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History

■ Nobogh Sarmayesh Industrial Co. in 1967 with the aim to supply the needs of industrial-commercial cooling doors and panels, in an area of 3000 square meters and workshop production systems started its activities. During nearly half a century, along with production, the company proceeded to build and operate more than 50 industrial refrigeration units for keeping of meat, poultry, fish and fruit and also freezing tunnels.

This know-how beside investments performed in line with research and development, created the necessary power that now this company has a land area of 24,000 square meters, with 50 qualified experienced personnel and daily production capacity of 7000 square meters of sandwich panels, A special cold storage door to different thicknesses and conex in the framework of international standard ISO 9001:2008 which was located in the industrial town of Arak No. 2 is enabled.



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Companionship with the customer

■ The company policy at any time wasn't simply selling products to customers but the company placing beside of the client to reach the ultimate goal surely is to launch a related tool as a pattern. In this regard, always communicate with customers nearly constitutes a warranty and life insurance for companies.

Special focus and attention to customer demands, awareness and understanding of the main problems of owners of the industries and, mastering knowledge of refrigeration systems, along with a half-century of circadian activity experience of the company has become into one of the poles of the industry.

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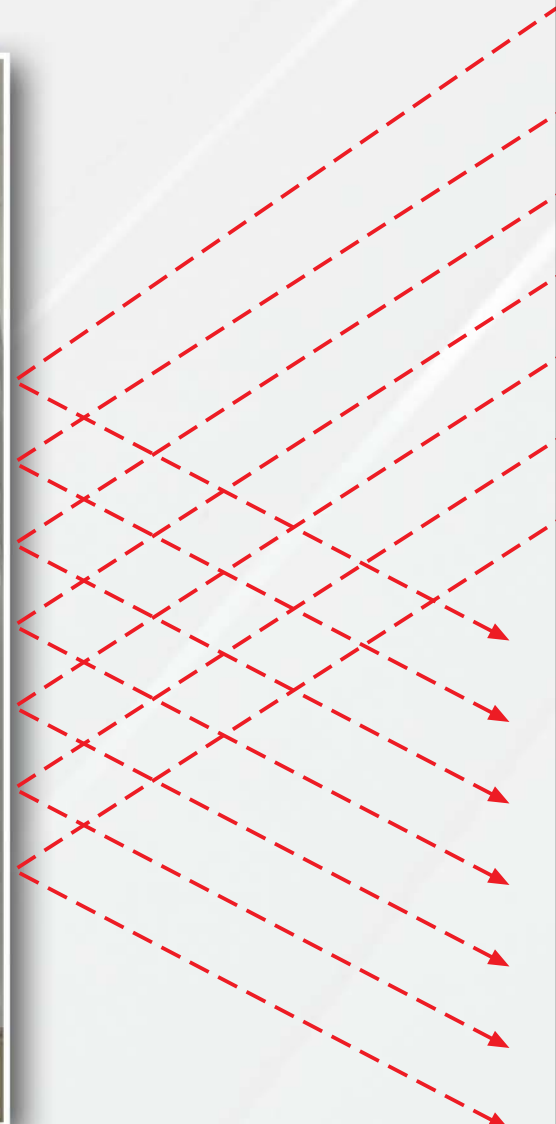
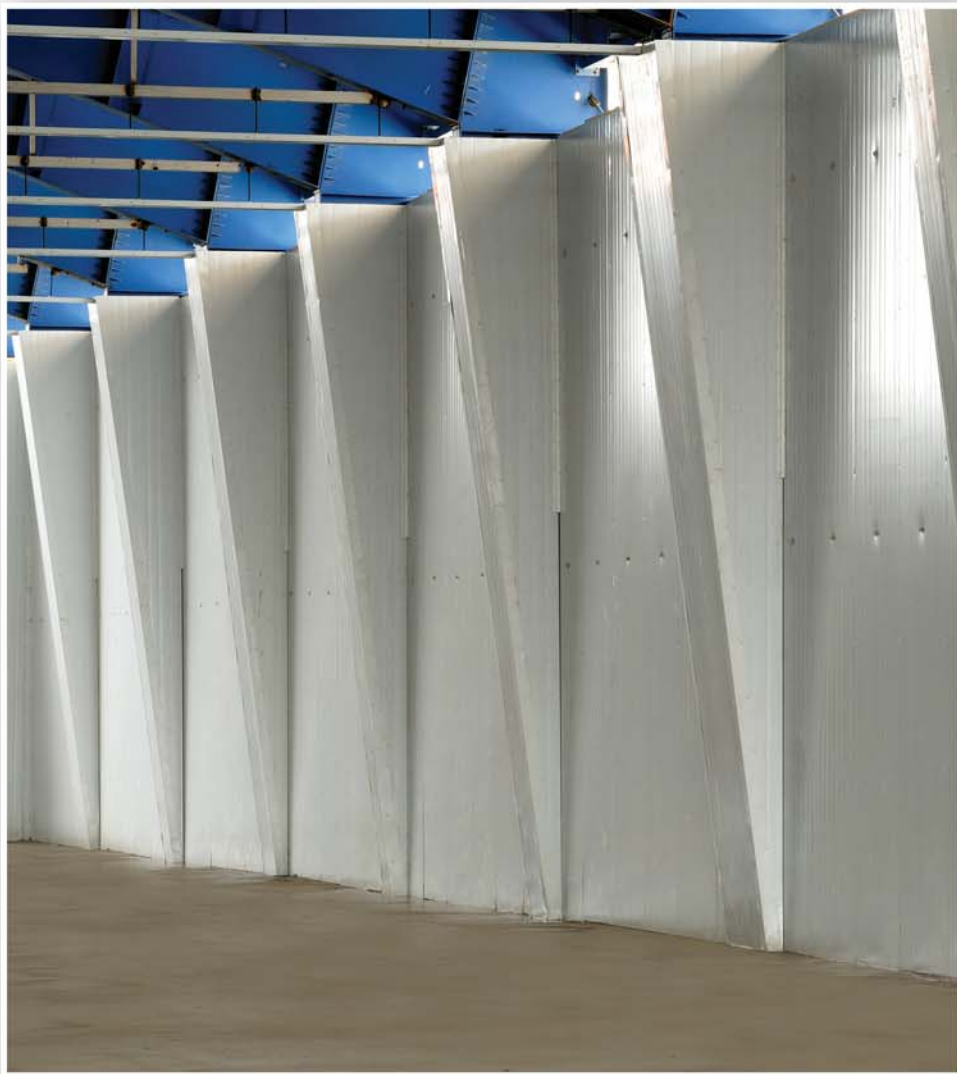
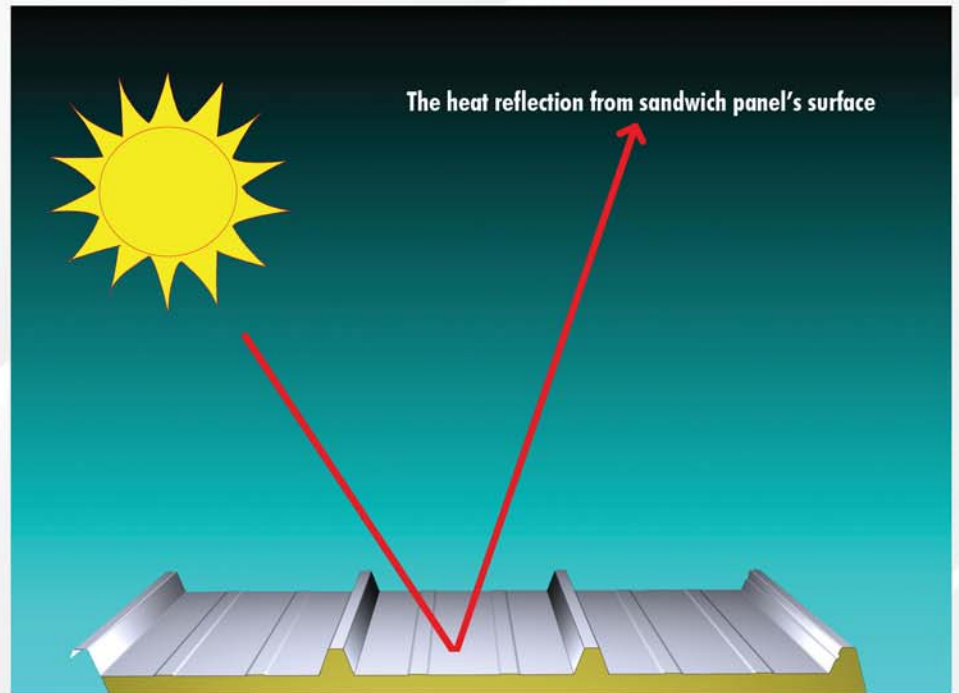




Reasons for replacing the sandwich panel instead of building materials

■ Expanding need for optimization of consumption and more attention to avoid wasting energy at the national level, sandwich panel as one of the main cases of the industrial insulation of business units can be known.

Possibility of installation in different climatic conditions and execution speed can be other major benefits of the sandwich panel considered in comparison with traditional materials.

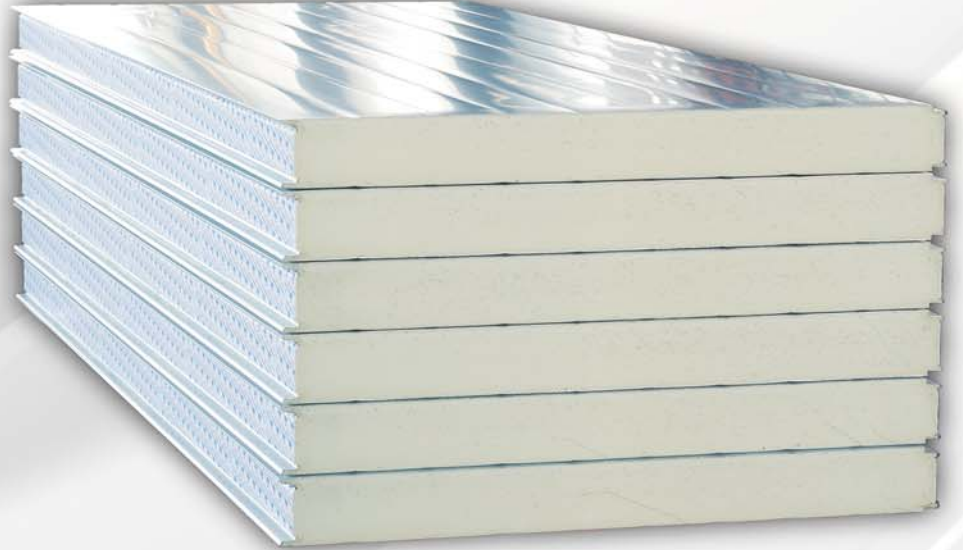


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Sandwich panel

■ In simple language combined rigid polyurethane core between two layers of steel sheet, which is called the sandwich panel. Rigid polyurethane is quite hard and brittle material, so lonely is not very usable.

But with making it like a sandwich between two layers of sheet metal material with high tensile strength which we can achieve a product with the mechanical very good properties.



The most common type of metal used in the present were galvanized sheets, aluminum and aluzinc sheets which were pre-painted, with its composition with polyurethane and manufacture of sandwich panel which can be reached to the product that some of the special characteristics of it is in the following:

- ✱ Good mechanical strength
- ✱ Light weight
- ✱ Resistance to rat and insects and other vermin penetration
- ✱ Lower heat transfer coefficient
- ✱ Fire resistant
- ✱ Reasonable prices
- ✱ Variety of colors
- ✱ Fast and easy to install
- ✱ Low cost installation
- ✱ No need specialized equipment for installation

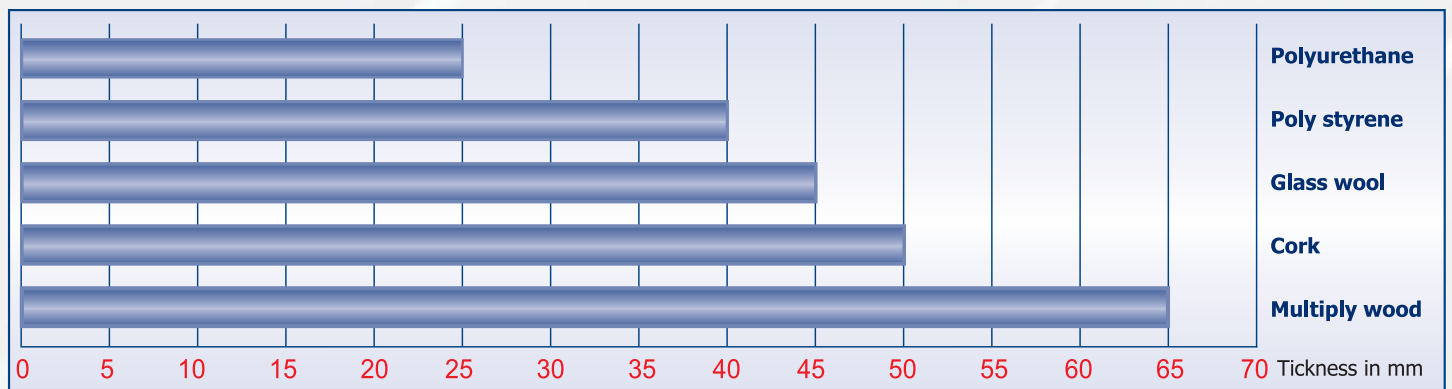




- Due to Mentioned issues the use of this product in commercial and industrial units has grown rapidly.



- In the following chart thickness needed to achieve the same heat transfer coefficient between different materials than rigid polyurethane is shown.

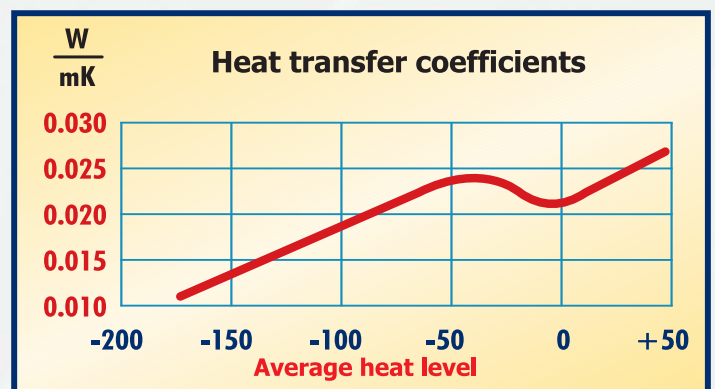


The Table of the rigid polyurethane heat transfer coefficients in different thicknesses

Heat transfer coefficients	
40 mm	0.380 W/m ² K°
50 mm	0.303 W/m ² K°
75 mm	0.244 W/m ² K°
100 mm	0.185 W/m ² K°
125 mm	0.148 W/m ² K°
150 mm	0.119 W/m ² K°

-273 C° = 0 K° = Absolute Zero

Table of the rigid polyurethane heat transfer coefficients at different temperatures



Applications

■ Sandwich panels produced by this company in terms of consumption items can be divided into two categories

- 1-Constructive sandwich panels
- 2-Refrigeration sandwich panels



Insulating properties of polyurethane sandwich panels is in direct relationship with the production process of a product, which means that adhesion the foam to the sheet and uniformly distributed throughout the product including technical issues that led to making a product with desired properties and this has a direct relationship with production technology.



But the second part of this property is the maintenance after installation of panels to each other that industrial design is an issue related to sandwich panels. Sandwich panels which hasn't each of these properties is not the user's desired results and it will assume the additional costs for energy waste, maintenance and repair facility and

Constructive Sandwich panels

These sandwich panels for walls and ceilings more hangars and warehouses are used. The main priority of applications is the capabilities of quick installation and mechanical properties and exponential shape of the sandwich panel . Therefore, in these products more emphasis on the product design is on how to connect, color, design and beauty.



Refrigeration sandwich panels

These sandwich panels for industrial and commercial use in the fridges are used. In this application, the main use is based on the followings:

1-insulation properties of polyurethane sandwich panel with core rigid.

2-seamless connectivity to prevent heat transfer at the connections.

3-comfort and ease of installation.





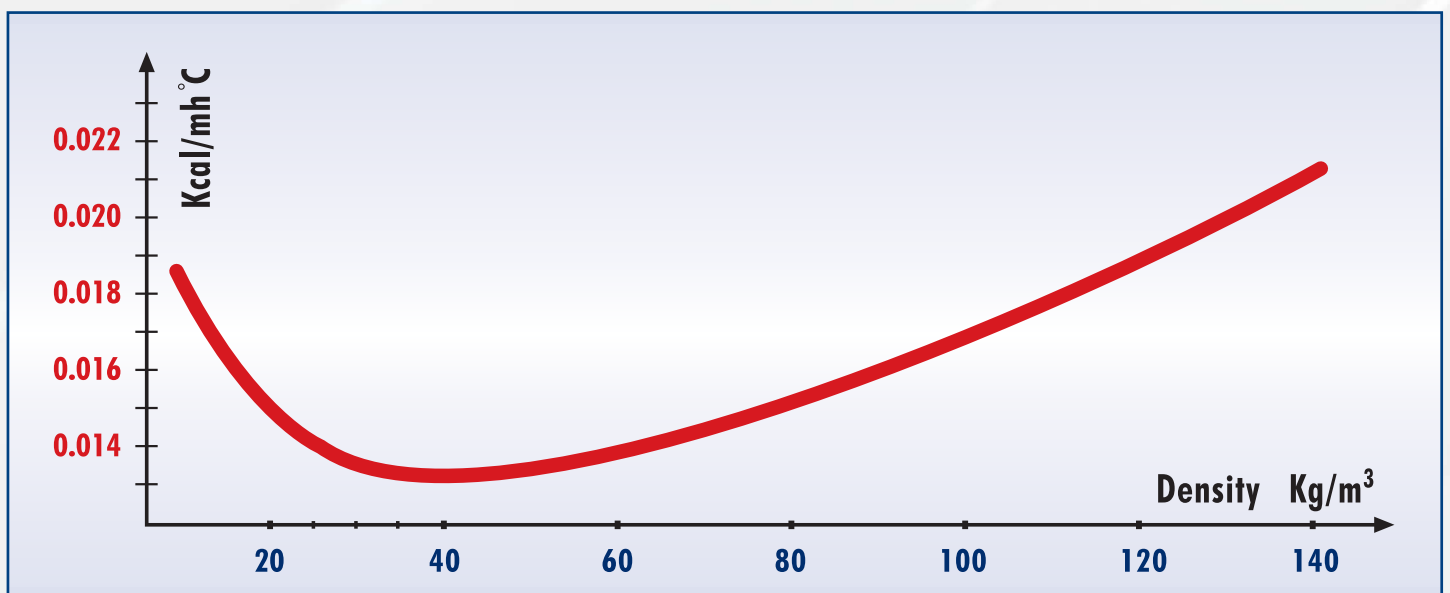
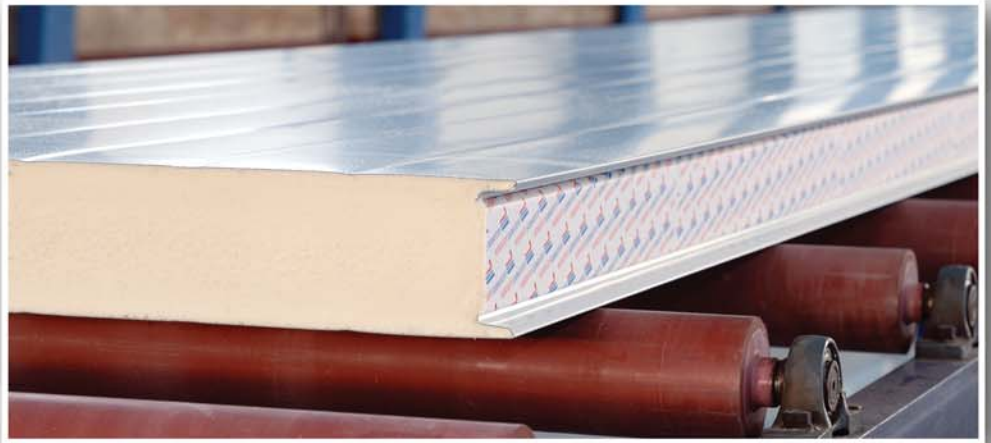
Technical characteristics of sandwich panels with polyurethane core and pre-painted sheets cover

■ sandwich panel components

1-Core of rigid polyurethane.
2-pre-painted sheets around the core.

■ Core of rigid polyurethane is composed of polyurethane, and isocyanat and other additives which is required. Process of the material composition, environment of formation and its temperature was very effective in properties of the final product, in the other word is the most sensitive stage of production.

Any fluctuation in temperature, humidity and composition of these materials leads to produce a heterogeneous product, with poor quality. In the figure below, polyurethane heat transfer coefficient graph with different densities can be seen.

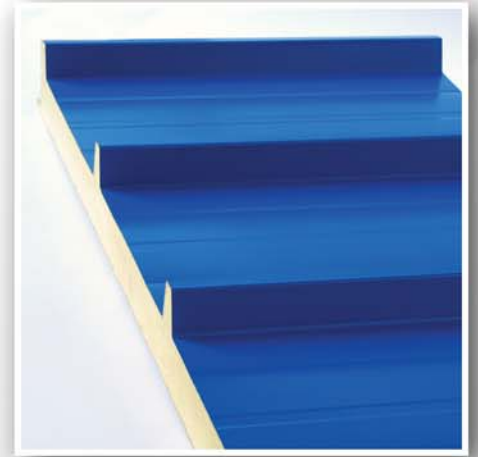


As can be seen from the graph the lowest heat transfer coefficient between the density of 38 to 42 kg per cubic meter is existed. This means that the increase in density over the limit or reduction of it to below this amount leads to increased heat transfer coefficient, or simply more energy will be wasted. In this regard, maintaining the desired density according to the above subjects is the most important and great quality factor .

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■ and Pre-painted sheets which of both sides of the polyurethane core makes sandwich has a similar role like rebar in reinforced concrete, with this difference that in addition to increasing the mechanical strength due to standing external surface adds other properties such as increased corrosion resistance and other chemical stimuli, reflection of radiant heat and beauty of the work surface to the final product.

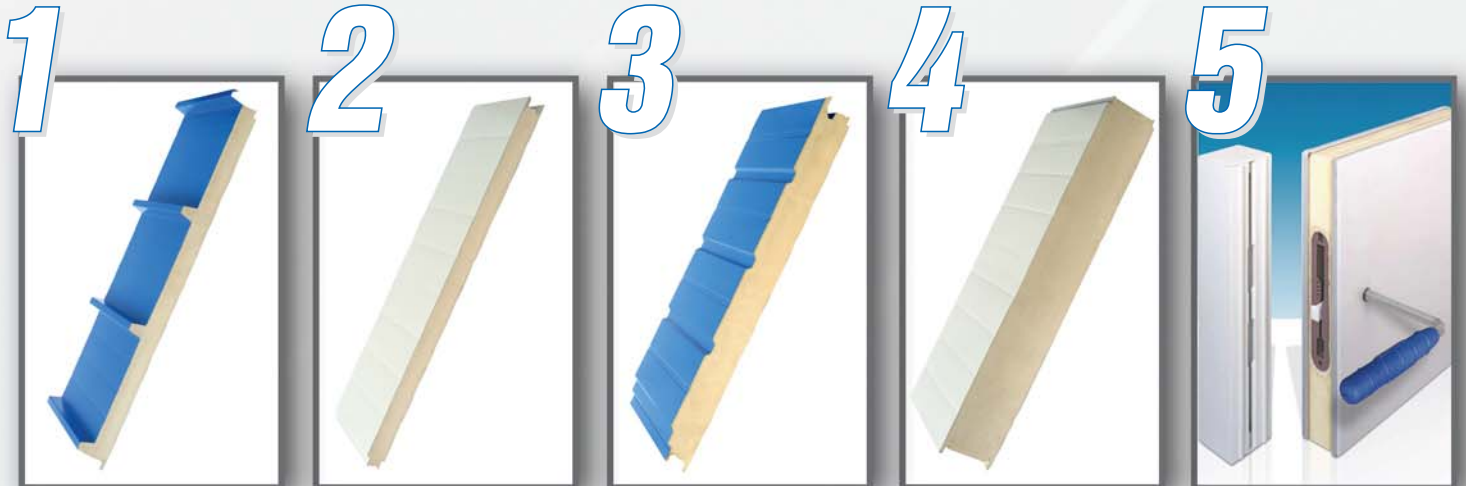
Commonly used thickness is between 4/0 to 7/0 mm. the sheet thickness, provides the optimum amount of weight and sandwich panel resistance. If the thickness is more than this leads to the final product being unnecessarily heavier the product . The following table shows the amount of load bearing of the sandwich panels in various thickness and lengths with pre-painted galvanized sheet or aluzinc with thickness of 5/0 mm.



Panel thickness	120 kg/m ²	150 kg/m ²	200 kg/m ²	250 kg/m ²	300 kg/m ²	350 kg/m ²	400 kg/m ²
4cm	2.2m	1.8m	1.35m	0.85m	0.8m	0.65m	0.5m
5cm	2.5m	2.0m	1.50m	1.00m	1.0m	0.75m	0.6m
7.5cm	3.5m	3.0m	2.25m	1.75m	1.5m	1.25m	1.0m
10cm	5.0m	4.0m	3.00m	2.00m	2.0m	1.5m	1.2m
12.5cm	6.0m	5.0m	3.75m	2.75m	2.5m	2.0m	1.6m
15cm	7.0m	6.0m	4.50m	3.50m	3.0m	2.5m	2.0m

Product types

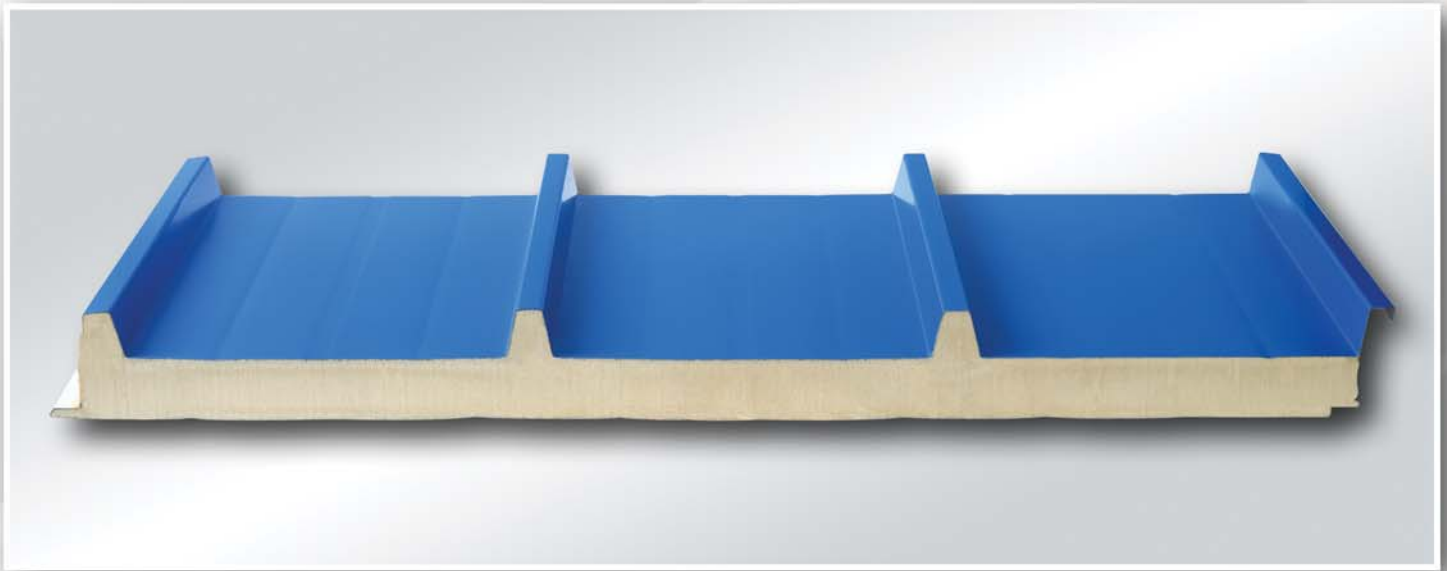
- 1-the roof sandwich panel.
- 2-the wall sandwich panels.
- 3-the hidden bolt wall sandwich panels.
- 4-the fridge sandwich panels.
- 5-the cam lock sandwich panels.



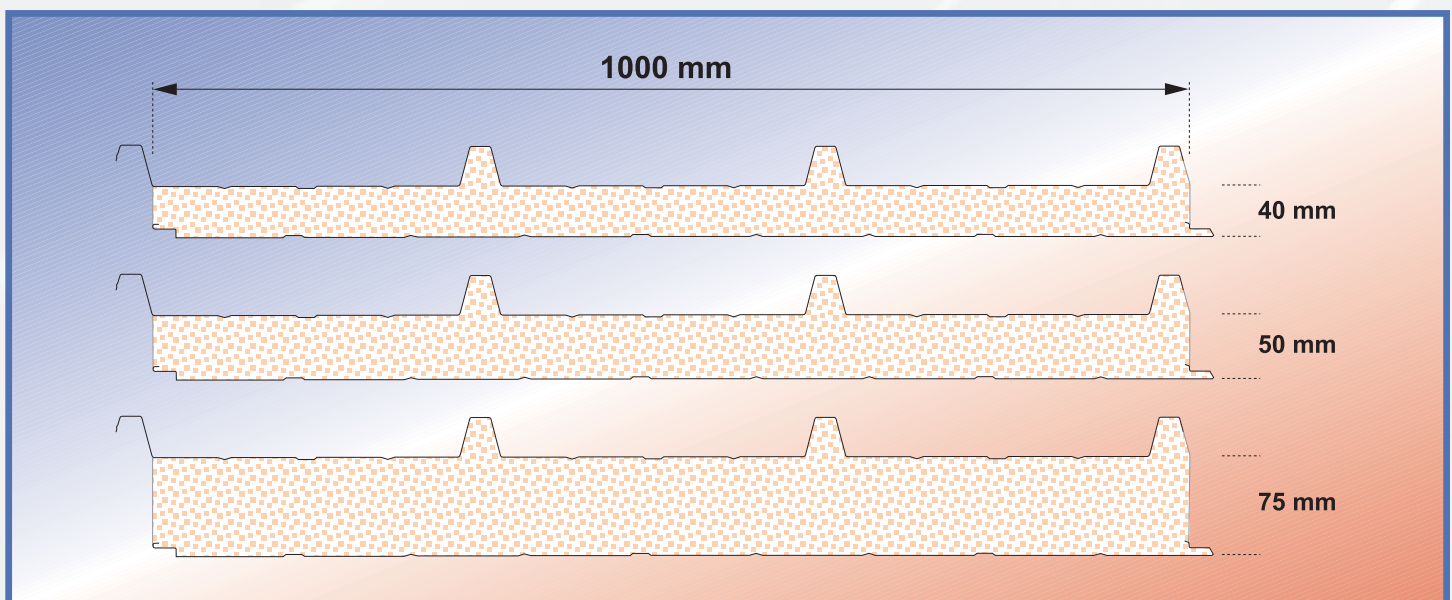


■ Roof Sandwich Panels

This type of sandwich panel is used in structures and used to cover the roofs .



The design of this sandwich panels is in a manner that prevents water penetration during rainfall . This means that when climate is rainfall of the puff of the wind on every side is possible. As can be seen in the image below, especial design of the joint surfaces in this type of panel allows the to minimize infiltration. This panel Also having shadow line to the height of 38 mm as a water channel restrict and transfer the water . Additionally, the shadow line on the panel caused to strengthen the panel resistance in the longitude axis and to prevent of the created wave during the panel . The sandwich panels with respect to the required length and the following thicknesses are produced:

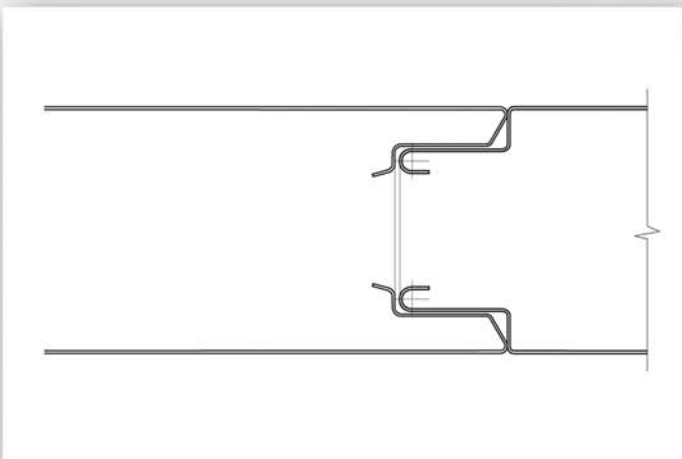
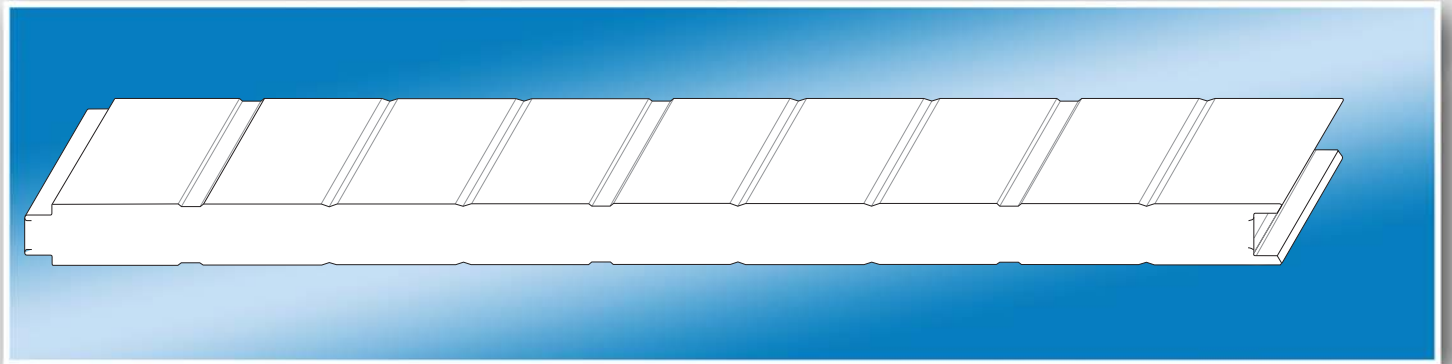


- 1-Roof sandwich panel thickness 40 mm (in the thickness peaks is 78 mm , the density is 40 ± 2)
- 2-Roof sandwich panel thickness 50 mm (in the thickness peaks is 88 mm , the density is 40 ± 2)
- 3-Roof sandwich panel thickness 75 mm (in the thickness peaks is 113 mm , the density is 40 ± 2)

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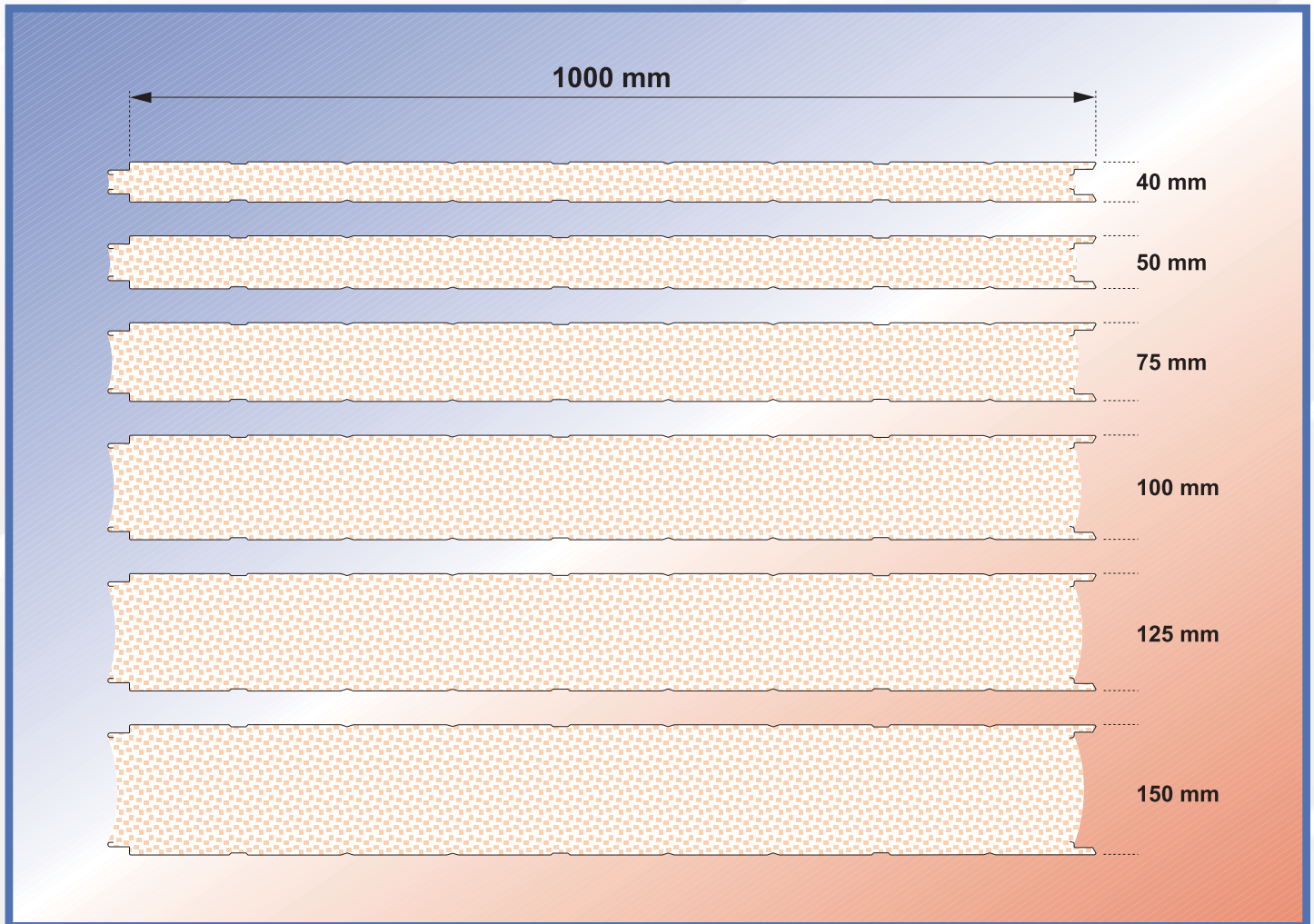
■ Simple & Refrigeration wall sandwich panels

Use of this type of sandwich panels is very extensive. Depending on the thickness of the polyurethane core panel, this panel construction can be used in fridge or constructions.





In this graph you can see the profile of these sandwich panels . It should be noted that the sandwich panel in the required and presented length and thickness are produced.



- 1- the wall sandwich panel thickness is 40 mm with double -faced sheet (structural applications and the density is 40 ± 2)
- 2- the wall sandwich panel thickness is 50 mm double -faced sheet (structural applications and the partitions inside the fridges, the density is 40 ± 2)
- 3- the wall sandwich panel thickness is 75 mm double -faced sheet (structural applications and the fridges above zero, the density is 40 ± 2)
- 4- the wall sandwich panel thickness is 100 mm double -faced sheet (special for the fridges with high maintenance above zero and below zero, the density is 40 ± 2)
- 5- the wall sandwich panel thickness is 125 mm double -faced sheet (special for freezing tunnel and the fridges with maintenance below zero, the density is 40 ± 2)
- 6- the wall sandwich panel thickness is 150 mm double -faced sheet (special for freezing tunnel and the fridges with maintenance below zero, the density is 40 ± 2)

■ Special design of the coldroom sandwich panels

These panels design is such that after installation, the full connection between of rigid polyurethane panel of two pieces nearby each other takes place.



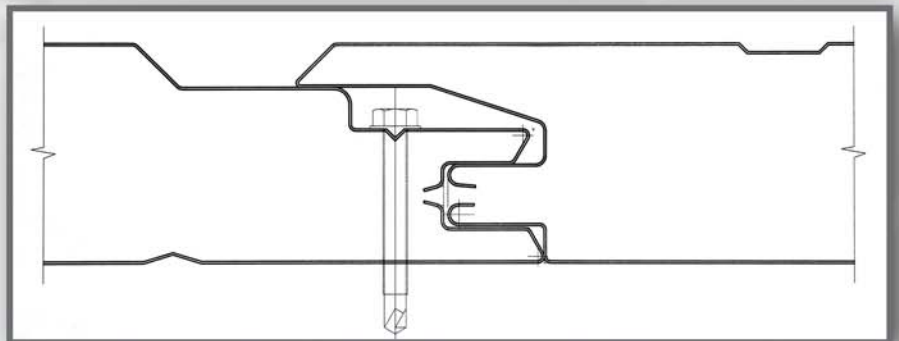
The result of this connection to provide a completely homogenous wall with density of polyurethane material. These advantages in addition to costs removal of the materials injection and projects speed up prevents from appearing heterogeneous surface in the joints due to the lack of the necessary pressure to be happened. Observing this principle, especially in the refrigeration sandwich panels is critical and inevitable. As can be seen in the figure, there is no space between two pieces of adjacent polyurethane sandwich panels .



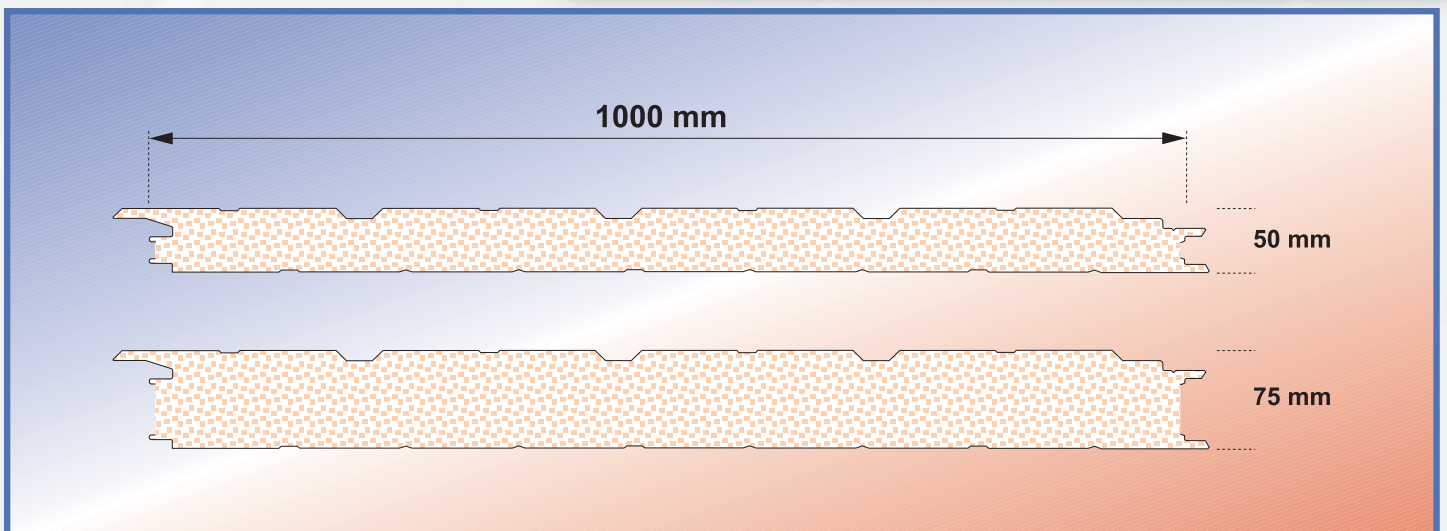


■ Hidden screw sandwich panels

Hidden screw sandwich panels mainly have constructional applications. This type of panel according to the specific structure of the body of it to a simple sandwich wall panels has a greater mechanical strength and due to specific design and structure of the junction of panels to each other, frame and panels connecting bolts is not visible.



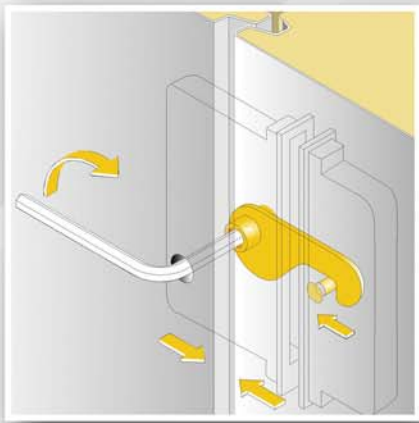
The sandwich panels in required length and thickness, are produced in the followings



- 1- The 50 mm sandwich panel with double-faced sheet and hidden bolt (strictional application , the density is 40 ± 2)
- 2- The 75 mm sandwich panel with double-faced sheet and hidden bolt (strictional application , the density is 40 ± 2)

■ The Cam Lock sandwich panels

The main characteristic of this sandwich panels is that they are rapidly assembled. Special feature of this panels is how to connect them to each other which using the special tools are done.



Considering the capabilities of rapid assembly and unassembly of this type of panel, its primary application in the places and buildings is that are not permanently and temporarily are made, because after use they can simply be unassembled and transferred to a new place. Production of panels are with different technologies and are produced discontinuously.

The sandwich panels to the required length and thickness, 70 mm, 100 mm and 130 mm are produced



Nobough Sarmayesh production technology



■ The products of this factory with possession of modern machinery and the Germany Krauss Maffei automatic injection apparatus fully comply with international standards and can produce consistently high quality sandwich panels.

Rigid polyurethane core sandwich panels can be one of these types B3 or B2 depending on customer requirements (auto self extinguished). Nobough Sarmayesh production factory at present is the only holder of specialized machinery of cooling sandwich panels production at Iran.

Production line from raw materials stage to final packaged product delivery and all critical stages of polyurethane material, isosianat and other additives injection are fully automated and also the ratio of materials is controlled by PLC.

■ The result of process is a completely homogeneous production, which ensuring a uniform density and the accuracy of the joint conformity.

The production capacity of the Nobough Sarmayesh factory daily is 7000 square meters and constitutes a guaranteed production capacity to meet rapidly with customer needs.



Packaging and production process



■ Packing sandwich panels of this company is such that when loading and unloading the product the minimal damage understands. In addition, to ensuring product safety during loading and transport, this package increases the mobility speed at moving the product.



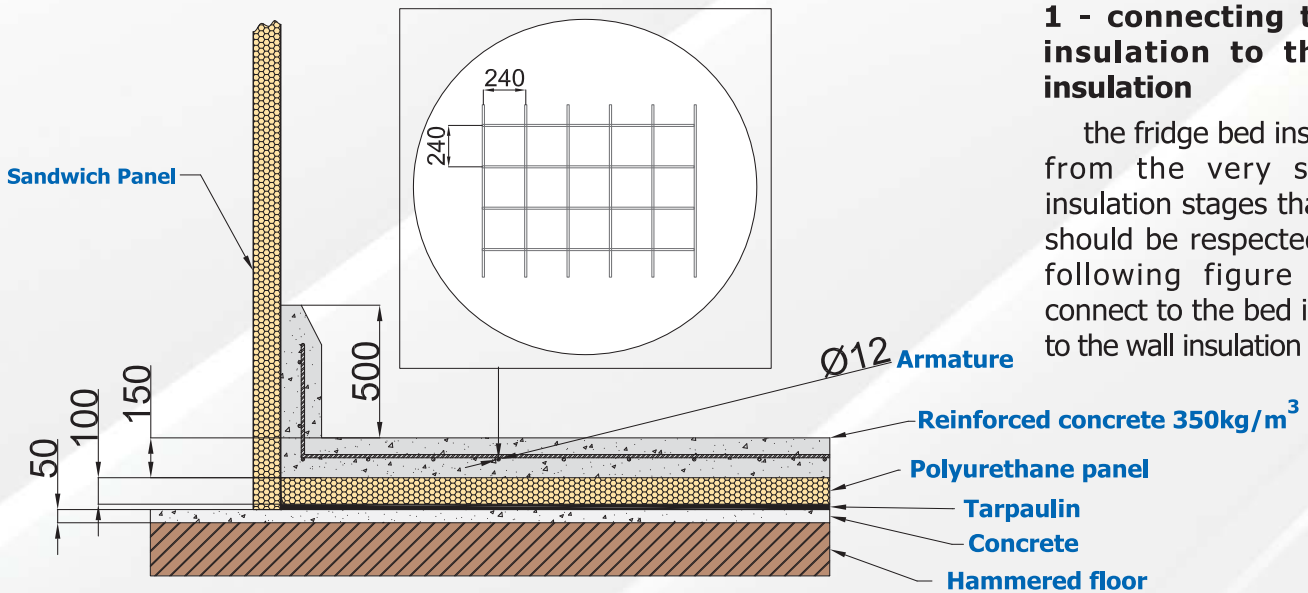
■ All result of efforts of the production process to deliver the high quality products due to improper handling will be lost. Therefore recommended for transporting and unloading the product must run in place with consultation of our experts.



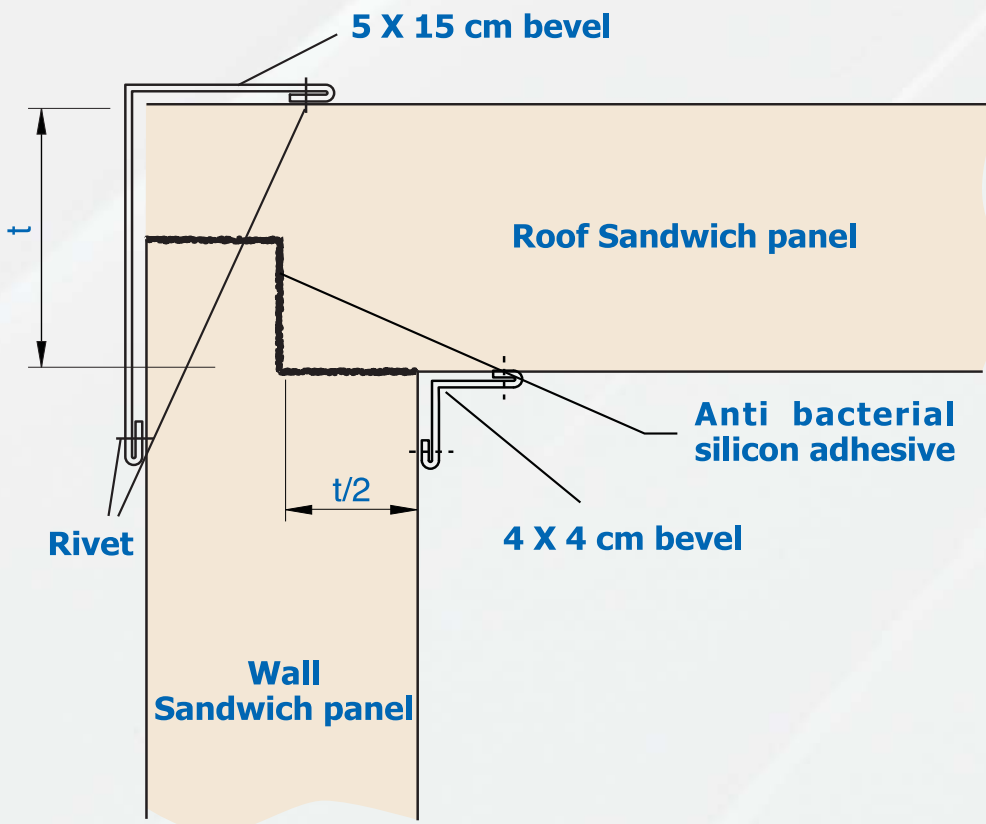


Installation manual

To install the Nobough Sarmayesh sandwich panels is not required a complicated and specialized device, but to avoid downtime and loss of sandwich panels, and competent professionals is recommended. Please note to a few more general points about the installation.



Roof to Wall Connection cross section



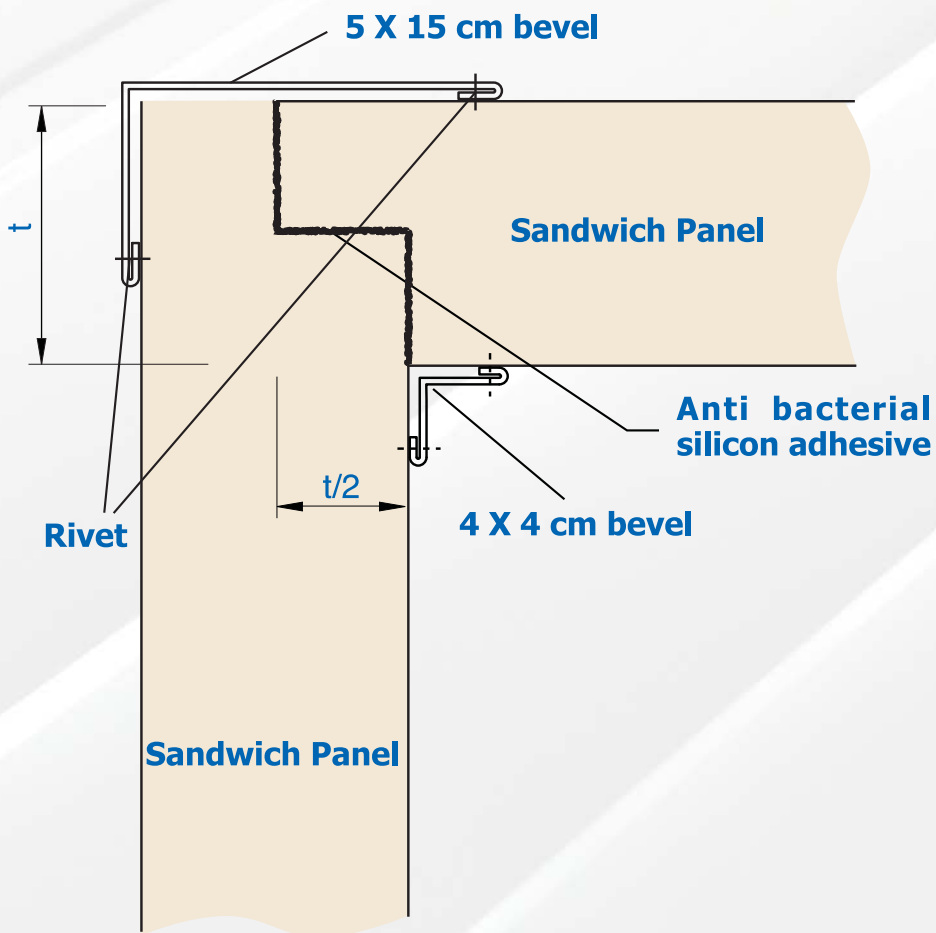
1 - connecting the bed insulation to the wall insulation

the fridge bed insulation is from the very sensitive insulation stages that the lot should be respected. In the following figure how to connect to the bed insulation to the wall insulation is shown.

2 - connection of the wall panel to the roof panel

Considering that the weight of the ceiling is applied on the walls, roof to wall connections must be such that at the joint, that the roof sandwich panels not to be faulty and simultaneously Ceiling and walls sheets are not connected with the outside.

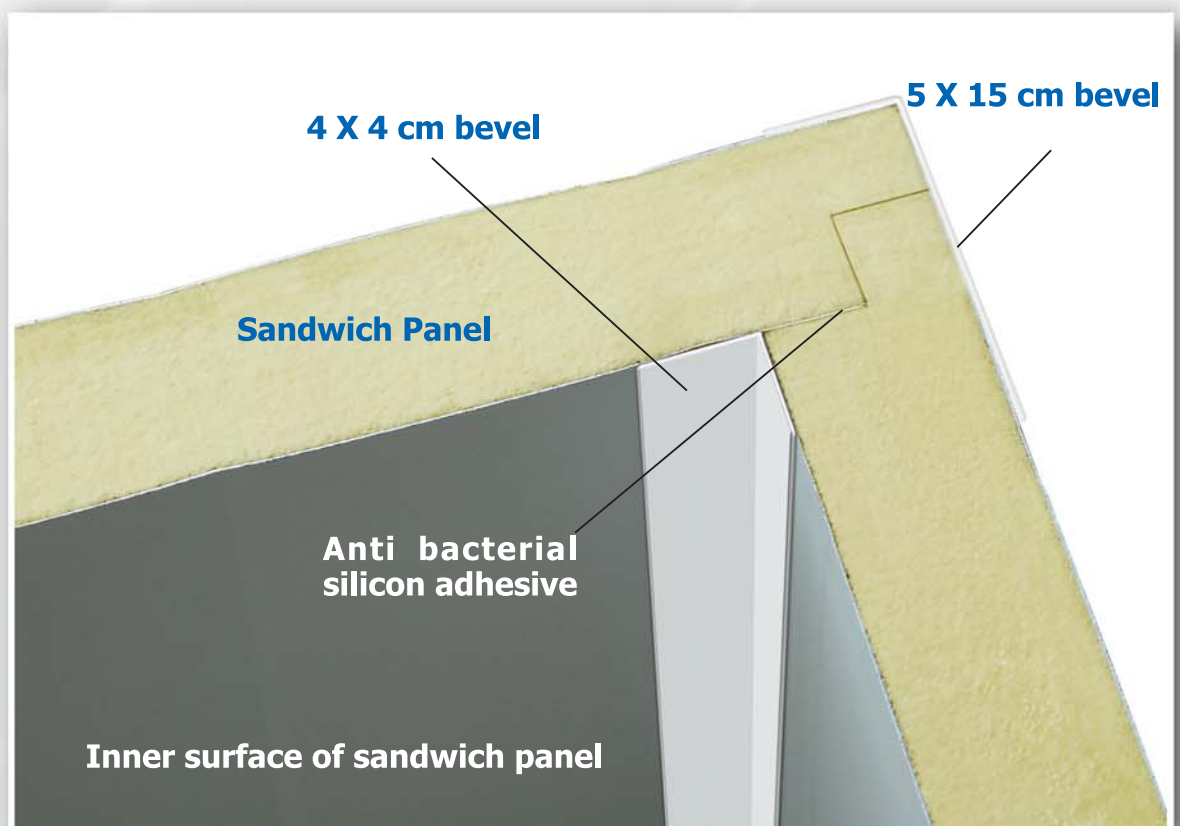
It should be noted that the length of sandwich panels for roof between 6 and 7 meters are. The length more than this amount reduces the strength sandwich panel, leading to a curve that is created.



3 - Connection of the vertical walls on each other

walls perpendicular junction in the corners, of the important points should be considered and the connection must be done so that the metal part of sandwich panels is not associated with outer space.

As you see in the below picture internal sheets had no contact with outside space and thus energy waste will not be.



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Support

Considering the company's strategy to bring customers to the ultimate destination means the optimized utilization of investments has been made, the company's consultants and experts are ready to provide services in all stages of construction.

This advice and support for pre-construction and construction of structures locating alongside you to prepare a plan to suit the requirements of sandwich panels and installations needed to start and finally the exploitation phase, and even then continues





Industrial zone 2 , Arak - Iran
Tel.: (0861) 3573301-5, fax : (0861) 3573246
Tehran central office : 021- 88302593
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