

TEST REPORT

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**Size of report**

This report consists of 22 pages (including appendices)

Subject

Test of the burglar resistance of a steel inwards-opening door, with frame dimensions 1192 x 2485 mm, produced from the Alara Lukagro system AL-D

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Conclusion

The facade element tested satisfies the requirements for burglar resistance for class RC 3 for the testing and assessment of burglar-resistant facade elements with doors, windows, shutters and fixed fillings according to the following standard:

EN 1627: 2011

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1 INTRODUCTION

1.1 PURPOSE OF THE INVESTIGATION

SKG was instructed by Alara Lukagro of Groot-Ammers to carry out a burglar resistance test on a steel inwards-opening door, for the purpose of testing the burglar resistance of this facade element in accordance with the relevant standards for the testing and assessment of burglar-resistant frames, windows and doors.

1.2 EXPLANATION AND METHOD

General:

The investigation and reporting are based on the following European standards for the testing and assessment of burglar-resistant frames, windows and doors:

- | | |
|--------------|---|
| EN 1627:2011 | Doors, windows, curtain walls, grilles and shutters – burglar resistance – Requirements and classification |
| EN 1628:2011 | Doors, windows, curtain walls, grilles and shutters - burglar resistance – Test methods for the determination of resistance under static loading |
| EN 1629:2011 | Doors, windows, curtain walls, grilles and shutters - burglar resistance – Test methods for the determination of resistance under dynamic loading |
| EN 1630:2011 | Doors, windows, curtain walls, grilles and shutters - burglar resistance – Test methods for the determination of resistance to manual burglary attempts |

These standards will be referred to from here onwards as EN 1627, EN 1628, EN 1629 and/or EN 1630

SKG is recognised for this testing by the Dutch Accreditation Council (RvA) in accordance with NEN-EN-ISO/IEC 17025 under no. L 406.

1.3 CONCLUSION OF THE INVESTIGATION

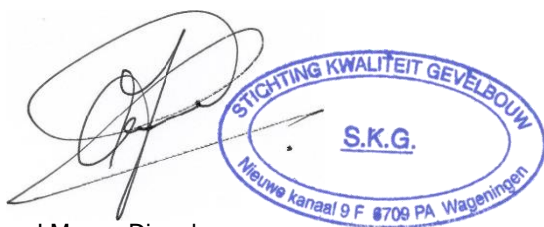
The element satisfies the total classification RC 3 of EN 1627

<i>Class RC 3</i>

1.4 REPRODUCTION OF SKG REPORTS

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Drawn up in Wageningen on 19 August 2014

A handwritten signature in black ink is written over a blue circular stamp. The stamp contains the text 'STICHTING KWALITEIT GEVELBOUW' around the top edge, 'S.K.G.' in the center, and 'Nieuwe kanaal 9 F 6709 PA Wageningen' around the bottom edge.

J.M. van Diggelen
Technical Manager

2 DESCRIPTION OF TEST ELEMENT

2.1 PHOTO OF TEST ELEMENT



2.2 PRODUCT GROUP

Products that are tested for burglar resistance in accordance with EN1627 are subdivided into 4 groups:

1. Group 1 products: products with a sturdy and rigid leaf or movable section, in which the element is opened by turning (e.g. casement windows and pivoting windows)
2. Group 2 products: products with a sturdy and rigid leaf or movable section, in which the element is opened by sliding (e.g. sash windows and sliding doors)
3. Group 3 products: products with a leaf or movable section, consisting of linked fixed elements that move in relation to each other (e.g. a roll-down shutter)
4. Group 4 products: products with one or more openings (which are not letterboxes) through which gauge B (25mm) can be passed (e.g. a grille)

The element investigated comes under group 1

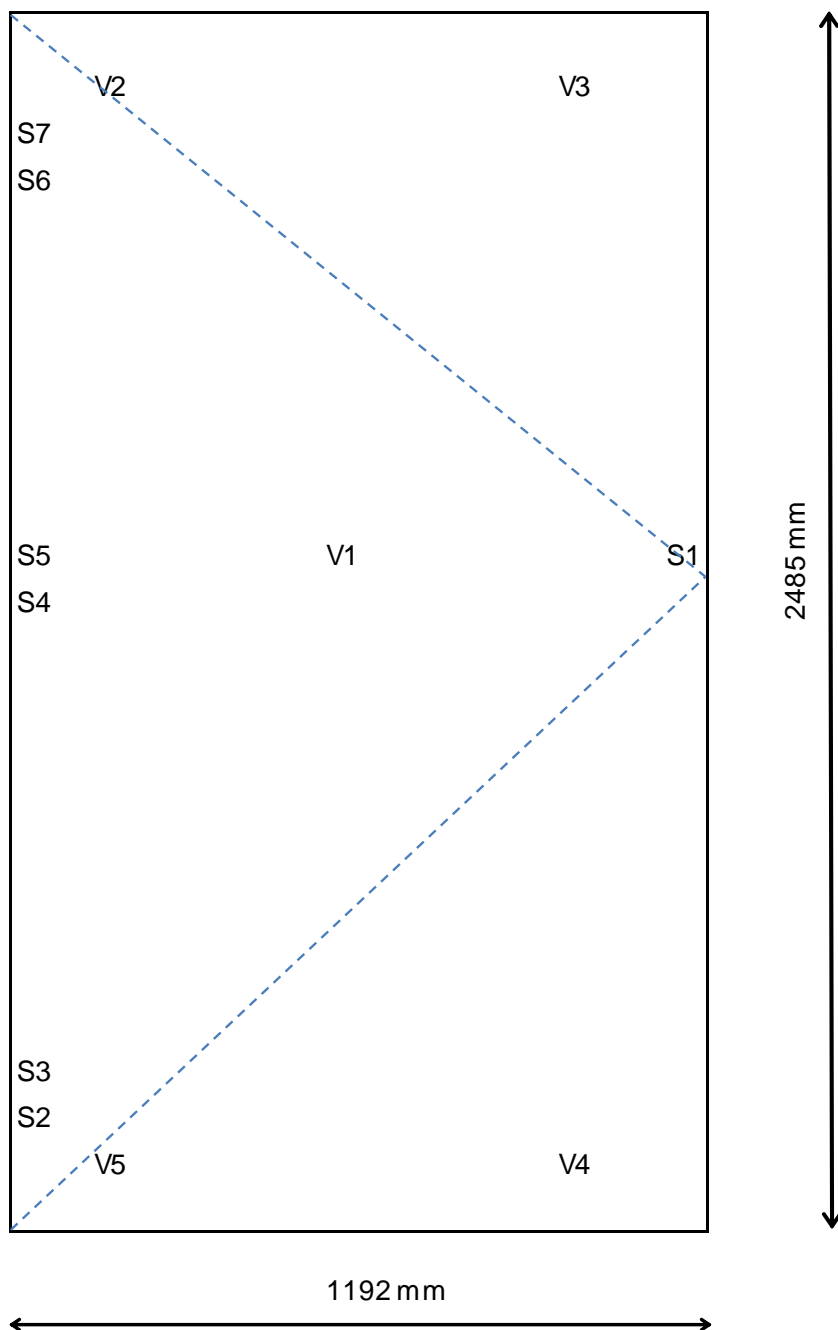
2.3 TECHNICAL SPECIFICATIONS OF TEST ELEMENT

Specification	Description	Photos
Material	Steel	
System	Alara-Lukagro AL-D	
Frame profile	Constructed from 2 mm sheet steel.	
Frame dimensions	1192 x 2485 mm.	
Sill	Alara-Lukagro AL-D type B.	
Leaf	Constructed from sheet steel, outside sheet 2 mm, inside sheet 1.5 mm. Door thickness is 80 mm. The closing edge is reinforced along the entire height with a steel corner profile with a thickness of 2 mm. The lock case openings are reinforced with steel plates with a thickness of 3 mm.	
Fastening	M8 x 40, 3 per upright and 2 on the head jamb.	
Anti-drilling plate	500 x 500 x 1 mm.	
Joints	EPDM joints in frame and leaf sections.	
Closure	Assa Abloy type EL160 panic lock with handle operation, constructed with day and night bolt (S1). SKG** certificate 427.113.05. The lock is fastened with 2 M5 x 10 mm screws. Operation using aluminium door handle, manufacturer BKS, Rondo H1.0 fastened with 3 M6 x 100 bolts.	
Hinges	3 Alara-Lukagro, type ALD hinges, (S3/S4/S6). These are each fitted to the leaf with 3 M6 bolts in threaded bushes. The frame sections are welded to the frame.	
Anti-lifting pins	At the site of the hinges, anti-lifting pins (S2/S5/S7) are welded to the leaf profile (which is reinforced at the site with 5 mm thick steel plates). The steel anti-lifting pins Ø12 mm, length 20 mm, close into the frame profile, in an opening of Ø 16 mm.	
Hardware	An SKG*** handle-knob fitting, in combination with a shared connecting pin.	1 and 2 on page 17
Cylinder	An SKG*** europrofile cylinder.	

Table 1

2.4 SCHEMATIC DIAGRAM OF TEST ELEMENT

Seen from attack side



S1	lock
S3, S4 and S6	hinges
S2, S5 and S7	anti-lifting pins

3 REQUIREMENTS AND TEST RESULTS

3.1 STATIC TEST

3.1.1 Static test requirements

If tested in accordance with EN 1628, making use of the loads given in table 2, the element may show no deficiencies in the desired resistance class.

			RC2	RC 3	RC 4	RC5 RC6
	Pressure piece	Gauge	Test load	Test load	Test load	Test load
Pressure points	Type		kN	kN	kN	kN
F1 Filler corners	1	B	3	6	10	15
F2 Corners of movable section	1 or 2	B	1.5	3	6	10
F3 Closing points	1 or 2	A	3	6	10	15

Table 2: Static loads for Group 1 products: e.g. casement windows and casement doors

3.1.2 Test results for static test

Observation:

The test results are shown in the table below. The diagrammatic representation of the test element (see section 2.4) shows the positions of the closing points and plane markings.

Corners of movable section	F2 = 3 kN Gauge B	Closing points	F3 = 6 kN Gauge A
Corner V2	Pass	S1	Pass
Corner V3	Pass	S2	Pass
Corner V4	Pass	S3	Pass
Corner V5	Pass	S4	Pass
		S5	Pass
		S6	Pass
		S7	Pass

Table 3: test results for static test

Comment: none.

Conclusion:

The element satisfies the specified requirement, class RC 3 of EN 1627, with respect to the static test.

3.2 DYNAMIC TEST

3.2.1 Dynamic test requirements

A dynamic load is applied to the test object in various places with a pendulum system and an impactor. After each impact, a check is made as to whether an opening in the test element has been made through which a type D*) gauge can be passed. A force of 200N is applied to the test object at the place where the size of the opening can be increased.

*) in accordance with EN 1628 an ellipse of 250mm x 150mm of 20mm thick.

Classification	Mass of impactor in kg	Height of fall
RC 2	50	450 mm
RC 3	50	750 mm
RC 4 - 6	none (in connection with size of the static loads)	

Table 4

3.2.2 Test results for dynamic test

Observation:

The test results are shown in the table below. The diagrammatic representation of the test element (see section 2.4) shows the positions of the places where the falling body hit the element.

Place	Height of fall	Number	Observed changes
V1	750 ± 10 mm	3	Deformation of panel observed; gauge D does not fit
V2		1	
V3		1	
V4		1	
V5		1	Deformation of panel observed; gauge D does not fit

Table 5

Comment:

After the test, it was not possible to pass gauge D through an opening in the element.
Nor were any parts of the flat area fillings or fastenings loose or moved from their position.

Conclusion:

The element satisfies the specified requirement, class RC 3 of EN 1627, with respect to the dynamic test.

3.3 MANUAL TEST

3.3.1 Requirements of manual test

During the test, using the tool set, the contact duration and total test time as specified in EN 1627, no opening in the test element may be made through which a test block ¹⁾ can be passed with the following shape and dimensions:

- A rectangle of 400mm x 250mm;
- An ellipse of 400mm x 300mm;
- A circle with a diameter of 350mm.

Resistance class	Tool set (EN 1630, chapter 7)	Resistance time [minutes]	Max. total test time [minutes]
RC 2	A2	3	15
RC 3	A3	5	20
RC 4	A4	10	30
RC 5	A5	15	40
RC 6	A6	20	50

Table 6

3.3.2 Test results of manual test

Preliminary test

Points of application: The following relevant points of application are specified in relation to this element:

- closing points
- manipulation of panic lock
- hinges
- closing edge;
- door leaf
- drilling resistance

The test results for the preliminary test are shown in the table below. For each point of application, an attack took place for at least 25% of the attack time. The diagrammatic representation of the test element (see section 2.4) shows the positions of the closing points and plane markings.

Points of application:	Contact time	Observations:
hardware knob	00:10	Knob broke off from the lock plate
connecting pin	04:24	Manipulation by attacking the outer pin of the shared connecting pin did not prove possible.
Closing edge/S1	02:07	Attempted to bend the frame flange locally and reach the closing edge, not successful at this point.
Closing edge/V4	06:07	Attempted to make space from the bottom corner to reach (S1) via wedging, not successful at this point.
Closing edge/V3	00:36	Frame flange on head jamb distorted over approx. 35 cm
Closing edge/V3	02:46	Attempted to reach (S1) by wedging from the top corner, not successful at this point.
S1	06:53	Wedged along the closing post to (S1). Closing point was still intact.
S3 – S4	06:48	Frame flange distorted between hinges (S3-S4). Wedged towards the bottom hinge (S3) and attempted to force this in combination with the anti-lifting pin (S2), which was unsuccessful.
Drilling door panel	00:15	Drilled through the outer panel (with a thickness of 1.5 mm) with HSS Ø 10.
Drilling door panel	00:36	Drilled through the outer panel (with a thickness of 1.5 mm) and the inner panel (with a thickness of 2 mm) with HSS Ø 10.
outer lock plate	n.a.	The SKG*** hardware was fitted in accordance with the fitting instructions.

Table 7

On the basis of the findings during the preliminary manual test, it was decided in consultation with the customer to carry out the main manual test on the same facade element.

Main test:

Observation:

During the test, the frame and the movable section were damaged while penetration did not prove possible during the contact time.

Comment:

On the basis of the times and other results of the preliminary manual test, the main manual test was carried out on the facade element used in the preliminary test.

The supplementary test in accordance with NEN 5096 on the manipulation of the closure did not take place because the closing mechanism could be locked.

Conclusion:

The element satisfies the specified requirement, class RC 3 of EN 1627, with respect to the manual test.

3.4 CONSTRUCTIONAL REQUIREMENTS CORRESPONDING WITH THE RESISTANCE CLASSES

3.4.1 General

The element is required to satisfy the relevant current standards relating to facade elements.

3.4.2 Door hardware

The door hardware must satisfy the requirements in the table below (table 2 from EN 1627) or must satisfy Annex B, table B.1 of EN 1627.

Resistance class in accordance with EN 1627	RC 1	RC 2	RC 3	RC 4	RC 5	RC 6
EN 1303 – Cyl. Key-related security (Digit 7)	4	4	4	6	6	6
EN 1303 – Cyl. Attack-related security (Digit 8)	1	1	1	2	2	2
EN 1906 – Hardware (Digit 7)	1	2*)	3	4	4	4
EN 12209 – Locks (Digit 7)	3	3	4	7 ^a	7	7
^a A lock with security class 6 (digit 7) may be used if the drilling resistance required in class 7 is achieved by the door construction. *) excluding drilling protection, see Annex B of EN 1627						

Table 8

3.4.3 Flat area fillings

If tested in accordance with EN 1628, EN 1629 or EN 1630 and the desired resistance class, the following applies for flat area fillings:

1. It must not be possible to dismantle the filling from the burglary side;
2. Fillings of materials other than glass must satisfy resistance class 3
3. Glazing in elements to be tested must satisfy the table below.

Resistance class in accordance with EN 1627	Resistance class of glazing, in accordance with NEN EN 356
RC 2 or RC 2N *)	P4A
RC 3	P5A
RC 4	P6B
RC 5	P7B
RC 6	P8B
* In this resistance class, national regulations may be followed. See § 3.4.6	

Table 9

3.4.4 Assembly

The facade elements must be built in following the manufacturer's guidelines and the current fitting instructions. The fitting instructions must be supplied by the manufacturer.

3.4.5 Verification of constructional requirements

Observation:

Locks: The lock bolt proved inaccessible during the manual test

This means the constructional requirements of § 3.4.2 are satisfied.

Hardware: The hardware was SKG*** certified.

SKG*** hardware satisfies at least the following classification under EN 1906: 2010.

npd	6	0	npd	0	2	1	npd
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In addition, the tensile strength of the fastening (EN1906 A2.2.4 / A3.6) and the chisel resistance (EN1906 A2.2.2/ A3.4) satisfy EN 1906:2010 burglar-resistance class 3 (7th digit).

This means the constructional requirements of § 3.4.2 are satisfied.

Cylinder: The cylinder was SKG*** certified.

SKG*** cylinders satisfy at least the following classification under EN 1303: 2005

1	6	0	0	0	A	6	2
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In combination with the burglar-resistant hardware, this means the constructional requirements of § 3.4.2 are satisfied.

It was verified that the perimeter variations were in line with the production instructions or drawings. No particular observations were made here.

No other comments; the constructional requirements are satisfied.

4 CONFORMITY

- A. The interchange of door hardware is permitted for cylinders and hardware in resistance class 2 and 3 without an expert declaration from the test institute, if the method of installation and the length of the fastenings remain unchanged and if evidence exists of conformity with the requirements of table 2 of EN 1627. The latter is the case for SKG-certified hardware (provided with SKG stars).

If hardware and cylinders are SKG-certified, the following also applies:

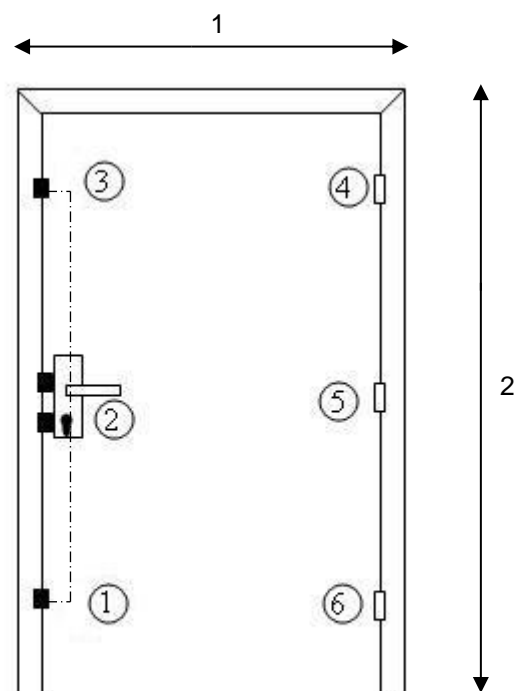
RC 2	RC 3
SKG** cylinder + SKG** hardware with protection against cylinder extraction	SKG** cylinder + SKG*** hardware with protection against cylinder extraction
SKG*** cylinder + SKG** hardware	SKG*** cylinder + SKG*** hardware

The interchange of floor and rebate seals is permitted in all classes, if the burglar-resistance characteristics of the building product are not diminished.

Modifications are the responsibility of the applicant and no change may diminish the burglar-resistance characteristics of the product.

- B. The results of the tests are transferable for door frames whose main dimensions (length/width) differ from those of the example tested, if the restrictions stated in annex D of EN 1627 are taken into account.

In relation to the element tested, this means, among other things:



For doors:
1: Width +10%, -20%
2: Height +10%, -20%

Points 1 - 6 Closing points

The permissible variations mentioned apply normatively. In addition, it is possible that SKG may accept variations outside what is regulated as normative. This is on the basis of experience during the manual tests, and expertise.