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Member of - European Group of Organisations for
Fire Testing, Inspection and Certifications

Ljubljana, 4. 5. 2021

CLASSIFICATION REPORT**No. 194/20-530-10****CLASSIFICATION OF FIRE RESISTANCE
PERFORMANCE IN ACCORDANCE WITH
SIST EN 13501-2:2016**a non-loadbearing wall made of 100 mm thick MW
self-supporting double skin metal faced insulating
panels**MINERAL WOOL WALL COVERING PANELS
100 mm**Orderer: **METALLEMPORIKI – TH. MAKRIS S.A.,
6th km Larissa-Sikurio, GR-41004 Larissa**Order/contract: **Offer No. 141/2020/10.02.2020**Responsible investigator: **Simon Grum, M.Eng.**Head of laboratory: **Friderik Knez, B.Sc.**Director: **Assist. Prof. Dr. Aleš Žnidarič (Civ. Eng.)**

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1. Introduction

This classification report defines the resistance to fire classification assigned to non-loadbearing wall made of vertically mounted self-supporting double skin metal faced insulating panels **MINERAL WOOL WALL COVERING PANELS 100 mm** in accordance with the procedures given in SIST EN 13501-2:2016 (identical to EN 13501-2:2016).

2. Information about the product

2.1 General

The non-loadbearing wall made of vertically mounted self-supporting double skin metal faced insulating panels **MINERAL WOOL WALL COVERING PANELS 100 mm** prevents spread of fire from room of origin considering resistance to fire performance characteristics stated in Clause 5 and 7.5.2 of SIST EN 13501-2:2016.

2.2 Product description

2.2.1 Composition of the panel

The composition of the insulating panels **MINERAL WOOL WALL COVERING PANELS 100 mm** is fully described below and is the following:

- 25 µm thick polyester coating;
- lightly profiled sheet-steel Zn coated facing, quality DX51D, Z100, measured thickness 0,50 mm (exposed side);
- adhesive made of two components, VORAMER AA 3042 Polyol and VORACOR CE 620 Isocyanate produced by DOW EUROPE GmbH, application ratio 170 g/m²;
- 95 mm thick mineral wool type rock wool core Fibrango B-001 (measured density 127 kg/m³, measured binder content 5,43 %, measured moisture content 0,26 %);
- adhesive made of two components, VORAMER AA 3042 Polyol and VORACOR CE 620 Isocyanate produced by DOW EUROPE GmbH, application ratio 170 g/m²;
- lightly profiled sheet-steel Zn coated facing, quality DX51D, Z100, measured thickness 0,50 mm (unexposed side);
- 25 µm thick polyester coating.

2.2.2 Sealing materials

The bottom and top gaps between the test frame and adjacent face of the L-profiles were sealed with fire rated sealant Sikacryl – 620 fire.

The gaps between the test frame and all adjacent faces of the L-profiles were sealed with ceramic wool and fire rated sealant Sikacryl-620 Fire. The same sealant was applied between two adjacent faces of the support steel L-profiles at the bottom edge of the specimen. Gaps between the test wall and the test frame at the top horizontal and restrained vertical edge were filled with ceramic wool.

Over the bottom three L profiles, 13 mm thick ceramic wool and over the ceramic wool 21 mm mineral wool were laid and protected with fire stopping coating Promat PROMASTOP CC. On that lining the test wall was placed.



All visible rock wool joint faces (male and female faces) between the panels were covered with fire stopping coating Promat PROMASTOP CC with application ratio of approximately 1860 g/m² and fire rated sealant Sikacryl-620 Fire with application ratio of approximately 186 g per meter of a joint.

The wall bottom and top rock wool faces were covered with fire stopping coating Promat PROMASTOP CC.

Cut rock wool joint face on the fixed edge was covered with fire stopping coating Promat PROMASTOP CC.

Gaps between the test specimen and the restrained test frame were filled with ceramic wool.

2.2.3 Fixing of the panels

Panels are fixed to the support construction by means of:

- self-drilling screws 6,3 × 130 mm with storm washers
- top horizontal edge of the panel is fixed by means of three self-drilling screws at a distance of approximately 400 mm between screws respectively, positioned 100 mm in from the joint gaps between the panels;
- bottom horizontal edge of the panel is fixed by means of three self-drilling screws to the panel of dimensions 6,3 × 25 on the exposed and unexposed side of the test specimen at a distance of approximately 400 mm between screws respectively, positioned 100 mm in from the joint gaps between the panels;
- vertical edge of the wall is fixed by means of three self-drilling screws of dimensions 6,3 × 30 on the unexposed side, at a distance of approximately 1250 mm between the top and middle screws and approximately 1680 mm between middle and bottom screws respectively. End screws are positioned 40 mm in from the horizontal edges of the wall;
- no fixing is used at the free vertical edge of the wall.

2.2.4 Joint fixing

The panels are connected to each other by means of longitudinal joint Type V., according to SIST EN 14509:2014 (identical to EN 14509:2013) with dimensions as shown in the drawing of the joint provided by the sponsor.

Sheet metal joints on the unexposed and exposed side of the panels are fixed together by means of:

- self-drilling screws 4,3 × 19 at a distance of approximately 200 mm between screws and approximately 5 mm inside from the joints gap.

The non-loadbearing wall, made of vertically mounted self-supporting double skin metal faced insulating panels **MINERAL WOOL WALL COVERING PANELS 100 mm**, is fully described in the test report provided in support of classification detailed in clause 3.1.

3. Test reports and test results in support of the classification

3.1 Test reports

No	Laboratory	Name of sponsor	Test reports No.	Test method
[1]	ZAG Ljubljana	METALLEMPORIKI TH. MAKRIS S.A.	194/20-530-9	SIST EN 1364-1:2015 (identical to EN 1364-1:2015)

3.2 Test results

The wall is symmetrical; the geometry of the joints between the panels is symmetrical.

Test report	Parameter	Results
[1]	Integrity (E) - Sustained flaming on the unexposed side - Ignition of cotton pad - Gap gauge ϕ 6 mm - Gap gauge ϕ 25mm	201 minutes, no failure 201 minutes, no failure 201 minutes, no failure 201 minutes, no failure 201 minutes, no failure
	Insulation (I) - mean temperature rise >140 °C - maximum temperature rise >180 °C	200 minutes 200 minutes 201 minutes, no failure
	Radiation (W) - time to exceed 15 kW/m ²	-

4. Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with Clause 7.5.2 of SIST EN 13501-2:2016.

4.2 Classification

The non-loadbearing wall made of vertically mounted self-supporting double skin metal faced insulating panels **MINERAL WOOL WALL COVERING PANELS 100 mm** is classified according to the following combinations of performance parameters and classes as appropriate. No other classification is allowed.

E		20	30		60	90	120	
EI	15	20	30	45	60	90	120	180
EW		20	30		60	90	120	

Fire resistance classification: E 120 / EI 180 / EW 120

4.3 Field of application

This classification is valid for non-loadbearing walls made of vertically mounted self-supporting double skin metal faced insulating panels
MINERAL WOOL WALL COVERING PANELS 100 mm.

According to SIST EN 1364-1:2015, The test results are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability. Other changes are not permitted.

- a) decrease in height;
- b) increase in the thickness of the wall;
- c) increase in the thickness of component materials;
- d) decrease in linear dimensions of boards or panels but not thickness;
- e) decrease in distance of fixing centres;
- f) increase in the number of vertical joints, of the type tested;
- g) horizontal and/or vertical joints, of the type tested.

Supporting construction

- the test results are applicable to high density rigid supporting constructions with at least the same fire resistance as the test specimen.

4.3.1 Extension in width

- the width of an identical construction may be increased.

4.3.2 Extension in height

- the height of an identical construction may be increased up to 4,0 m.

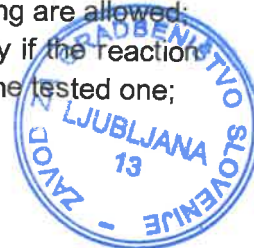
Extension of the field of application to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability are made according to SIST EN 15254-5:2018 (identical to EN 15254-5:2018). Other changes are not allowed.

4.3.3 Variations in the facing thickness

- the thickness of the facing on the exposed and unexposed side may vary from 0,30 mm to 0,70 mm.

4.3.4 Variations in the coatings

- change to non-coated facings is not allowed;
- on the exposed facing any changes of the type and colour of the coating are allowed;
- on the unexposed facing modifications in the coating are allowed only if the reaction to fire classification of the panels shall be the same or better than for the tested one;



- on the unexposed facing any changes in the colour of the same type of coating are allowed.

4.3.5 Variations in the metal material

- the test results are valid for all grades of steel facings;
- change to other facings metal material is not allowed.

4.3.6 Variations in profile geometry of facing

- the test results are valid and panels are regarded as symmetrical for any change in the range from 0 mm to 5 mm profiling on both sides of the panels but only if the declared tensile strength value is equal to or higher than for the tested panel.

4.3.7 Variations in the adhesive

- the results are valid for all adhesives with PCS value below 4 MJ/m².

4.3.8 Variations in the mineral wool core material

- change from one core material to another core material is not allowed;
- change from one core material producer to another core material producer is not allowed;
- the test results are valid for density of the tested mineral wool core in range from 114 kg/m³ to 150 kg/m³ – (standard EN 15254-5:2018, Chapter 5.2.4.2);
- change of orientation of the tested mineral wool fibres is not allowed;
- the test results are valid for panels with a decrease in the number of lamella or slab joints of the tested mineral wool core;
- the test results are valid if the organic binder content of the mineral wool core is up to 6,5 % or lower;
- the nature and the proportions of materials used to manufacture the mineral wool fibres of the tested mineral wool core shall not be different from those used in the reference test.

4.3.9 Variation in span length

- a decrease in span length is always allowed;
- increase of the span length is allowed up to 4,0 m for EI 180 classifications and 7,5 m for all other classifications allowed in Clause 4.2 of this report, with increased amount of fasteners. Extension of span length is only allowed with vertical panel orientation;
- the required amount of fasteners per each edge shall always be calculated in accordance with this formula:

$$n k_{y,\theta} \geq F_{v,Ed}/F_{v,Rd} + F_{t,Ed}/F_{t,Rd}$$

n = number of fasteners;

$k_{y,\theta}$ = decrease on the yield strength $k = 1$ (defined by the EXAP standard);

$F_{v,Ed} = (L b q)/2$;

$F_{v,Rd}$ = the design value of shear strength of the fasteners in normal temperature stated by the producer of the fasteners;

$F_{t,Ed} = L b (q + g)$;

$F_{t,Rd}$ = the design value of tensile strength of the fasteners in normal temperature stated by the producer of the fasteners;



q....air pressure in fire $q = 0,3 \text{ Pa}$, (defined by the EXAP standard);
g....panels weight in kPa $g =$ calculated from the weight of a panel;
L....span length in meters;
b....panel width in meters.

According to SIST EN 15254-5:2018, Annex B, the following measurements and calculations were carried out, based on measurements presented in the test report provided in support of this document detailed in clause 3.1.

Classification time [min]	Deflection differences [mm] and Δ calculations [°]										
	f_1	$f_{1,2}$	f_2	$f_{2,3}$	f_3	$\Delta f_{1,2}$	$\Delta f_{2,3}$	$(c_2-c_1)_{1,2}$	$(c_2-c_1)_{2,3}$	$\Delta c_{1,2}$	$\Delta c_{2,3}$
15	4	6	-3	10	14	0,006	0,005	0	0	0,000	0,000
20	2	8	-1	13	15	0,008	0,006	0	0	0,000	0,000
30	4	15	3	19	18	0,012	0,009	0	0	0,000	0,000
45	-1	14	-1	17	23	0,015	0,006	0	0	0,000	0,000
60	-24	-2	1	4	27	0,010	-0,010	-0,5	0	-0,023	0,000
90	-31	-39	-27	-1	25	-0,010	0,000	0	0	0,000	0,000
120	-29	-39	-27	-2	20	-0,011	0,002	0	0	0,000	0,000
180	-34	-44	-31	-2	22	-0,012	0,003	0	-0,5	0,000	-0,023

f_ideflection of panel i;

$f_{j,i+1}$deflection of joint of panel i and panel i+1;

$\Delta f_{i,i+1}$ relative difference of deflection of joint of panel i and panel i+1;

$(c_2-c_1)_{i,i+1}$opening of joint of panels;

$\Delta c_{i,i+1}$ relative difference of joint covering of panel i and panel i+1;

$L_{1:1,2}$ distance between deflection f_1 and f_2 measuring points $L_{1:1,2}=1000 \text{ mm}$;

$L_{1:2,3}$ distance between deflection f_2 and f_3 measuring points $L_{1:2,3}=970 \text{ mm}$;

$L_{2:1,2}$ steel sheet covering in panels joints $L_{2:1,2}=L_{2:2,3}=22 \text{ mm}$;

4.3.10 Variations in orientation

- the test results are not valid for horizontally mounted panels.

4.3.11 Variations in the panel width

- the test results are valid if the width of the panels, using the same core as the tested, is 1200 mm or less.

4.3.12 Variations in the panel thickness

- the test results are valid if the thickness of the panels, using the same core material as the tested, is 98 mm or more.

4.3.13 Variations in the longitudinal joint construction

- an increase in the overlap in the steel facing at the joint is allowed, if other dimensions remain unchanged;
- an increase in the amount of joint fixing screws is always allowed, decrease is not allowed;
- use of tongue and groove joint in the core material is allowed;

- the test results are valid when the panel joints are sealed with fire stopping coating Promat PROMASTOP CC with application ratio of 1860 g/m² of a joint face and with fire rated sealant Sikacryl-620 Fire with application ratio of 186 g per meter of a joint groove;
- the test results are not valid for joints without sealants.

4.3.14 Variations in the boundary conditions and fixing system

- an increase in the amount of self-drilling fasteners is always allowed;
- an increase in the diameter of self-drilling fasteners is always allowed;
- change of the material of self-drilling fasteners is not allowed;
- an increase in protection ability of self-drilling fasteners is always allowed;
- if the thickness of the panel is increased the length of the self-drilling fasteners shall be increased pro rata;
- load per fastener imposed by the changes made is less than those tested.

4.3.15 Length of wall construction

- the length of the wall can be freely increased.

4.3.16 Support structure

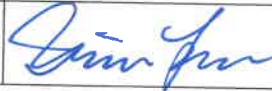
- the test results are valid if the support structure has at least the same fire resistance classification time for loadbearing capacity (R) as the panel assembly has for insulation and/or integrity;
- the test results are valid if the fixing system has the same loadbearing capacity (R) in the support structure as in the frame used in the reference test;
- the test results are valid if the fixation areas are thermal insulated.

4.3.17 Heating conditions

- the test results are valid also for the external fire exposure curve.

5. Limitations

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

	Name	Signature	Date
Person undertaking classification:	Dominik Gerdej, B.Sc.		4. 5. 2021
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