

CLASSIFICATION OF FIRE RESISTANCE ACCORDING TO EN 13501-2: 2016 OF A ROLLING SHUTTER TYPE METACON RGS

Classification no.	2021-Efectis-R001703
Sponsor	Metaalwarenfabriek Metacon B.V. Handelsnaam Metacon-Next Zuidbaan 450 2841 MD MOORDRECHT THE NETHERLANDS
Product name	Metacon RGS
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1. INTRODUCTION

This classification report defines the resistance to fire classification assigned to a Metacon rolling shutter assembly, type RGS, in accordance with the procedures given in EN 13501-2:2016.

1.1 SPONSOR AND MANUFACTURER

Sponsor and manufacturer	Metaalwarenfabriek Metacon B.V. Handelsnaam Metacon-Next Zuidbaan 450 2841 MD MOORDRECHT THE NETHERLANDS
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1.2 NORMATIVE REFERENCES

Table 1.1: Normative references

European standard	Part
EN 1363-1:2012	Fire resistance tests – Part 1: General requirements
EN 1634-1:2014	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and openable windows
EN 13501-2:2016	Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services
EN 15269-10:2011	Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies including their elements of building hardware - Part 10: Fire resistance of steel rolling shutter assemblies

1.3 REVISION INFORMATION

This is the first issue of the classification report.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Metacon RGS, is defined as a rolling shutter assembly.

For the dimensions and specifications of the materials and components of the examined construction, also see the figures in chapter 6. Details of the assembly of the construction are given in the paragraphs below.

2.2 DESCRIPTION

The element, a rolling shutter, type Metacon RGS, is fully described below in support of classification listed in 4.1.

2.3 TEST SPECIMEN

The test specimen was a METACON RGS EW240 steel skin cassette vertical rolling shutter assembly.

2.3.1 Test frame

The test frame was composed of steel profiles with a fire-resistant concrete inner frame (density 1440 kg/m³). Dimensions of the test frames used in each test can be found in the relevant test reports.

2.3.2 Supporting construction

The door set was built in a, according to EN 1363-1, standard low density rigid supporting construction, being an aerated concrete wall with a lintel above the aperture. A calcium silicate board panel was placed under the door set to simulate a non-combustible floor facing 200 mm from the bottom edges of the door surface, thickness 20 mm.

Specifications	
Overall dimensions	See relevant test report
Aperture	2500 x 2400 mm (w x h)
Material	Aerated concrete
Density	650 kg/m ³ ± 200 kg/m ³
Thickness	150 mm

2.3.3 Shutter

The rolling shutter was built of steel skin insulated cassettes hooking at the top and bottom part of each cassette. At the top a flame barrier was mounted on the shutter and on the door. The bottom cassette comprised an armour limit cover as comprised the sides an armour end cap.

Dimensions door-set	
Overall	2700 x 2500 mm (w x h)
Specifications cassettes	
Material	Galvanised steel
Manufacturer	Metacon
Thickness	0.8 mm
Dimensions	2700 x 150 x 60 mm (w x h x t)
Insulation	Rockwool
Manufacturer / type	Rockwool / Taurox
Dimensions	158 x 60 mm (h x t)
Bottom cassette	U-shaped armour limit cover
Material	Galvanised steel
Dimensions	62 x 61 x 2 mm (w x h x t)
Sides cassette	Armour end cap with insulated filling
Material	Galvanised steel (see drawing no. 6)
Thickness	1.5 mm
Material filling	Promatect 100 from Promat
Dimensions	40 x 15 mm (w x t)
Flame barrier	
On top cavity of cassette / wall	Labyrinth
Material	Galvanised steel
Dimensions wall labyrinth	25 x 25 x 1.5 mm (w x h x t)
Dimensions cassette labyrinth	25 x 27 x 1.5 mm (w x h x t)
On the protruding part labyrinth wall side	Intumescent seal
Manufacturer	Odice
Type	Palusol
Dimensions	45 x 4 mm (w x t)

2.3.4 Side guides

The side guides were composed of welded side guide bases and tubes.

Specifications	
Material guide flame barrier bases	Galvanised steel
Tubes	Steel
Overall dimensions	125 x 115 x 2 mm (w x h x t)
Manufacturer bases	Metacon
Side guide base dimensions	S-shaped 125 x 15 x 2 mm (w x h x t)
On the protruding part side guide base	Intumescent seal
Manufacturer	Odice
Type	Palusol
Dimensions	45 x 4 mm (w x t)
Side guide outer cover dimensions	Edge shaped 102 x 102 x 1.5 mm (w x h x t)
Side guide inner cover dimensions	Edge shaped 85 x 85 x 1.5 mm (w x h x t)
Manufacturer tubes	MCB
Side guide base and cover tube dimensions	60 x 15 x 2 mm (w x h x t)
Tightness door and guide flame barrier	18 mm (see picture 7.1 in § 7)

2.3.5 Fixings

The side guides were fixed with M8 bolts for the test specimen mounted at the exposed side of the supporting construction and M6 bolts for the test specimen mounted at the non-exposed side of the supporting construction at 500 mm c.t.c. distance through the wall.

2.3.6 Electronic rolling system

In opened position the shutter is rolled upon a barrel. The power drive of the barrel was an electrical motor. On both sides axles were welded on the closed sides of the barrel.

On the supporting construction left and right a console was mounted. The ball bearings are fixed with two bolts on the consoles.

The shutter was mounted to the barrel with steel plate hooks fixed with bolts. A smaller barrel placed under the main barrel served as guiding for rolling up the shutter.

Specifications	
Material consoles and barrel	Steel
Dimensions barrel	Ø 101.6 x 3600 x 2 mm (w x t)
Thickness consoles	2 mm
Power drive	Electric motor on one side of barrel
Mounting axles barrel	Ball bearings
Mounting motor	Motor bracket
Mounting shutter top lath	Steel plates with hooks

Diameter hook	Ø 20 mm
Number steel mounting plates	7
Bolts	1 per plate
Dimensions	Ø 8 x 20 mm

2.4 GAP WIDTH

The calculated gap width (secondary gap with) of the guiding system and the cassettes:

Nominal width guiding system minus thickness steel: $115 - 2 \times 2 - 15 = 96$ mm.

96 mm minus nominal width cassette: $96 - 60 = 36$ mm / 2 sides = 18 mm on both sides of the cassettes.

2.5 METHOD OF ASSEMBLY

The test specimen was built in the following order:

- Assembly of the aerated concrete supporting construction
- Mounting of the side guides
- Mounting of the sections
- Connecting the sections
- Mounting the electronic rolling system.

2.6 SAMPLING AND MANUFACTURING OF THE CONSTRUCTION

Efectis Nederland BV	Test frame Supporting construction
Metaalwarenfabriek Metacon B.V.	Manufacturer door-set Installation of the construction

3. TEST REPORTS AND EXTENDED APPLICATION REPORTS AND TEST RESULTS IN SUPPORT OF THE CLASSIFICATION

3.1 TEST REPORTS

Table 3.1: Details test reports

Name of laboratory	Name of sponsor	Report ref. no	Test standard and Date
Efectis Nederland BV	Metaalwarenfabriek Metacon B.V.	2016-Efectis-R000801 (Test specimen mounted at the exposed side of the supporting construction)	EN 1634-1:2014*
Efectis Nederland BV	Metaalwarenfabriek Metacon B.V.	2017-Efectis-R001342[Rev.1] (Test specimen mounted at the non-exposed side of the supporting construction)	EN 1634-1:2014*

* For the test reports to be used as a basis for classification according to EN 13501-2:2016 it is necessary to make a gap analysis to investigate if the reports of the tests that were performed according to the standard EN 1634-1:2014 are still valid for use according to the standard EN 1634-1:2014+A1:2018. Efectis made the comparison between the two versions of the EN 1634-1 standard and came to the conclusion that the result from the tests according to the EN 1634-1:2014 standard is still valid according to the standard EN 1634-1:2014+A1:2018. Therefore, the test reports can be used as a basis for classification according to EN 13501-2:2016.

3.2 DURABILITY TEST REPORT

Table 3.2: Details test report

Name of laboratory	Name of sponsor	Report ref. no	Standard and Date
Efectis Nederland BV	Metaalwarenfabriek Metacon B.V.	2016-Efectis-R000902[Rev.4]	EN 12605:2000

3.3 EXTENDED APPLICATION REPORTS

Table 3.3: Details extended application report

Name of laboratory	Name of sponsor	Report ref. no	field of extended application standard and date
Efectis Nederland BV	Metaalwarenfabriek Metacon B.V.	2021-Efectis-R001287	EN 15269-10:2011
Efectis Nederland BV	Metaalwarenfabriek Metacon B.V.	2021-Efectis-R001482	EN 15269-10:2011

3.4 RESULTS

Table 3.4: Summary of test results of report 2016-Efectis-R000801

Criterion	Time (min.)	Result
Integrity, (E) - Cotton pad - Gap Gauge: Ø 6 mm Ø 25 mm - Sustained flaming > 10 seconds		Not determined Not determined Not determined No Failure
Thermal insulation, (I) - Mean temperature rise - Maximum temperature rise I ₁ - Maximum temperature rise I ₂	78 49 68	Failure Failure TC8 Failure TC13
Heat radiation (W)		No failure*, max. 2.5 kW/m ² at 260 min.
* The heating was terminated after 260 minutes in concurrence with the client.		

Table 3.5: Summary of test results of report 2017-Efectis-R001342[Rev.1]

Criterion	Time (min.)	Result
Integrity, (E) - Cotton pad - Gap Gauge: Ø 6 mm Ø 25 mm - Sustained flaming > 10 seconds		Not determined Not determined Not determined No Failure
Thermal insulation, (I) - Mean temperature rise - Maximum temperature rise I ₁ - Maximum temperature rise I ₂	66 68 68	Failure Failure TC2* Failure TC2*
Heat radiation (W)		No failure**, max. 3.3 kW/m ² at 280 min.
* End of thermal insulation (I) after 66 minutes of heating, due to exceeding average temperature rise of 140°C		
** The heating was terminated after 280 minutes in concurrence with the client.		

4. CLASSIFICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with Clause 7 of EN 13501-2:2016.

4.2 CLASSIFICATION

The element, a rolling shutter, type Metacon RGS, is classified according to combinations of performance parameters and classes as described in Clause 6.7 of EN 13501-2:2016.

E 240-C2
EI₁ 45-C2
EI₂ 60-C2
EW 120-C2

5. DIRECT FIELD OF APPLICATION

The conclusions in this chapter apply exclusively to all door set types mounted on an aerated concrete wall which are equivalent in detail, including fittings/furniture and materials used, to the structure described in this report and that also comply with the following conditions:

5.1 GENERAL

The field of direct application defines the allowable changes to the test specimen following a successful fire resistance test. These variations can be applied automatically without the need for the sponsor to seek additional evaluation, calculation or approval.

NOTE When extended product size requirements are envisaged, the dimensions of certain components within the test specimen can be less than those intended to be used at full size in order to maximize the extrapolation of the test results by modelling the interaction between components at the same scale.

Where referred to annex B or annex C in this paragraph, the annexes in EN 1634-1:2014 + A1:2018 are meant.

5.2 MATERIALS AND CONSTRUCTION

5.2.1 General

Unless otherwise stated in the following text, the materials and construction of the rolling shutter shall be the same as that tested.

5.2.1.1 Metal construction

The type of metal shall not be changed from that tested.

5.2.2 Decorative finishes

5.2.2.1 Paint

The paint finish is not expected to contribute to the fire resistance of the door, alternative paints are acceptable and may be added to the rolling shutter or frames for which unfinished test specimens were tested.

5.2.2.2 Decorative laminates

Decorative laminates and timber veneers up to 1,5 mm thickness may be added to the faces (but not the edges) of doors that satisfy the insulation criteria (normal or supplementary procedure).

5.2.3 Fixings

The number of fixings per unit length used to attach door-sets to supporting constructions may be increased, but shall not be decreased and the distance between fixings may be reduced but shall not be increased.

5.3 PERMISSIBLE SIZE VARIATIONS

5.3.1 General

Door-sets of sizes different from those of tested specimens are permitted within certain limitations, but the variations are dependent on product type and the length of time that the performance criteria are fulfilled.

The increase and decrease of dimensions permitted by the field of direct application are applicable to the overall size.

5.3.2 Test periods

The amount of variation of size permitted is dependent on whether the classification time was just reached (Category 'A') or whether an extended time (Category 'B') in accordance with the values shown in Table 5.1 were fulfilled before the test was concluded.

For category 'B':

Table 5.1: Category B overrun requirements

Classification time (min)	All performance criteria fulfilled for at least minutes
15	18
20	24
30	36
45	52
60	68
90	100
120	132
180	196
240	260