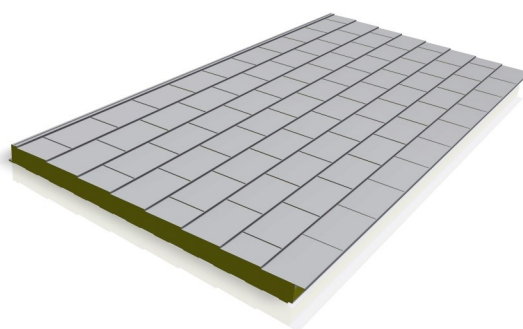


Product Instruction Sheet

Polyurethane Roof Slate Panel S. PU 4.12



Packaging

The polyurethane roof slate panels are packed in bundles. In order to reduce the volume of the bundles and protect the panels, the panels are piled up in the bundle without being pulled.

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 in order to protect the products from environmental conditions, according to the bundling machine boundaries.

Upon request, it is possible to place a self-adhesive transparent polystyrene film on the outer surfaces of the panels to protect the paint coating against mechanical damages.



The adhesive film should be removed immediately upon receipt of the product and in no case later than 4 weeks after the date of manufacture. Panels with adhesive film should never be exposed to rain and to solar radiation.

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

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

The total length of the bundle depends on the desired panel length of each order and is from 2m to 14m.

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

Shipping

The transportation of the most shipments is made usually by truck carriers by land using the road network. For the transportation it can be used any vehicle made for this purpose, as long as it complies with the European and National regulations.

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. The technical department of the company can carry out a preliminary loading assessment, upon request.

Nominal panel thickness	Number of panels per bundle	Overall bundle height	Weight per meter length
[mm]		[mm]	[kg/m]
40	18-18-17	840 / 2470	180 / 530
50	15-14-14	860 / 2480	170 / 450
60	13-12-12	830 / 2490	130 / 390
80	9-9-9	820 / 2460	105 / 315
100	8-7-7	900 / 2490	100 / 275
120	6-6-6	810 / 2440	80 / 240

INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12

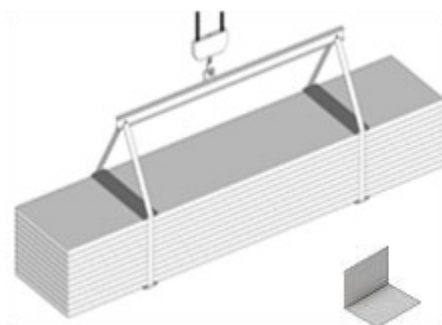
Products Unloading

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.

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 panels. 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 panels (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 panel edges.



Lifting devices must be secured to prevent the bundle from slipping.

Movements should be done carefully, slowly and gradually with extra caution for the personal safety.



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, which may will cause panel deformation.

Unloading by forklift

It is recommended to use forklift trucks suitable for handling panels 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 panels.

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.

As long as the paint coating is unattached the panels are protected against oxidation.

It is generally advisable to install the panels 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 panels from direct sunlight, rain, moisture, dust and mechanical damages. Protect the metal face coating

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 panels or the coating.

Generally handling the panels is a two persons job. Lift the panel and place it carefully upright next to the bundle. Do not drag the panels together. Avoid in any case to damage the surface coating.

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

INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12

Installation

The panels 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 unnecessary losses and damaging the panels, 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 polyurethane slate panels are designed to cover the outer roofs and the external vertical facades of the buildings.
- In both roof and wall cover application on the buildings, the polyurethane slate panels are designed only for horizontal installation, without overlapping. It is strongly not recommended vertical installation and transversal overlap.

In constructions and buildings where the architectural and aesthetic requirements are high, horizontal installation combined with panel slate formation excels.

- The panels can be applied on roofs with a slope of not less than 30%. It is recommended that they cover the entire length of the roof without vertical joints. Its necessary the use of sealants on the horizontal joints.
- At the faces in wall cover application, the panels may have vertical joints. Apart from the sealant use on the horizontal joints, it is mandatory the use of special pieces and accessories for sealing the vertical joints.

The company has designed a vertical sealing system for the vertical joints. Further details regarding its application are provided by the technical department of the company.

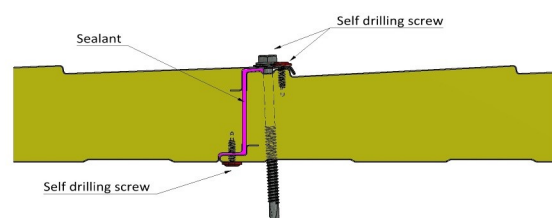
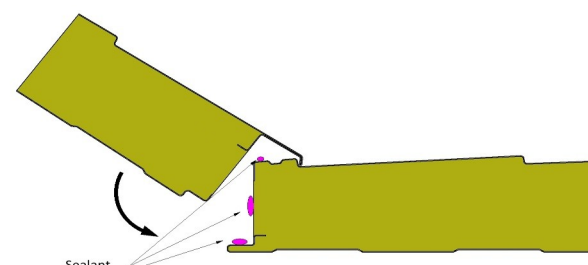
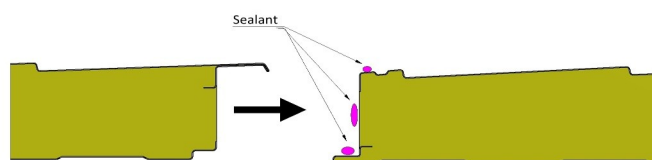
- Slate panels can be used in vertical wall interior partitions, although it is not recommended.
- They can be used for the construction of horizontal partitions, which do not carry loads other than the weight of the installer, although it is not recommended.

For the polyurethane panel the temperature working limits are -25o to 60oC.

Assembly process

Both in roof and wall cover the assembly process is similar and simple when carried out by suitably qualified personnel. The key points of the process are:

1. First, the special pieces and components that they are not accessible after the installation, are installed.
2. Then the first panel is placed, aligned and secured to the beams or columns. The panels are fixed to the structural element by the method of visible anchoring.
- Depending on the winds of the area, more screws may be applied across the width of the panel.
3. Then, along the first panel, apply sealant at the joint as shown in the figure.
4. The next (second) panel is lifted and snaps at an angle. It is aligned and held in place temporarily.
5. When the second panel is placed, self tapping is applied at the point that is shown in figure.
6. Then apply the remaining screws, if any.
7. The process continues until the entire roof or wall is covered.



INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12

8. At the end, protective and decorative accessories have to be installed.
9. In order to achieve maximum thermal insulation, waterproofing and fire protection is necessary to "sew" the joint panels externally and internally with screws eg 4.3x19mm.

The panels are cut on the construction site in order to form the openings of the buildings and then they are installed as mentioned above.

- At the openings, the panels are fixed according to the manufacturer's instructions

In the wall cover at the horizontal installation, the vertical joint requires specific sealing. The company has designed and developed a vertical joint sealing system for this application. Refer to the technical department of the company for assembly details.



It is important that the vertical joints between the panels should be supported by beams or secondary steel supports.



Pay close attention to the joint fitting and do not leave gaps in the joints. The gaps significantly affect the efficiency of construction.

Sealants

In any case, in order to achieve the best possible sealing result, it is recommended the use of sealants in the joints and in the panel to panel contacts.

Sealants are not included in the order. It is possible to supply these sealants upon request. Sealants are applied on site during the installation of the panels, not at the factory.

To achieve the best possible sealing results, it is recommended to use sealants with high fire resistance and water resistance. In particular, it is suggested to use acrylic or butyl acrylic sealants on the internal side of the panel, which offer the best possible resistance to fire.

While on the external side of the panel are preferred silicone base sealants, whose waterproofing characteristics are more effective.

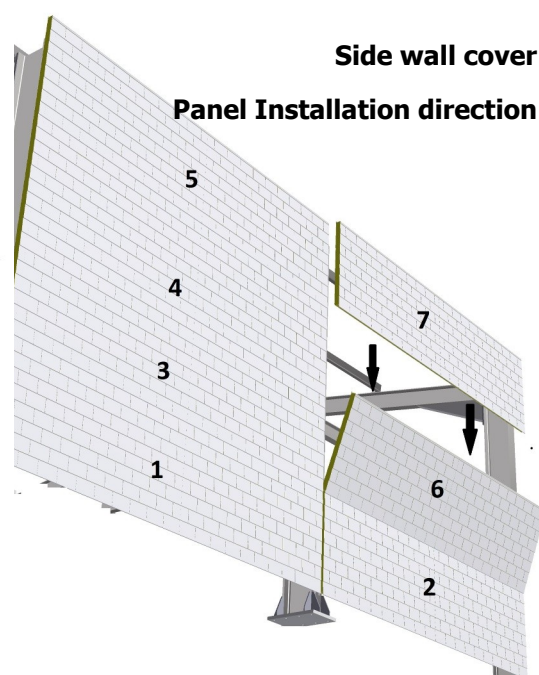
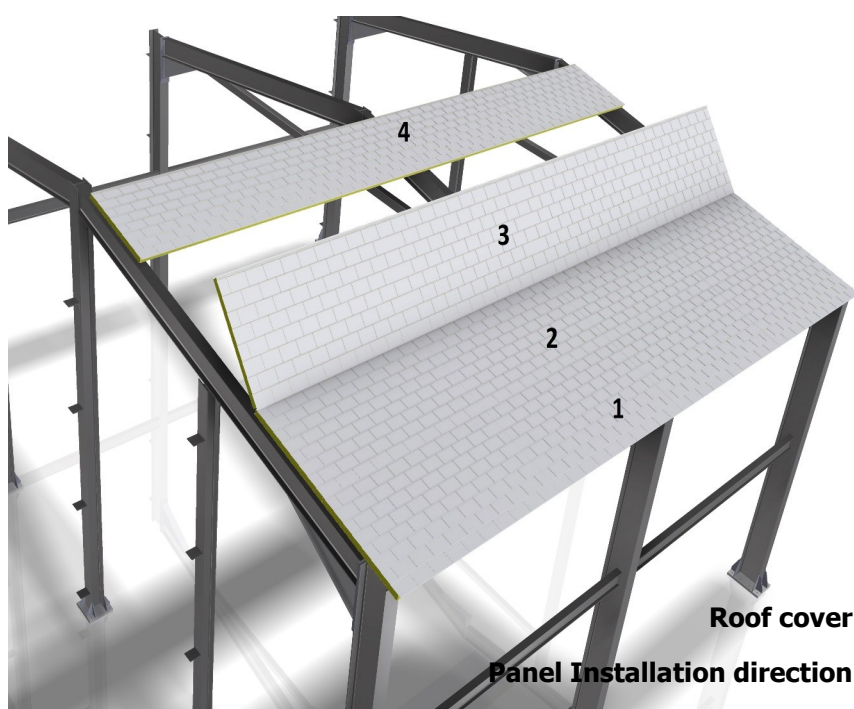
Fasteners

The polyurethane panels are fastened to the structure by the visible or hidden fixing method.

The dimensions of the screws vary depending on the panel itself (thickness, weight, laminates and etc.) and are determined by the designer engineer of the structure.

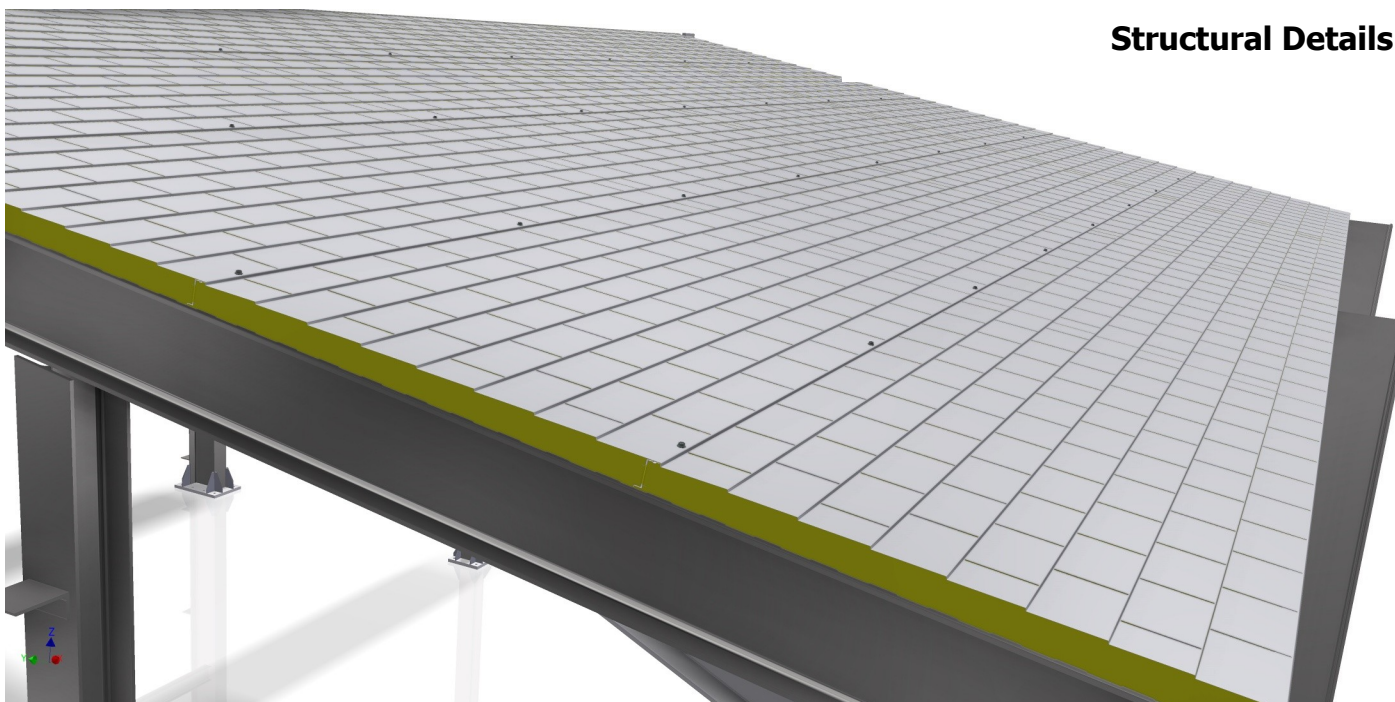
Typically self-tapping screws with hexagonal head and washer with sealing ring are used. Their material can be high-strength steel or stainless steel. Their type depends on the material of the structure.

It is also proposed to use self-tapping screws for stapling the metal faces between the panels that contribute to sealing the joints.



INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12

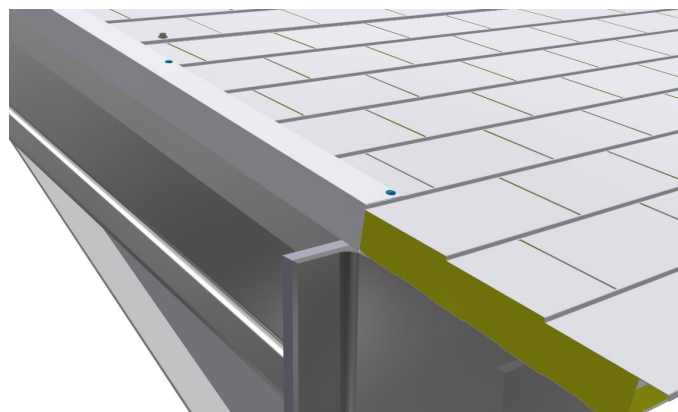
Structural Details



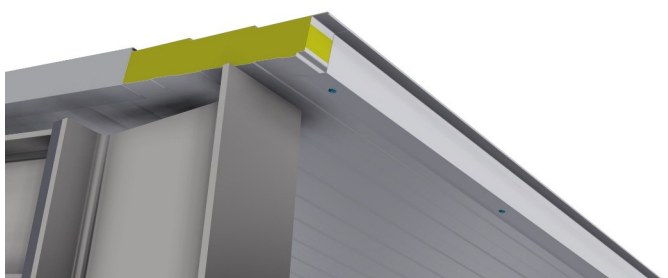
Roof covering. The polyurethane roof slate panel delivers excellent architectural and aesthetic results without compromising their characteristic properties of the panel.



Ridge cap. A flashing that covers the ridge. It is necessary to apply sealants during the installation. The space in-between may be filled with low expansion polyurethane foam.



Side end piece. A flashing that covers each side (left and right of roof) of the panel. It improves the panel aesthetically and protects the core from the rainwater. It is necessary to apply sealants during installation.



End piece. A flashing that covers at the eave the core of the panel. It's special design protects the panel core from the rainwater. It is necessary to apply sealants during the installation. It is combined with all types of gutter.



In any case, both in **roof and wall cover** applications it is necessary to "sew" the joint panels externally and internally with screws (eg 4.3x19mm) in order to improve thermal insulation, waterproofing and fire protection. For more details and applications, please refer to the technical department.

INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12

Important Installation Notes

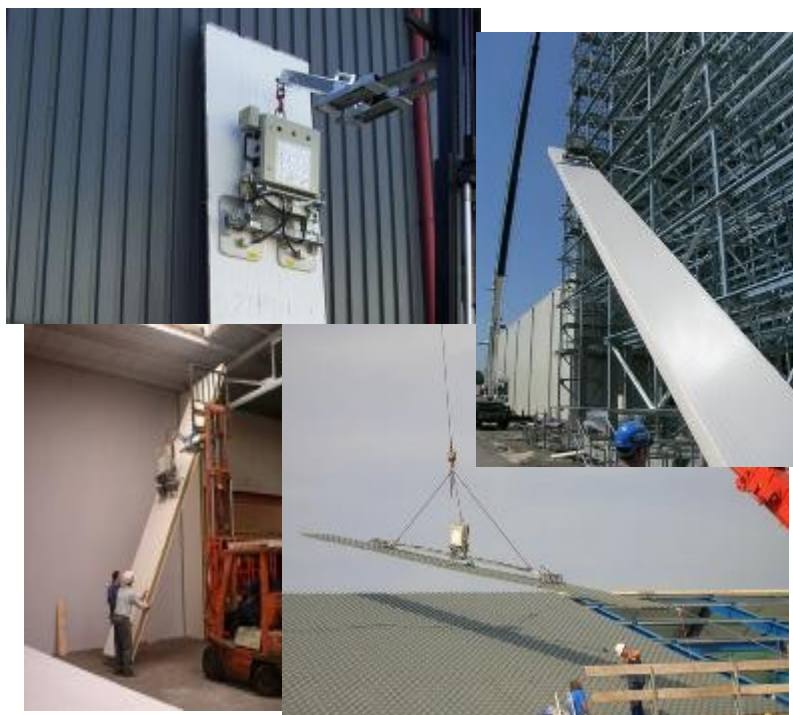
- Always use Personal Protective Equipment and always follow the hygiene and safety rules and regulations
- Always use the appropriate tools to handle panels for both processing and transport.
- It is permissible to make minor corrections to any deformations that may arise from the handling of the panels.
- Ensure that the structure is intact and perfectly aligned
- **REMOVE** the protective adhesive film of the panels if any.
- Pay close attention to properly installing the panels so that they fit correctly before install them in the structure.
- Proceed gradually, it is preferable a short delay at the beginning rather fixing the mistakes later.
- The panels must be properly aligned and have a perfect snap
- Do not leave gaps at the joints. If there are gaps, the panels lose their properties (thermal insulation, fire resistance, air permeability, water permeability)
- Do not omit the use of sealants and do not use them sparingly.
- Use suitable sealants that are weather resistant and do not corrode the metal face of the panels.
- Pay attention to the coating of the plates. The panels do not wear over time as long as their coating remains intact.
- Select materials and components resistant to galvanic erosion, especially when there are various metals that come in contact.
- The tightening torque of the screws must be such as to secure the panel without deforming it.
- Do not burden the panel with your weight when screwing in because it can be deformed and not clamped
- Complete the installation by placing decorative and protective accessories.
- Carefully clean the roof without damaging the coating, especially from metallic objects that can be oxidized.
- Wash the structure creating a rainfall in order to check for possible leakages.

Vacuum lifting devices

Professional vacuum lifters offer security and speed in installing panels to cover roofs or walls. Some of the advantages of these are the following:

- They offer security and improve working conditions by relieving staff from handling heavyweight panels (a prerequisite is to comply with safety rules)
- Saving and reducing the workforce for the construction of the project. Saving time and reducing construction costs.
- Reduce the damage after removing the clamping and lifting accessories that come into contact with the panels
- Flexibility due to their operation with rechargeable batteries

Clad boy quarantines easy, fast and safe installation of the panels in all kind of buildings.



The company has the ability to dispose of such devices (**Clad-Boy**) upon agreement. Along with the device, instructions for use and handling are sent. Before operating the device, read the operating instructions carefully.

INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12**Structural details****Wall cover**

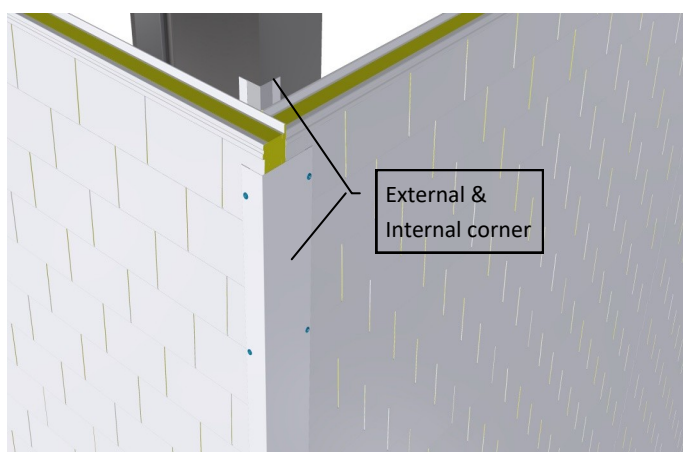
The panels are installed horizontally from bottom to top until they cover the whole side.

The advantages of this type of installation are the following:

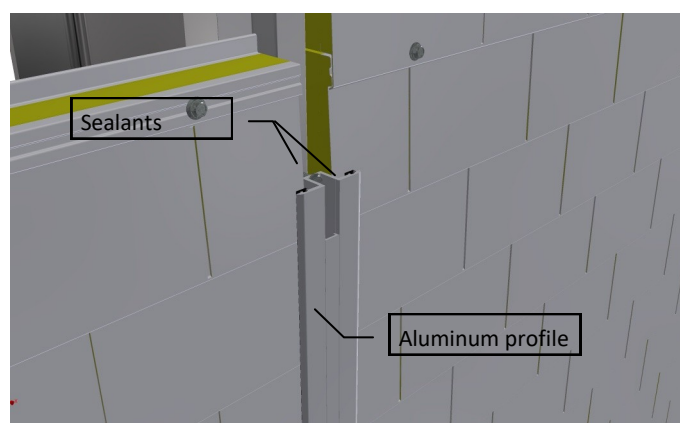
Decrease of thermal bridges to the minimum.

Restriction of air and moisture penetration .

Minimization of installation time and therefore, construction costs.



External & Internal corner flashings. At the corner joints of the building, the inner metal sheet of one panel is cut off so that the insulating cores of the panels forming the corner are in contact. Internal and external sealants and angled flashings are fitted to cover the joints.

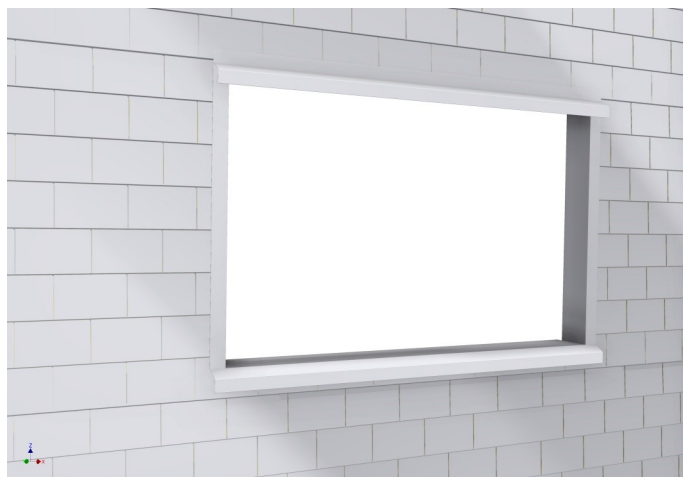


Vertical joint. When installing the panels horizontally, the vertical joint is covered with an aluminium profile. The EPDM rubber sealants of the profile are fit in such a way that eliminate any thermal bridge. The aluminum profile is designed to be easy in the installation, provide excellent insulation results effect.

Openings. The panels are cut on site to form the openings before installation. At the end, protective and decorative flashings are installed.

The polyurethane slate panel has designed in such way that there is no need for additional flashing installation, at the wall cill level, in order to block the intrusion of rainwater. The panel itself is capable for this.

Install all types of accessories using self tapping screws 4,3x19mm or others provided from our company, as shown in the figures. For more details and applications, contact the company's design department.



INSTRUCTION SHEET POLYURETHANE SLATE PANEL S. PU 4.12**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.**

**Quality & Reliability**

The rapid service of our customers' needs, combined with our modern technological equipment, our well-trained staff and our dependable products, place [Metaltemporiki - 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 14509 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.

Maintenance

Self-supporting insulating panels are products that require little or no maintenance. Any maintenance required is mainly limited to cleaning. However, it is advisable to carry out an annual check, which includes:



Cleaning check. If necessary, wash the panels with water and soap using a soft brush. You can use scrubbers and pressure water jets, but not high pressure (<50bar). Do not have the nozzle of the water jet perpendicular to the surface.

Coating control. If marks or scratches are observed on the paint coating, repair and repaint the surface.

Check the screws. Retighten or replace the screws that have loosened.

Check accessories. Check all the accessories, gutters, end pieces, ridge caps, etc. for oxidation, if necessary clean and repaint the pieces.

**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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