Testing of 'Smart Wall' single leaf bidirectional doorset to LPS 1175: Issue 7

Prepared for:
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28 September 2010

Test report number 264827a

Prepared on behalf of BRE Global by

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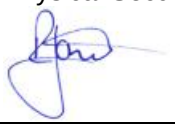
Signature 

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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].

This report details the results of a series of tests conducted in accordance with the performance requirements contained within LPS 1175: Issue 7[1] for a Security Rating 2 classification.

The subsequent evaluation of the doorsets’ compliance to the other requirements contained in LPS 1175: Issue 7[1], such as design and documentation, are detailed in BRE Global Limited report 264827b[3].

The results of tests conducted in accordance with prEN 1627: May 2009[2] are detailed in BRE Global Limited report 264828[4].

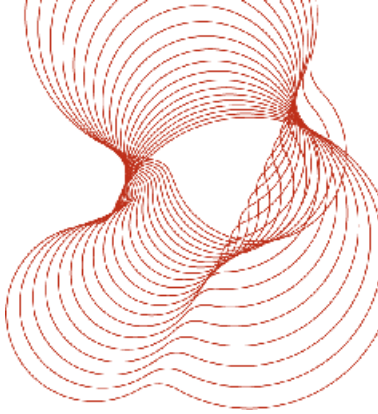
1.2 Objective

The objective of the test programme conducted on the ‘Smart Wall’ doorsets submitted by Smart Systems Limited was to determine whether the specimens offered resistance to forced entry commensurate with the performance requirements of a Security Rating 2 classification defined in LPS 1175: Issue 7[1].

1.3 Origin of test request

The testing conducted on the ‘Smart Wall’ single leaf doorsets was covered by quotation Q4165 issued on 22 February 2010. The quotation was accepted by Mr Anthony Murray of Smart Systems Limited on 4 March 2010.

The testing was completed under BRE Global Limited’s project number 260634 and 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 in this report.

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 BRE Global Limited report 264828[4].

3 Test specimens and data examination

3.1 Specimens submitted for test

The following specimens were submitted for test.

3.1.1 Specimen 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 low thresholds (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.

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[i] 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).

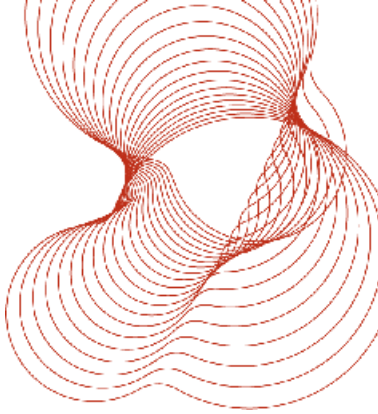
Locked conditions: The following locked conditions existed on the two specimens:

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)*

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



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 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.

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[ii] 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).

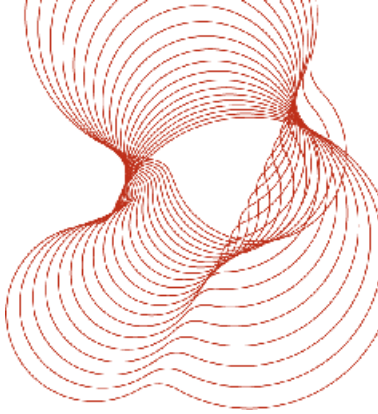
Locked conditions: The following locked conditions existed on the two specimens:

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.

[ii] 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.

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[iii] 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

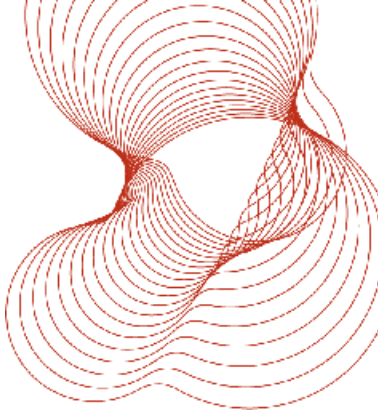
Specimen installation: The doorsets were fitted into 100 mm by 50 mm timber sub-frames using 3" long No 12 woodscrews at 400 mm maximum centres. The timber sub-frames were clamped into the BRE security test rig.

3.1.4 Specimen 260634/05

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

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

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



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 1 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

The documentation requirements defined within LPS 1175: Issue 7[1] were not met because the documentation did not fully define the construction of the doorsets, the method of installation or the construction of specimen 260634/05.

3.3 Specimen design conformity checks

Specimens 260634/01 to 260634/04 generally conformed with the documents specifying their construction, except for the following:

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

The equipment listed in Table 2 was used to check the construction of the specimens submitted for test.

Table 2 Equipment used to check the construction of the specimens submitted for test

Article Number	Description
IN4075	Tape
IN3363	Digital Vernier

4 Test objective and methodology

4.1 General

The objective of the development test programme was to determine the resistance to manual attack exhibited by the specimens submitted in accordance with the performance requirements for a Security Rating 2 classification defined in LPS 1175: Issue 7[1].

4.2 Methodology

The manufacturer‘s classification expectation was Security Rating 2. This permitted a working time of up to 3 minutes within a total test time of 15 minutes for each individual attack test.

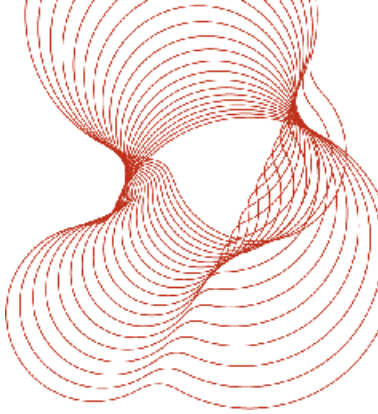
The preliminary attack test programme detailed in Table 3 and the complete attack test programme detailed in Table 4 were devised following a complete visual examination of the test specimens and review of the documents submitted.

Table 3 Preliminary attack tests

Test reference	Specimen	Summary of attack test methods to be attempted
A	260634/02	Create hand access aperture through glazing.
B	260634/02	Create hand access aperture through mid-rail profile.
C	260634/02	Cut through frame fixings.
D	260634/05	Remove cylinder escutcheon and snap the cylinder.

Table 4 Complete attack test programme

Test reference	Specimen	Locked condition	Summary of attack test method to be attempted	Target Security Rating
1 and 2	260634/02	Optimum	Lever glazing panel out.	2
3	260634/02	Optimum	Remove beading to remove glazing unit.	2
4 and 5	260634/02	Optimum	Lever out mid-rail.	2
6	260634/02	Optimum	Lever hinge edge.	2
7	260634/02	Optimum	Lever out bottom hinge pin.	2
8 and 9	260634/02	Optimum	Cut bottom hinge pin.	2
10	260634/02	Optimum	Lever out top hinge pin.	2
11 and 12	260634/02	Optimum	Cut top hinge pin.	2
13	260634/02	Optimum	Overcome door closer mechanism in top frame.	2
14	260634/02	Optimum	Cut section of door leaf to isolate hinge.	2
15, 16 and 25	260634/02	Optimum	Lever off escutcheon.	2
17	260634/02	Optimum	Impact off escutcheon.	2
18	260634/02	Optimum	Create access aperture through profile to expose escutcheon fixing plate.	2
19	260634/02	Optimum	Impact screwdriver into cylinder to punch cylinder through leaf.	2
20	260634/02	Optimum	Impact screwdriver into cylinder and twist cylinder.	2
21	260634/02	Optimum	Impact the hook lock in the direction of operation to disengage it.	2
22	260634/02	Optimum	Cut out lock keeps.	2
23	260634/01	Minimum	Lever open leading edge.	1
24	260634/01	Optimum	Lever open leading edge.	2
26	260634/03	Minimum	Lever open leading edge.	2
-	260634/02	Optimum	Create aperture through leaf to remove beading. *Not conducted due to result of preliminary attack test B and attack tests 1, 2 and 3.*	2
-	260634/02	Optimum	Cut hook lock out of door leaf. *Not conducted as attack test 18 showed this was not possible.*	2
-	260634/02	Optimum	Drill out cylinder. *Not conducted because it was kite marked to 1303 for attack resistance to drilling grade 2.*	2



Test reference	Specimen	Locked condition	Summary of attack test method to be attempted	Target Security Rating
-	260634/02	Optimum	Create access aperture through profile to manipulate lock mechanism. *Not conducted as the lock mechanism was protected behind the 6 mm escutcheon plate, which could not be overcome during previous attack tests.*	2
-	260634/02	Optimum	Create hand access aperture in glazing to overcome escutcheon fixings. *Not conducted due to result of preliminary attack test B and attack tests 1, 2 and 3.*	2

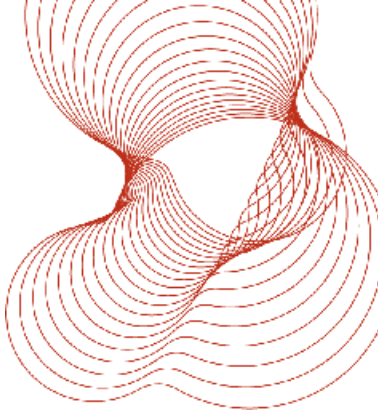
The failure criteria used during the test programme was the creation of an aperture through which the elliptical test block defined in clause 4.3 of LPS 1175: Issue 7[1] could be passed.

The tools used were selected from the relevant tool categories defined in clause 4.4.2.3 of LPS 1175: Issue 7[1].

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.

During each individual attack test the timing device used to measure test duration remained activated. The resolution of the stopwatches used was 0.01 seconds and therefore complied with the requirements of clause 4.4.2 of LPS 1175: Issue 7[1].

The test programme was conducted by Mr P Dillon, Mr C Dunton and Mr C Devine of BRE.



5 Test results

The specimens’ security ratings were determined by conducting the following series of manual intervention attack tests.

5.1 Preliminary attack test results

Attack test no.:	A	Date:	8 March 2010
Objective:	Create hand access aperture through glazing.		
Test specimen:	260634/02	Locked condition:	Not applicable
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact glazing.	Claw hammer	00:08.50	00:08.50	-
Drill 6 mm pilot hole through polycarbonate layer.	Hand drill and 6 mm HSCO drill bit	00:11.56	00:20.06	Hole drilled.
Impact knife to cut polycarbonate layer.	Claw hammer and knife	02:39.94	03:00.00	20 mm cut created in polycarbonate layer.

Duration of attack test (min:sec):	<15 minutes	Security rating achieved:	Not applicable

Comments: It was not possible to create a hand sized aperture through the glazing within 3 minutes using this method.

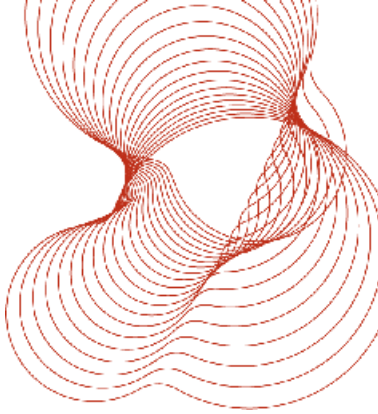
Attack test no.:	B	Date:	8 March 2010
Objective:	Create hand access aperture through mid-rail profile.		
Test specimen:	260634/02	Locked condition:	Not applicable
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Pierce mid-rail profile with screwdriver.	6.5 mm screwdriver and claw hammer	00:12.00	00:12.00	-
Impact screwdriver to cut mid-rail.	Claw hammer, 6.5 mm and 14 mm screwdrivers	01:49.93	02:01.93	80 mm cut created through first layer of aluminium. Test halted.

Duration of attack test (min:sec):	<15 minutes	Security rating achieved:	Not applicable

Comments: Three further layers of aluminium remained to be cut through.

Figure 3 Cut created through outer layer of aluminium mid-rail profile



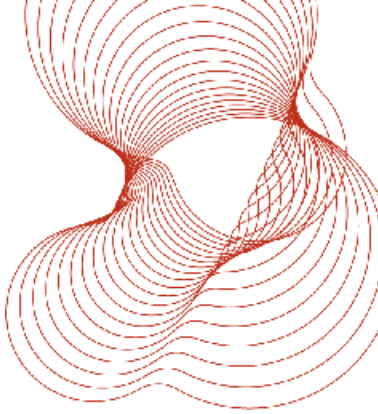
Attack test no.:	C	Date:	8 March 2010
Objective:	Cut through frame fixings.		
Test specimen:	260634/02	Locked condition:	Not applicable
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers between frame and sub-frame (header, towards leading edge side of leaf).	Claw hammer, 6.5 mm and 14 mm screwdrivers	00:27.94	00:27.94	5 mm wide gap created.
Impact screwdriver through frame towards the fixing.	6.5 mm screwdriver and claw hammer	00:19.53	00:47.47	Tip of screwdriver just touched fixing.
Chisel the fixing.	6.5 mm screwdriver and claw hammer	00:22.30	01:09.77	Fixing cut.

Duration of attack test (min:sec): <15 minutes Security rating achieved: Not applicable

Comments: It was possible to cut through one fixing within 23 seconds, once a 5 mm gap was created.

The manufacturer stated a maximum 5 mm gap was permitted when fitting the doorsets.



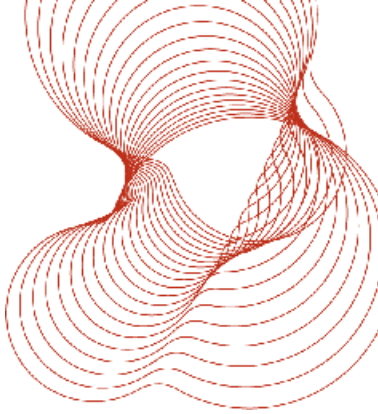
Attack test no.:	D	Date:	1 June 2010
Objective:	Remove cylinder escutcheon and snap the cylinder.		
Test specimen:	260634/05	Locked condition:	Not applicable
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers between escutcheon and lock stile to shear fixings. Apply levering forces to remove escutcheon.	Claw hammer, 6.5 mm and 14 mm screwdrivers	01:08.51	01:08.51	Escutcheon removed.
Impact screwdriver and apply levering forces to widen hole that the cylinder sits in. Attach self gripping pliers to cylinder and lever to snap.	6.5 mm screwdriver, claw hammer, self gripping pliers.	01:10.57	02:19.08	Cylinder snapped, lock unlocked.

Duration of attack test (min:sec):	<15 minutes	Security rating achieved:	1 (minimum) / 2 (optimum)

Comments: It was possible to snap the cylinder and undo the lock within 2 minutes 19 seconds.

The doorset would therefore only offer resistance to this method of attack commensurate with the requirements of Security Rating 1 if only one lock were fitted to the leading edge of the leaf, or only one lock was engaged. None the less, it would offer resistance to this method of attack commensurate with the requirements of Security Rating 2 classification when both locks were engaged.



5.2 Complete attack test results

Attack test no.:	1	Date:	8 March 2010
Objective:	Lever glazing panel out.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

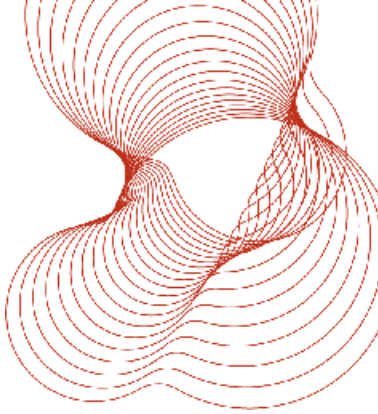
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver and lever into top edge of bottom mid-rail and apply levering forces.	14 mm screwdriver, claw hammer and tyre lever	00:57.22	00:57.22	Deformed top edge of bottom mid-rail.
Impact screwdriver into vertical edge surrounding middle glazing panel and apply levering forces.	14 mm screwdriver and claw hammer	00:50.10	01:47.32	Deformed right-hand edge.
Impact screwdriver and lever into bottom right-hand corner of glazing panel and apply levering forces to remove panel.	14 mm screwdriver, claw hammer, tube and tyre lever	01:12.68	03:00.00	Glazing panel not removed.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

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

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

However, it was considered that the test team may have been able to lever the glazing panel out within 3 minutes if attempted again. This was investigated on the bottom glazing panel during attack test 2.



Attack test no.:	2	Date:	8 March 2010
Objective:	Lever glazing panel out.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into left-hand edge of frame around bottom glazing panel and apply levering forces.	14 mm screwdriver and claw hammer	00:45.08	00:45.08	Left-hand edge deformed.
Impact screwdriver into right-hand edge of frame and apply levering forces.	14 mm screwdriver and claw hammer	00:55.41	01:40.49	Right-hand edge deformed.
Impact screwdriver into bottom edge of frame and apply levering forces.	14 mm screwdriver and claw hammer	00:35.34	02:15.83	Bottom edge deformed.
Impact screwdriver and lever between glazing panel and frame and apply levering forces to remove panel.	14 mm screwdriver, lever, claw hammer and tube	01:01.05	03:16.88	Glazing panel not removed.

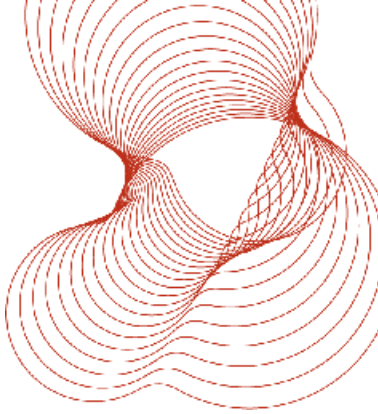
Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

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

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

Furthermore, the manufacturer revealed that the additional reinforcement angle (UTL039) detailed on the drawings was not part of the finished specimen as the part had not been shipped in time. That angle was designed to fit around the corner of the glazing and screw into the aluminium profile. It was considered that the addition of that angle around the beading (rather than the rebate) would have enhanced the doorset's resistance to this attack method.

Figure 4 Bottom glazing panel after attack test 2 (lever out glazing panel)



Attack test no.:	3	Date:	8 March 2010
Objective:	Remove beading to remove glazing unit.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

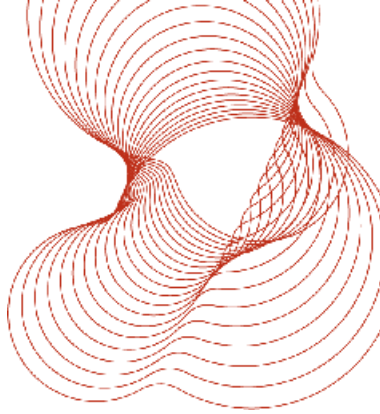
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into left-hand edge of frame surrounding glazing and apply levering forces.	14 mm screwdriver and claw hammer	00:24.32	00:24.32	Frame deformed.
Impact punch through gap created.	Claw hammer and punch	00:48.07	01:12.39	Punched hole through beading.
Impact glazing with hammer.	Claw hammer	01:49.22	03:01.61	Glazing not removed.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

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

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

Figure 5 Punches penetrating through beading



Attack test no.:	4	Date:	8 March 2010
Objective:	Lever out mid-rail.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

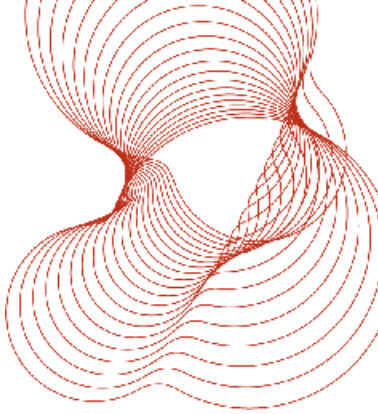
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver at edge of mid-rail to pierce outer layer of aluminium, then apply levering motion to cut skin.	Claw hammer, 6.5 mm and 14 mm screwdrivers	00:38.08	00:38.08	115 mm cut created in outer skin.
Impact to pierce second layer, and apply levering forces to lever out mid-rail fixing cleat.	6.5 mm and 14 mm screwdrivers, nail bar, tube and claw hammer	02:21.92	03:00.00	Could not remove cleat.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to remove the mid-rail fixing cleat within 3 minutes using this method of attack and category B tools.

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

Figure 6 Result of attempting to lever the mid-rail profile



Attack test no.:	5	Date:	8 March 2010
Objective:	Lever out mid-rail.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

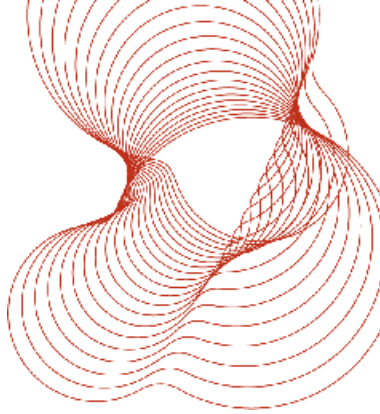
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver at edge of mid-rail to pierce outer layer of aluminium, then apply levering motion to cut skin.	Claw hammer, 6.5 mm and 14 mm screwdrivers	00:38.08	00:38.08	115 mm cut created in outer skin (Time taken from attack test 4).
Extend cut on outer skin by impacting screwdriver and applying levering forces.	14 mm screwdriver and claw hammer	00:36.50	01:14.58	320 mm cut in outer skin.
Impact screwdriver and apply levering forces to cut second layer of aluminium.	Claw hammer, 6.5 mm and 14 mm screwdrivers	01:47.70	03:02.28	90 mm cut in second layer of skin.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to cut through the mid-rail within 3 minutes using this method of attack and category B tools.

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

Figure 7 Result of second attempt to lever out the mid-rail profile



Attack test no.:	6	Date:	8 March 2010
Objective:	Lever hinge edge.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact nail bar into hinge edge and apply levering forces, starting at middle of doorset then near bottom hinge.	Nail bar, claw hammer, tube and 14 mm screwdriver	01:38.41	01:38.41	-
Impact screwdriver into threshold, then impact nail bar into hinge edge and apply levering forces near bottom hinge.	Nail bar, claw hammer, tube, 6.5 mm and 14 mm screwdrivers	01:28.17	03:06.58	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

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

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

Attack test no.:	7	Date:	8 March 2010
Objective:	Lever out bottom hinge pin.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

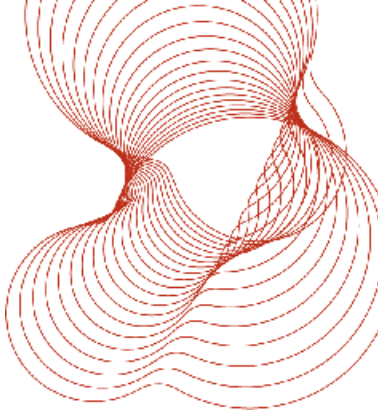
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver and nail bar into bottom hinge and apply levering forces. Impact wooden wedge into threshold.	6.5 mm and 14 mm screwdrivers, claw hammer, nail bar, tube and wooden wedge	03:02.34	03:02.34	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to lever out the bottom hinge pin within 3 minutes using this method of attack and category B tools.

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

Figure 8 Damage sustained during attack test 7



Attack test no.:	8	Date:	8 March 2010
Objective:	Cut bottom hinge pin (chisel).		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact wedge into threshold near hinge. Then chisel the hinge pin using the screwdriver.	Wooden wedge, claw hammer and 6.5 mm screwdriver	03:00.00	03:00.00	Previous damage existed around hinge edge.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to cut the bottom hinge pin within 3 minutes using this method of attack and category B tools.

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

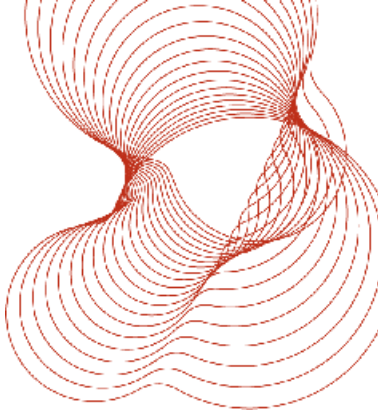
Attack test no.:	9	Date:	8 March 2010
Objective:	Cut bottom hinge pin (junior hacksaw).		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact wedge into threshold near leading edge.	Wooden wedge and claw hammer	00:10.66	00:10.66	Previous damage existed around the hinge edge.
Cut hinge pin with junior hacksaw.	Junior hacksaw	02:58.06	03:08.72	Cut three-quarters of the way through the pin.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to cut the bottom hinge pin within 3 minutes using this method of attack and category B tools.

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



Attack test no.:	10	Date:	8 March 2010
Objective:	Lever out top hinge pin.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

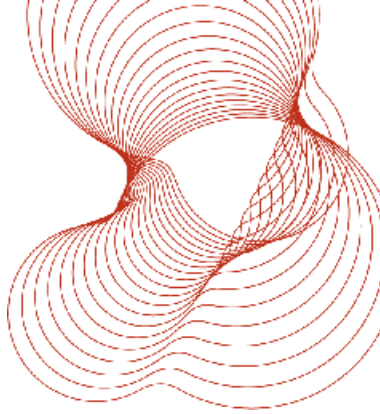
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver and wedge between leaf and frame near hinge.	14 mm screwdriver, wooden wedge and claw hammer	00:41.43	00:41.43	-
Impact lever and screwdriver between top hinge and frame and apply levering forces.	Lever, claw hammer, tube and 14 mm screwdriver	02:29.75	03:11.18	Header deformed.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to lever out the top hinge pin within 3 minutes using this method of attack and category B tools.

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

Figure 9 Damage as a result of attack test 10



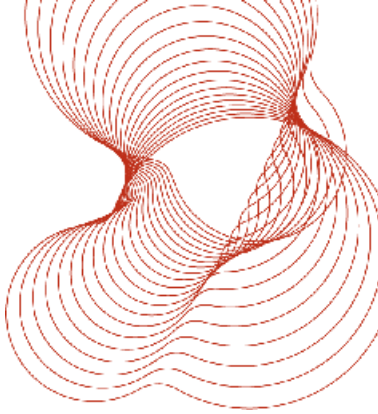
Attack test no.:	11	Date:	8 March 2010
Objective:	Cut top hinge pin (chisel).		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Chisel the hinge pin.	Claw hammer, 6.5 mm and 14 mm screwdrivers	01:48.91	01:48.91	Previous damage existed around the top hinge area. Test halted.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: The test was halted at 1 minute 49 seconds as it was evident that the screwdriver was not cutting the hinge pin at all.

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



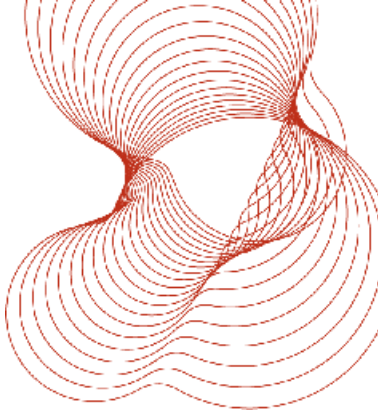
Attack test no.:	12	Date:	8 March 2010
Objective:	Cut top hinge pin (junior hacksaw).		
Test specimen:	260634/0	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact wedge, screwdriver and lever into gap between leaf and frame to create access for hacksaw.	Wooden wedge, 14 mm screwdriver, claw hammer and lever	00:51.37	00:51.37	Previous damage existed around the top hinge area.
Cut hinge pin with junior hacksaw.	Junior hacksaw	02:09.99	03:01.36	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to cut the top hinge pin within 3 minutes using this method of attack and category B tools as the pin was made of hardened steel.

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



Attack test no.:	13	Date:	8 March 2010
Objective:	Overcome door closer mechanism in top frame.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into header and apply levering forces to deform outer skin.	Claw hammer, 6.5 mm and 14 mm screwdrivers	03:02.11	03:02.11	Could not remove fixings from one end of door closer.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to overcome the door closer mechanism within 3 minutes using this method of attack and category B tools.

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

Attack test no.:	14	Date:	8 March 2010
Objective:	Cut section of door leaf to isolate hinge.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

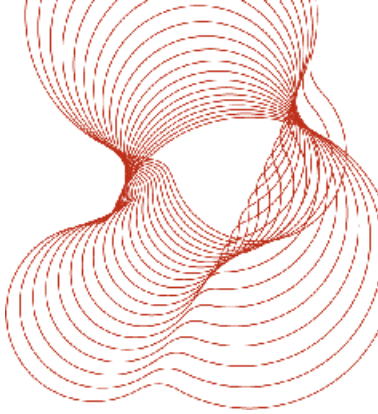
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into outer layer of aluminium and apply levering forces to deform skin.	Claw hammer, 6.5 mm and 14 mm screwdrivers	03:01.96	03:01.96	Hinge pin exposed.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to isolate the hinge and door closer mechanism from the leaf within 3 minutes using this method of attack and category B tools.

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

Figure 10 Damage to leaf sustained during attempt to isolate hinge, and damage to header sustained during attempts to overcome the door closer mechanism



Attack test no.:	15	Date:	8 March 2010
Objective:	Lever off escutcheon (upper).		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver behind upper escutcheon and apply levering forces to remove from leaf.	6.5 mm and 14 mm screwdrivers, claw hammer and "Bonsai bar"	03:01.66	03:01.66	-

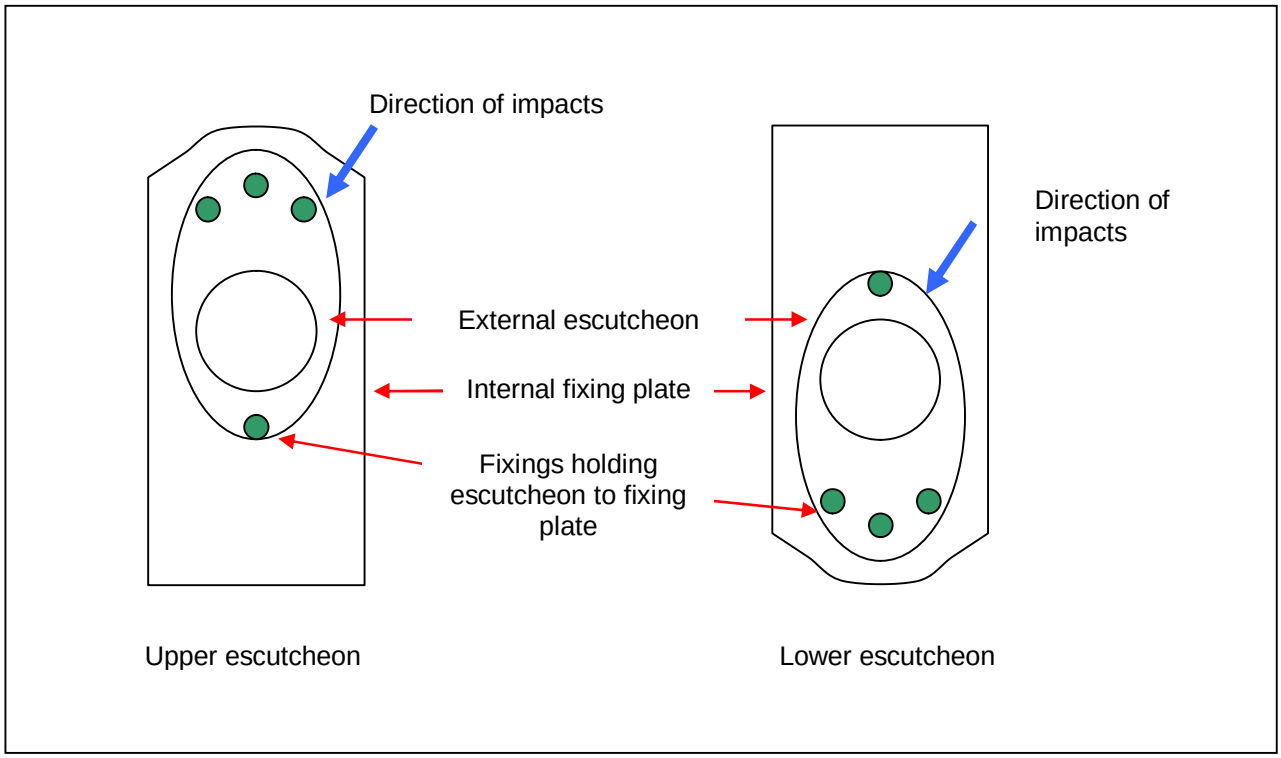
Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

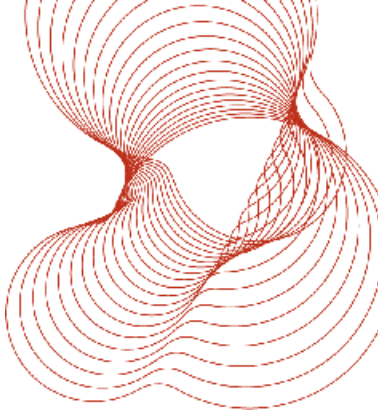
Comments: It was not possible to lever off the escutcheon within 3 minutes using this method of attack and category B tools.

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

Furthermore, as the lower escutcheon was rotated 180 degrees from the upper escutcheon, it was thought that the location of the fixings may affect it's resistance to attack (see Figure 11 for illustration of fixings). This attack was therefore repeated on the lower escutcheon in attack test 16.

Figure 11 Diagram of orientation of escutcheons on specimen





Attack test no.:	16	Date:	8 March 2010
Objective:	Lever off escutcheon (lower).		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

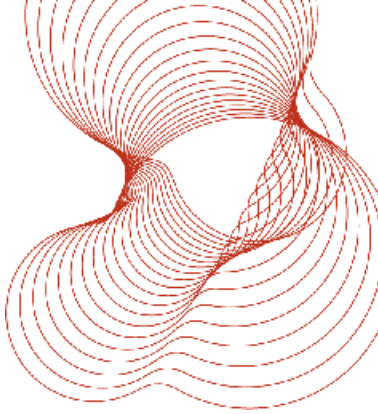
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver behind lower escutcheon and apply levering forces to remove from leaf.	Claw hammer, 6.5 mm and 14 mm screwdrivers	02:44.50	02:44.50	Top screw sheared.
Impact screwdriver behind lower escutcheon and apply levering forces to remove from leaf.	14 mm screwdriver and claw hammer	00:16.63	03:01.13	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to lever off the escutcheon within 3 minutes using this method of attack and category B tools.

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

Figure 12 Damage sustained during attempts to lever off the lower escutcheon



Attack test no.:	17	Date:	8 March 2010
Objective:	Impact off escutcheon.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

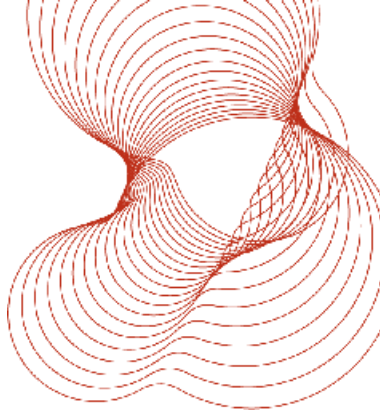
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact escutcheon to remove from door leaf.	Claw hammer	03:02.29	03:02.29	Cylinder snapped just after 3 minutes of attack.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to impact the escutcheon from the door leaf within 3 minutes using this method of attack and category B tools.

However, the internal face of the cylinder snapped just after 3 minutes and was ejected from the door leaf by the impacts. The external face of the cylinder remained within the leaf and it was not possible to manipulate that half of the cylinder to operate the lock.

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



Attack test no.:	18	Date:	8 March 2010
Objective:	Create access aperture through profile to expose escutcheon fixing plate.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

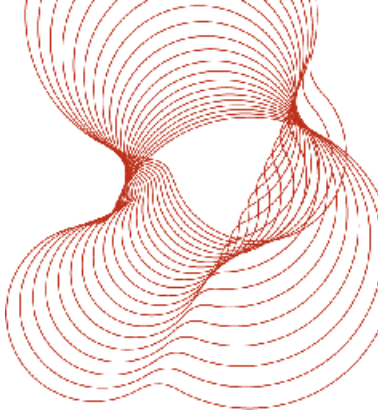
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into leaf to cut outer aluminium skin.	6.5 mm and 14 mm screwdrivers and claw hammer	03:00.00	03:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to overcome the escutcheon fixing plate within 3 minutes using this method of attack and category B tools.

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

Figure 13 Damage sustained during attack test 18



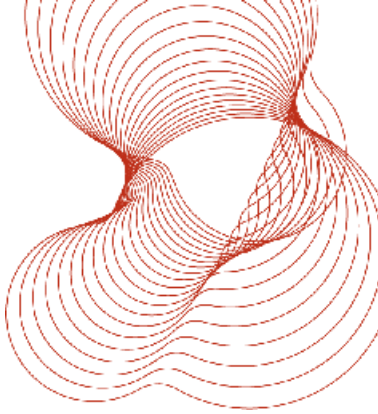
Attack test no.:	19	Date:	8 March 2010
Objective:	Impact screwdriver into cylinder to punch cylinder through leaf.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into cylinder key slot.	6.5 mm screwdriver and claw hammer	03:00.00	03:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to punch the cylinder through the door leaf within 3 minutes using this method of attack and category B tools.

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



Attack test no.:	20	Date:	8 March 2010
Objective:	Impact screwdriver into cylinder and twist cylinder.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

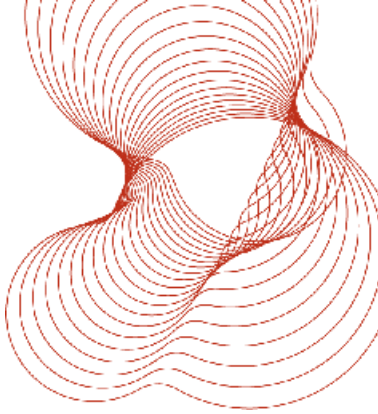
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver into cylinder key slot and apply twisting forces to disengage cylinder.	6.5 mm screwdriver, claw hammer and self gripping pliers	< 01:00.00	< 01:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: The cylinder had already sustained some damage, having undergone 3 minutes of impacting.

None the less, it was not possible to disengage the cylinder by twisting it within 1 minute using this method of attack and category B tools. Furthermore, it was considered that continuing the method for a further 2 minutes would not have caused the cylinder plug to rotate.

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



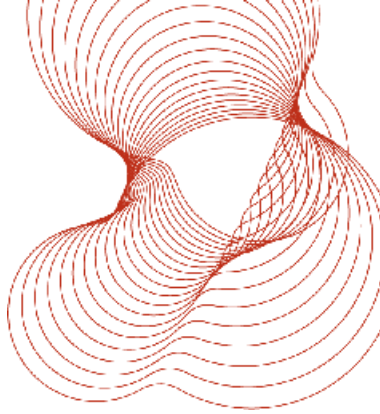
Attack test no.:	21	Date:	8 March 2010
Objective:	Impact the hook lock in the direction of operation to disengage it.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact the screwdriver and punch downwards in the leading edge gap to force the hook lock downwards and disengage it.	6.5 mm and 14 mm screwdrivers, claw hammer and punch	03:00.00	03:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to impact the hook lock downwards to disengage it within 3 minutes using this method of attack and category B tools.

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



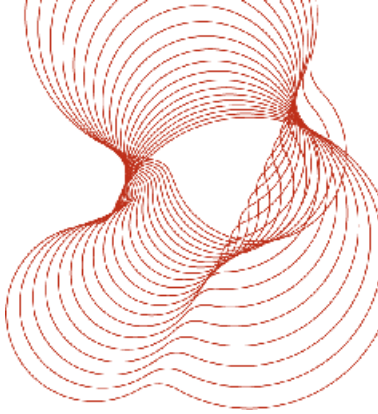
Attack test no.:	22	Date:	8 March 2010
Objective:	Cut out lock keeps.		
Test specimen:	260634/02	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdrivers and wedge into leading edge gap and apply levering motion to tear outer skin surrounding lock keeps.	6.5 mm and 14 mm screwdrivers, wooden wedge and claw hammer	03:02.15	03:02.15	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was not possible to isolate the lock keeps within 3 minutes using this method of attack and category B tools.

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



Attack test no.:	23	Date:	8 March 2010
Objective:	Lever open leading edge.		
Test specimen:	260634/01	Locked condition:	Minimum
Tool category:	B	Target security rating:	1

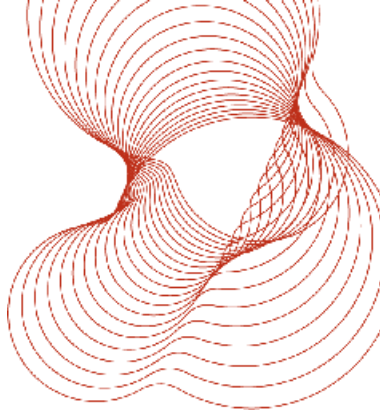
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact tools into the leading edge gap and apply levering forces to forcibly open the doorset, starting from the bottom of the leading edge.	Lever and 6.5 mm screwdriver	01:00.00	01:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 1

Comments: The top hook lock was locked for this test (i.e. bottom hook lock unlocked).

It was not possible to lever the leading edge in the minimum locked condition within 1 minute using this method of attack and category A tools.

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Security Rating 1 in the minimum locked condition.



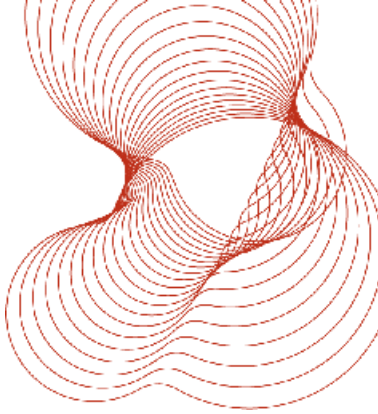
Attack test no.:	24	Date:	8 March 2010
Objective:	Lever open leading edge.		
Test specimen:	260634/01	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact tools into the leading edge gap and apply levering forces to forcibly open the doorset, starting from the bottom of the leading edge.	14 mm screwdriver, lever, tube and claw hammer	03:02.45	03:02.45	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

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

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



Attack test no.:	25	Date:	8 March 2010
Objective:	Lever off escutcheon.		
Test specimen:	260634/01	Locked condition:	Optimum
Tool category:	B	Target security rating:	2

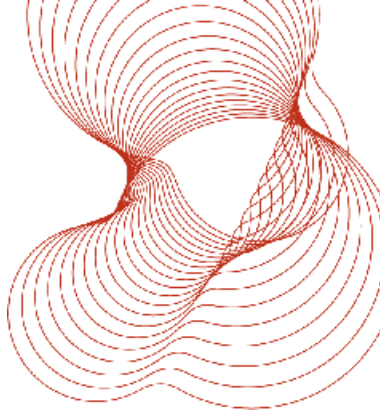
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact screwdriver behind upper escutcheon and apply levering forces to remove from leaf.	Claw hammer, 6.5 mm and 14 mm screwdrivers	02:36.56	02:36.56	Three fixings removed and the escutcheon was levered away, revealing the cylinder. Test halted.

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: It was possible to lever off the escutcheon within 2 minutes 37 seconds using this method of attack and category B tools.

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Security Rating 2 because the specimen was fitted with two cylinders protected by identical escutcheons. Furthermore, it was considered there would have been insufficient time to snap the exposed cylinder, retract the bolt on that lock by manipulating the cam and then lever the door open. This was because attack test 23 confirmed the doorset resisted over 1 minute of levering in the minimum locked condition. Although the category B tool kit incorporated longer tools, it was considered they would not enable the leaf to be levered open within the remaining 23 seconds.

Figure 14 Cylinder exposed during attack test 25



Attack test no.:	26	Date:	9 March 2010
Objective:	Lever open leading edge.		
Test specimen:	260634/03	Locked condition:	Minimum
Tool category:	B	Target security rating:	2

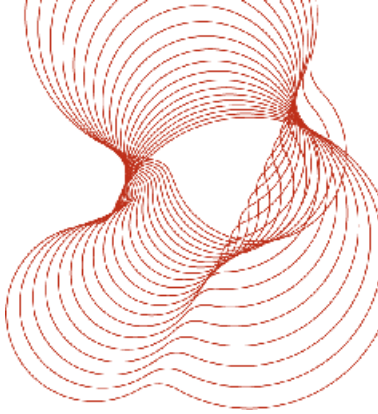
Attack action	Attack tools	Working time *(min:sec)*		Notes
		Increment	Running	
Impact tools into leading edge and apply levering forces.	6.5 mm and 14 mm screwdrivers, claw hammer, wooden wedges, lever and tube	03:00.00	03:00.00	-

Duration of attack test (min:sec): <15 minutes Security rating achieved: 2

Comments: The top lock only was engaged for this test.

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

The specimen therefore offered resistance to this method of attack using these tools commensurate with the requirements of Security Rating 2 in the minimum locked condition.



6 Conclusion

The specimen ‘Smart Wall’ single leaf bidirectional glazed aluminium doorsets offered resistance to forced entry commensurate with the performance requirements of a Security Rating 2 classification defined in LPS 1175: Issue 7[1] in the optimum locked condition and a Security Rating 1 classification in the minimum locked condition.

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.

7 References

1. LPS 1175: Issue 7 Requirements and testing procedures for the LPCB approval and listing of intruder resistant building components, strongpoints, security enclosures and free-standing barriers. BRE Global Limited, 2010.
2. prEN 1627: May 2010 Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Requirements and classification. CEN, 2009.
3. 264827b Assessment of ‘Smart Wall’ single leaf bidirectional doorset to LPS 1175: Issue 7. BRE Global Limited, 2010.

4. 264828 Evaluation of ‘Smart Wall’ single leaf bidirectional doorset to the requirements contained in prEN 1627: May 2009. BRE Global Limited, 2010.

5. BRE Global Limited’s standard terms and conditions of testing (PN145/6). BRE Global Limited, 2008.

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.

8. prEN 1630: May 2010 Pedestrian doorsets, windows, curtain walling, grilles and shutters - Burglar resistance - Test method for the determination of resistance to manual burglary attempts. CEN, 2009.

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