

## CLASSIFICATION REPORT FOR FIRE RESISTANCE

№ CR-430-01/16.09.2024

In accordance with BDS EN 13501-2:2023

Sponsor:	<b>Metallemporiki – Th. Makris S.A.,</b> Larissa, Sikourio, 6th km, Greece
Prepared by:	F plus Ltd., Konstantin Kostenechki str. 16, 2042 Kostenets
Notified body No.	NB 2548
Product name:	<b>A roof structure</b> made of <b>sandwich panels</b> type Mineral Wool Roof Covering Panel with a thickness of 120 mm and <b>a mineral wool core</b>
Contents of the report:	5 pages

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## 1. Introduction

This classification report determines the classification of a roof structure made of sandwich panels type Mineral Wool Roof Covering Panel with a thickness of 120 mm and a mineral wool core, in accordance with the procedures described in BDS EN 13501-2:2023.

## 2. Details of classified product

### 2.1. General

The element, roof structure made of sandwich panels type Mineral Wool Roof Covering Panel with a thickness of 120 mm and a mineral wool core is defined as fire resistant.

### 2.2. Description

**Sandwich panels** Mineral Wool Roof Covering Panel type are two steel sheets and a mineral wool core. The steel sheets are made of galvanized steel type DX51D, produced by the company MAKRIS S.A. The steel sheet on the heated (bottom) side is 0.5 mm thick and has a 25 µm thick polyester coating applied. Additionally, it is profiled with a depth of 0.5 mm. The steel sheet on the unheated (top) side is 0.5 mm thick and has a 25 µm thick polyester coating applied. In addition, it is profiled with a depth of 0.5 mm and is ribbed with 5 trapezoidal ribs with a height of 160 mm and a pitch of 250 mm.

The distance between the two metal sheets is 120 mm and it is filled with mineral wool named Fibrangeo BL-50c with density 100 kg/m<sup>3</sup>, produced by Fibran S.A. The wool is mounted with a binder (glue) based on two components type VORAMER AA 3042 and VORACOR CD 526 manufactured by DOW EUROPE GMBH. The amount used in total is 340 g of glue per one meter of length. The wool is cut into lamellas with a height of 120 mm, and they are located so that the threads of the wool are located perpendicular to the steel sheets. The lamellas are closely spaced to each other and they are freestanding. The panels are produced with a width 1000 mm and a length depending on the request.

**The supporting structure** is made of a steel frame to which the sandwich panels are mounted. The frame consists of UPN200 steel profiles located around the perimeter of the furnace opening and one in the middle.

On the steel frame are mounted four panels (ribs are on the unheated side). One with 550 mm x 1000 mm rams and three with 1000 mm x 950 mm. On the upper part of the UPN profile, between the panels and the frame, free-standing ceramic wool type FyreWrap is laid with dimensions of 25x100 mm, produced by UNIFRAX. Longitudinally, the installation was carried out along one UPN200 profile of the supporting structure using self-tapping screws Ø6.3/200 mm, manufactured by EJOT SE & Co. KG. The screws are located at a distance of 500 mm from each other. Transversely, the panels are attached to the UPN200 profiles using self-tapping screws Ø6.3x200 mm with a plate measuring (40x65x20) mm, manufactured by KAMTSIS SA. The screws pass through the corrugations at a distance of 347 mm from the transverse end of the structure and clamp them to the transverse supporting steel profiles. According to the average UPN, the installation was carried out with the help of self-tapping screws Ø6.3/200 mm, manufactured by EJOT SE & Co. KG. The screws are spaced 250 mm apart.

The outer feathers when assembling two panels are additionally reinforced with self-tapping screws for steel Ø4.3x19 mm located at a distance of 250 mm from each other along the entire length of the joint. Along the length of the joint between two panels, silicone type Promastop CC Liquid manufactured by Promat is laid.

The joints at the edges of the roof structure and the furnace are filled with mineral wool with a density 100 kg/m<sup>3</sup>.

The joints between the panels are made with overlapping.

A load of 12 pcs is applied to the structure. constant point loads of 5 kg each..

The manufacturer of the panels type Mineral Wool Roof Covering Panel and the structure is the company Metallemporiki- Th. Makris S.A., Larissa, Sikourio, 6<sup>th</sup> km, Greece.

More details of the test specimen are given in the test report.

### 3. Test reports and test results in support of this classification

#### 3.1. Test reports

This classification report includes test details.

Name of laboratory	Name of sponsor	Report ref. no.	Test method and date
Laboratory for testing and research F plus	Th. Makris S.A., Greece	Test report № TR-430-01/22.08.2024	BDS EN 1365-2: 2015

#### 3.2. Results

Test method, number and date	Parameter	Results
Test method according to the requirements of BDS EN 1365-2:2015 Test report № TR-430-01/22.08.2024	Installation	According to description in p. 2.2
	Loadbearing capacity R	148 min
	Integrity E Cotton pad Gap gauge Sustained flaming	162 min
		162 min
		162 min
Thermal Insulation I	155 min	

### 4. Classification and field of application

#### 4.1. Reference of classification

This classification has been carried out in accordance with Clause 7 of BDS EN 13501-2:2023

#### 4.2. Classification

The roof structure made of sandwich panels type Mineral Wool Roof Covering Panel with a thickness of 120 mm and a core of mineral wool is classified according to the following combination of presented parameters and certain classes under fire impact from below.

R	E	I	W		t	t	t	M	S	C	IncSlow	sn	ef	r
X	X	-	-		1	4	8	-	-	-	-	-	-	-
X	X	X	-		1	4	8	-	-	-	-	-	-	-

## Fire resistance classification RE 120; REI 120

### 4.3. Field of direct application

The test results are directly applicable to similar roof structures provided the following are met:

#### 4.3.1. Regarding the bearing element:

The maximum moments and shear forces calculated on the same basis as the test load shall not be greater than those of the test.

- an increase in the thickness of the profiled sheet metal and/or stone wool is allowed while maintaining the maximum bending moments and shearing forces;

#### 4.3.2. Regarding the inclination of the roof structures::

- = the inclination of the bottom member of roof construction with prefabricated roof trusses can vary up to  $\pm 5^\circ$ ;

- = for roofs with one or more longitudinal beams the results are valid for installation in practice under an angle from  $0^\circ$  up to  $80^\circ$ ;

- the inclination for double slope (apex) or monopitch construction can be from  $0^\circ$  to  $15^\circ$ ;

- installation on massive supporting structures of high density with fire resistance equal to or greater than that provided for the roof.

### 5. Opinions and interpretations of the applicability of the results

5.1. The maximum bending moments and crushing forces calculated on the same basis as in the test shall not exceed 0.27 kNm and 0.66 kN respectively.

5.2. It is allowed to increase the thickness of the profiled sheet metal and/or stone wool while preserving the maximum bending moments and shear forces.

5.3. It is necessary that the installation of the panels is carried out on a massive supporting structure of high density with a fire resistance equal to or greater than that provided for the roof.

### 6. Limitations

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

Classification undertaken by:

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This report was issued in Bulgarian and English languages.  
By established distinction between both reports the Bulgarian one is valid.