN 1628: May 2009[6] and prEN 1629: May 2009[7] respectively, while the methods used to determine the specimens' resistance to manual attack were those defined in prEN1630: May 2009[8].

The manufacturer's initial classification expectation was Resistance Class 2. However, on completion of the initial round of mechanical strength tests and manual attack tests, the manufacturer requested further tests be conducted to determine whether the doorsets achieved a Resistance Class 3 classification. That permitted a working time of up to 5 minutes within a total test time of 20 minutes for each individual attack test conducted in accordance with prEN1630: May 2009[8].

The preliminary attack test programme detailed in Table 8 and the complete attack test programme detailed in Table 9 were devised following a complete visual examination of the test specimens, a review of the documents submitted and took into account the results of tests conducted on the other specimens submitted to LPS 1175: Issue 7[1], detailed in BRE Global Limited report 264827a[3].

Table 8 Preliminary attack tests

Test reference	Specimen	Locked condition	Summary of attack test method to be attempted	Target Resistance Class
A	260634/03	Optimum	Lever open trailing edge.	RC2
B	260634/03	Optimum	Cut bottom hinge.	RC2
C	260634/03	Optimum	Lever open leading edge.	RC2
D	260634/03	Optimum	Manipulate hook lock.	RC2
E	260634/02	Optimum	Create aperture through mid-rail profile.	RC2
F	260634/03	Optimum	Lever glazing panel out.	RC2

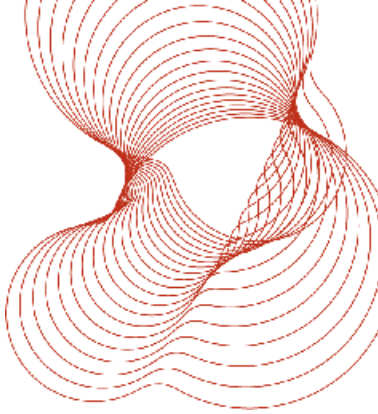


Table 9 Complete attack test programme

Test reference	Specimen	Locked condition	Summary of attack test method to be attempted	Target Resistance Class
1	260634/03	Optimum	Lever glazing panel out.	RC2
2	260634/03	Optimum	Lever the leading edge of the door leaf open.	RC2
3	260634/03	Optimum	Lever the leading edge of the door leaf open.	RC3
4	260634/03	Optimum	Lever the glazing panel out.	RC3
5	260634/02	Optimum	Lever the glazing panel out.	RC3

The following manual attack methods were discounted from the test programme due to the results achieved by the doorsets when tested in accordance with LPS 1175: Issue 7[1]:

(i) Create a hand aperture through the mid-rail.

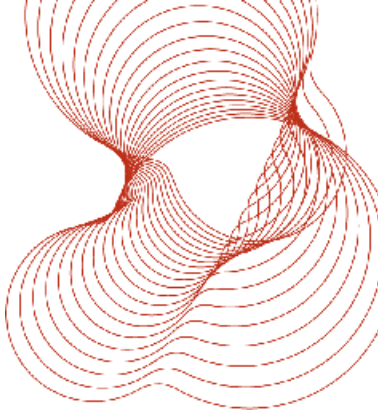
This was not conducted because preliminary test B, conducted on the doorsets during the test programme to LPS 1175: Issue 7[1] detailed in BRE Global Limited report 264827a[3], confirmed a significant force was required to chisel a hole in the aluminium extrusion. Tool set A3 in prEN1630: May 2009[8] did not contain any hammering tools that could impart the same forces as those used during that attack test. It was therefore considered the mid rail would offer at least 5 minutes resistance to attempts at penetrating it using tools selected from tool set A3.

(ii) Shear frame fixings and then lever the door leaf from the surrounding substrate.

This was not conducted because preliminary test C, conducted on the doorsets during the test programme to LPS 1175: Issue 7[1] detailed in BRE Global Limited report 264827a[3], confirmed a significant force was required to shear a single fixing. Furthermore, it took over 1 minute to shear a single fixing using a claw hammer and impact screwdriver. Tool set A3 in prEN1630: May 2009[8] did not contain any hammering tools that could impart the same forces as those used during that attack test. It was therefore considered the fixing method specified by the manufacturer would offer at least 5 minutes resistance to attempts at removing the doorset using this method of attack and tools specified in tool set A3.

(iii) Remove the cylinder escutcheon and then snap the cylinder.

This was not conducted because preliminary test D, conducted on the doorsets during the test programme to LPS 1175: Issue 7[1] detailed in BRE Global Limited report 264827a[3], confirmed a significant impact force was required to shear the fixings which held the escutcheon on the door leaf. Furthermore, it took over 2 minutes 19 seconds to overcome a single cylinder using this method. Tool set A3 in prEN1630: May 2009[8] did not contain any hammering tools that could impart the same forces as those used during that attack test. It was therefore considered the doorset would offer at least 5 minutes resistance to attempts at overcoming the two cylinders and operating the locks using this method of attack and tools specified in tool set A3.



(iv) Remove the mid rail by levering it away from the lock and hinge stiles.

This was not conducted because test 4, conducted on the doorsets during the test programme to LPS 1175: Issue 7[1] detailed in BRE Global Limited report 264827a[3], confirmed a significant impact force was required to overcome the cleats at both ends of the mid rail. Tool set A3 in prEN1630: May 2009[8] did not contain any hammering tools that could impart the same forces as those used during that attack test. It was therefore considered the doorset would offer at least 5 minutes resistance to attempts at removing the mid rail to create an access aperture using this method of attack and tools specified in tool set A3.

(v) Impact the hook bolts in the direction to disengage them.

This was not conducted because test 21, conducted on the doorsets during the test programme to LPS 1175: Issue 7[1] detailed in BRE Global Limited report 264827a[3], confirmed it was not possible to drive the hook bolts back using a claw hammer, screwdrivers and punch. Furthermore, tool set A3 in prEN1630: May 2009[8] did not contain any hammering tools that could impart the same forces as those used during that attack test. It was therefore considered the doorset would offer at least 5 minutes resistance to attempts aimed at driving the hook bolts from engagement using tools specified in tool set A3.

The failure criteria used during the manual attack test programme was the creation of an aperture through which the accessible opening test blocks defined in clause 3.11 of prEN 1630: May 2009[8] could be passed.

Individual attack tests were only aimed at areas or features which in the opinion of the team leader were not weakened by previous tests. Fresh specimens were used to enable the programme of tests to be completed where necessary.

4.3 Laboratory test equipment and personnel

4.3.1 Test rig

The test rig used to install the specimens was constructed from structural steel members. The two vertical members slid together and were clamped to horizontal members running across the top and bottom of the frame. This secured the vertical members in place. The timber sub-frames, into which the specimens were installed by the manufacturer, were then clamped within the channels formed by the two vertical members on the test rig using a series of bolts and clamping plates.

The rig's deflection when 15 kN forces were applied to the points indicated in Figure A.5 of prEN 1628: May 2009[6] were found to be:

- 14 mm - Right hand side when loaded parallel to the plane of the rig.
- 10.9 mm - Left hand side when loaded parallel to the plane of the rig.
- 1.7 mm - Right hand side when loaded perpendicular to the plane of the rig.
- 1.35 mm - Left hand side when loaded perpendicular to the plane of the rig.

Figure 3 Test frame

While the deflections resulting from the perpendicular to plane forces were within the 5 mm limit permitted in clause 4.1 of prEN 1628: May 2009[6], prEN 1629: May 2009[7] and prEN 1630: May 2009[8], the deflections resulting from the parallel to plane forces exceeded those permitted. None the less, it was considered that:

- Any such flexing of the rig in that direction would not affect the results of the static or dynamic load tests. This was because they were applied to the product in the perpendicular to plane direction.
- The deflection measurements were taken when the rig did not incorporate the specimens. When the specimens were installed and clamped within the verticals, the clamping technique used would have helped to reduce the parallel to plane deflections of the two vertical elements of the test rig when loads were applied to the doorsets.
- Any minor deflection of the test rig during manual burglary attempts would have had a negative effect on the product in so much as the deflection would have made it easier to force gaps between the leaf and frame within the central region of the rig's height. None the less the products passed those manual burglary attempts (refer to section 5.3). As such, it was considered that the parallel to plane deflections exhibited by the rig did not result in the specimens achieving inflated ratings during the tests conducted.

4.3.2 Static load cell

The load cell used to apply the static loads perpendicular to the face of the specimen during tests conducted in accordance with prEN 1628: May 2009[6] was BRE item number IN1791.

Figure 4 Load cell used to apply static loads perpendicular to the face of the specimen

4.3.3 Pendulum impactor

The dynamic impact tests were conducted using a pendulum impactor (BRE item number SBI/F/50) complying with the requirements contained in clause 4.2 of prEN 1629: May 2009[7] and a suspension system complying with the requirements contained in clause 4.3 of prEN 1629: May 2009[7].

4.3.4 Manual burglary test tools

The tools used were selected from the tool sets A1 to A3 defined in clause 7 of prEN 1630: May 2009[8].

Figure 5 Tool set A1

Figure 6 Tool set A2[vii]

4.3.5 Gap gauges

The dimensions of the gap gauges used during the static load tests were:

- Gap gauge A - Cylindroid with 10 mm diameter.
- Gap gauge B - Cylindroid with 25 mm diameter.
- Gap gauge C - Cylindroid with 50 mm diameter.
- Gap gauge D - Ellipsoid with 150 mm minor dimension and 250 mm major dimension.

The gap gauges complied with clause 4.6 of prEN 1628: May 2009[6] and clause 4.5 of prEN 1629: May 2009[7].

4.3.6 Test blocks

The dimensions of the test blocks used during the manual burglary tests were:

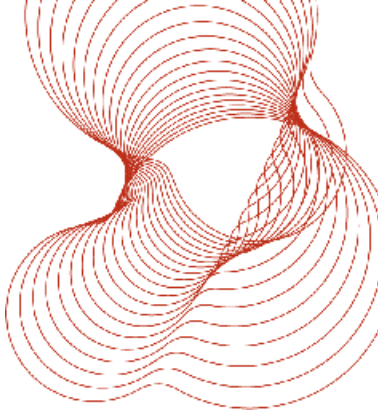
- Test block E1 - Rectangle measuring 400 mm long by 250 mm wide by 20 mm thick.
- Test block E2 - An ellipse measuring 400 mm long by 300 mm wide by 20 mm thick.
- Test block E3 - A circle measuring 350 mm diameter by 20 mm thick.

The test blocks complied with clause 3.11 of prEN 1630: May 2009[8].

4.3.7 Tests team

The test programme was conducted by Mr P Dillon, Mr C Dunton and Mr C Devine of BRE Global Limited on 8 and 9 March 2010. The test programme was monitored by Mr R Flint of BRE Global Limited.

[vii] Toolset A2 comprised the tools shown in Figure 5 and Figure 6.



4.3.8 Chronometers

The stopwatches used were marked with BRE article numbers IN3874 (resistance time) and IN3576 (total test time). The resolution of both stopwatches used was 0.01 seconds and therefore complied with the requirements of clause 4.4 of prEN 1630: May 2009[8].

4.3.9 Laboratory temperature and humidity

The laboratory temperature and humidity was measured using a Rotronic Hydroclip combined temperature and humidity meter (BRE article number IN1647).

The temperature recorded during the two days the tests were conducted on ranged between 16.63 degrees (low) and 18.56 degrees (high) and the relative humidity ranged between 33.06 % (low) and 40.94 % (high). The laboratory conditions therefore complied with the requirements contained in the following standards and clauses:

- Clause 6.1 of prEN 1628: May 2009[6].
- Clause 6.1 of prEN 1629: May 2009[7].
- Clause 6.2 of prEN 1630: May 2009[8].

Furthermore, the temperature of the environment in which the specimens were stored for a period of 24 hours prior to the test ranged between 14.5 degrees (low) and 20.81 degrees (high). Although the lower temperature was 0.5 degrees lower than that required in clause 5.2 in prEN 1628: May 2009[6], prEN 1629: May 2009[7] and prEN 1630: May 2009[8], it was only below 15 degrees for a brief period. It was considered that this deviation from the standard did not have a significant effect on the specimen's performance when tested to prEN 1628: May 2009[6], prEN 1629: May 2009[7] and prEN 1630: May 2009[8].

5 Test results

5.1 Static load tests

5.1.1 Static load tests in accordance with the requirements of a Resistance Class 2 classification

The initial series of static load tests were conducted on specimen 260634/03 in accordance with the requirements contained in prEN 1628: May 2009[6] for a group 1 product of Resistance Class 2.

Of the three glazed infill present on the specimen tested, only the central one was loaded because all of the glazed units and beads were identical to the central one.

The results of the static load tests conducted in accordance with the requirements of a Resistance Class 2 classification are detailed in Table 10.

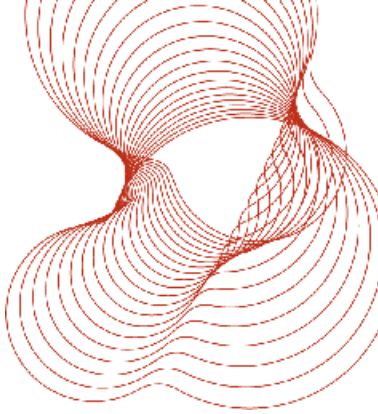


Table 10 Results of static load tests conducted on specimen 260634/03 in accordance with the requirements of a Resistance Class 2 classification

Location	Load		Observations
	Parallel to plane[viii]	Perpendicular to plane	
Bottom left corner of central glazed infill.	None	3 kN	Load held.
Bottom right corner of central glazed infill.	None	3 kN	Load held.
Top right corner of central glazed infill.	None	3 kN	Load held.
Top left corner of central glazed infill.	None	3 kN	Load held.
Top hinge corner of leaf.	None	3 kN	Load held.
Bottom hinge corner of leaf.	None	3 kN	Load held.
Bottom leading edge corner of leaf.	None	1.5 kN	Load held.
Bottom locking point of leaf.	None	3 kN	Load held.
Top locking point of leaf.	None	3 kN	Load held.
Top leading edge corner of leaf.	None	1.5 kN	Load held.

No entry was achieved through the doorset as a result of the static loads applied to the specimen and it was not possible to inset gap gauges A or B through the specimen at any time during the static load test. The specimen therefore offered resistance to static load commensurate with the requirements of a Resistance Class 2 classification defined in clause 7.1 of prEN 1627: May 2009[2].

5.1.2 Static load tests in accordance with the requirements of a Resistance Class 3 classification

Following completion of the initial series of static load tests, detailed in section 5.1.1, a further series of static load tests were conducted on specimen 260634/03. Those tests were conducted in accordance with the requirements contained in prEN 1628: May 2009[6] for a group 1 product of Resistance Class 3.

Of the three glazed infill present on the specimen tested, only the central one was loaded because all of the glazed units and beads were identical to the central one.

It should also be noted that although the specimen had been damaged during previous tests, it was considered that damage did not significantly affect the specimen's resistance to the static loads applied.

The results of the static load tests conducted in accordance with the requirements of a Resistance Class 3 classification are detailed in Table 11.

No entry was achieved through the doorset as a result of the static loads applied to the specimen and it was not possible to inset gap gauges A or B through the specimen at any time during the static load test. The specimen therefore offered resistance to static load commensurate with the requirements of a Resistance Class 3 classification defined in clause 7.1 of prEN 1627: May 2009[2].

[viii] Parallel to plane forces are not relevant to resistance class 2 to 6 products, as stated in clause 6.3.4 of prEN 1628: May 2009[6].

Table 11 Results of static load tests conducted on specimen 260634/03 in accordance with the requirements of a Resistance Class 3 classification

Location	Load		Observations
	Parallel to plane[ix]	Perpendicular to plane	
Top right corner of central glazed infill.	None	6 kN	Load held.
Bottom right corner of central glazed infill.	None	6 kN	Load held.
Bottom left corner of central glazed infill.	None	6 kN	Load held.
Top left corner of central glazed infill.	None	6 kN	Load held.
Top hinge corner.	None	6 kN	Load held.
Bottom hinge corner.	None	6 kN	Load held.
Bottom leading edge corner.	None	3 kN	Load held.
Bottom locking point.	None	6 kN	Load held.
Top locking point.	None	6 kN	Load held.
Top leading edge corner.	None	3 kN	Load held.

5.2 Dynamic load tests

5.2.1 Dynamic load tests in accordance with the requirements of a Resistance Class 2 classification

The initial series of dynamic load tests were conducted on specimen 260634/03 in accordance with the requirements contained in prEN 1629: May 2009[7] for a group 1 product of Resistance Class 2.

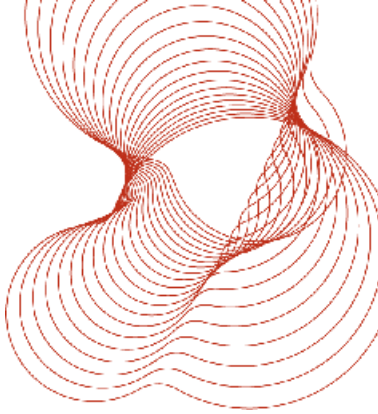
The results of the dynamic load tests conducted in accordance with the requirements of a Resistance Class 2 classification are detailed in Table 12.

Table 12 Results of dynamic load tests conducted on specimen 260634/03 in accordance with the requirements of a Resistance Class 2 classification

Impact location	Number of impacts	Observations
Centre of doorset (central glazed infill).	3	No visible damage.
Bottom leading edge corner.	1	No visible damage.
Bottom hinge corner.	1	No visible damage.
Centre of bottom glazed infill.	3	No visible damage.
Top leading edge corner.	1	No visible damage.
Top hinge corner.	1	No visible damage.
Centre of top glazed infill.	3	No visible damage.

No entry was achieved through the specimen as a result of applying the dynamic loads, nor was it possible to inset gap gauge D through the specimen at any time during the test. The specimen therefore offered

[ix] Parallel to plane forces are not relevant to resistance class 2 to 6 products, as stated in clause 6.3.4 of prEN 1628: May 2009[6].



resistance to dynamic load commensurate with the requirements of a Resistance Class 2 classification defined in clause 7.2 of prEN 1627: May 2009[2].

5.2.2 Dynamic load tests in accordance with the requirements of a Resistance Class 3 classification

Following completion of the initial series of dynamic load tests, detailed in section 5.2.1, a further series of dynamic load tests were conducted on specimen 260634/03. Those tests were conducted in accordance with the requirements contained in prEN 1629: May 2009[7] for a group 1 product of Resistance Class 3.

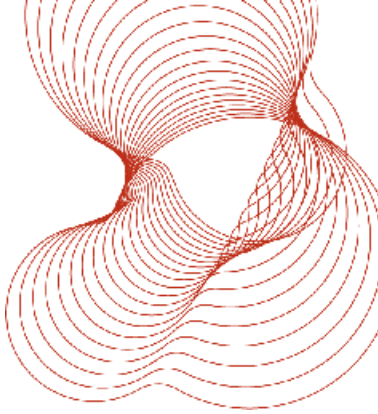
It should also be noted that although the specimen had been damaged during previous tests, it was considered that damage did not significantly affect the specimen's resistance to the static loads applied.

The results of the dynamic load tests conducted in accordance with the requirements of a Resistance Class 3 classification are detailed in Table 13.

No entry was achieved through the specimen as a result of applying the dynamic loads, nor was it possible to inset gap gauge D through the specimen at any time during the test. The specimen therefore offered resistance to dynamic load commensurate with the requirements of a Resistance Class 3 classification defined in clause 7.2 of prEN 1627: May 2009[2].

Table 13 Results of dynamic load tests conducted on specimen 260634/03 in accordance with the requirements of a Resistance Class 3 classification

Impact location	Number of impacts	Observations
Centre of doorset (central glazed infill).	3	No visible damage.
Bottom hinge corner.	1	No visible damage.
Bottom leading edge corner.	1	No visible damage.
Centre of bottom glazed infill.	3	No visible damage.
Top hinge corner.	1	No visible damage.
Top leading edge corner.	1	No visible damage.
Centre of top glazed infill.	3	No visible damage.



5.3 Manual burglary tests

5.3.1 Preliminary manual burglary tests

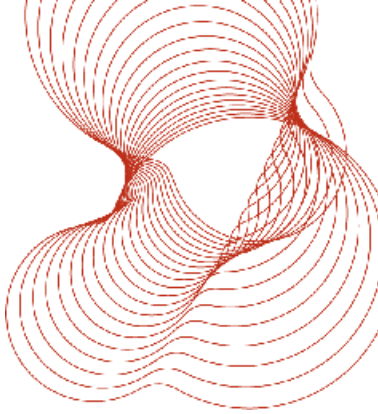
The results of the preliminary manual burglary tests are detailed below:

Pre-test reference:	A	Date:	9 March 2010
Objective:	Lever open trailing edge.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact wedge and screwdrivers into gap between trailing edge of leaf and frame and apply levering forces.	Rubber hammer, wooden wedge, large and small screwdrivers	00:45.00	00:45.00	-

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to lever the trailing edge of the door leaf open within 45 seconds using this method of attack and category A2 tools. At this stage it became clear that the tools selected would not cause the trailing edge of the door leaf to deform sufficiently in order to create a gap through which to pass the test blocks listed in section 4.3.6.

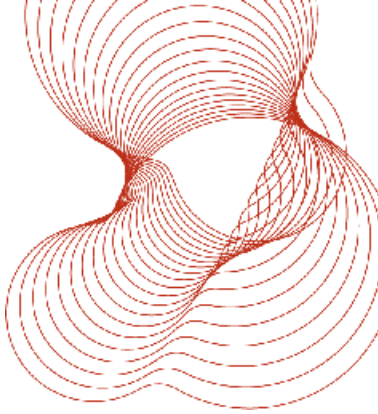


Pre-test reference:	B	Date:	9 March 2010
Objective:	Cut bottom hinge.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Insert pad saw into gap at bottom of leaf to cut hinge.	Padsaw	00:45.00	00:45.00	-

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to cut the bottom hinge within 45 seconds using this method of attack and category A2 tools.

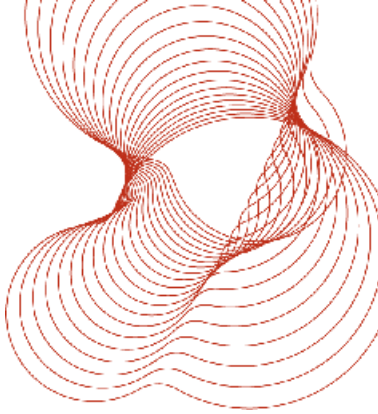


Pre-test reference:	C	Date:	9 March 2010
Objective:	Lever open leading edge.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact wedge and screwdrivers into gap between leading edge of the leaf and frame and apply levering forces to the leaf.	Rubber hammer, wooden wedge, large and small screwdrivers	00:45.00	00:45.00	-

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to lever the leading edge of the leaf open within 45 seconds using this method of attack and category A2 tools.

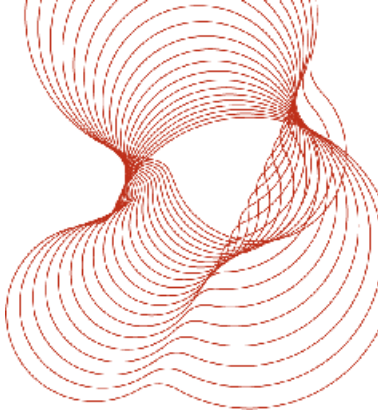


Pre-test reference:	D	Date:	9 March 2010
Objective:	Manipulate hook lock.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers into leading edge gap and apply levering forces to widen gap. Insert small screwdriver into gap to try to access hook lock in order to lever and disengage lock.	Rubber hammer, large and small screwdrivers	00:45.00	00:45.00	-

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to manipulate the hook lock within 45 seconds using this method of attack and category A2 tools.

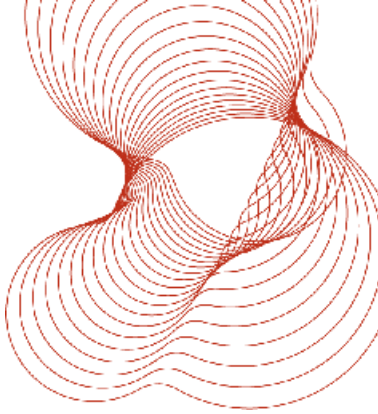


Pre-test reference:	E	Date:	9 March 2010
Objective:	Create an aperture through the mid-rail profile.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Use screwdriver to pierce aluminium skin at joint between mid-rail and hinge.	Small screwdriver	00:45.00	00:45.00	Unable to pierce outer skin.

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to pierce the outer skin of the mid-rail profile within 45 seconds using this method of attack and category A2 tools.

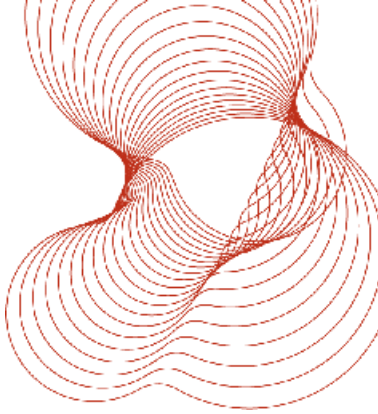


Pre-test reference:	F	Date:	9 March 2010
Objective:	Lever glazing panel out.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Insert screwdriver into frame around glazing and apply levering forces to bend frame.	Small screwdriver	00:45.00	00:45.00	-

Duration of attack test (min:sec): <15 minutes Resistance class achieved: Not applicable

Comments: It was not possible to lever out the glazing panel within 45 seconds using this method of attack and category A2 tools.



5.3.2 Main manual burglary tests

The results of the main manual burglary tests are detailed below:

Burglary test no.:	1	Date:	9 March 2010
Objective:	Lever glazing panel out.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

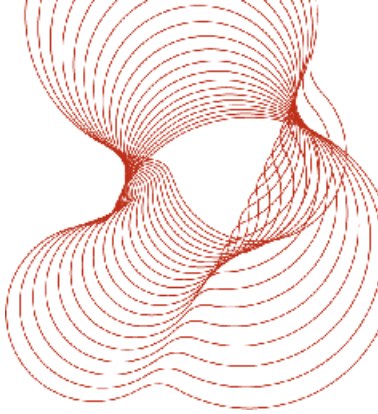
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Insert screwdriver into frame around glazing and apply levering forces to bend frame.	Small and large screwdrivers	03:00.00	03:00.00	-

Duration of attack test (min:sec): 3 m 45 s Resistance class achieved: 2

Comments: It was not possible to remove the glazing panel within 3 minutes using this method of attack and category A2 tools.

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Resistance Class 2.

Figure 7 Damage sustained by the door leaf around the glazed infill panel on specimen 260634/03 during burglary test 1



Burglary test no.:	2	Date:	9 March 2010
Objective:	Lever the leading edge of the door leaf open.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A2	Target resistance class:	2

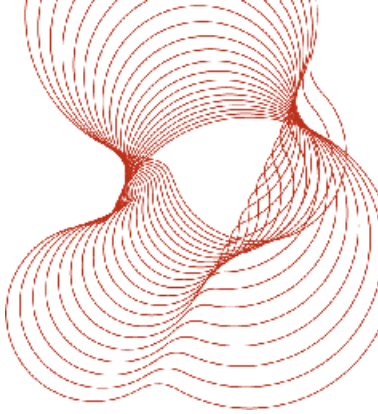
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Insert screwdrivers and wedge into the gap between the leading edge of the leaf and frame and apply levering forces to the leaf.	Large and small screwdrivers, rubber hammer and wooden wedge	03:00.00	03:00.00	-

Duration of attack test (min:sec): 3 m 59 s Resistance class achieved: 2

Comments: It was not possible to lever the leading edge of the leaf open within 3 minutes using this method of attack and category A2 tools.

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Resistance Class 2.

Figure 8 Damage sustained by the leading edge of the door leaf on specimen 260634/03 during burglary test 2



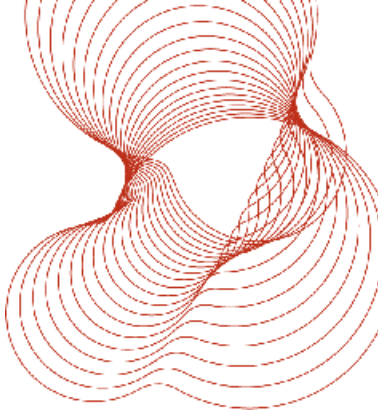
Burglary test no.:	3	Date:	9 March 2010
Objective:	Lever the leading edge of the door leaf open.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A3	Target resistance class:	3

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver and wedge, and plunge crowbar, into the gap between the leading edge of the leaf and frame and apply levering forces to the leaf.	Rubber hammer, large and small screwdrivers, crowbar and wooden wedge	05:00.00	05:00.00	-

Duration of attack test (min:sec): 6 m 20 s Resistance class achieved: 3

Comments: It was not possible to lever the leading edge of the leaf open within 5 minutes using this method of attack and category A3 tools.

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Resistance Class 3.



Burglary test no.:	4	Date:	9 March 2010
Objective:	Lever the glazing panel out.		
Test specimen:	260634/03	Locked condition:	Optimum
Tool set:	A3	Target resistance class:	3

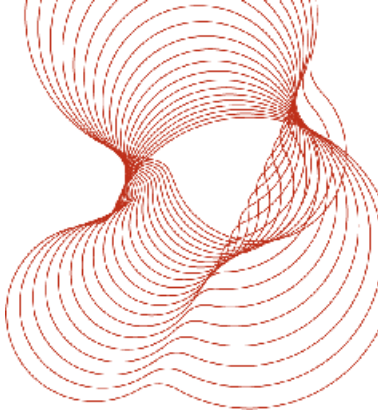
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers and plunge crowbar into frame around glazing panel and apply levering forces to deform the frame and remove the glazing.	Large screwdriver, rubber hammer and crowbar	05:00.00	05:00.00	-

Duration of attack test (min:sec): 7 m 31 s Resistance class achieved: 3

Comments: It was not possible to lever out the glazing panel within 5 minutes using this method of attack and category A1, A2 and A3 tools.

The product therefore offered resistance to this method of attack using these tools commensurate with the requirements of Resistance Class 3.

Figure 9 Damage sustained by the door leaf around the central glazed infill panel on specimen 260634/03 during burglary test 4



Burglary test no.:	5	Date:	9 March 2010
Objective:	Lever the glazing panel out.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool set:	A3	Target resistance class:	3

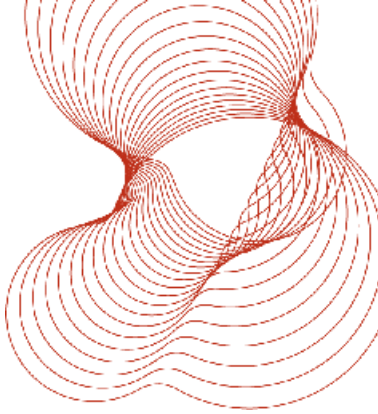
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers and plunge crowbar into frame around glazing panel and apply levering forces to deform the frame and remove the glazing.	Large screwdriver, small screwdriver and crowbar	05:17.00	05:17.00	Glazing unit removed.

Duration of attack test (min:sec): 7 m 31 s Resistance class achieved: Not applicable

Comments: It was possible to lever out the smallest size glazing panel within 5 minutes 17 seconds using this method of attack and category A1, A2 and A3 tools.

None the less, as the working time exceeded 5 minutes, the product offered resistance to this method of attack commensurate with the requirements of Resistance Class 3.

Figure 10 Damage sustained by the lower glazing panel on specimen 260634/02 during burglary test 5



6 Component specification checks

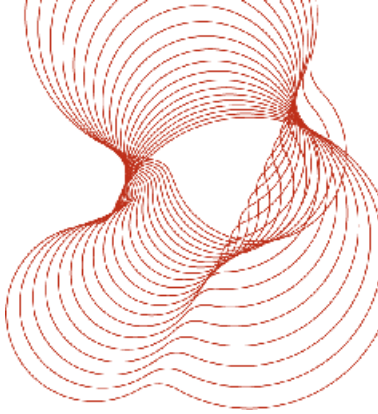
6.1 Hardware

The specimens incorporated two Adams Rite Sentinel 6 deadlocks. Each of the locks incorporated a Yale KM3535-NP G35x35 double europrofile (key:key) cylinder.

Smart Systems Limited submitted the following evidence of that locking hardware's conformity with the requirements contained in clause 6 of prEN 1627: May 2009[2]:

- Assa Abloy Limited's UKAS accredited test report TC115-08 dated 15 October 2008. That report confirmed the Adams Rite Sentinel 6 deadlock met the requirements of class 3H400F4KA00 defined in BS EN 12209: 2003[12]. The Adams Rite Sentinel 6 deadlock therefore achieved the minimum security and drill resistance class required by clause 6 of prEN 1627: May 2009[2] for a resistance class 3 classification.
- BSI Kitemark licence KM 532920 dated 13 August 2008. This confirmed the Yale 'KM3535-NP G35x35' double europrofile cylinder (key:key), which was also marketed under the 'Wah Yuet' trade name, met class 16010C52 defined in EN 1303: 2005[11]. The cylinder therefore exceeded the following:
    - The minimum key security class required by clause 6 of prEN 1627: May 2009[2] (i.e. key security class 4) for a resistance class 3 classification; and
    - The minimum attack resistance class required by clause 6 of prEN 1627: May 2009[2] (i.e. attack resistance class 2) for a resistance class 3 classification.

The hardware therefore complied with the minimum requirements for hardware specified in Table 1 in clause 6 of prEN 1627: May 2009[2].



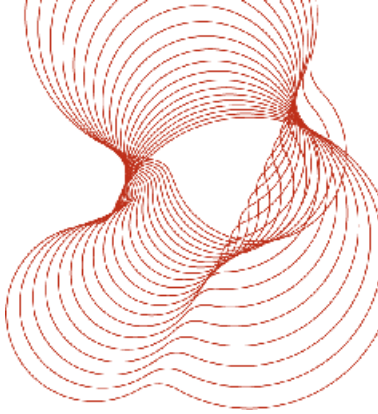
7 Assessment of range of doorset sizes and configurations listed in Table 1 to Table 4

Following completion of the test programme, Smart Systems Limited requested BRE Global Limited to assess whether the full range of sizes and configurations of doorsets falling within the scope detailed in Table 1 to Table 4 would meet the requirements of a resistance class 3 classification in accordance with prEN 1627: May 2009[2].

The assessment confirmed the specimens tested represented the largest and smallest doorsets in the range detailed in Table 1. Furthermore, the documents listed in Table 5 confirmed the doorsets construction was consistent across the range defined in Table 1 to Table 4.

The only modification noted during the review of the documents submitted was the inclusion of the beading reinforcement (UTL039). This was introduced to enhance the beading's resistance to attempts aimed at removing the glazing during the tests conducted in accordance with LPS 1175: Issue 7[1]. Their introduction would not compromise the systems' resistance to any of the other tests conducted in accordance with prEN 1628: May 2009[6], prEN 1629: May 2009[7] and prEN 1630: May 2009[8]. This was because they simply reinforce the beading and edges of the glazed infill, strengthening that aspect of the systems' construction.

Therefore, based on the results of tests detailed earlier in this report and the field of application rules presented in Annex D of prEN 1627: May 2009[2], it was considered that all doorsets falling within the scope defined in Table 1 to Table 4 would meet the performance requirements of resistance class 3 when manufactured and installed in accordance with the documents listed in Table 5 if placed in the optimum locked condition (i.e. both locks were engaged and the keys removed). No resistance classification was attributed to the product when placed in the minimum locked condition (i.e. only one of the two locks engaged and the key removed). This was because insufficient tests had been conducted to confirm a classification when the doorset was left in that locked state.



8 Conclusion

The 'Smart Wall' single leaf bidirectional glazed aluminium doorsets, falling within the scope defined in Table 1 to Table 4, met the requirements relating to a resistance class 3 classification defined in prEN 1627: May 2009[2] when:

- Manufactured and installed in accordance with the documents listed in Table 5.
- Placed in the optimum locked condition, that is, with both locks engaged and the keys removed.

No tests were conducted to confirm the resistance classification achieved when only one of the two locks were engaged.

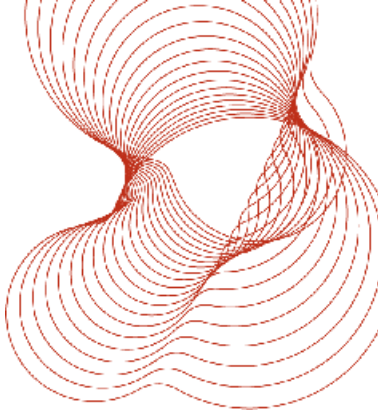
Whilst every effort was made to expose the minimum resistance of the product to manual attack during the test programme, the catalogue of tests and sequence of events was not exhaustive. Other modus operandi may exist that give different results.

The assessments contained within this report have been based on test data and information to hand at the time of issue. The assessment is invalidated if the assessed construction is subsequently tested since actual test data is deemed to take precedence over an expressed opinion. Any changes in the specification of the product will also invalidate the assessments contained within this report unless they are themselves covered by a valid assessment report issued by BRE Global Limited.

The assessments detailed within this report only apply to the designs assessed and may not be applicable to other constructions not specifically defined within the report.

The assessments detailed within this report relate to the manual attack performance of the product and do not cover aspects of quality, durability, maintenance or service requirements. Furthermore, the assessments relate only to the documents and/or specimen(s) assessed. They do not in themselves infer that the product or system assessed is approved by the Loss Prevention Certification Board or any other endorsements, approval or certification scheme.

This report should not be used to convey or infer approval or certification of the product by LPCB unless it is supported by a valid certificate for the product issued by LPCB and a Red Book listing. Copies of this report shall only be distributed in full without any abridgement or amendment.



9 References

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6. prEN 1628: May 2010 Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance under static loading. CEN, 2009.
7. prEN 1629: May 2010 Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance under dynamic loading. CEN, 2009.
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12. BS EN 12209: 2003 Building hardware - Locks and latches - Mechanically operated locks, latches and locking plates - Requirements and test methods. BSI, 2003.

==========REPORT ENDS==========