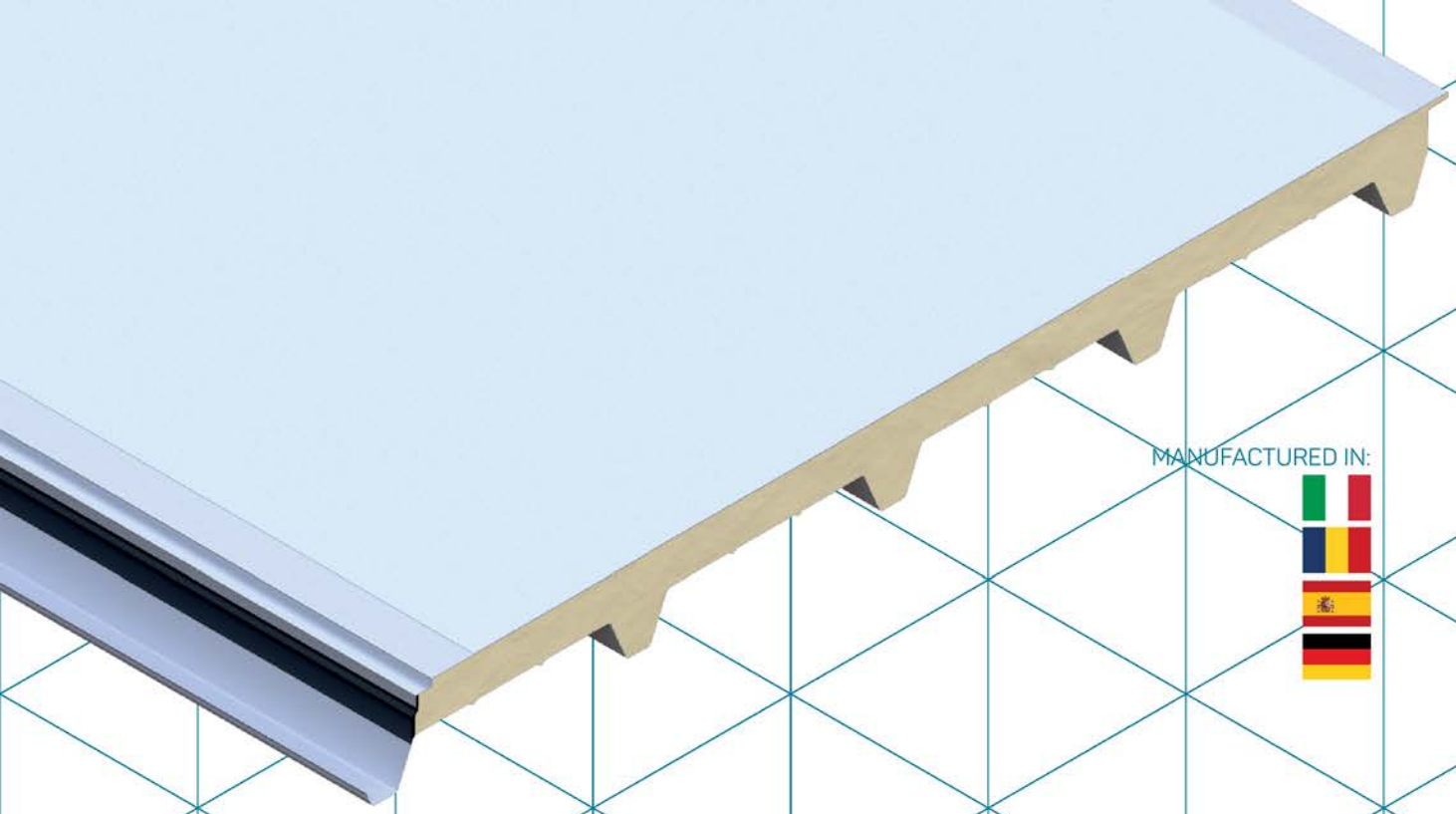

MANUFACTURED IN:

TECHNICAL MANUAL

PVC Flat Roof Range

ISODECK PVSTEEL | ISODECK SYNTH

PART OF MANNI GROUP

ISOPAN
INSULATING DESIGN

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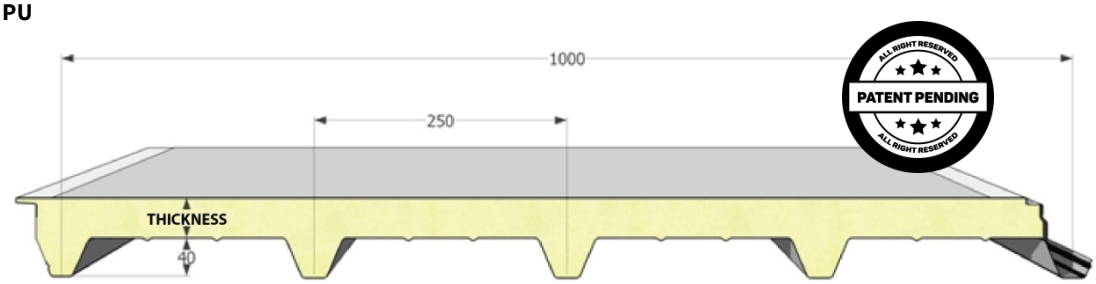
PVC Flat Roof range

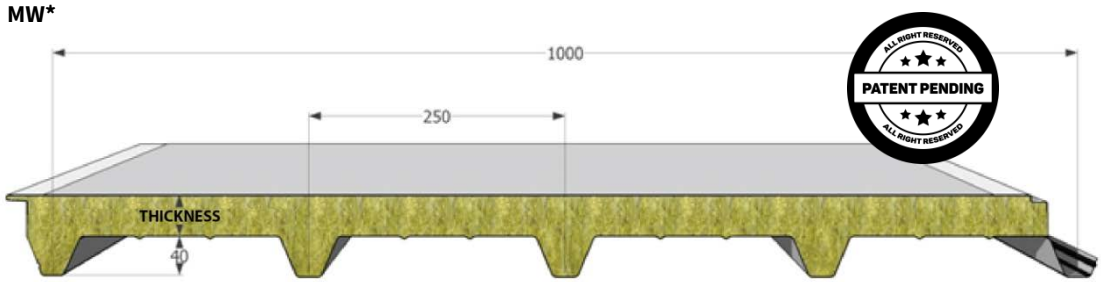
TYPES OF PANELS

ISODECK PVSteel

- **PU**



- **MW***

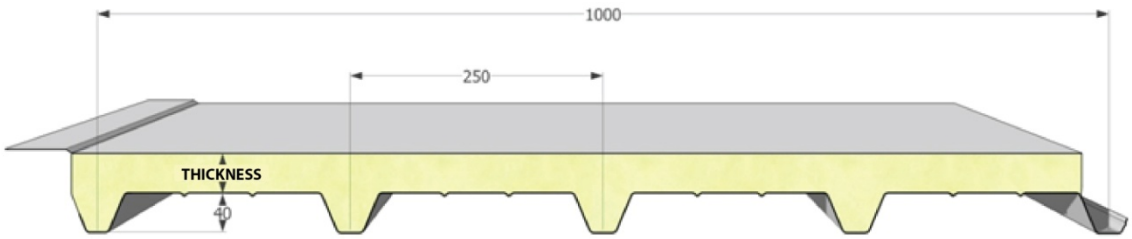


*Manufactured only in the facility of Trevenzuolo (Verona), IT

Ideal panel to build flat or slightly sloping roofs. The panel consists of a metal external face pre-coupled to a PVC membrane, an internal ribbed face and insulating core in polyurethane or rock wool. The solution makes it possible to make a completely waterproof roof with high aesthetic value, ideal also for replacing fibre-cement roofings.

The patent application for the ISODECK PVSteel panel is in progress.

ISODECK Synth



Single skin metal roof panel, polyurethane insulated to be used on flat or slightly sloping roofs. The non-metallic outer surface consists of a PVC synthetic coat, which assures waterproofing and high thermal insulation values. Through type fasteners. The number and position of the fastening elements must assure resistance to stresses.

GEOMETRIC FEATURES

	ISODECK PVSTEEL PU	ISODECK PVSTEEL MW	ISODECK SYNTH
Length	Up to maximum transportable		
Useful Pitch (mm)	1000		
Insulating Thickness (mm)	30-40-50-60-80-100-120-150	50-60-80-100-120-150	30-40-50-60-80-100
Internal face	Ribbed metal sheet with 5 ribs: -rib height 40 mm -rib pitch 250 mm		
Smooth external face	obtained by application of a PVC waterproofing membrane		PVC synthetic coat

FEATURES OF THE PVC COAT

ISODECK PVSteel

PVC-P single layer synthetic coat obtained by co-extrusion. It has different chemical-physical properties on both sides: the upper, light-grey layer has extremely high resistance to weathering and UV rays, the lower, dark grey layer has extremely high resistance to piercing and roots.

Features

- High resistance to weathering and UV rays
- High mechanical resistance
- High resistance to piercing
- Root resistance
- Resistance to immersion in water with mild chemical attack

ISODECK Synth

PVC-P synthetic coat obtained by coating. Consisting of Plastisol with different chemical-physical properties and dimensionally stabilised. Coupled to non-woven polyester felt mat.

Produced in UNI EN ISO 9001:2000 (company quality system) and UNI EN ISO 14001 (environmental system) certified facility. Installation by skilled and experienced personnel (contact Isopan for information).

Features

- High resistance to weathering and UV rays
- Absence of dimensional shrinkage
- Insensitivity to hot-cold cycles
- Resistance to piercing
- Possible RAL colour for landscaping or architectural purposes

METAL FACINGS

- SENDZIMIR system hot dip galvanised steel by continuous process (UNI EN 10346) and pre-painted by means of a coil coating continuous process with different painting cycles based on end use (see: ''Guide to Choosing Pre-painted'').
- 3000 or 5000 series aluminium alloys with pre-painted finish with the cycles mentioned in the previous point, with a natural or embossed effect.

PROTECTION OF THE PRE-PAINTED FACES

All pre-painted metal facings are supplied with an adhesive polyethylene protective film that prevents damage to the paint layer. If the material is specifically requested without protective film, Isopan assumes no liability in case of damages to the paint. The protective film that covers the pre-painted panels must be completely removed during assembly and, in any case, within sixty days after the material preparation.

It is also recommended not to expose the panels covered by a protective film to direct sunlight.

INSULATION

Polyurethane (ISODECK PVSteel PU and ISODECK Synth)

Made with rigid polyurethane foam, having the following physical and mechanical features:

- Compressive strength ≥ 0.11 MPa (at 10% of deformation)
- Tensile strength ≥ 0.10 MPa
- Shear strength ≥ 0.10 MPa
- Thermal conductivity coefficient λ = 0.022 W/mK
- The 95% closed cells guarantee an anhygroscopic structure
- Operating temperature: minimum - 40 °C
maximum + 80 °C

Foaming agent: N-Pentane in accordance with the Montreal protocol

Thermal transmittance coefficient U*

Panel thickness (mm)	30	40	50	60	80	100	120	150
U [W/m²K]	0.71	0.54	0.44	0.37	0.28	0.22	0.19	0.15

* Mandatory for CE marking of double skin metal faced sandwich panels according to EN 14509.

Thermal resistance coefficient R

Panel thickness (mm)	30	40	50	60	80	100	120	150
R [m²K/W]	1.41	1.85	2.27	2.70	3.57	4.55	5.26	6.67

Mineral wool (ISODECK PVSteel MW)

Made with rock wool with oriented fibres, having the following physical and mechanical features:

- Incombustibility Class A1 according to standard EN 13501
- Thermal conductivity coefficient λ = 0.04 W/mK
- Compressive strength ≥ 0.06 MPa (at 10% of deformation)
- Tensile strength ≥ 0.04 MPa

Thermal transmittance coefficient U*

Panel thickness (mm)	50	60	80	100	120	150
U [W/m²K]	0.78	0.66	0.50	0.41	0.34	0.28

* Mandatory for CE marking of double skin metal faced sandwich panels according to EN 14509.

Thermal resistance coefficient R

Panel thickness (mm)	50	60	80	100	120	150
R [m²K/W]	1.28	1.52	2.00	2.44	2.94	3.57

STATIC FEATURES

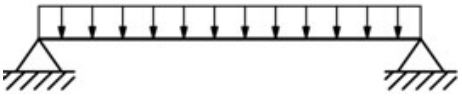
The resistance values refer to a panel assembled horizontally and subject to the action of a distributed load; the calculation method used by Isopan does not consider the thermal effects, which are verified by the designer. Depending on the weather conditions of the installation location and the colour of the external face, if the designer feels a detailed verification of the stresses caused by thermal actions and long-term effects is necessary, he/she should contact the Isopan Technical Office. The designer is still responsible for checking the fastening systems, based on their number and the way they are placed.

ISODECK PVSteel

ISODECK PVSteel panels are self-supporting according to the UNI EN 14509 definition. "…panel capable of supporting, by virtue of its materials and shape, its own weight and in case of panel fastened to spaced structural supports, all applied loads (snow, wind, air pressure), and transmitting these loads to the supports.", depending on the type of metal supports, their thickness and the thickness of the thermal insulating core.

Below are some examples of indicative load bearing tables:

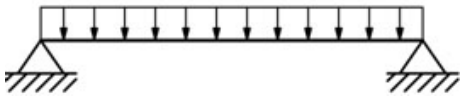
- **PU** panel on two supports:



STEEL SHEETS 0.6 / 0.6 mm - Simple support 120 mm								
UNIFORMLY DISTRIBUTED LOAD [kg/m2]	NOMINAL PANEL THICKNESS mm							
	30	40	50	60	80	100	120	150
	MAXIMUM SPAN cm							
80	305	335	385	405	485	495	520	580
100	280	310	360	395	440	450	485	525
120	250	290	325	360	410	425	450	485
140	215	270	305	340	390	400	420	455
160	185	245	300	310	360	370	405	435
180	165	210	280	300	350	355	380	410
200	150	185	235	295	320	340	365	400
220	140	160	215	270	305	320	345	375
250	115	140	180	225	295	305	325	355

STEEL SHEETS 0.6 / 0.8 mm - Simple support 120 mm								
UNIFORMLY DISTRIBUTED LOAD [kg/m2]	NOMINAL PANEL THICKNESS mm							
	30	40	50	60	80	100	120	150
	MAXIMUM SPAN cm							
80	345	385	465	490	580	660	705	755
100	315	365	440	480	530	600	635	645
120	285	340	395	440	505	580	615	565
140	235	315	360	425	490	560	580	550
160	190	275	355	375	440	520	570	545
180	150	225	340	360	430	510	540	510
200	140	190	270	350	380	500	535	490
220	110	160	240	315	375	465	520	470
250	105	140	190	260	365	450	500	470

- **MW** panel on two supports:



STEEL SHEETS 0.6 / 0.6 mm - Simple support 120 mm						
UNIFORMLY DISTRIBUTED LOAD [kg/m2]	NOMINAL PANEL THICKNESS mm					
	50	60	80	100	120	150
	MAXIMUM SPAN cm					
80	295	320	365	380	420	470
100	265	290	330	350	390	450
120	250	265	305	320	355	405
140	230	250	280	290	325	380
160	215	230	265	280	305	355
180	210	215	250	255	285	335
200	190	210	240	240	270	310
220	175	200	225	235	265	295
250	160	175	210	220	240	280

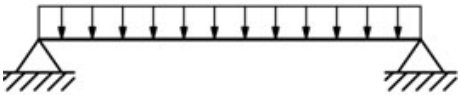
STEEL SHEETS 0.6 / 0.8 mm - Simple support 120 mm						
UNIFORMLY DISTRIBUTED LOAD [kg/m2]	NOMINAL PANEL THICKNESS mm					
	50	60	80	100	120	150
	MAXIMUM SPAN cm					
80	340	375	455	460	530	570
100	305	345	420	445	495	545
120	290	315	380	405	460	515
140	250	300	335	380	435	480
160	235	265	340	345	395	430
180	220	230	310	325	365	420
200	205	215	280	315	335	395
220	195	205	250	295	320	390
250	175	185	225	260	290	365

ISODECK Synth

ISODECK PVSteel panels are self-supporting according to the UNI EN 14509 definition. "…panel capable of supporting, by virtue of its materials and shape, its own weight and in case of panel fastened to spaced structural supports, all applied loads (snow, wind, air pressure), and transmitting these loads to the supports.", depending on the type of metal supports, their thickness and the thickness of the thermal insulating core.

Below are some examples of indicative load bearing tables:

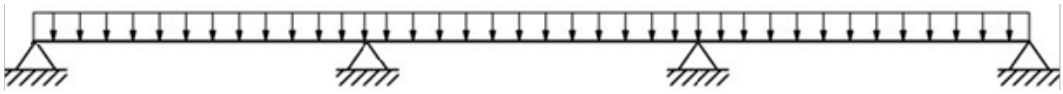
- panel on two supports:



SIMPLE SUPPORT STEEL SHEET					
UNIFORMLY DISTRIBUTED LOAD [kg/m²]	NOMINAL SHEET THICKNESS mm				
	0.5	0.6	0.7	0.8	1.0
	MAXIMUM SPAN cm				
60	245	260	275	290	315
80	220*	235	250	265	285
100	200*	220*	235	245	265
120	180*	200*	215*	230	250
140	165*	185*	200*	215*	235
160	155*	170*	185*	200*	225
180	145*	160*	175*	190*	215*
200	140*	155*	165*	180*	200*

**Values with stress limitations.*

- panel on multiple supports:



MULTI-SUPPORT STEEL SHEET					
UNIFORMLY DISTRIBUTED LOAD [kg/m²]	NOMINAL SHEET THICKNESS mm				
	0.5	0.6	0.7	0.8	1.0
	MAXIMUM SPAN cm				
60	275	295	310	325	350
80	250*	270	285	295	320
100	220*	245*	260	275	295
120	200*	225*	240*	260	280
140	185*	205*	225*	240*	265
160	175*	195*	210*	225*	255
180	165*	180*	200*	210*	240*
200	155*	170*	185*	200*	225*

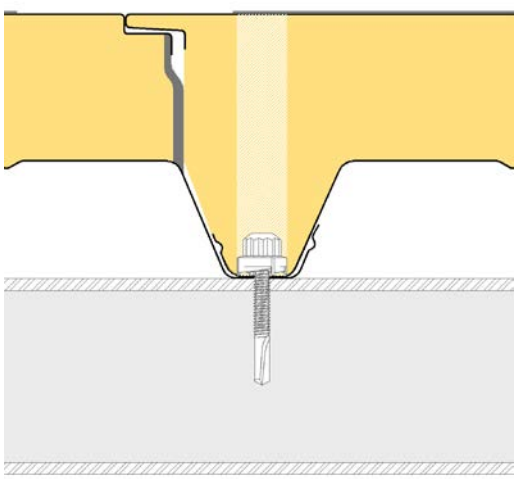
**Values with stress limitations.*

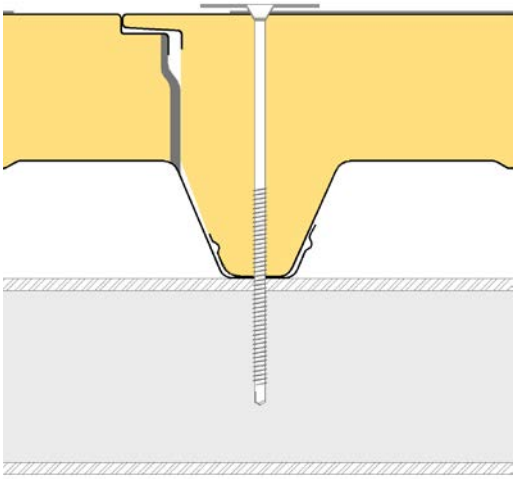
The information contained in the load tables refers to the panel features only.
It cannot replace the design calculations drawn up by a skilled technician, who must validate this information under the laws in force in the place where the panels are installed.

JOINT

ISODECK PVSteel

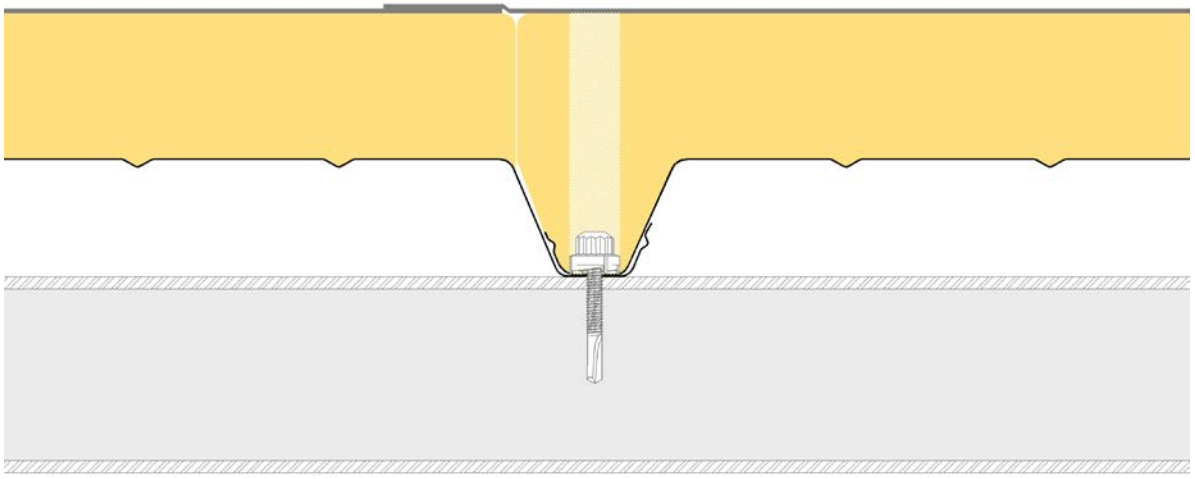
Coupling is performed at the joint rib. Waterproofing is carried out by heat sealing the bridging band according to the rules of good workmanship. Bridging is carried out with a 1.5mm-thick, 25cm-wide reinforced PVC band; the bridging band is heat-sealed for a width of 5 cm per side. **(see "Fastening instructions").**





ISODECK Synth

Coupling is performed at the joint rib. Waterproofing is assured by heat sealing according to the rules of good workmanship **(see "Fastening instructions").**



TOLERANCES (ANNEX D EN 14509)

- Facing thickness: according to the reference standards for the products used
- Panel thickness: nominal, ± 2 mm
- Length: if ≤ 3000 mm ± 5 mm; if > 3000 mm ± 10 mm
- For the ISODECK PVSteel the aesthetic appearance of the PVC lined sheet is not comparable to that of the pre-painted galvanised steel sheet. There might be small pressure marks that affect neither appearance nor roof functionality.

WATER PERMEABILITY

Roofs made with panels of the *PVC FLAT ROOF Range* assure complete waterproofing provided the heat sealing operation of the bridging bands for ISODECK PVSteel or the synthetic coat to the extrados for ISODECK Synth is performed by skilled and experienced personnel.

RESTRICTIONS OF USE

- A thermohygrometric check should be performed during the design stage. In certain conditions (e.g. high indoor humidity level) condensation can appear on the internal face of the panel with consequent dripping inside the building. If these conditions persist long enough, they can accelerate the natural degradation of the organic facing of the face itself.
- With regards to the features and recommendations for use of the PVC coat to the extrados, please refer to the indications in the product sheet in the “PVC Coat” paragraph.
- Isopan suggests carefully assessing the effects of metal dilations of the metal supports for very long panels (L > 8 m).

GENERAL DESIGN INSTRUCTIONS

The roof panels generally require, during the design phase, a load-bearing structure able to absorb the external loading stress that will not submit the metal supports of the panels to excessive and permanent distortions to the detriment of their basic characteristics. When choosing the panel types during the design phase, you should consider some parameters related to environmental actions like:

- **Wind action**: depends on the climatic zone of the building installation; the values vary depending on the wind speed, with consequent greater or lesser load pressure on the exposed surfaces (affects the type and number of panel fastening systems).
- **Snow load**: depends on the elevation above sea level compared to the one at the building construction site. The formation of water puddles resulting from snowmelt must be taken into account, which can expose the overlapping joints to being pressed under a load of water and possibly create infiltrations. It is recommended to implement appropriate tinwork systems (or suitable constructive measures) to ensure normal water run-off.
- **Atmospheric corrosion**: depends on the environment where the panels are installed (marine, industrial, urban, rural); mainly affects the degree of corrosiveness on the panel surfaces. In this regard, suitable metallic or organic facings should be chosen (refer to the available documentation or contact the Isopan Technical Department).
- **Rainfall**: in order to assure correct water drainage Isopan suggests using a minimum 2% slope.

In order to make up for possible lack of material due to damages during handling and assembly, ISOPAN recommends procuring spare panels (quantity equal to approximately 5% of the total).

THERMAL EXPANSION (UNI 10372 STANDARD)

All the materials used to build the roofs, especially metals, are subject to **thermal expansion and contraction** phenomena, due to temperature changes. The stresses due to metal sheet thermal expansions act on the roof and can cause functional and structural product anomalies, particularly in case of:

- Significant panel length (L > 8000 mm)
- High solar radiation;
- Dark colours;
- High panel thickness (see proposed Isopan fastening in the "Roofing panel fastening" section in this manual)

FASTENING INSTRUCTIONS

The purpose of the fastening elements is to efficiently anchor the panel to the load-bearing structure; the type of fastening unit depends on the type of face. The number and position of the fastening elements must guarantee resistance to the stresses induced by dynamic loads, which can also exist in depression.

Isopan recommends fastening at the top of the ribs; the possibility of fastening at the bottom of the rib is not to be ruled out, provided the system assures water tightness.

Appropriately coated carbon steels or austenitic type stainless steels must be chosen as suitable materials to fasten panels. Pay particular attention to the compatibility of the steel and aluminium materials in order to prevent the formation of galvanic currents.

Fastening methods

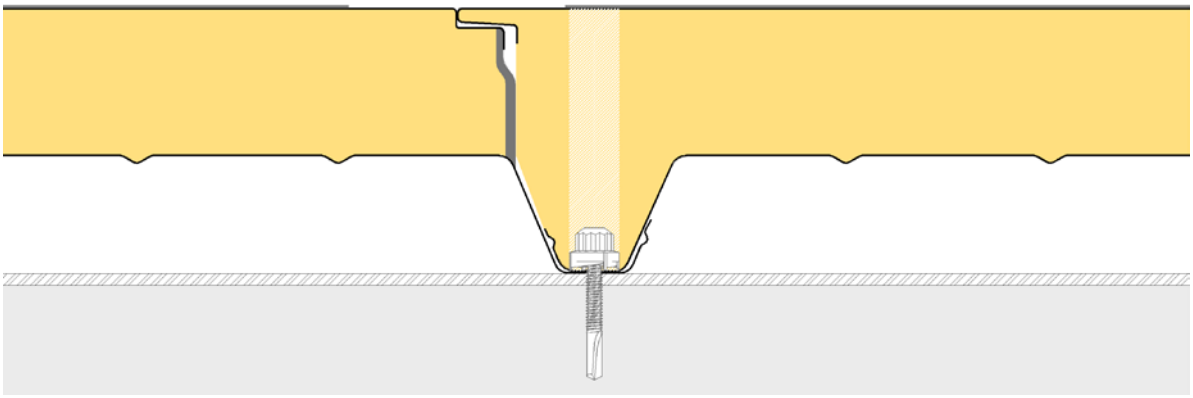
Fastening varies according to the design to be constructed and the panel application system at the construction site. Contact the Isopan Technical Department to make the right choice for the application.

Note: the correct length of the screw depends on the type of face (steel, wood).

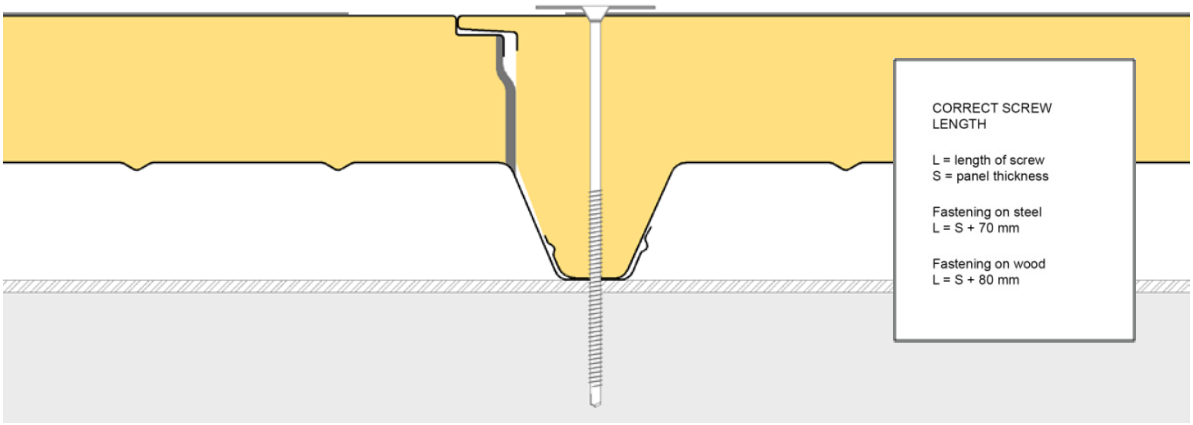
ISODECK PVSteel

The PVSteel panel is fastened in two possible ways:

- With self tapping screw;

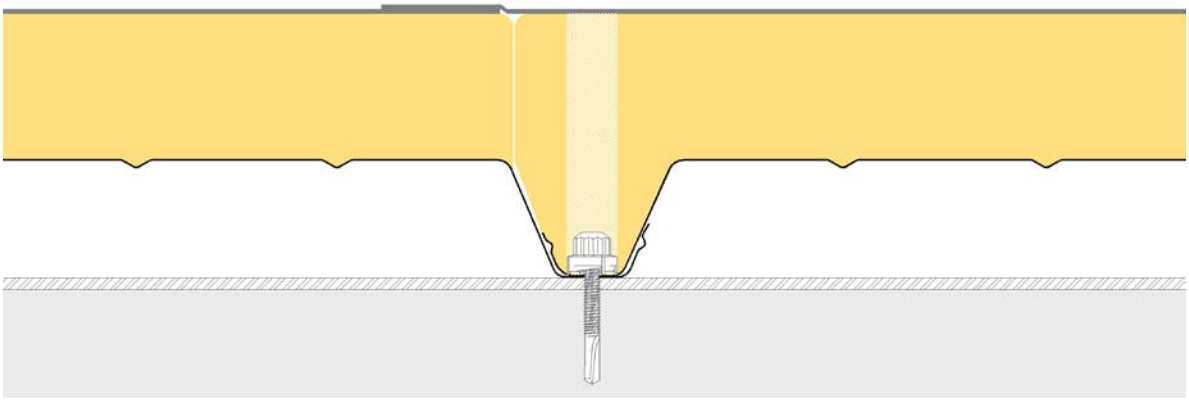


- With screw and plate for strain distribution.



Note: the position of the PVC glued to the sheet may change. Such changes do not affect the system's effectiveness. The correct length of the screw depends on the panel thickness and on the type of face (steel, wood). For the screw and plate solution, the actual availability of adequate screws for the thickness of the panel to be installed must be verified beforehand.

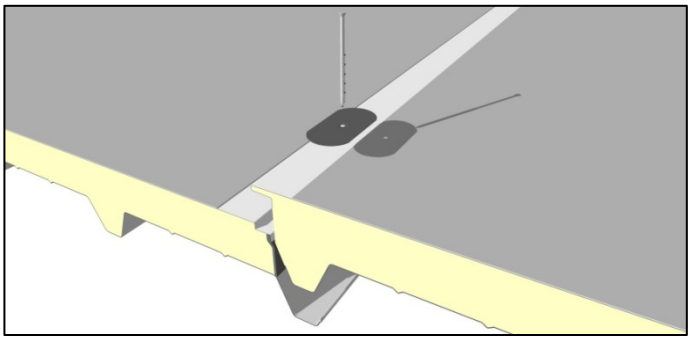
ISODECK Synth



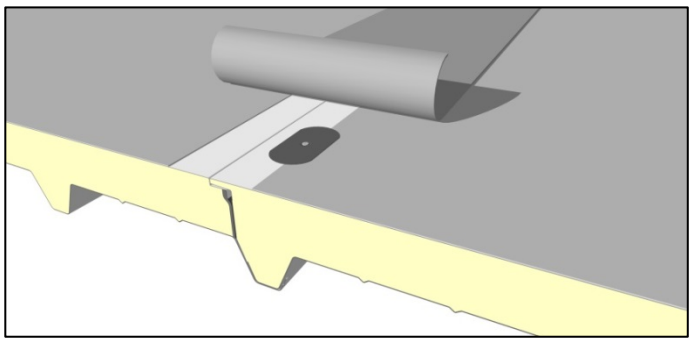
PVC Flat Roof range roof panel fastening

ISODECK PVSteel assembly sequence

1) Install the first panel.
2) Install the second panel and couple it to the already installed first panel.

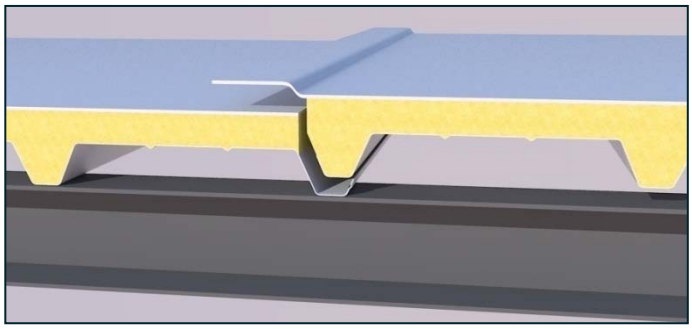


3) Fasten by self tapping screw or screw and plate at the overlapping rib.
4) Install the entire roof with panels according to the diagram described above.
5) If necessary, apply an aluminium adhesive band at the joints, to temporarily waterproof the roof.

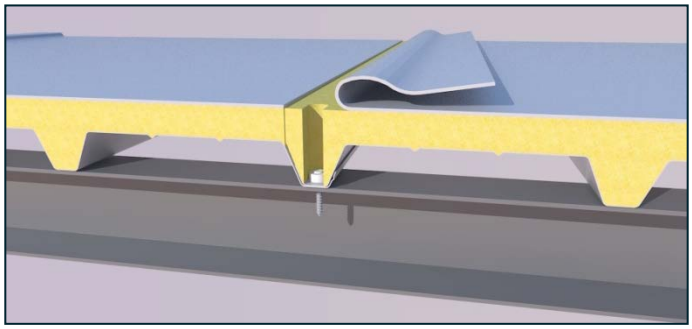


6) Install the PVC bands.
7) Heat seal the PVC bands by a width of 5 cm per side. This operation must be performed by skilled and experienced personnel.

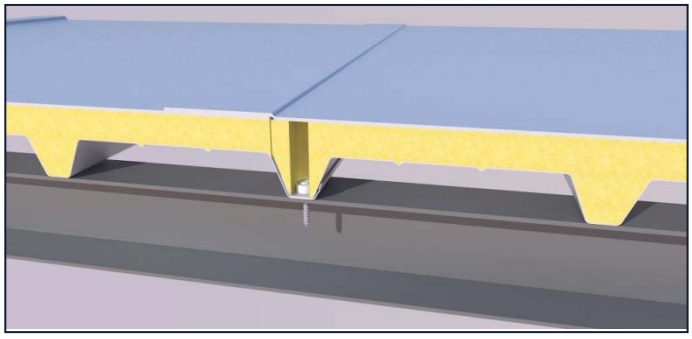
ISODECK Synth assembly sequence



1) Assemble the panels by means of the suitable joint rib (special attention should be paid to the integrity of the overlapping border).



2) Fasten by means of suitable screws supplied by Isopan. Fastening must be done at the joint (overlapping rib) of the panels, after lifting the overlapping border.



3) Reposition the border and seal by means of the specific hot air blowers.

Note: The number of fastenings for the PVC Flat Roof Range must be assessed according to the type of project. Isopan suggests a distribution of fasteners equal to two screws per square metre.

Joint sealing

1) Dry and clean the areas involved in sealing.
2) Automatic and manual sealing operations.
3) Make any technical parts on site, such as expansion joints, downspouts, protruding bodies.
4) Operations to check and test the coat tightness.

These operations must be performed by skilled personnel adhering to the manufacturer's instructions.

ASSEMBLY INSTRUCTIONS

In view of the product's special technical features, Isopan is willing to provide contact information of specialised firms for roofs made with the PVC Flat Roof range panels.

The correct sequence of assembly operations is the following:

Preliminary operations

- Verify that the supports are properly aligned.
- Pay particular attention to the contact points between the supports and the panel support plates to avoid phenomena linked to electrochemical corrosion if incompatible metals are coupled. For this purpose, elastomer or expanded resin strips may be applied as separators.
- Ensure that the site area has appropriate storage and handling capacity in order to prevent material damage.
- Use suitable tools (toothed circular saw, jigsaw, shears, nibbler) for on-site cutting operations. The use of equipment that produces metallic sparks (e.g. abrasive discs, disc cutter) is absolutely not recommended.
- Use suitable handling systems, particularly for long or heavy panels, in order to prevent safety risks on site and damages to the product.

Using acetic silicones is prohibited as they tend to attack the pre-painted galvanised face and form incipient oxidation. It is best to use single component sealant silicones with neutral curing that tend to harden due to the air humidity and, being free of solvents, do not attack the paint.

Assembly

- Lift the panels to height.
- Install of the panels.
- Check straightness of installed panels with respect to the structure and trace fastening positions.
- Preliminary fastening of panels in two points (e.g. head and tail).
- Perform the remaining fastenings on the previously made tracing.
- Perform the sealing operation. To assure correct adhesion, the PVC coat surfaces must be cleaned and dried before sealing. Coats undergoing long periods of contact with water, snow or ice must be dried before sealing.

Note: the panel is delivered with a protective film on the panel's flat side. Isopan recommends not removing the film until the end of the fastening and sealing operations, only lifting it in the points undergoing said operations.

PACKAGE COMPOSITION

The panels are normally supplied packaged and wrapped with extensible polyethylene film; the standard composition of the package is as shown below:

Panel thickness (mm)	30	40	50	60	80	100	120	150
No. of panels per package	16	12	10	8	6	6	4	4

Package compositions and types of packaging other than standard must be explicitly requested when ordering.

TRANSPORT AND STORAGE

Lorry loading

- The packages of panels are loaded on lorries, usually two in width and three in height. The packages include polystyrene spacers at the base, which are thick enough to allow for the lifting straps.
- The goods are arranged on the vehicles so as to ensure safe transportation and integrity of the material, in accordance with the requirements of the carrier, who is solely responsible for load integrity. Pay special attention to ensure the weight bearing on the bottom package, as well as the pressure exerted in the tying points, do not cause damage and the straps do not distort the shape of the product in any way.
- Isopan assumes no liability for loading lorries that are already partially occupied by other materials, or that do not have a suitable loading floor.

Customers who will pick up the material must instruct the drivers accordingly.

Lorry unloading with crane

- Use any type of crane equipped with spreader beam and equipped straps. Isopan can advise customers on the choice of spreader beams and straps. By using correct lifting systems, the panels will not be damaged.
- Never use chains or metal cables for lifting under any circumstances. As a general rule, sling the packages leaving about 1/4 of their length protruding from each end.

Lorry unloading with forklifts

- If the lorries are unloaded using a forklift, the length of the packages and their possible bending should be taken into account in order to prevent damages to the bottom of the package.
- The forks must be wide and long enough in order not to damage the product. When possible, protective material against surface abrasion and scratches should be applied between the fork and the package.

Indoor storage (Annex A)

- The materials must be stored in ventilated indoor facilities that are free of dust and humidity and not subject to temperature changes.
- Moisture that can penetrate (rain) or form (condensation) between two panels can damage the facings since it is particularly aggressive on metals and facings, with subsequent oxidation.
- Pre-painted facings may be more exposed to the negative consequences of combined heat/humidity conditions.

Outdoor storage (Annex A)

- If the packages and accessories are stored outdoors, the surface must absolutely be inclined longitudinally to prevent moisture from accumulating and to allow water run-off and natural air circulation.
- If storage is not shortly followed by pick-up for installation, it is advisable to cover the packages with a protective tarp, assuring impermeability as well as adequate ventilation to prevent condensate from accumulating and puddles of water from forming.

Storage terms (Annex A)

- Based on experience, in order to maintain original product performance, continuous indoor storage in closed and ventilated facilities should not exceed six months, while outdoor storage should never exceed sixty days from the date of production. These terms refer to the properly stored product, as instructed in the ''storage'' chapter in Annex A. However, the materials must always be protected against direct sunlight, as it may cause alterations.
- In case of transport in containers, the products must be removed from the containers as soon as possible and, however, no later than 15 days from the loading date, to prevent deterioration of the metal supports and organic coatings (e.g. blistering). Moisture inside the container must absolutely be avoided. Upon customer request, Isopan can provide special packages that are more suitable for transport in containers.

PACKAGING

Isopan suggests carefully choosing the type of packaging depending on destination, type of transport, conditions and length of storage.

To choose the correct type of packaging, please refer to the "**Packaging and Services**" document on www.isopan.it.

DURABILITY

Product durability depends on the intrinsic features of the panel used in relation with its final use. The panel, including the features of the metal supports, must be chosen after the roof has been properly designed.

In this regard we recommend, if necessary, using the Isopan documentation, also available on the web (www.isopan.com), and/or the reference standards.

We recommend using accessories like ridge tinwork, caps and gaskets supplied by Isopan, as they are appropriately designed for the specific use of the manufactured products.

MAINTENANCE

All types of facings, including those made with metal sandwich panels, require maintenance.

The type and frequency of maintenance activities depend on the product used for the outer facing. In any case, we recommend periodically inspecting the building (at least once a year), in order to assess its preservation and tightness of seals.

In order to maintain the aesthetic and physical properties of the elements and to extend the efficiency of the protective facing, it is also recommended to regularly clean the roof, paying special attention to the areas that could facilitate rain water stagnation, where harmful substances may be concentrated. Should you notice any problems following an on-site inspection, you must react immediately in order to restore the initial general conditions (e.g. restoring the sealing).

At the customer's request, Isopan can provide useful information to solve some issues related to this topic.

SAFETY AND DISPOSAL

Pursuant to Directive 68/548/EEC the sandwich panel does not require labelling. To meet customer requirements, Isopan has drawn-up a "Technical details for safety" document, to be referenced for any kind of information related to safety.

Caution: all information contained in the product data sheets must be validated by a qualified technician according to the laws in force in the country where the panels are installed.

Technical specifications and features are not binding. Isopan reserves the right to make changes without prior notice; the latest documentation is available on our website www.Isopan.it. For whatever is not explicitly specified herein, please refer to the ''General conditions of sale of the corrugated metal sheets, insulated metal panels and accessories''. All the products that fall under the EN 14509 standard field of application are CE marked.

Annex A

LORRY UNLOADING WITH CRANE

For lifting, the packages must always be attached in at least two points. The distance between them must be no less than half the length of the packages.
Lifting should be possibly carried out using synthetic fibre straps (Nylon) no thinner than 10 cm, so that the load is distributed on the strap and does not cause distortion.
(see Figure 1)

Figure 1
Suitable spacers must be placed under and above the package, made of sturdy solid wood or plastic elements to prevent the strap from coming into direct contact with the package.
These spacers must be at least 4 cm longer than the width of the package and be at least as wide as the strap.
Make sure that the straps and supports cannot move during lifting and that manoeuvres are performed cautiously.

LORRY UNLOADING WITH FORKLIFTS

If the lorries are unloaded with a forklift, take into account the length of the packages and their possible bending in order to avoid damaging the bottom of the package and/or to the extreme failure limit of the panels.
We recommend using forklifts that are suitable for handling panels and similar products.

STORAGE

The packages must always be kept off the ground both in the warehouse and, more so, at the construction site. They must have plastic foam supports with flat surfaces longer than the width of the panels and at a distance adequate to the features of the product.
The packages should preferably be stored in dry facilities to prevent stagnation of condensation water on inner, less ventilated elements, which is particularly aggressive on metals, resulting in the formation of oxidation.
The panels must be stored in dry ventilated facilities; should this not be possible, open the packages and ventilate the panels (spacing them from each other). If the panels remain packaged outdoors, the galvanised facing may oxidise (white rust) even after a few days, due to electrolytic corrosion.
The panels must be stored to facilitate water run-off, especially when it is necessary to temporarily store them outside (see Figure 2).
If storage is not shortly followed by pick-up for installation, it is advisable to cover the packages with protective tarps.
To maintain original product performance, continuous indoor storage in ventilated facilities should not exceed 6 months, while outdoor storage should never exceed 60 days.
Packages stored at a height must always be properly bound to the structure.

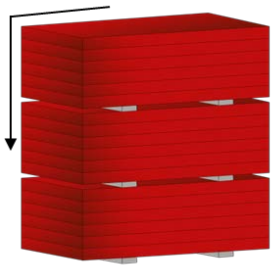


Figure 2

PRE-PAINTED FACES

In case of prolonged storage, the pre-painted products must be stored indoors or under a canopy. There is the risk that stagnant humidity may attack the paint layer, causing it to detach from the galvanised face. It is not advisable to let more than two weeks elapse from when the products were stored at the site.
In case of container transport, the products must be removed from the container within 15 days from the loading date in order to prevent the metal supports from deteriorating.

PANEL HANDLING

The panels must be handled using adequate protection equipment (accident-prevention shoes, gloves, overalls, etc.) in compliance with current regulations.
The individual element must always be manually handled by lifting the element without dragging it on the ground and turning it sideways beside the package; it must be transported by at least two people according to the length, keeping the element on its side. (see Figure 3)

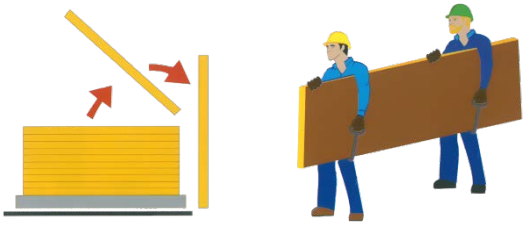


Figure 3
Handling equipment as well as gloves must be clean and such not to damage the items.

INSTALLATION

Panel installation personnel must be qualified and know the correct technique to perform the work in a workmanlike manner.
If required, the seller can provide appropriate guidance and instructions.
Installation personnel must be equipped with footwear with soles that do not damage the external facing of the panel.
On-site cutting operations must be done with suitable tools (jigsaw, shears, nibbler, etc.).
We do not recommend using tools with abrasive discs.
To fasten the panels, it is advisable to use devices that can be provided by the seller.
Tighten the screws using a screwdriver with torque limitation.
For roofs with pitch elements without intermediate joints (overlaps), the slope is usually no less than 7%. For smaller slopes, adopt the seller's provisions.
In case of head overlaps, the slope should take into account the type of joint and material used, as well as the specific environmental conditions.
During panel assembly and, in particular, in roofs, it is necessary to immediately remove all residual materials paying special attention to metal ones that may cause early deterioration of the metal supports by oxidising.

PROTECTIVE FILM

The pre-painted metal facings are supplied upon request with adhesive polyethylene protective film that prevents damage to the paint layer.
The protective film covering the pre-painted panels must be completely removed during assembly or, in any case, within 60 days from material preparation.
It is also recommended not to expose the panels covered by a protective film to direct sunlight.

Maximum 2 months

For panels expressly requested without protective film, special care is required during on-site handling and installation.

MAINTENANCE

The main routine maintenance operation is cleaning the panels. Panel surfaces that, following visual inspection, are found to be dirty or oxidised can be washed with soap and water using a soft brush. Cleaning water pressure can be applied up to 50 bar, but the jet must not be too close or perpendicular to the surfaces. Near the joints the water must be sprayed at a sufficient angle not to undermine their tightness.

YEARLY CHECKS OF THE ISOPAN PANELS	
WHAT TO INSPECT	**CORRECTIVE ACTIONS**
Conditions of the pre-painted surfaces (cracks and colour unevenness)	Assess the condition of the surfaces Repaint where possible
Scratches and dents	Repaint and repair dents
Fastening screws	Remove a screw and check if oxidised Tighten the screws where necessary
Angular cut-edge parts	Check the state of oxidation Clean and repaint

These provisions are taken from the General Conditions of Sale.

Annex B

BUILDING DETAILS

FR 01 - Detail of roof with slight slope with detail of the ridge

FR 02 - Detail of drainpipe on roof with slight slope

FR 03 - Detail of gutter and drainpipe for roof with slight slope

FR 04 - Detail of ridge for roof with single pitch slight slope

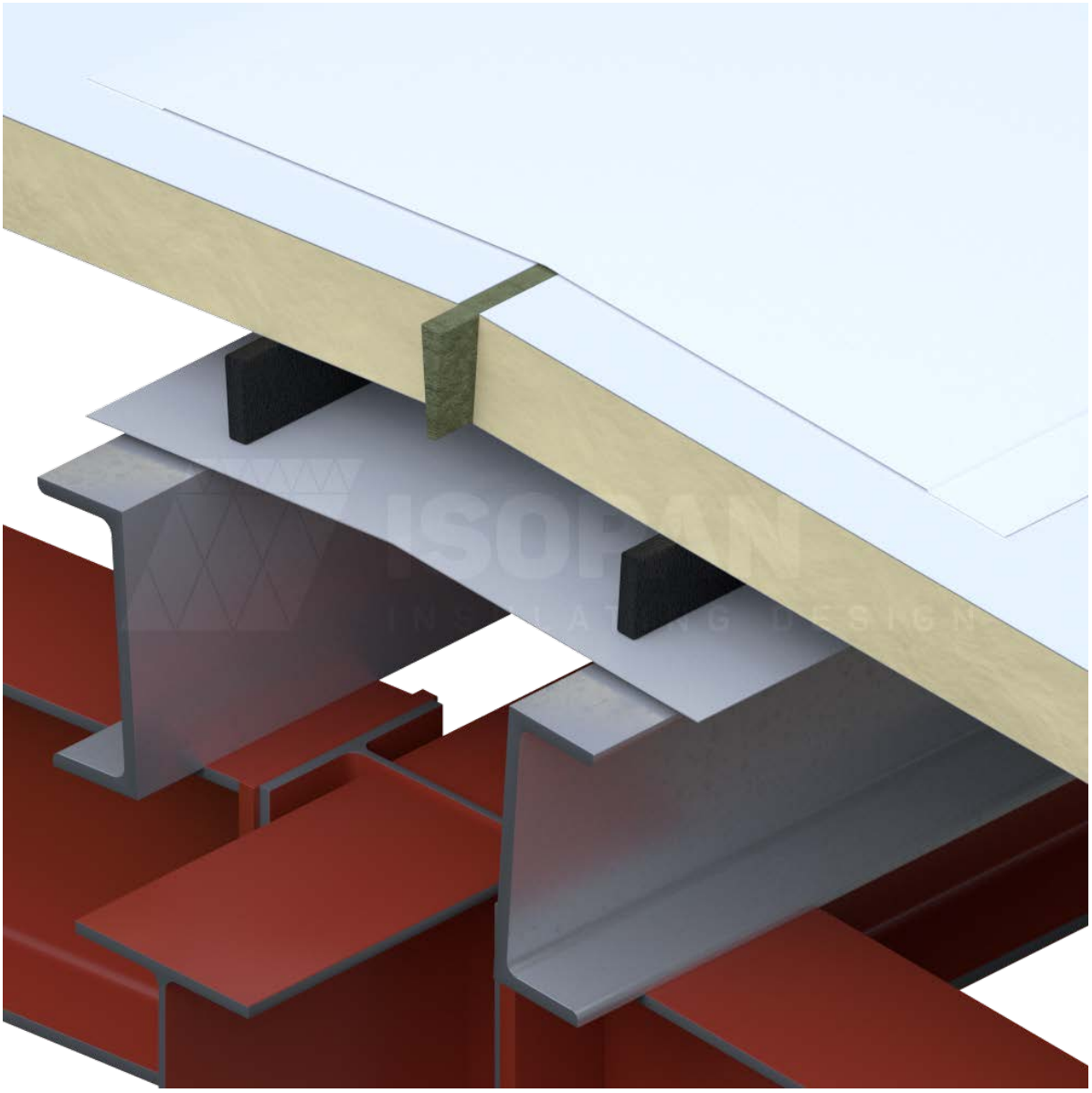
FR 05 - Detail of side connection for roof with slight slope

FR 06 - Detail of butt joint - Screw and plate

FR 07 - Detail of butt joint - Self tapping screw

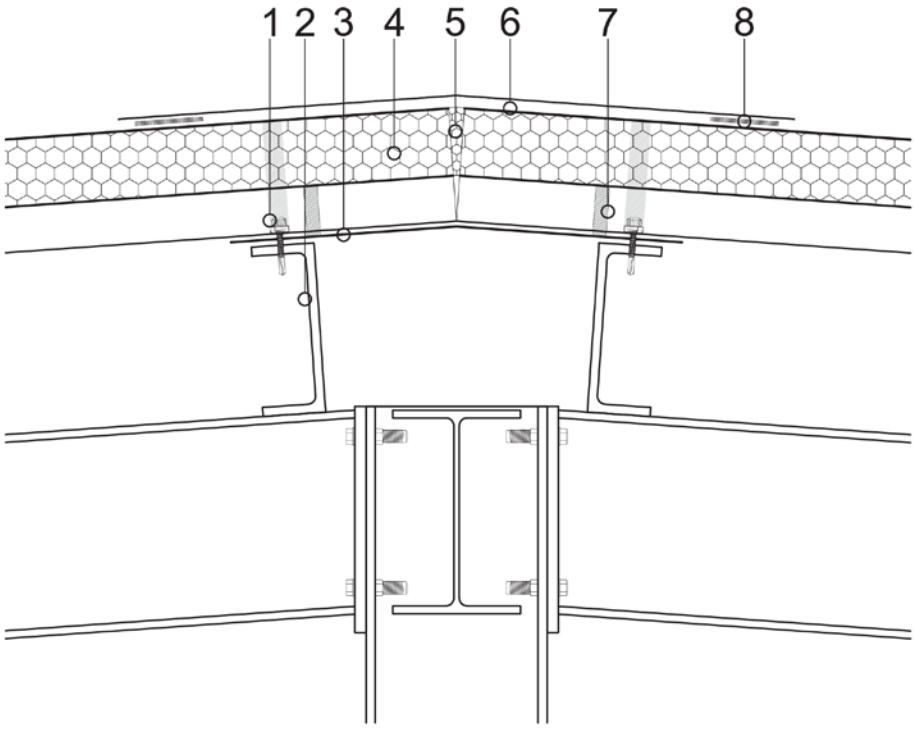
FR 08 - Detail of side connection for natural green roof

DETAIL OF ROOF WITH SLIGHT SLOPE WITH DETAIL OF THE RIDGE



ISOPAN FR 01

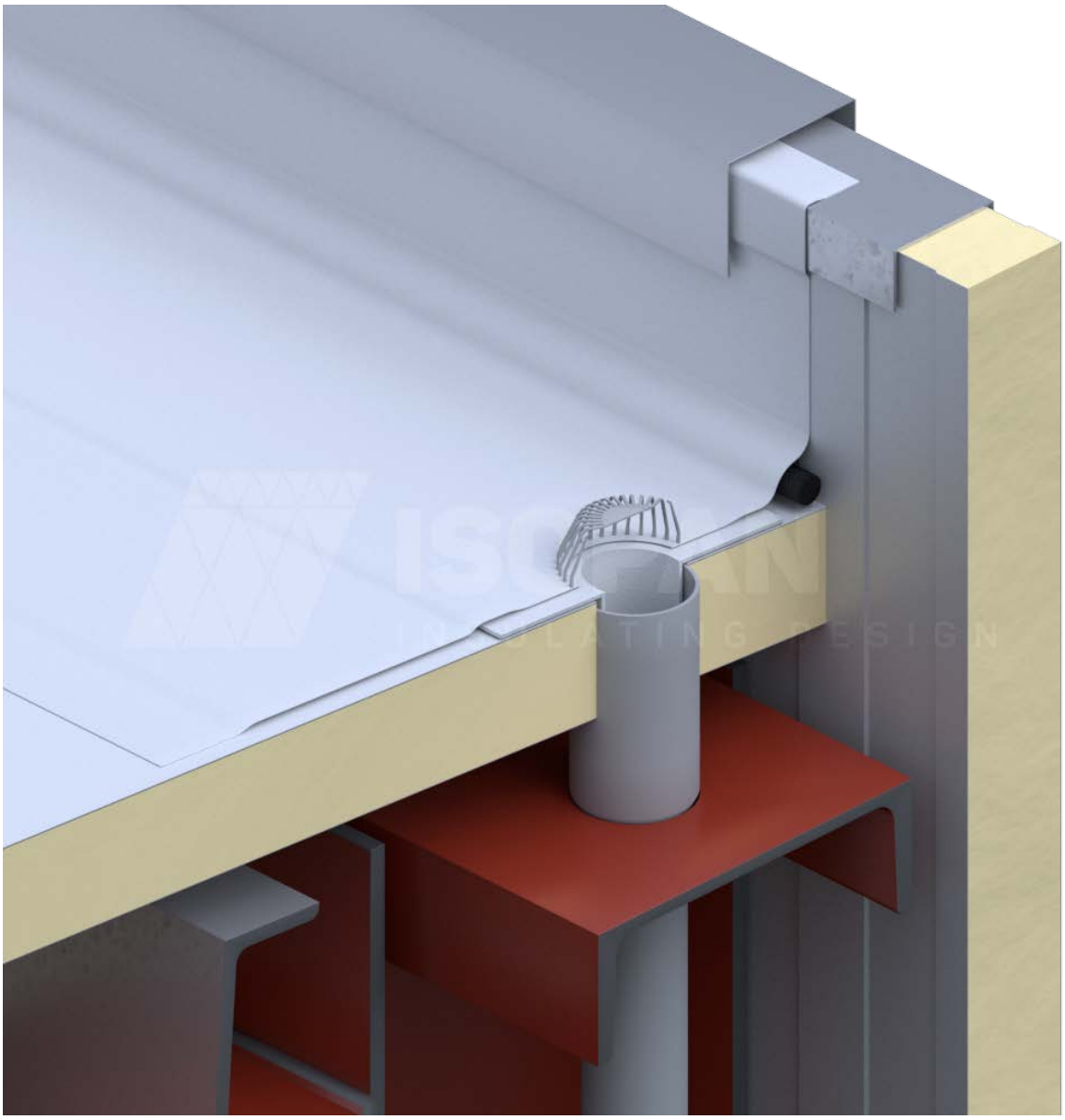
Detail of roof with slight slope with detail of the ridge



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

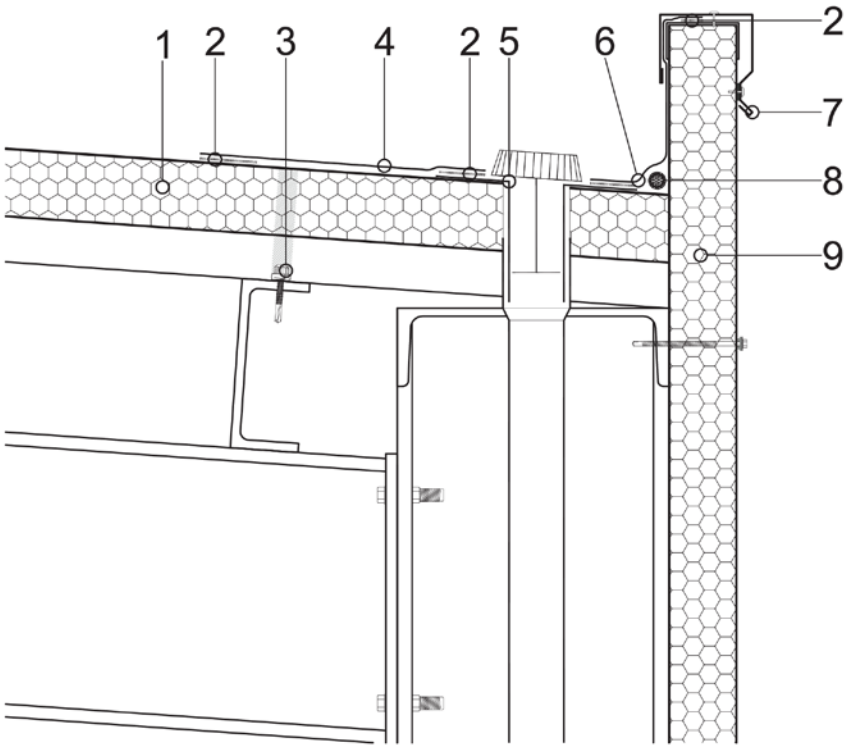
Key	
1	Self tapping screw
2	Substructure
3	Sub-ridge sheet
4	Flat Roof ISOPAN PVC range roof panel
5	Polyurethane foam or mineral wool insulating material
6	PVC band for bridging
7	Moulded gasket
8	PVC sealing

DETAIL OF DRAINPIPE ON ROOF WITH SLIGHT SLOPE



ISOPAN FR 02

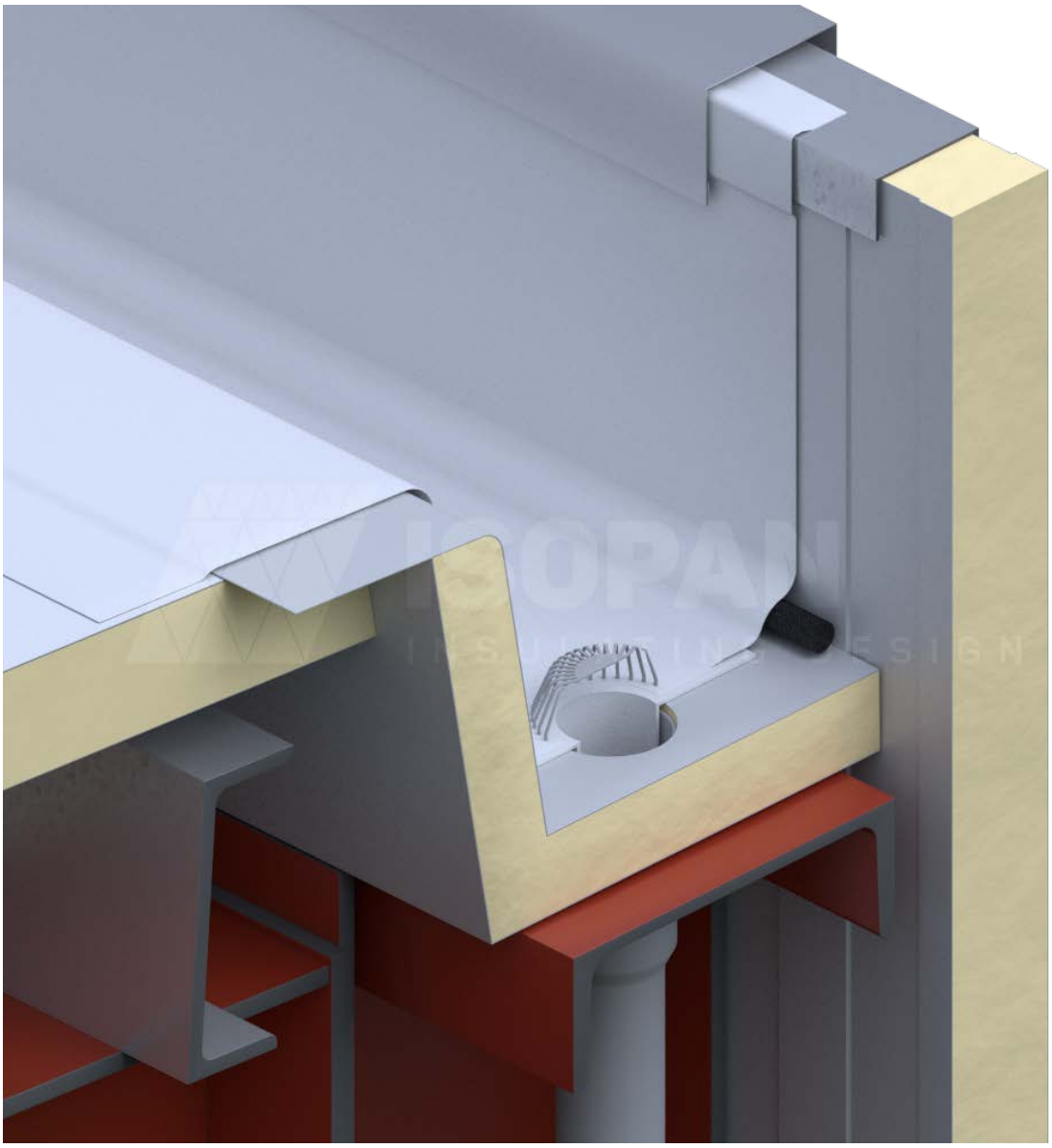
Detail of drainpipe on roof with slight slope



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

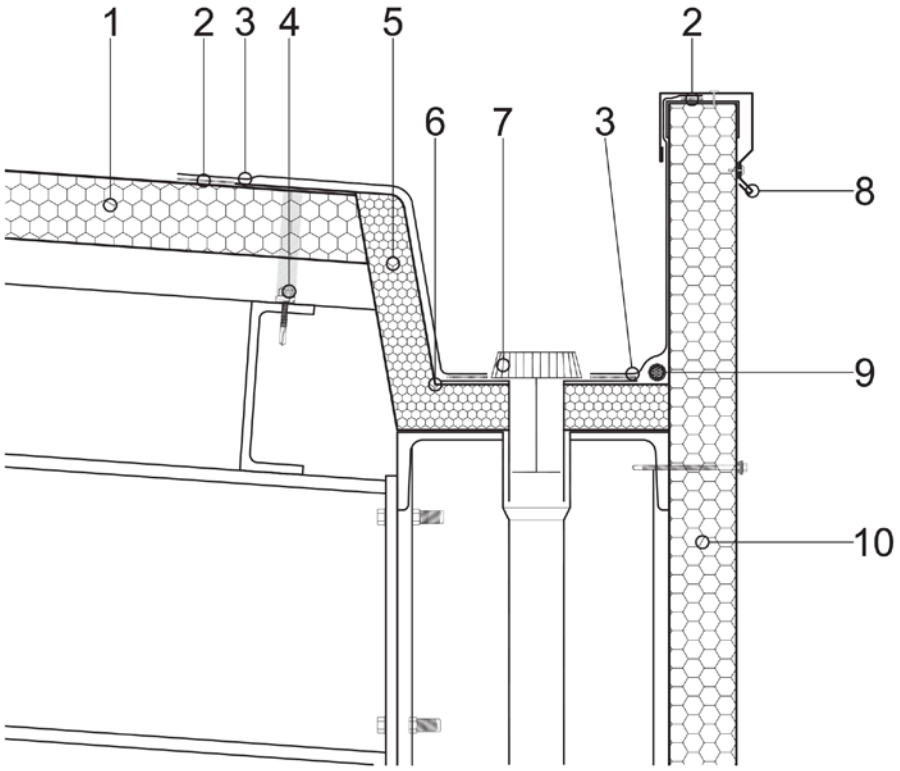
Key	
1	Flat Roof ISOPAN PVC range roof panel
2	PVC sealing
3	Self tapping screw
4	PVC band for bridging
5	Drainpipe with gravel guard
6	PVC membrane
7	Tinwork to protect the parapet
8	Compressible element
9	ISOPAN wall panel

DETAIL OF GUTTER AND DRAINPIPE ON ROOF WITH SLIGHT SLOPE



ISOPAN FR 03

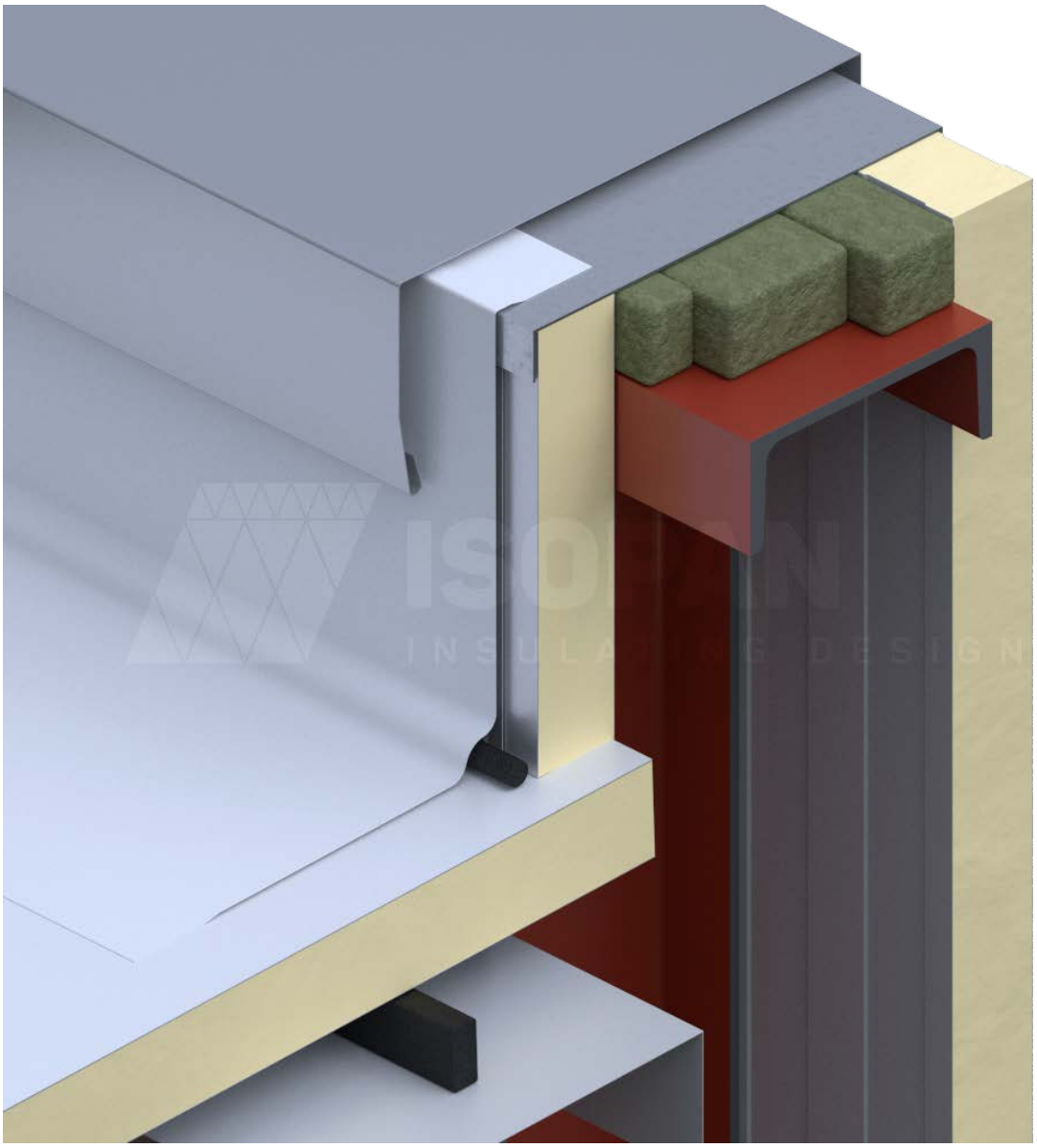
Detail of gutter and drainpipe for roof with slight slope



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

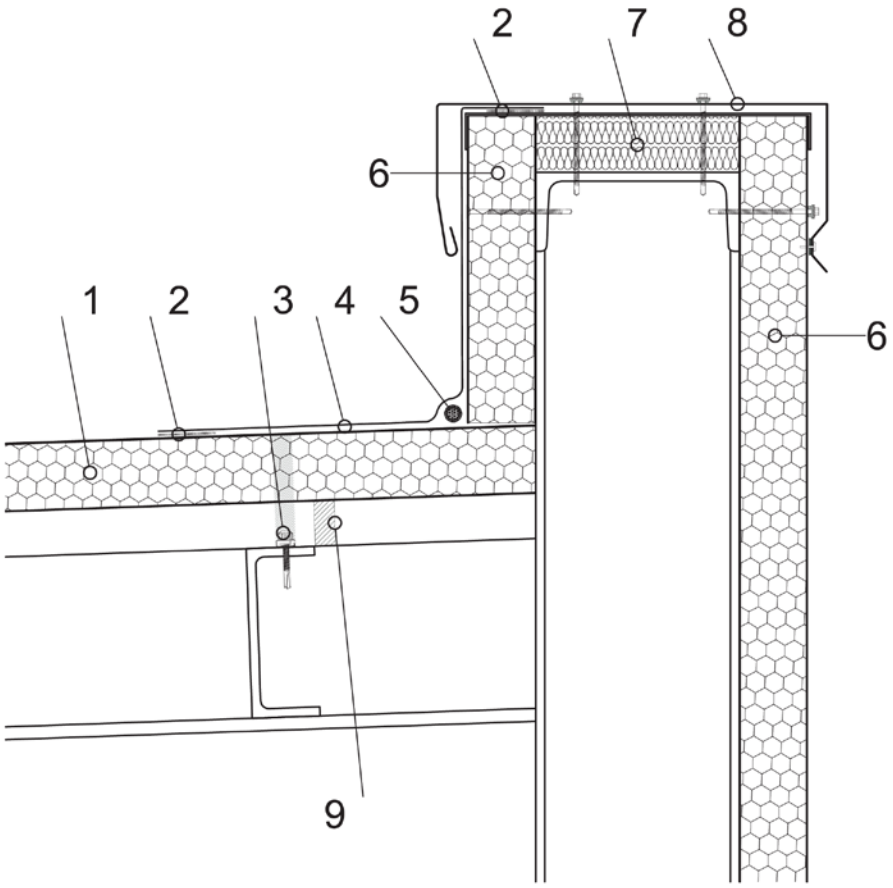
Key	
1	Flat Roof ISOPAN PVC range roof panel
2	PVC sealing
3	PVC membrane
4	Self tapping screw
5	Polyurethane foam or mineral wool insulating material
6	Gutter tinwork
7	Drainpipe with gravel guard
8	Tinwork to protect the parapet
9	Compressible element
10	ISOPAN wall panel

DETAIL OF RIDGE FOR ROOF WITH SINGLE PITCH SLIGHT SLOPE



ISOPAN FR 04

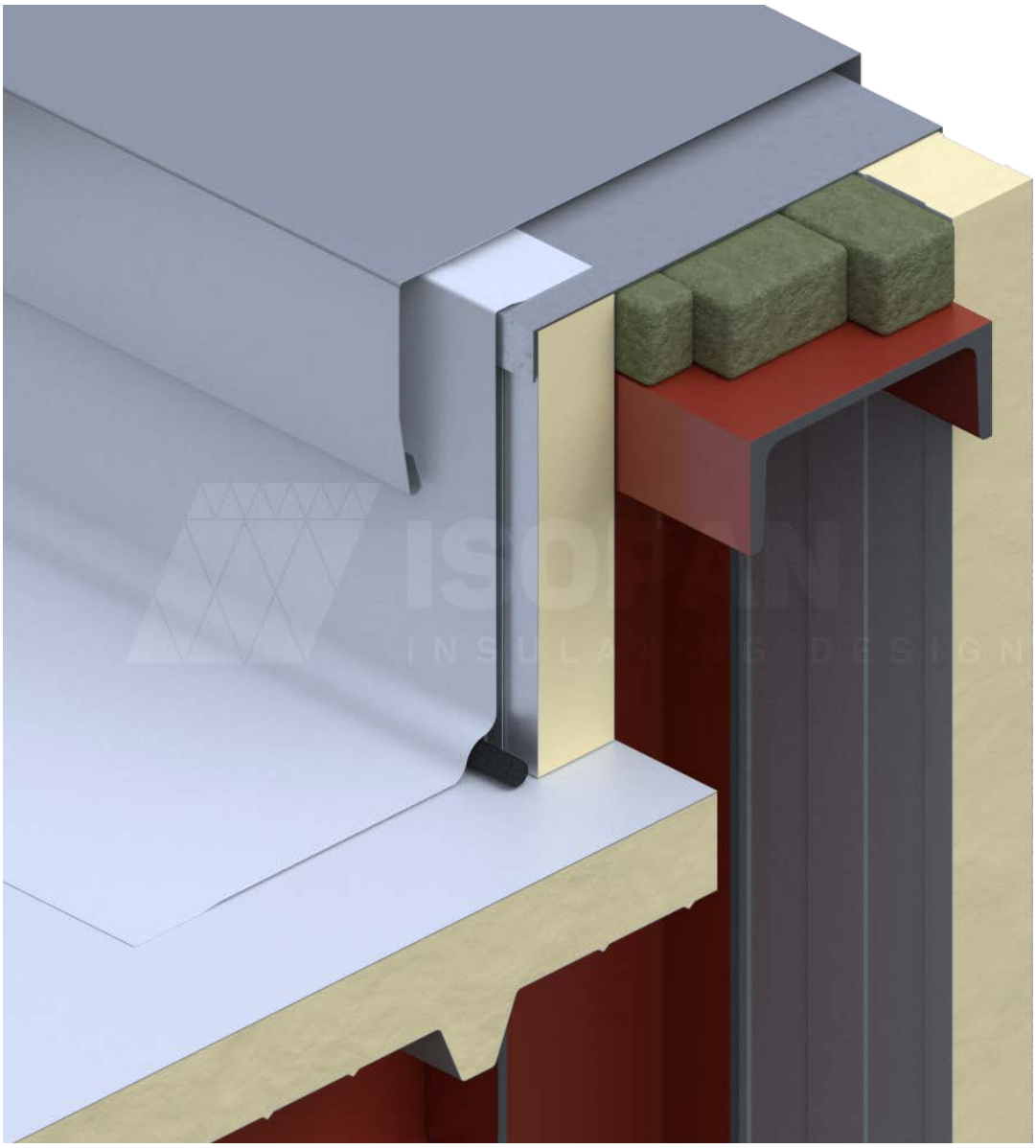
Detail of ridge for roof with single pitch slight slope



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

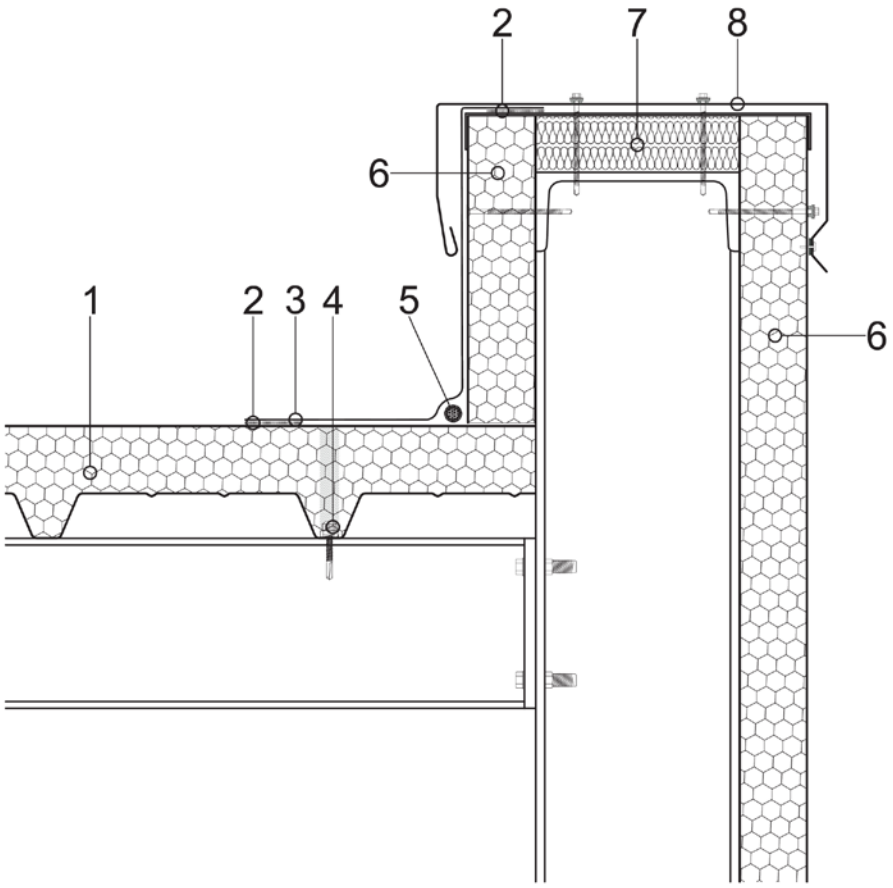
Key	
1	Flat Roof ISOPAN PVC range roof panel
2	PVC sealing
3	Self tapping screw
4	PVC membrane
5	Compressible element
6	ISOPAN wall panel
7	Polyurethane foam or mineral wool insulating material
8	Tinwork to protect the parapet
9	Moulded gasket

DETAIL OF SIDE CONNECTION FOR ROOF WITH SLIGHT SLOPE



ISOPAN FR 05

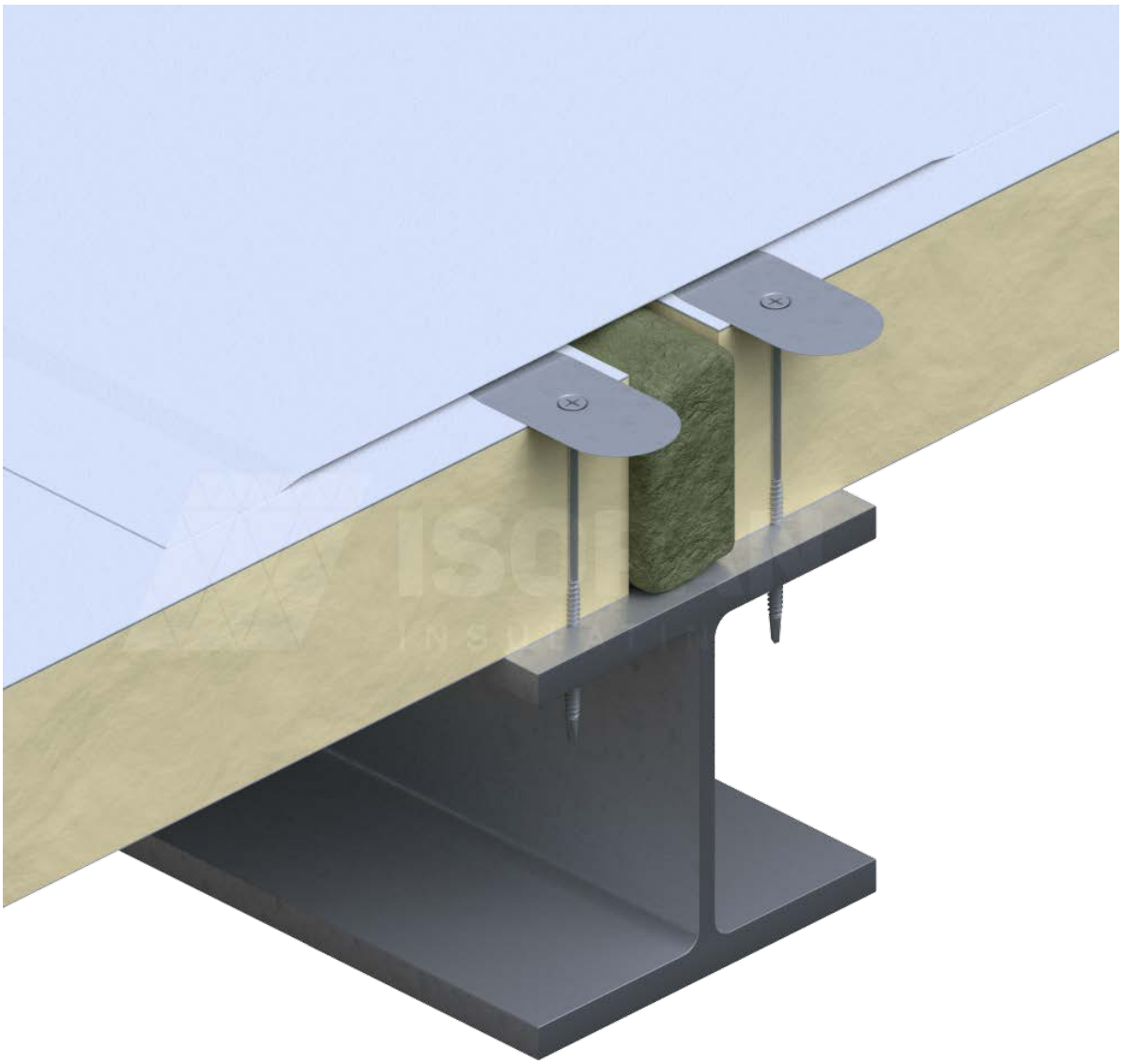
Detail of side connection for roof with slight slope



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

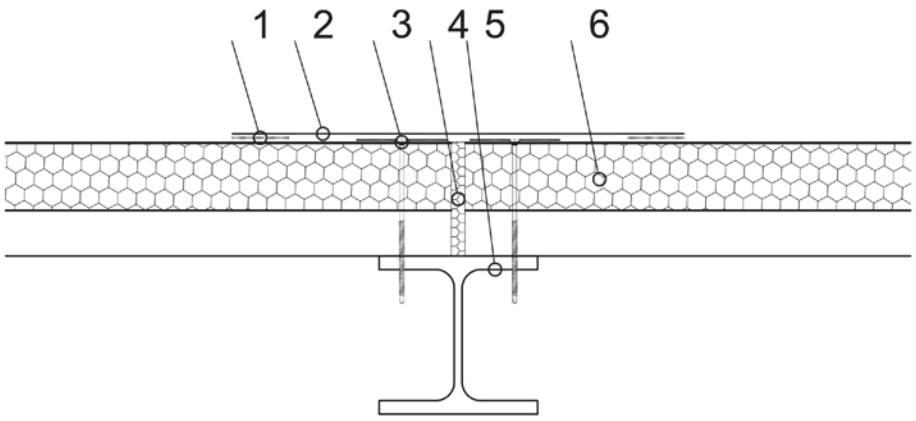
Key	
1	Flat Roof ISOPAN PVC range roof panel
2	PVC sealing
3	PVC membrane
4	Self tapping screw
5	Compressible element
6	ISOPAN wall panel
7	Polyurethane foam or mineral wool insulating material
8	Tinwork to protect the parapet

DETAIL OF BUTT JOINT – SCREW AND PLATE



ISOPAN FR 06

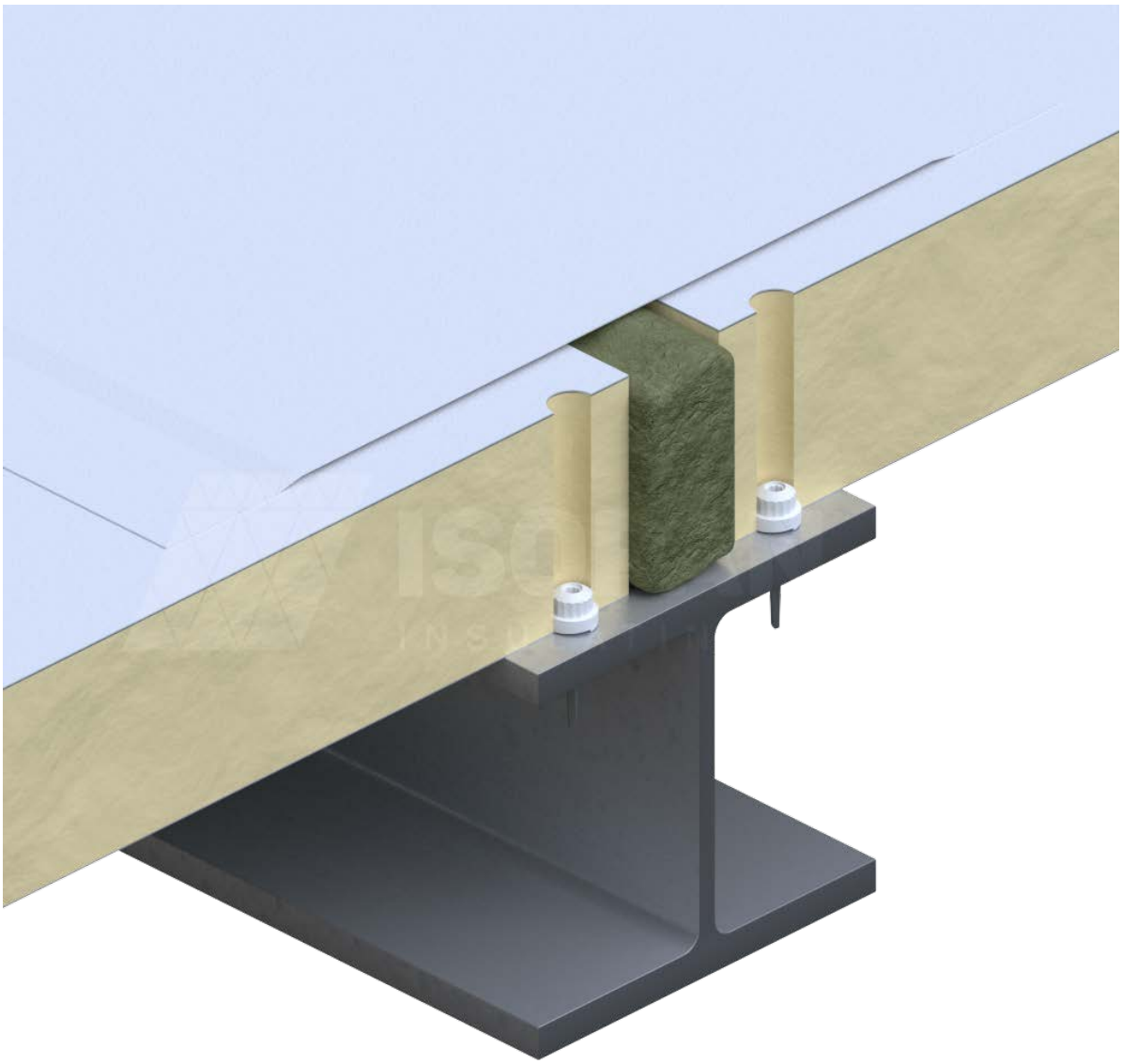
Detail of butt joint - Screw and Plate



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

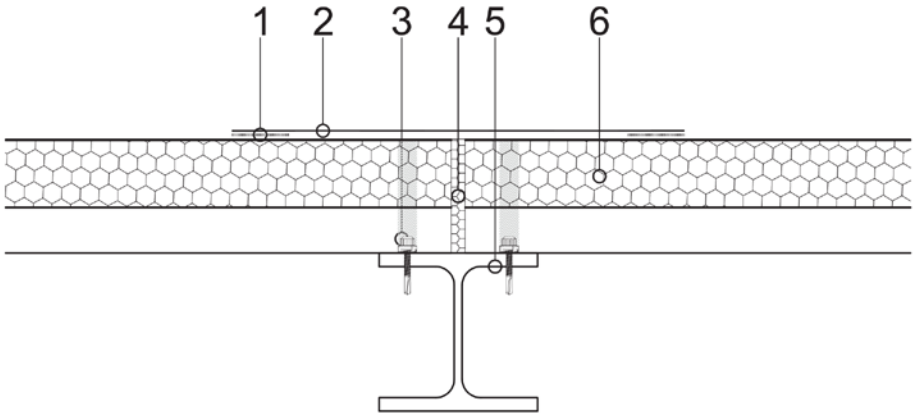
Key	
1	PVC sealing - width > 50 mm
2	PVC band for bridging - width 400 mm
3	Countersunk screw and Plate
4	Polyurethane foam or mineral wool insulating material
5	Substructure
6	Flat Roof ISOPAN PVC range roof panel

DETAIL OF BUTT JOINT - SELF TAPPING SCREW



ISOPAN FR 07

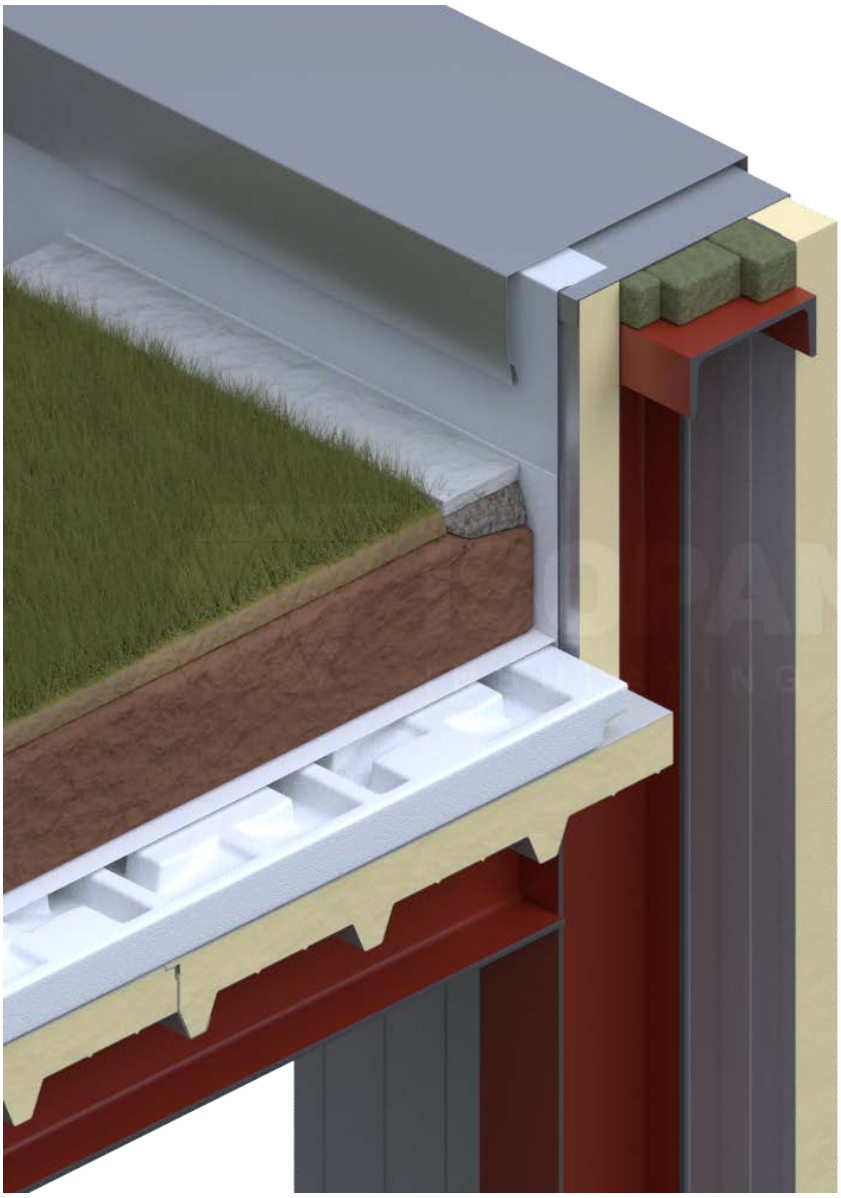
Detail of butt joint - Self tapping screw



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

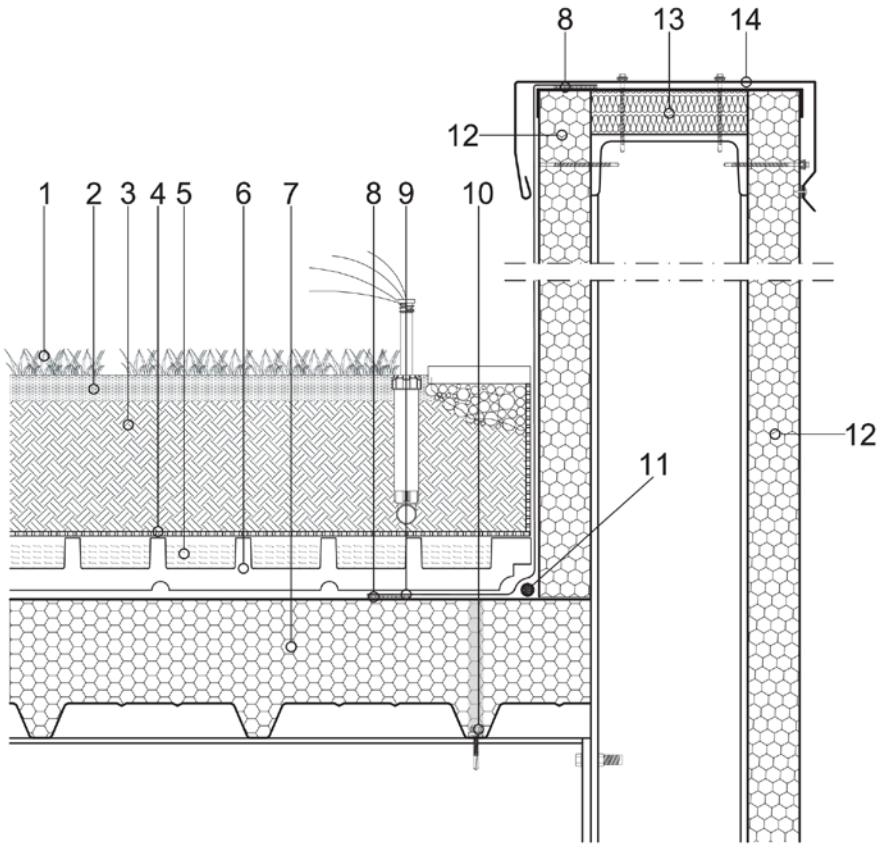
Key	
1	PVC sealing - width > 50 mm
2	PVC band for bridging - width 400 mm
3	Self tapping screw
4	Polyurethane foam or mineral wool insulating material
5	Substructure
6	Flat Roof ISOPAN PVC range roof panel

DETAIL OF SIDE CONNECTION FOR NATURAL GREEN ROOF



ISOPAN FR 08

Detail of side connection for natural green roof



The designer is responsible for assessing the need to insert additional gasket and/or closing elements, even when not indicated in the drawing details.

Key

1	Natural lawn	9	PVC membrane
2	Sowing soil	10	Self tapping screw
3	Soil	11	Compressible element
4	Stabiliser Filter	12	ISOPAN wall panel
5	Water containment	13	Polyurethane foam or mineral wool insulating material
6	Polystyrene moulded panel	14	Tinwork to protect the parapet
7	Flat Roof ISOPAN PVC range roof panel		
8	PVC sealing		

PART OF MANNI GROUP

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INSULATING DESIGN

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