



Stichting Kwaliteit Gevelbouw

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Alara - Lukagro BV
Huijgensweg 3
Postbus 15
2964 LL Groot-Ammers

bezoekadres
Nieuwe Kanaal 9F
Wageningen

postadres
Postbus 362
6700 AJ Wageningen

T 0317 - 421 720
F 0317 - 421 677
E info@skg.nl
I www.skg.nl

ABN-AMRO
50.84.85.800

IBAN.NR
NL 33ABNA0508485800

BIC-CODE
ABNANL2A

KVK Den Haag
41149617

BTW nummer
004465520 B01

Subject

Investigation of burglar resistance of an outward steel revolving double door construction with frame dimensions 2106x2373 mm made from the Alara-Lukagro AL-D/D50 profile system.

Laboratory Technician

B. Biekhram / M.F. van Dijk / F. Koldenhof

Technical Manager

J.M. van Diggelen

Conclusion

The tested facade element meets the requirements for burglar resistance class 3 for testing and evaluating of burglar-resistant facade elements with doors, windows, shutters and solid fillings according to the standards:

- ENV 1627: 1999
- NEN 5096: 2007 + C1: 2007



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Lid EOTA (European
Organisation for
Technical Approvals)

Notified Body
NB 0960

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1 INTRODUCTION

1.1 Purpose of the investigation

Alara - Lukagro BV based in Groot-Ammers commissioned SKG to conduct a burglar resistance test on an outward revolving steel double door construction for the purpose of testing the burglar resistance of this facade element against the applicable standards for testing and assessing of burglar-resistant frames, windows and doors.

1.2 Conclusion of the investigation

The element meets the total classification 3 of ENV 1627 and therefore also automatically meets class 3 of NEN 5096.

Class 3

1.3 Conformity statement

Except as provided in Section 4, for this element conformity does not apply.

1.4 Reproduction of SKG reports

This report may be reproduced in its entirety only, unless prior written consent of SKG has been obtained.

Drawn up in Wageningen on 6 December 2010

A handwritten signature in black ink, appearing to be 'J.M. van Diggelen'.

J.M. van Diggelen
Sector Manager



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1.5 Accountability and method

General:

Study and report are based on the Dutch standard for testing and evaluating of burglar-resistant facade element with doors, windows, shutters and solid fillings according to NEN 5096 2007 en ENV 1627.

Test in main lines:

- The test requires 2 identical elements.
- See for the test set-up according to NEN 5096 drawing Section 1.8.
- During the test, the test element was placed in the test set-up with the attack side forward, unless otherwise stated
- Prior to the test, the elements are assessed on whether they operate normally and the client has the possibility to perform on-site adjustments or to release the elements.
- The locking points and panel surfaces of the elements are marked and the perimeter determined.
- On the first element, the static, dynamic and manual preliminary test are performed. By means of the static and dynamic test, the properties of the test element are determined under laboratory conditions.
- Statically the displacements as a result of the exerted pressure forces of the movable part relative to the fixed part and of the panel fillings in the mount relative to the movable part are determined. For the points of engagement see Tables 7, 8 and 9.
- The engagement points for the dynamic test are indicated in Table 10, Section 5.2.
- The manual preliminary test is solely intended to determine the weak spots of the test element, on the basis of which an attack plan is made for the manual main test. During the manual preliminary test, all engagement points are attacked for a period of time dependent on the class, followed by forcing of a passage way, regardless of the time required.
- The manual main test is carried out on the second element.

Report number:**SKG 10.172****issued 6 December 2010**1.6 Classification of resistance classes

'Class designation' KOMO approval ¹⁾	Static	Dynamic	Manual	Tool set
1	1	1	1	none
2	2	2	2	A
3	3	3	3	B
4	4	4	4	C
5	5	5	5	D
6	6	6	6	E

Table 1

- 1) If this report is used for applying for a KOMO approval for burglar-resistant facade elements, the designations listed apply:

Informative description of manual test according to NEN 5096, annex D:

- 1 resistant to burglar without tools;
- 2 resistant to burglar with simple tools;
- 3 resistant to burglar with simple tools, including a crowbar;
- 4 resistant to experienced burglar with extensive tool set, including battery powered tool;
- 5 resistant to experienced burglar with extensive tool set, including power tools such as grinder with cutting disc of up to 125 mm;
- 6 resistant to experienced burglar with extensive tool set, including power tools such as grinder with cutting disc of up to 230 mm.

1.7 Overview of tool sets

Tool sets A, B and C, and general additional tools for all classes according to NEN 5096.

Set A:

1 screwdriver	l=375 mm, w=16 mm	l= length total incl. handle
1 screwdriver	l=260 mm, w=10 mm	
1 pipe wrench	l=240 mm	
1 pliers	l=240 mm	
wooden wedges	l=200 mm, w=80 mm, h=40 mm, (angle 9 á 10°) (oak or beech)	

Set B

Set A plus:

1 crowbar	l=500 mm
1 screwdriver	l=375 mm, b=16 mm

Set C

Set B plus:

1 hammer 1.25 kg	l=300 mm	1 minisaw
1 firmer chisel	l=250 mm, b=30 mm	1 metal saw 300 mm
1 cold chisel	l=350 mm, b=30 mm	1 drilling machine 320 W Input power
1 axe	l=350 mm	1 drill set HSS, max. 10 mm
1 bolt cutter	l=460 mm	2 plate shears (left/right)
1 crowbar	l=710 mm (instead of crowbar l=500 mm)	

General additional tools:

1 set small screwdrivers	lmax=220 mm, bmax=6 mm	1 flashlight
1 set various socket wrenches	lmax=180 mm	1 set wire hooks
1 set allen keys	lmax=120 mm	iron wire
1 set tapping bars		1 chord
1 hammer	200 gram	1 roll adhesive tape
1 tongs	lmax=200 mm	1 overall
1 tweezers		1 pair gauntlets
1 knife	blade max=120 mm	1 goggles
1 adjustable spanner	10"	1 steel master key

Tools for test via "drilling holes"

1 drill set HSS, max. 10 mm	1 speed drill set, max. 16 mm
1 cordless drill	pieces (bent) wire max. Ø 4 mm

2. REQUIREMENTS

2.1 Requirements for the resistance classes:

<u>Requirements for static test:</u>						The maximum deflection of the movable part relative to the frame profile as a result of a load to be placed in accordance with the table below, may not be exceeded.	
Classifi- cation	Filling angles Guide mechanism ⁵⁾ Guide rail ⁵⁾ F1 in kN / F _{1,1} in kN ⁵⁾		Between locking points ¹⁾ Between guides ⁵⁾ Roll guides ⁵⁾ F2 in kN		Locking points Pull-up resistor ⁵⁾ F3 in kN		Weakest point P4 ⁴⁾
	max. deflection ²⁾ pressure point relative to the mount or attack in (mm or °)		max. deflection ²⁾ pressure point relative to attack in (mm)		max. deflection ²⁾ pressure point relative to attack in (mm)		max. deflection ²⁾ pressure point relative to attack in (mm or °)
1 / 2	3	8 / (10 or 30° ⁵⁾	1.5	30 / (10° ⁵⁾	3 / (6° ³⁾	10 / (50° ⁵⁾	30 / (50 or 30° ⁵⁾
3	6	8 / (10 or 30° ⁵⁾	3	20 / (10° ⁵⁾	6	10 / (50° ⁵⁾	20 / (50 or 30° ⁵⁾
4	10	8 / (10 or 30° ⁵⁾	6	10	10	10 / (50° ⁵⁾	10 / (50 or 30° ⁵⁾
5 / 6	15	8 / (10 or 30° ⁵⁾	10	10	15	10 / (50° ⁵⁾	10 / (50 or 30° ⁵⁾

Table 2

¹⁾ Only to the extent the centre-to-centre distance is > 400mm.

²⁾ The deflection is measured after the locking points about by applying a light load of 0.3 kN.
The maximum deflection may amount to 2 mm for the specified load.

³⁾ When the element is designed with only one lock or locking point (not applicable to roll elements).

⁴⁾ P4 is the weakest point, that is to say the point at any place, with the largest deflection, as a result of the load applied at the location of the locking points (F3) or between them (F2).

⁵⁾ Only applicable for roll elements.

Requirements for dynamic test:	
As a result of this test, the moving part may not be so heavily battered or deformed that a passage way can be realized without considerable resistance. Attachments of section fillings must still be functional.	
Classification	Drop height
1	800 mm
2	800 mm
3	1200 mm

Table 3

Requirements for the manual main test:

The general criterion is that no opening should arise that offers an adequate passage way.

Passage way: Block of 150 x 250 x 250 mm.

Manual class	Max. contact time	Max. total test time (minutes)	Tool set see Section 1.6
1	n.a.	n.a.	None
2	3	15	A
3	5	20	B
4	10	30	C
5	15	40	D
6	20	50	E

Table 4

2.2 Constructive requirements for the resistance classes

- 2.2.1 General:
- The element should meet the applicable standards with respect to the facade elements;
 - The assessment of the requirements set here with regard to the construction is the responsibility of the test institute.
- 2.2.2. Hinges and locks
- At least one latch of movable glazed doors and windows of adjacent glazed elements where no burglar-resistant glass of at least class 2 according to NEN-EN 356 is applied, must be (key) lockable. If burglar-resistant glass of at least class 2 according to NEN-EN 356 is applied, the requirement of lockability is cancelled.
 - Hinges and locks where the attachment must be 'in sight' or must be accessible for disassembly should be fixed with at least 2 one-way screws.

Resistance class according to NEN 5096	2	3
Cylinders	**	***
Fittings	**	***

Table 5

Resistance class according to ENV 1627	2	3	4
EN 1303 – Cylinders			
Key-related security digit 7	4	4	6
Attack-related security digit 8	1 ²⁾	1	2
EN 1906 – Fittings digit 7	1	3	4
EN 12209 – Locks digit 7	3	5	7

Table 6

²⁾ The pull protection of the cylinder must be achieved by both the cylinder itself and the fittings.

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- 2.2.3 Section fillings
- On the burglary side the filling may not capable of being dismantled.
 - The section filling of material other than glass must also meet resistance class 2.
 - The section filling of glass must comply with what is stated in Table 6.

Resistance class according to NEN 5096	Resistance class of glazing in accordance with NEN EN 356
1	P2A or insulated glazing ¹⁾
2	P2A or insulated glazing ¹⁾
3	P4A
4	P5A
5	P7B
6	P8B

Table 7

- 1) When applying insulated glazing, see the conditions described in 2.2.2 of this report.

- 2.2.4 Installation:
- The facade elements should be integrated in accordance with the guidelines of the manufacturer and the current installation instructions.

3. VERIFICATION OF CONSTRUCTIVE REQUIREMENTS

Observation: No details

4. Conformity

- 4.1 When elements as tested and approved are provided with additional locking points etc they can be declared equivalent provided these additions do not affect the degree of burglar resistance.

Example: an element provided with one-point lock passes the test. An otherwise identical version provided with extra locking points is then at least equivalent.

- 4.2 The hinges and locks of tested elements are interchangeable with at least equivalent hinges and locks: this means that only hinges and locks may be replaced by certified hinges and locks of equal class when furthermore it is determined by visual assessment that these replacement hinges and locks are at least functionally equivalent in terms of burglar resistance.
- 4.3 The results of tests on frames with different main dimensions (length/width) than the tested specimen are transferable with due observance of the **restrictions listed in Annex C of NEN 5096**.

This means among other things:

- The main dimensions of A, B, C and D (see Figures C1 to C4) may positively vary up to (+20%).
- The dimension E (see Figures C3 and C4), may positively vary up to (+10%);
- When elements are carried out smaller with the same number of locking points, it is assumed that these elements are at least as burglar-resistant as the tested specimen.
- Windows and doors of composite fittings may be larger to an unlimited degree (seen only from the perspective of burglar resistance) provided such locking points are added that therefore the dimensions E and B are not exceeded.

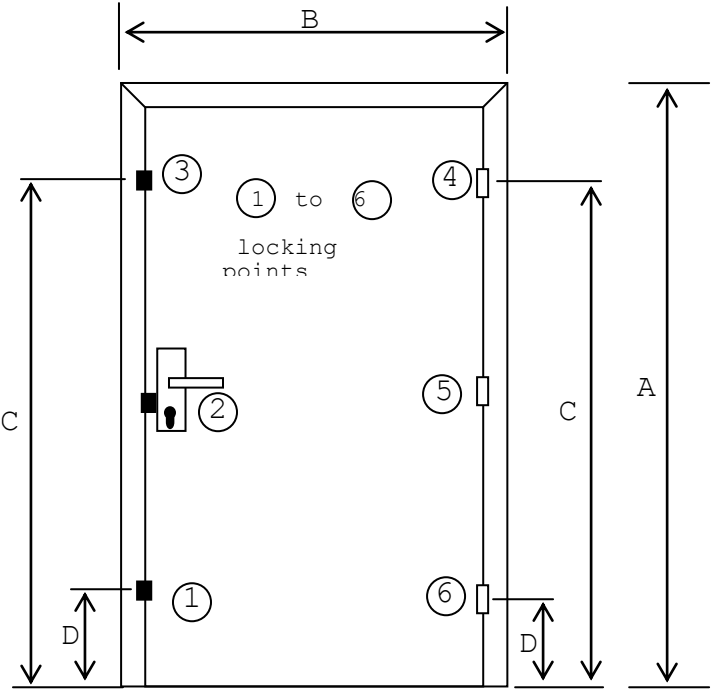


Fig. C1

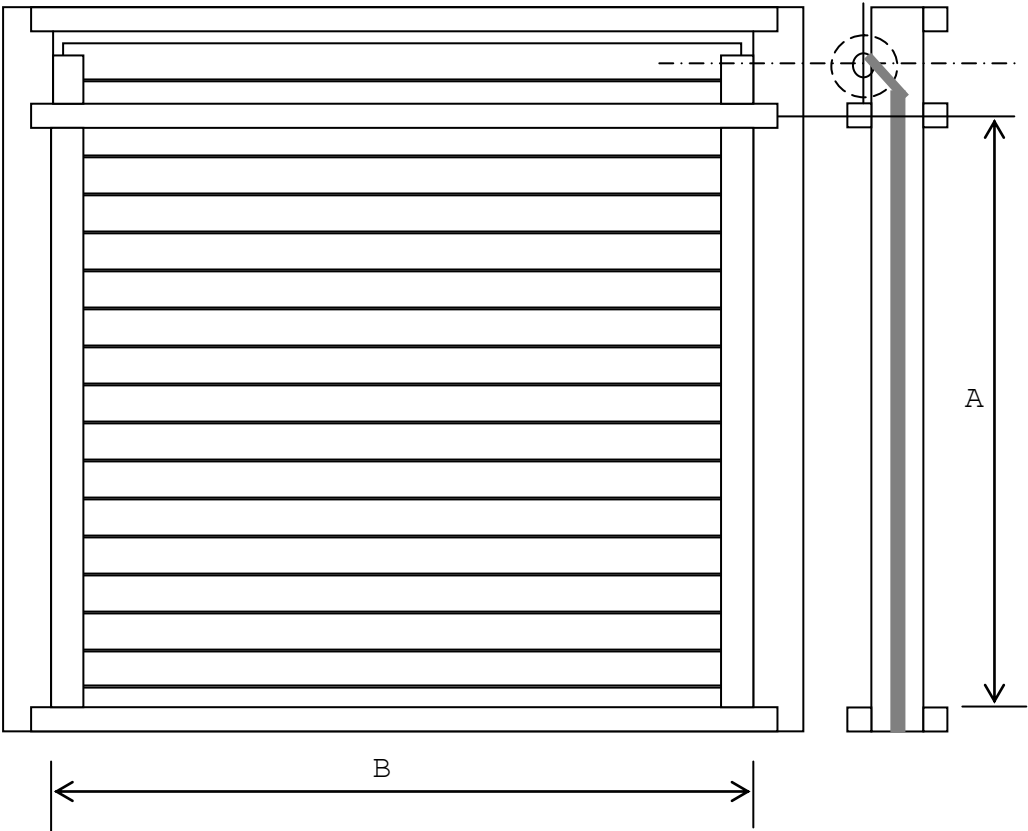


Fig. C2

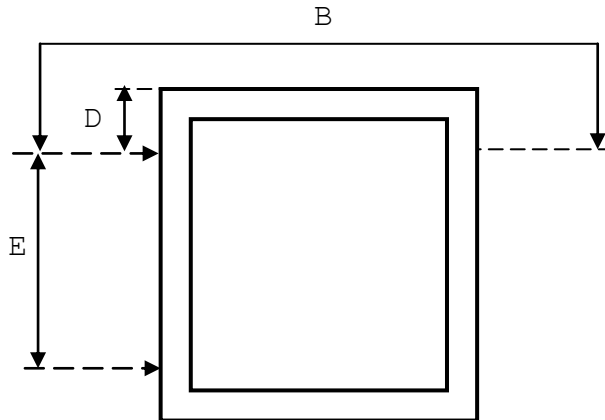


Fig. C3

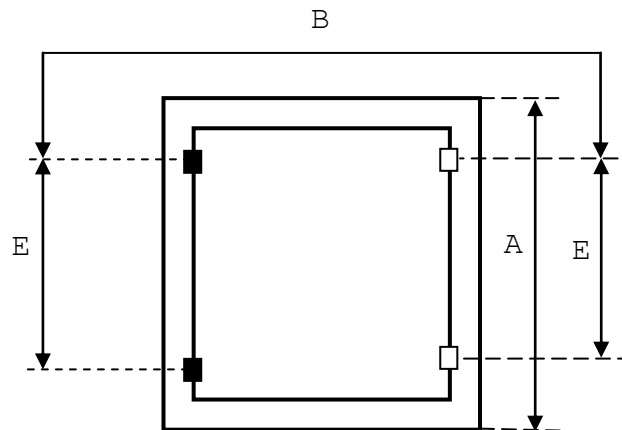


Fig. C4

4.4 Detailed conditions for the use of certified hinges and locks:

- When using certified hinges and locks the accompanying installation instructions should be used.
- When using certified composite fittings, the main dimensions of the facade elements (tilt-and-turn window etc.) may be selected according to the installation instructions of the build-in matrix for the fittings concerned. Under these conditions the limit previously mentioned with regard to the variation of the main dimensions may be ignored.

4.5 For burglar-resistant elements, additional restrictions may be made.

4.6 If burglar-resistant elements are required that are not within the specified tolerances, the opinion of an independent certified third-party is required.

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5 TESTS

5.1 Static test

Requirement: Deflection up to 8 mm at the corners of the panel filling, up to 10 mm at locking points and up to 30 mm between locking points.

Observation: In the following tables (8, 9 and 10) the test results are indicated (in the figure in Section 6 the positions of the locking points and surface marking are indicated).

1a) deflection ≤ 8 mm

Filling angles	Deflection in mm. F1 6 kN
n.a.	

Table 8

1b) deflection ≤ 10 mm.

Locking points	Deflection in mm F3 6 kN
S1	3.0
S2	2.9
S5	2.6
S6	0.4
S7	3.8

Table 9

1c) deflection ≤ 30 mm.

Between locking points	Deflection in mm F2 3 kN
S2 – S8	6.3
S6 – S7	1.5
S4 – S5	3.7

Table 10

Conclusion: The element meets the specified requirement, class 3, with respect to the static test.

5.2 Dynamic test

Requirement: No passage way may arise.

Observation: Given the weight of the construction and the outward revolving implementation it is not considered necessary to carry out the dynamic test.

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5.3 Manual tests

5.3.1 Preliminary test

Attack points: The relevant points of engagement for this element are:

- * Panic closure S2 on the active part
- * Espagnolette bar S1 on the active part
- * Hinges S5/S6/S7/S8/S9/S10 in combination with security pins

The procedure during the 1st phase of the manual preliminary test (at least 45 seconds per attack point) was as follows:

- * After approx. 6 minutes attack the lock S2 was still intact.
- * Subsequently, it was attempted to activate the anti-panic function, which after 5.13 minutes was unsuccessful.
- * Espagnolette bar S1 was forced after 1.50 minutes.
- * Subsequently, it was attempted to wedge on via S1 to S2, which after 1.13 was unsuccessful due to the rigidity of the door.
- * Espagnolette closure S4 was forced after approx. 1 minute and then it was attempted to press both door parts outwards, which appeared to be impossible.
- * Espagnolette closure S3 could not be forced after an attack of 1.32 minutes.
- * The top cap of pin hinge S8 was removed after 2.15 minutes.
The the pin was tapped out in 16 seconds.
- * The security pin at the location of S8 was unable to be forced after 2.04 minutes of brutal breaking.
- * Between pin hinge S8 and S9 it was attempted to create an opening, which appeared to be impossible after 2.33 minutes.
- * The top cap of hinge S8 was removed after 2 minutes and 15 seconds. In 18 seconds the pin had been removed.
- * Pin hinge S9 attacked like S8, but here too no opening was created after 5.33 minutes.

Through further manual test an attempt was made to force a passage way (2nd phase)).

Based on the findings during the manual preliminary test it was concluded that with the appropriate tool no passage way could be realized within 5 minutes contact time.

5.3.2 Main test

Requirement: Contact time 5 minutes, in 20 minutes total no penetration was possible.

Observation
and test procedure: Based on the (time) course of the manual preliminary test no manual main test took place.

Conclusion: The elements meets the specified requirement, class 3, with respect to the manual test.