

Sectional door set type Metacon OHD EI(1)-60 Classification of the fire resistance according to EN 13501-2:2007+A1:2009

Report number	2013-Efectis-R0245b
Sponsor(s)	Metacon BV James Wattstraat 14 NL-2809 PA GOUDA The Netherlands
Author(s)	S. Lutz W. Scheffer BBE
Project number	2013245
Report date	September 2013
Number of pages	11

All rights reserved.

No part of this document may be reproduced and/or published by means of printing, photocopying, microfilm, or by any other method without prior permission from Efectis.

If this report was issued on behalf of a customer, please refer to the General Terms and Conditions for Research Assignments to TNO or the relevant agreement signed between the parties for the rights and obligations of the customer and the contractor.
This Efectis Report may be made available to immediate stakeholders for consultation.

TABLE OF CONTENTS

1. Subject	3
2. Details of classified product	3
2.1 General	3
2.2 Test frame	3
2.3 Supporting construction	3
2.4 Sectional door set	3
2.5 Plaster board lining supporting construction	4
2.6 Side Guides	4
2.7 Flame barrier	4
2.8 Intumescent strips	4
2.9 Fixings	5
2.10 Method of assembly	5
3. Sampling and manufacturing of the construction	5
4. Test report & test results in support of classification	5
4.1 Test report	5
4.2 Test results	5
5. Classification and direct field of application	6
5.1 Reference of classification	6
5.2 Classification	6
5.3 Field of application	7
5.4 Specific restrictions on materials and constructions	7
5.5 Decorative finishes	7
5.6 Fixings	7
5.7 Permissible size variations	7
5.8 Supporting construction	8
6. Limitations	8
APPENDIX: Figures	9

1. SUBJECT

This report defines the resistance to fire classification in accordance with the procedures given in EN 13501-2:2007+A1:2009 of a sectional door set type Metacon OHD EI(1)-60.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

For the dimensions and specifications of the materials and components of the examined construction also see the figures in the Appendix. Significant details of the construction are given in the paragraphs below.

2.2 TEST FRAME

The test frame was constructed of steel beams with a fire resistant concrete lining with internal dimensions of 4 x 5m (w x h). The width of the test frame was 250mm. The floor underneath the door set consisted of a sheet of calcium silicate board, 20mm thick.

2.3 SUPPORTING CONSTRUCTION

The test specimen was built in a standard low density rigid supporting construction according to EN 1363-1:2012 being an aerated concrete wall with a thickness 150mm and a density of $650 \pm 200\text{kg/m}^3$. The dimensions of the wall aperture: 3400mm x 4450mm (w x h).

2.4 SECTIONAL DOOR SET

The door set comprised metal covered plasterboard tubular door sections. The steel covers were glued to the plasterboard. On the top and bottom edge of each section a fire resistant MDF plate was applied. Each shutter section was attached to another section with four steel hinges.

Overall dimensions of the door set	
Width	3640mm
Height	4747mm
Thickness	81.6mm
Specifications of the door sections	
Height	550mm
Steel frame	Welded, tubular rectangle
Dimensions of the outer vertical tubes	50mm x 50mm x 2mm (w x h x t)
Dimensions of the inner vertical tubes	80mm x 50mm x 2mm (w x h x t)
Dimensions of the horizontal tubes	50mm x 50mm x 2mm (w x h x t)
On top and bottom of panel	Fire resistant MDF strips
Thickness	18mm

Plasterboard cover	FR Gyproc
Thickness	15mm x 1mm
Location	At both faces of the section and the sides
Metal / Alu cover	Zinc electroplated / aluminium sheet
Thickness	0.63mm
Location	At both faces of the section
Glue	Ankerweld 2514 R
Specifications steel hinges	
Manufacturer	ConDoor
Material	Zinc electroplated steel
Dimensions	60mm x 155mm x 2mm (w x h x t)
Locations at guiding system	A pair far at each edge
Locations at top of section equally spread	Four with c.t.c. distance 700 mm

2.5 PLASTER BOARD LINING SUPPORTING CONSTRUCTION

On the supporting construction following the edges of the aperture a strip of plaster board, dimensions 172.5mm x 12.5mm (w x t), was fixed with phosphated plasterboard screws, Ø 3.5mm x 55mm, the edge of the strip against the guiding system. The intumescent strips were stuck to the plasterboard. (See APPENDIX: FIGURES: detail 2)

2.6 SIDE GUIDES

The ConDoor side guide mounting bracket was made of zinc electroplated steel with a thickness of 2mm and guided the two inch steel wheels on a 11mm steel shaft. The wheels were connected to the ConDoor steel hinges described in 2.4. (See APPENDIX FIGURES: detail 2)

2.7 FLAME BARRIER

On the lintel of the supporting construction and on the top section a flange, length 50mm, of zinc electroplated steel, thickness 1.5mm, labyrinth like flame barrier was placed. (See APPENDIX FIGURES: detail 2)

2.8 INTUMESCENT STRIPS

Between the two MDF plates in the shutter sections a 20mm x 2mm Palusol fire seal was applied. Two strips of Palusol 45mm x 4mm were applied between the door and the wall on the vertical sides.

One strip of Palusol 45mm x 4mm was applied between the door set and the wall at the top horizontal side. (See APPENDIX FIGURES: detail 2)

2.9 FIXINGS

The side guides were fixed with M6 bolts at 1000mm c.t.c. distance through the wall.
The floor underneath the door set consisted of a sheet of calcium silicate board, 20mm thick.

2.10 METHOD OF ASSEMBLY

The shutter was built in the following order:

- Assembly of the aerated concrete wall
- Mounting of the side guides
- Mounting of the sections
- Connecting the sections.

3. SAMPLING AND MANUFACTURING OF THE CONSTRUCTION

Efectis Nederland BV Centre for Fire Safety	Test frame Supporting construction
Metacon BV	Producing sectional door set Assembly of construction

4. TEST REPORT & TET RESULTS IN SUPPORT OF CLASSIFICATION

4.1 TEST REPORT

Name of laboratory	Name of sponsor	Test report no.	Test method
Efectis Nederland BV, Centre for Fire Safety	Metacon BV	2013-Efectis-R0245a	EN 1634-1:2008

4.2 TEST RESULTS

Summary of test results: test I, at the fire side.

Criteria	Minutes reached from start of test	
Integrity (E) - Cotton pad - Gap Gauge Ø 6mm - Gap Gauge Ø 25mm - Sustained flaming longer than 10 sec.	106 minutes	Not determined Not determined Not determined Failure
Insulation (I) - Average temperature rise - Max. temperature rise I ₁ - Max. temperature rise I ₂	76 minutes 51 minutes 65 minutes	Failure Failure Failure
Heat radiation (W)	106 minutes*	No failure, 3.5 kW/m ²
* The criterion was reached by sustained flaming for more than 10 seconds = end of E		
The heating was terminated after 106 minutes in concurrence with the sponsor.		

Summary of test results: test II, at the non-fire side.

Criteria	Minutes reached from start of test	
Integrity, (E) - Cotton pad - Gap Gauge Ø 6mm - Gap Gauge Ø 25mm - Sustained flaming longer than 10 sec.	118 minutes	Not determined Not determined Not determined Failure
Insulation, (I) - Average temperature rise - Max. temperature rise I ₁ - Max. temperature rise I ₂	78 minutes 114 minutes 90 minutes	Failure Failure Failure
Heat radiation (W)	118 minutes*	No failure, 3.5 kW/m ²
* The criterion was reached by sustained flaming for more than 10 seconds = end of E		
The heating was terminated after 118 minutes in concurrence with the sponsor.		

5. CLASSIFICATION AND DIRECT FIELD OF APPLICATION

5.1 REFERENCE OF CLASSIFICATION

The door sets have been classified in accordance with clause 7 of EN 13501-2:2007+A1:2009.

5.2 CLASSIFICATION

The door sets will be classified as follows:

Test I, at the fire side

E90
EI₁45
EI₂60
EW60

Test II, at the non-fire side

E90
EI₁60
EI₂60
EW60

5.3 FIELD OF APPLICATION

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1634-1:2008. Any significant deviation with respect to size, constructional details, load stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.

The conclusions in chapter 5.2 apply exclusively to sectional 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:

5.4 SPECIFIC RESTRICTIONS ON MATERIALS AND CONSTRUCTIONS

- The dimensions of metal wrap around frames may be increased to accommodate increased supporting construction thickness. The thickness of the metal may also be increased by up to 25 %.
- The type of metal shall not be changed from that tested.

5.5 DECORATIVE FINISHES

- If a paint finishing layer does not contribute to the fire behaviour, applying a paint coating to the door surface is allowed.
- Decorative laminates and wood veneers with a maximum thickness of 1.5mm may be added to the surfaces, but not the edges.

5.6 FIXINGS

The number of fixings to attach the frame to the supporting construction may be increased but not decreased. The centre to centre distance between the fixings may be reduced but not increased.

5.7 PERMISSABLE SIZE VARIATIONS

For EI₁45 (sectional door set mounted at fire side):

- Unlimited size reduction is permitted.
- Size increase is not permitted.

For EI₁60 (sectional door set mounted at the non-fire side):

- Unlimited size reduction is permitted.
- Size increase is permitted up to 50% in height, 50% in width and 50% in total area.

For EI₂60 (sectional door set mounted at the fire side):

- Unlimited size reduction is permitted.
- Size increase is not permitted.

For EI₂60 (sectional door set mounted at the non-fire side):

- Unlimited size reduction is permitted.
- Size increase is permitted up to 50% in height, 50% in width and 50% in total area.

When size increase is allowed, the following maximum dimensions are applicable:

Maximum dimensions door leaf surface			
Width	3640mm	Increase width 50%	5460mm
Length	4747mm	Increase length 50%	7121mm
Total surface	17.28 m ²	Increase surface 50%	25.92 m ²

5.8 SUPPORTING CONSTRUCTION

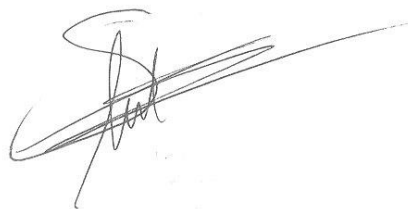
The sectional door set built on to a standard rigid supporting construction as specified in EN 1363-1 can be applied to a door set mounted in the same manner in a wall provided it has a density of at least $650 \pm 200 \text{ kg/m}^3$ and a minimum wall thickness of 150mm.

6. LIMITATIONS

This classification document does not represent type approval or certification of the product.



W. Scheffer BBE
Project leader fire resistance



S. Lutz
Project leader fire resistance

APPENDIX: FIGURES

Figure 1: Front view test object
Figure 2: Detail 2

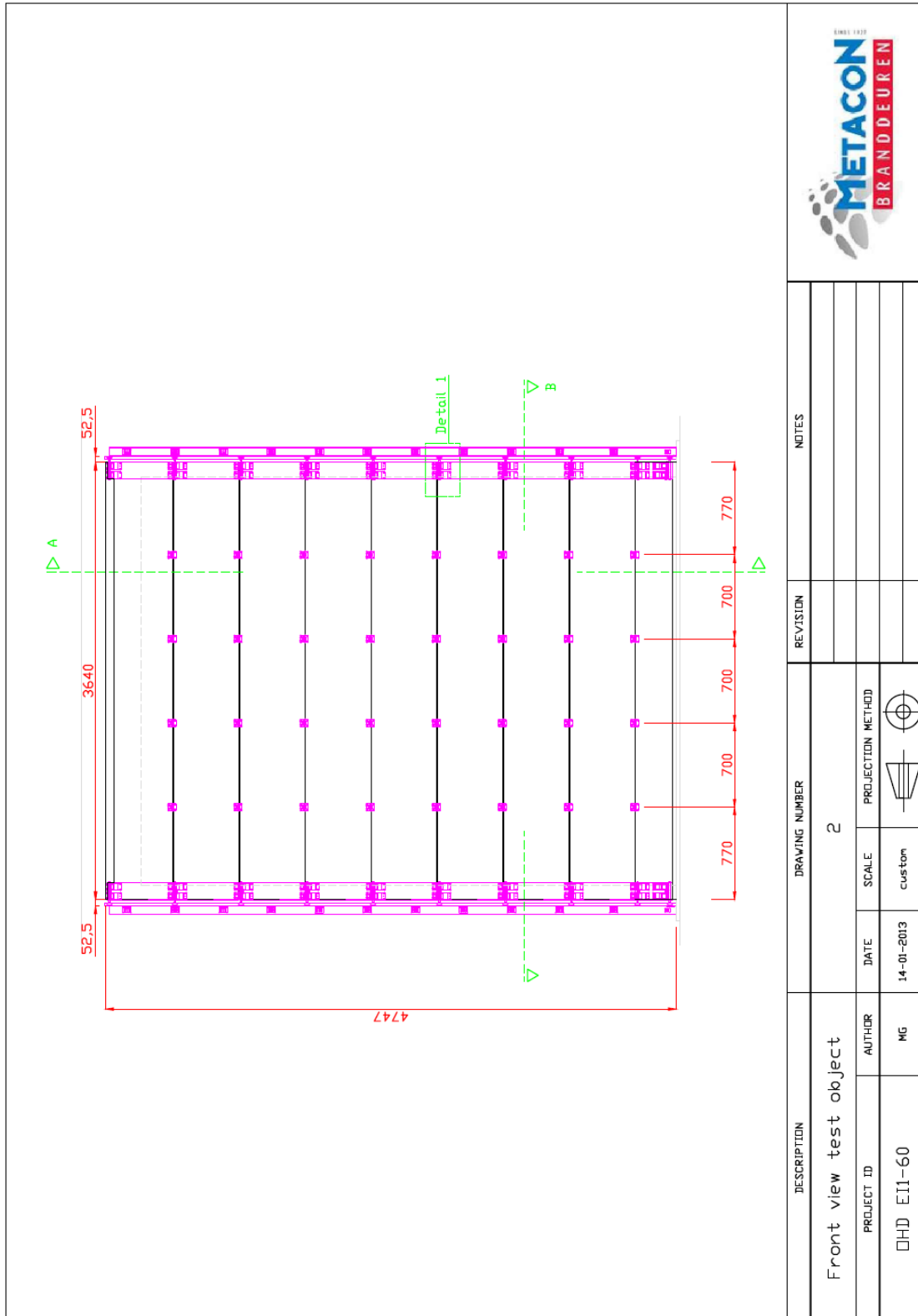


Figure 1: Front view test object

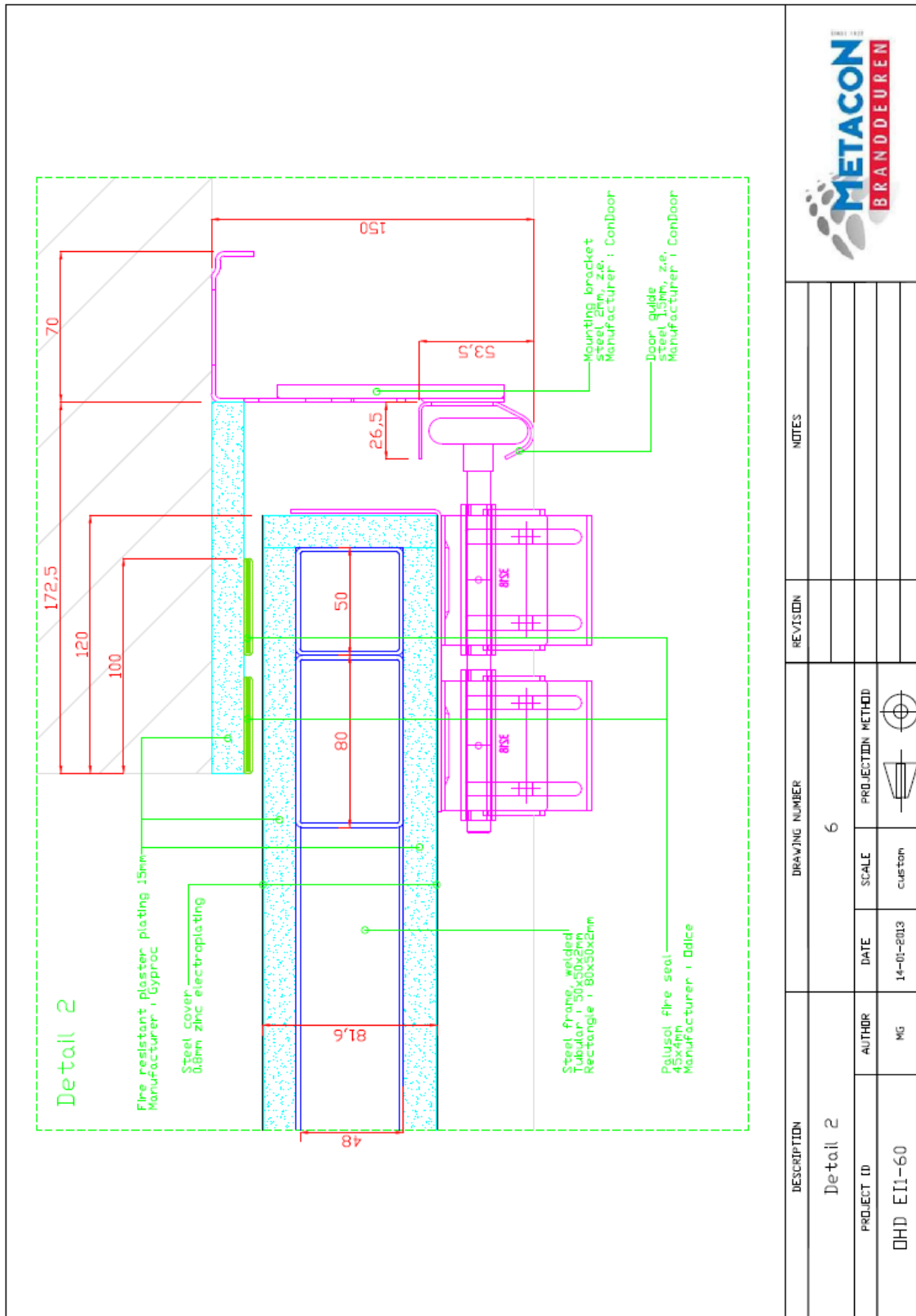


Figure 2: Detail 2