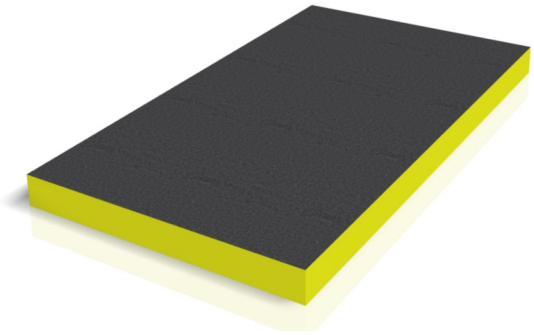
Product Data Sheet

Polyurethane Thermal Insulation Board PP. PU 115



Packaging

The polyurethane thermal insulation boards are packed in bundles. In order the boards to be protected they are piled up without dragging each other.

Under the bundle, expanded polystyrene block supports are placed in order to protect and facilitate the transport by crane or by forklift.

The entire bundle is wrapped with a transparent polyethylene film to protect the products from environmental conditions, according to the bundling machine boundaries.

The dimensions of the bundle vary. The table on the right shows the number of boards in the bundle, the overall height of the bundle and the weight per length (meters), in relation with the thickness of the boards.

The overall width of the bundle does not exceed 1200mm.

The total length of the bundle depends on the desired board length of each order and is from 2m to 8m.

The total height of the bundle depends on the desired board thickness of each order and is not more than 1000mm.

Board thickness	Number of board per bundle	Overall bundle height	Bundle weight per length
[mm]		[mm]	[kg/m]
30	25-25-25	750 / 2490	35 / 104,3
50	15-15-15	750 / 2490	34,5 / 103,5
80	10-9-9	800 / 2480	37 / 103,6
100	8-7-7	800 / 2440	36,8 / 101,2

Shipping

The transportation of the shipments is made by truck carriers by land using the road network. Upon request or if the conditions require, it is possible to dispatch the products in containers. It is necessary to use special equipment for loading and unloading products.

In case of transportation with container, table values do not apply. Packages and dimensions depend on the type of the container. They are suitably matched for full volume coverage. Technical department of company can carry out a preliminary loading assessment.

Product unloading

The unloading of the bundles can be done either by crane or by forklift. It is a procedure that falls under the customer's responsibility.

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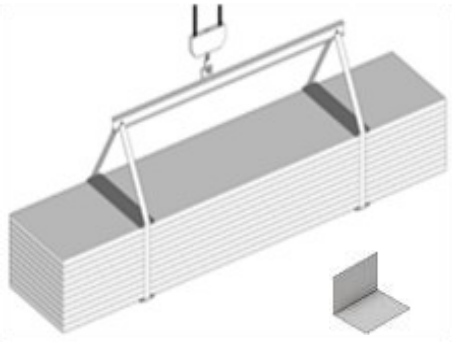
Unloading by crane

The bundles are hung with synthetic fiber straps at least on two points. The distance between the straps must not be less than half the length of the boards. Commonly the distance between the straps is the 3/5 of length of the panels. It is recommended to use synthetic fiber straps with a width of not less than 100mm. It is not advisable to use chains or wire ropes.

Wooden or plastic planks can also be used as spacers. Their length must be greater than the width of the boards (40mm) and their width at least the same as the width of the straps. We recommend the use of 1 mm thick metallic angles and twice the width of the straps at the points of contact of the straps with the bundle to avoid deformation of the board edges.



Lifting devices must be secured to prevent slipping. Movements should be done carefully, slowly and gradually.

Unloading by forklift

It is recommended to use forklift trucks suitable for handling panels/boards or related products with the possibility of bearing extension attachments for the distance between the forks.

The width of the forks must be at least 250 mm and the distance between them not less than 2 m. The final opening should be not less than the 3/5 of the length of the boards.

Take into account the total weight and length of the panels as well as the possible bending of the bundle. The bend arrow must not exceed the maximum permissible limits.

Storage

The bundles can be stored on the ground on top of supporting boards. They can be stacked on top of each other, but not more than 3 bundles per stack.

They can be stored either indoors or outdoors. In any case they must be protected against environmental conditions. It is recommended to remove the package (film) before storage.

Storage time **indoors** should not exceed 6 months and the storage room should be dry and well ventilated.

Storage time **outdoors** should not exceed 60 days. It is recommended to place the bundles with 5% slope for the drainage of the rainwater.

It is generally advisable to install the boards as soon as possible and not later than 1 month from the day of receipt.

When transporting using containers, bundles must be unloaded in less than 15 days.

Protect the thermal insulation boards from direct sunlight, rain, moisture, dust and from mechanical damages.

Handling

Always use Personal Protective Equipment (such as protective gloves, safety shoes, workpieces, etc.) in accordance with the regulations. Do not use metallic tools and lifting devices that may damage the boards.

Generally handling the boards is a two persons job. Lift the board and place it carefully upright next to the bundle. Do not drag the boards together.

The boards are transported in a vertical position by personnel comprising at least two people. The number of people depends on the length.

It is strongly recommended not to place packages on high-rise constructions.

Otherwise, secure and anchor the packages in order to avoid the risk of a fall that can lead to serious or even mortal injury.

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Installation

The boards should only be installed by qualified personnel with appropriate knowledge and experience. Always refer to the construction plans for proper installation. Additional instructions can be provided by the technical department of the company.

To avoid damaging the boards, use the appropriate equipment and tools. A circular saw or jigsaw can be used to cut the panels on site. Tools with abrasive or friction discs are not recommended. Also suitable are drills and screw drills, without impact, with adjustable torque.

- The insulation boards are designed to cover the outer vertical or slightly sloping sides of buildings.
- They can also be used to insulate interior vertical partitions of the building.
- They can be used for the insulation of horizontal structural elements (roofs, floors, internal partitions).
- Finally, their use is extended to the manufacture of cold or hot chambers under conditions with operating temperatures from –25^{o} to 60^{o}C.

When insulating both vertical and horizontal structural elements, the polyurethane insulation boards must be fully supported. The boards, unlike the panels, are not designed to carry loads.

The insulation efficiency, apart from the board properties and the use of sealants, mainly depends on the expertise and the diligence of the installation team.

In case of proper installation of the polyurethane board some of it's main advantages are:

- Excellent thermal insulation and lack of thermal bridges.
- Restriction of air and moisture penetration.
- Easy handling of the material, simple and easy installation process.
- Low-cost material purchase related to its properties.

The schematic diagrams below provide a schematic representation of the cover layer priority. In Figure 1, it is shown the vertical cover on the outer face of a wall.

Assembly process

The assembly process is simple when is carried out by suitably qualified personnel. The key points of the process are:

Mounting on vertical structural elements.

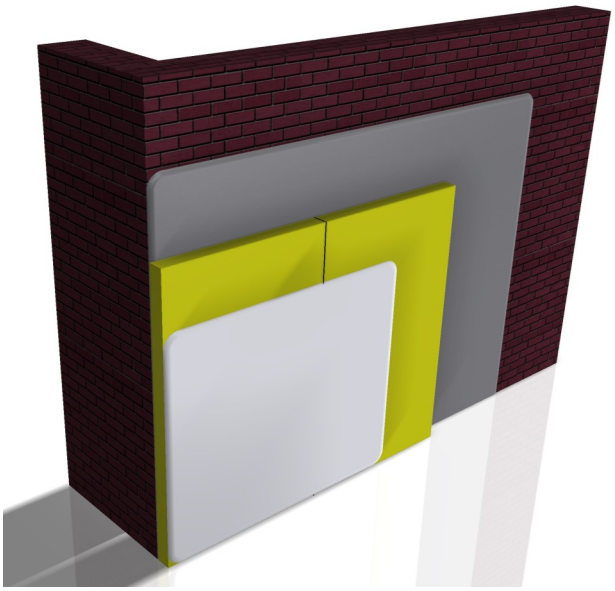
1. The outer face of the vertical structural element should be clean and free from installations that protrude.
2. First, the special pieces and components that concern the openings, ducts and grids are installed because they will not be accessible after the installation of the boards.

- The special pieces may be supports, cover flashings, gutters, etc., which they should be designed in cooperation with the construction engineer.

3. The insulation boards are placed, aligned and fixed on the structural element, using adhesives and the suitable connectors.

- The boards are cut at the construction site before the installation, according to the predesigned openings and then they are installed as mentioned above.

4. At the joints of the boards, sealant is applied to improve waterproofing.
5. The installation process continues until the entire face is covered. Then, the same procedure applied on the next faces of the structure.
6. Finally, the boards are covered with roughcast for facade waterproofing.



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Mounting on horizontal structural elements

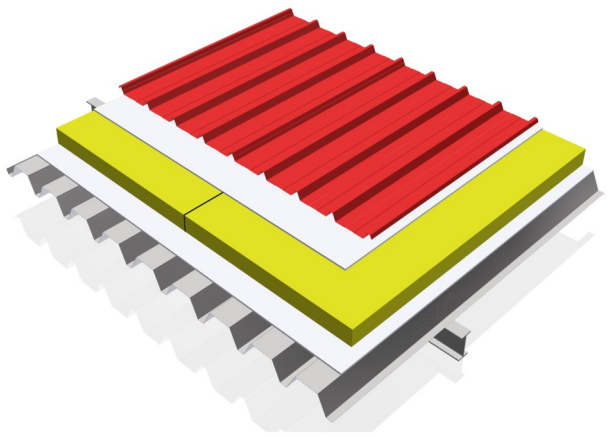
1. The outer face of the horizontal structural element should be clean and free from installations that protrude.
2. First, the special pieces and components that concern the openings, ducts and grids are installed because they will not be accessible after the installation of the boards.

- The special pieces may be supports, cover flashings, gutters, etc., which they should be designed in cooperation with the construction engineer.

3. A vapor membrane barrier is applied as a substrate of the insulation boards.
4. The insulation boards are placed, aligned and fixed on the structural element.

- The boards are cut at the construction site before the installation, according to the predesigned openings and then they are installed as mentioned above.

5. At the joints of the boards, sealant (polyurethane foam or other material) is applied to improve waterproofing.
6. The installation process continues until the entire side of roof is covered. Then, the same procedure applied on the other sides.
7. After, above the boards a vapor membrane barrier is applied.
8. At the end the roof is covered with metal sheets of different profiles according to the architectural requirements for protection of the insulation from weather conditions.
9. The sheets and the entire composite system are fixed to the structural element with the suitable self -tapping screws.



Installation variations

The two previous examples of vertical and horizontal applications of thermal insulation boards are not the only ones, they are indicative of the applications of polyurethane board.

In both vertical and horizontal installation there are many variations of complex thermal insulation systems.

Choosing the right thermal insulation system depends on many factors such as the type of the structural element, the needs of vapor and weather control, the applied surface and the environmental conditions.

Composite insulation systems are designed and implemented by the construction engineer, according to the needs of the project.

The polyurethane insulation boards are designed for exterior and interior structural elements as well as cold store chambers. Refer to the technical department of the company for installation details.

Sealants

In any case, to achieve the best possible results, at the joints of the boards is recommended the use of sealants.

It is recommended the use of sealants with high fire resistance and water resistance depending on the project requirements.

It is suggested to use silicon based or polyurethane low expansion foam sealants that have similar properties of the insulation boards.

Fasteners

Composite thermal insulation systems in metal buildings are usually fixed to the structural element by the method of visible anchoring.

The dimensions of the screws vary and they depend on both the composite thermal insulation system (thickness, weight, laminates and so on) and by the designer engineer of the structure.

Typically self-tapping screws with hexagonal head and washer with sealing ring are used. Their material can be high-strength steel or stainless steel. The type of screws depends on the materials of the structure.

Finally, in non-metallic structural elements are used adhesives, plastic connectors and roughcasts.

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Important Installation Notes

- Always use Personal Protective Equipment and always follow the hygiene and safety rules and regulations.
- Always use the appropriate tools for both processing and transportation.
- Make sure that the structure is intact, clean and properly aligned.
- First install the components and accessories, such as starter brackets, cover flashings, angles, gutters, etc.
- Use suitable sealants that are weather resistant and do not corrode the boards.

It is important to know that polyurethane insulation boards are NOT load-bearing or self-supporting components. They are fully supports insulated elements.

Quality & Reliability

The rapid service of our customers' needs, combined with our modern technological equipment, our well-trained staff and our dependable products, place Metallemporiki - Th. Makris SA among the leading companies in the sector.
The company applies a Quality and Environmental Management System in accordance with ISO 9001 and ISO 14001 standards and guarantees the durability and reliability of its products.
The company's panels comply with building regulations and with EN 13165 European Norm.
> In addition to this Instruction Data Sheet, the products are accompanied by the Product Data Sheet, the Declaration of Performance, the CE marking, and all the necessary legal documentation.

Technical support

The company has the ability to provide Technical Support before, during and after construction. Contact us and ask for instructions and additional information such as:

- Calculation of coverage areas, Special construction details, Tips for fire protection, thermal insulation and sound insulation, Development and design items with specified use.

Maintenance

Thermal insulation boards are products that require no maintenance. Any maintenance required is mainly limited to oxidation testing and cleaning of the composite system.

Pay close attention to the joint and do not leave gaps in the joints. The gaps significantly affect the efficiency of the construction (thermal insulation, fire resistance, air permeability, water permeability).

Note

All information can be used as a general guide but in no case as a technical manual and the company can not be held responsible if damage is caused .

The laws, regulations and standards of different countries vary and change. Contact our technical department for additional information.

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