



PANELS

ATTRACTIVE PANEL- SOLUTIONS

Successful companies, especially those from abroad, and some successful businessmen lately, are more and more interested in putting accent on head- offices, premises and residential houses. They are searching for new architectural solutions for visual attraction in building with advanced materials, quickly and safety.

M- Profil in Zabok with its production programs of thermo- panels is adaptable to the trade- market requests. The production plant in Zabok produces 2 million m² sheets annually and 10.000 t steel structural elements, directly distributed to the work- site, ready to be embedded.

The thermo- panel, known as sandwich panel, is used for façades, walls and roofs. The external layers are two sheets on the outside, usually trapezoid profiled (especially attractive is the micro lined sheet with sinus profile, horizontally and vertically embedded) with a thermal insulation inside. Depending of the type of the building and client's requests or Investors demands, the internal thermal insulation can be Rockwool or Polystyrene.

PANEL PROPERTIES

The sandwich panel properties are related to the type of interconnection between the separated pieces into one composite panel. The two sheets from the outside laid on the insulation of Rockwool or Polystyrene. The sheets have extraordinary mechanical properties and the core is great thermal insulator.

The sheets are made of steel, or can be galvanized or painted with polyester color. The sheets are produced according to the HRN EN 10147 and HRN EN 143 standards. The usually used thickness are 0,50 and 0,60 mm. The proof stress value is $f_y = 280$ Mpa. The core can be made of Rockwool with density of 120 kg/ m³. The core thickness is 60-120 mm.

COMMON PROPERTIES OF THE PANELS

Covering sheets: galvanized steel

Insulation: Polystyrene and Rockwool

External sheet: 0,50 mm and 0,60 mm

Internal sheet: 0,50 mm and 0,60 mm

Panel area: high trapezoid profiled sheet (micro lined)

Panel thickness: 60 mm, 80 mm, 100 mm, 120 mm, 150 mm, 200 mm

The assortment of colors and different profiles of the steel sheets make the building more attractive, nevertheless if it is an old existing building, or the new one.

WALL PANELS

The core of the sandwich panel is made of material with small heat transmission coefficient. Non- existence of the heat-loss makes this product appropriate for all kind of building, from physics point of view. The panels are satisfying in the meaning of diffusion of vapor.

The interconnection between the wall panels is made with hidden joints. Thus, the facades and the internal walls are looking better.

WALL PANEL PROPERTIES

Insulation: POLYSTYRENE

WALL PANEL TYPE			ZP-060-PS	ZP-080-PS	ZP-100-PS	ZP-120-PS
Thickness	D(mm)		60	80	100	120
Weight	(kg/m ³)	05/05	9.9	10.3	10.7	11.1
		06/05	10.8	11.2	11.6	12
		06/06	11.6	12	12.4	12.8
Heat transmission coefficient	k(W/m ² K)		0.63	0.43	0.32	0.28
Soundproofing	Rw (dB)			25	25	25

Insulation: ROCKWOOL

WALL PANEL TYPE			ZP-060-T	ZP-080-T	ZP-100-T	ZP-120-T
Thickness	D(mm)		60	80	100	120
Weight	(kg/m ³)	05/05	16	18.3	20.7	23.1
		06/05	16.8	19.2	21.6	24
		06/06	17.6	20	22.4	24.8
Heat transmission coefficient	k(W/m ² K)		0.66	0.45	0.35	0.29
Soundproofing	Rw (dB)			30	30	30
Fireproofing	HRN DIN 4102-2			F60-A	F90-A	F90-A

ADVANTAGES OF THE SANDWICH PANELS:

- Attractive design
- The length of the panel is adaptable to the project documentation requires
- Short- term assemblage
- Low operative expenditures
- The panels are adaptable to the different kind of weather influence
- Low maintenance costs

ROOF PANELS

With the extraordinary static values and the small weight, the roof panels are great choice for covering of roof structures with big dimensions. The length of the roof panels (up to 13 m) gives an opportunity for embedding of the whole piece, which is extremely economic solution.

Due to the core of mineral wool, the sandwich panels are ideal for buildings with high requirements for soundproofing, thermal insulation and fireproofing as well.

ROOF PANEL PROPERTIES

Insulation: POLYSTYRENE

ROOF PANEL TYPE			KP-060-PS	KP-080-PS	KP-100-PS	KP-120-PS	KP-150-PS	KP-200-PS
Thickness	D(mm)		60	80	100	120	150	200
Weight	(kg/m ³)	05/05	10.9	11.3	11.7	12.1	12.7	13.7
		06/05	11.9	12.3	12.7	13.1	13.7	14.7
		06/06	12.7	13.1	13.5	13.9	14.5	15.5
Heat transmission coefficient	k(W/m ² K)		0.52	0.41	0.33	0.27	0.22	0.17
Soundproofing	Rw (dB)			26	26	26	26	26

Insulation: ROCKWOOL

ROOF PANEL TYPE			KP-060-PS	KP-080-PS	KP-100-PS	KP-120-PS	KP-150-PS	KP-200-PS
Thickness	D(mm)		60	80	100	120	150	200
Weight	(kg/m ³)	05/05	16.9	19.3	21.7	24.1	27.7	33.7
		06/05	17.9	20.3	22.7	25.1	28.7	34.7
		06/06	18.7	21.1	23.5	25.9	29.5	35.5
Heat transmission coefficient	k(W/m ² K)		0.54	0.42	0.34	0.28	0.23	0.18
Soundproofing	Rw (dB)			31	31	31	31	31
Fireproofing	HRN DIN 4102-2			F60-A	F120-A	F120-A	F120-A	F120-A

SANDWICH PANEL UTILIZATION

- public buildings (administration, post-office, hospital, cultural centre)
 - representative houses
 - industrial buildings (production plants, distribution centers, warehouses)
 - malls and showrooms
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EMBEDDING OF THE SANDWICH PANELS

The sandwich panels are used for façade and roof coverings. The secondary construction (Z and C profiles) is embedded in the panel, inside, between the two sheets and has a purpose of separator at the same time.

The embedding of the panels is a process which is implemented on the work-site.

HIGH- PROFILED SHEET

Due to the aim for spreading the compressive force from the roof covering to the secondary construction, between the girder and the covering, it is usually used a high profiled sheet. It is used for the small slope roofs (1,5-2,5%) and intercolumniations up to 9 m. With its static properties, it is ideal for making slabs in industrial buildings and trading centers.

The calculation for the whole structure and the necessity for planning of installations are directly connected with the project documentation and surveyed in the engineering department.

ADVANTAGES IN BUILDING OF HIGH- PROFILED SHEET

- Lower costs in building process
- Short-term of embedding
- High level of utilization

THE SANDWICH PANEL CONSISTS OF

- Underside sheet OTP 18 type which is embedded under the Z profile
 - Foil
 - Mineral wool (insulation layer thickness depends of the client's demands)
 - Waterproof foil
 - Topping sheet, according to the client's demands and statics requires
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Delivery

The sandwich panels are usually delivered in standard dimensions

Manipulation

Handling, loading and unloading of just one palette with length of max. 6 m is managed with fork truck. In case of manipulation with palettes with length which exceeds those 6 m, it is used a load bearing frame.

Storage

In case of stocking of the sandwich panel palettes, there is a necessity for protection of weather influence. Due to the need of discarding of different damages because of action of some compressive force, it is allowed to put only two palettes one on another.

Ripping of the panels on the work-side

Cutting of the sandwich panel is made with scissors and ripsaw, without heating the cutting area on the high

COLOR PALETTE

The increased coefficient of extension for metal covering layer and the high heat transmission as well, can be reasons for distortion and particular tension in the cross- section area. It especially refers to the items of group number II and group number III. According to that, choosing colors of groups II and III, in correlation with the statically indeterminate compositions, it is reducing the load bearing abilities of the panels.

RAL	COLOR	GROUP
9002	off- white	I
9010	pure white	
1015	ivory	
7035	light gray	
1018	yellow	
RAL	COLOR	
1002	yellow- sand	II
9006	white aluminum	
5015	sky blue	
2004	orange	
2008	red- orange	
RAL	COLOR	
7024	graphite gray	III
9005	black	
8017	brown chocolate	
8019	brown- gray	
3009	red oxide	
6028	pine green	
5009	azure blue	
5010	gentian blue	
3020	red	
5002	ultramarine	

Standardized color palette- M- Profile

Certificates

Certificates of Institutions which are our representatives:

- **ZIK- Institute for quality testing (mechanical properties of the sheets)**
- **LTM- Lab for thermo stable measuring**
(For roof and wall panels- HR DIN, EN standards)
- **ZAG- Institute for building construction in Slovenia**
(For roof and wall panels- EN standards)
- **IBMB**
Product quality reports
For roof and wall panels 100, 120 i 150 mm (DIN Standards)
- **IS- Institute for sandwich panel technology in Mainz**
(For mechanical properties of the panels)
- **IMS- classification for fire resistance-**
(For roof and wall panels)
- **IGH- Institute for construction in Croatia**
(For geotextile- HRN, DIN and ISO standards)