

FLAT ROOF INSULATION

LATEST
SYSTEM
SOLUTIONS



WITH THE USE OF ROOFING FELT

Lightweight
single-ply
systems

ThermaBitum
ThermaBitum FR

WITH THE USE OF MEMBRANE

ThermaMembrane
ThermaMembrane FR

REI 30 · B_{ROOF} (t1) · NRO · B-s3, d0 · 120 kPa · $\lambda_{\text{dekl.}}$ 0,022 W/mK

MODERN FLAT ROOFS



Expectations

High requirements for flat roofs, among which the most important is the sustainability of the tightness of hydro and thermal insulation as well as issues related to changes in the load (wind and snow zone, along with the need for snow clearance) cause that this type of covering has been so far considered to be quite problematic both in terms of assembly and use.

However, these problems have been finally solved.

Flat roofs are an integral part of the architectural landscape that surrounds us. The flat roof allows for maximizing of usable space in buildings. This type of covering can most often be seen in the case of big surface objects- the production halls, warehouses, hypermarkets. Flat roofs are a common solution in public buildings such as schools, hospitals, offices. We also meet them in housing (blocks or solid, single-family houses).



Solution

The answer to the current imperfections in the covering of flat roofs is the latest, cutting-edge technology developed by the Europanel for this type of covering. The years of research resulted in a series of products: ThermaBitum and ThermaMembrane, which, depending on the preferred technology of application use the felt or membrane as a waterproofing membrane. But the most important feature of the newly developed products is **integrating functions of waterproofing in a single-ply system with thermal insulation made of rigid PU foam.**

The way

HOW IT WORKS?

The general rule is very simple. Let us discuss it on the example of ThermaMembrane. Factory-made, optimized with respect to the dimensions of the roof, ready to install panels with a layer of thermal insulation and waterproofing are anchored to the base using telescopic fasteners along the contact line of the panels. Then the overlap of membrane covering the mounting sleeves and cross contacts is welded.

READY!

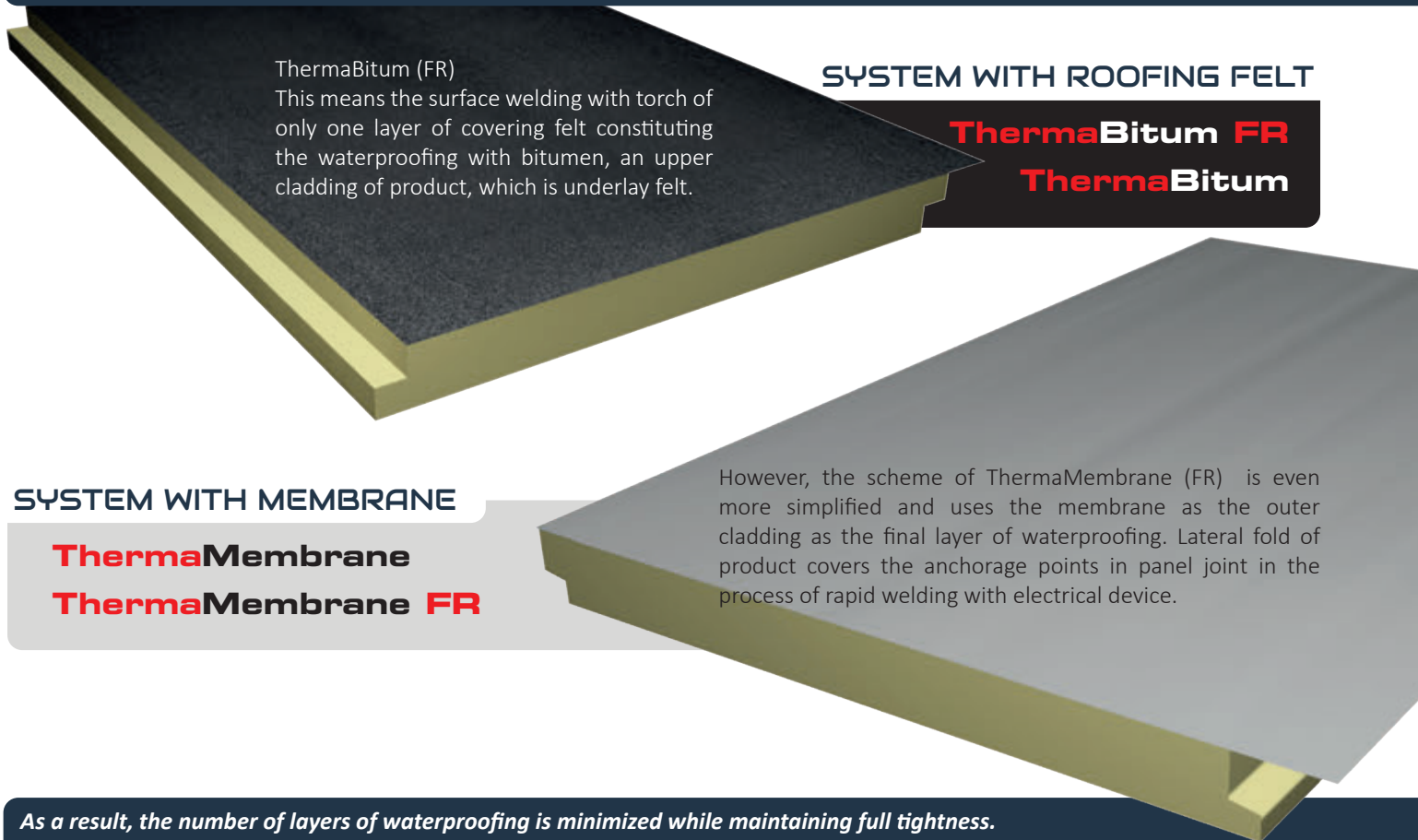
THE ADVANTAGES ARE CLEAR

- Very Efficient, fast installation (up to 50% savings in installation time compared to tiered system of "build-up")
- Guarantee of waterproofing tightness
- Excellent Thermal insulation (PU Foam)
- Maximum Resistance to temperature, UV radiation
- Easy processing and finishing
- High rigidity and resistance to pressure
- Size stability
- Minimum self-weight of panels

ThermaBitum and ThermaMembrane systems are ideal for use on any type of base used for the construction of flat roofs- steel, concrete. This brochure describes in detail each of the systems indicating the advantages and methods of assembly.

To meet the expectations of investors regarding reductions in installation costs, as well as of construction companies as to facilitate, speed up and streamline the work carried out on the roof, our products use:

Single ply waterproofing systems



ThermaBitum (FR)
This means the surface welding with torch of only one layer of covering felt constituting the waterproofing with bitumen, an upper cladding of product, which is underlay felt.

SYSTEM WITH ROOFING FELT

ThermaBitum FR
ThermaBitum

SYSTEM WITH MEMBRANE

ThermaMembrane
ThermaMembrane FR

However, the scheme of ThermaMembrane (FR) is even more simplified and uses the membrane as the outer cladding as the final layer of waterproofing. Lateral fold of product covers the anchorage points in panel joint in the process of rapid welding with electrical device.

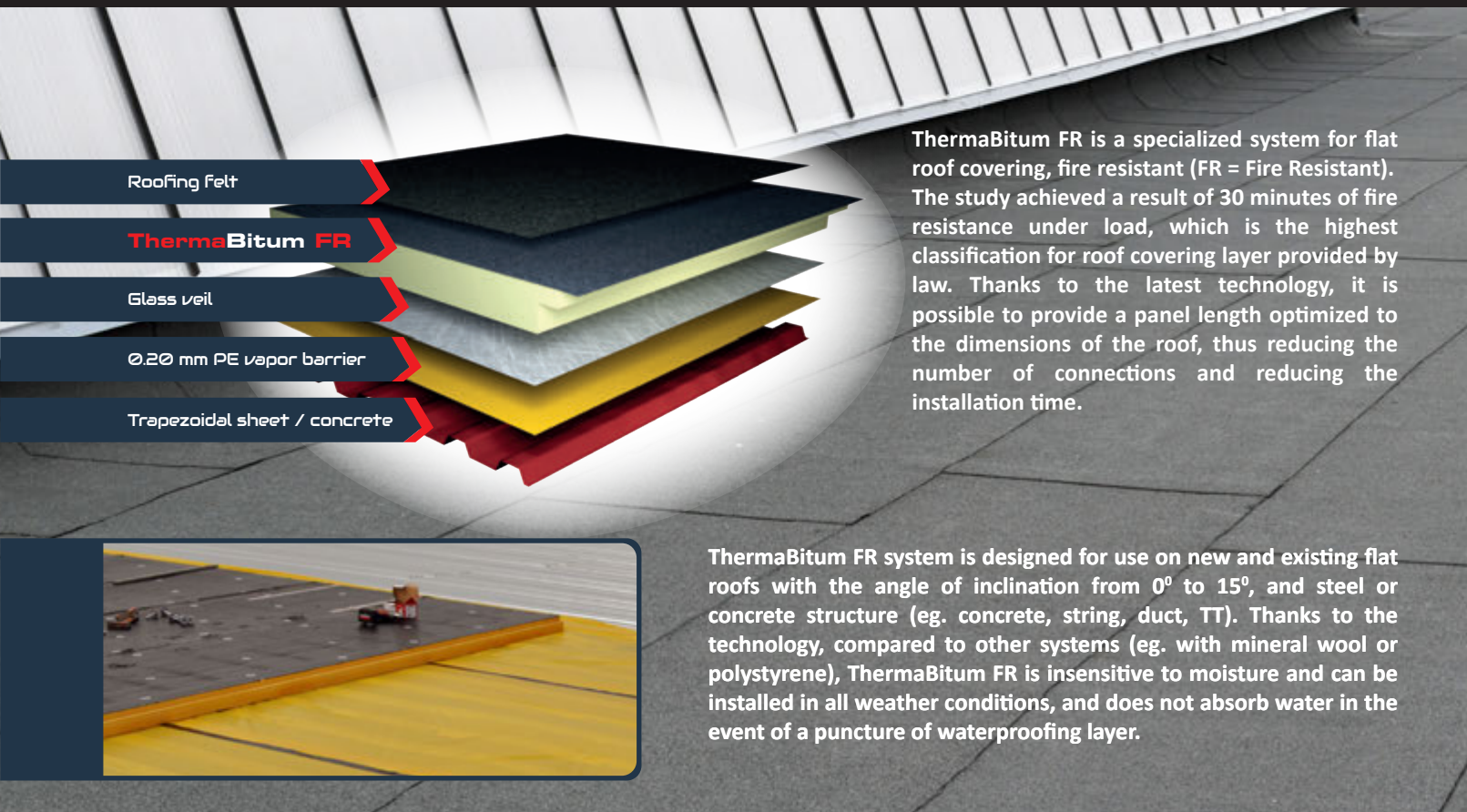
As a result, the number of layers of waterproofing is minimized while maintaining full tightness. It also reduces the weight of the system, reduces installation time and reduces the total cost of execution (in terms of materials and labor).

FUNCTION OF WATERPROOFING INTEGRATED WITH PU THERMAL INSULATION

Another innovative feature of products from the ThermaBitum (FR) and ThermaMembrane (FR) is integrating the functions of waterproofing and thermal insulation panels. The core of panels made of rigid PU foam is in the production process permanently welded to the outer cladding in the form of underlay roofing felt (ThermaBitum) or membrane (ThermaMembrane). This means that from now on there is no need for a separate supply and installation of individual layers of thermal insulation and waterproofing separately. It also translates into productivity and allows to significantly reduce the cost of investment and shorten the installation time by up to 50%.

In order to maximize energy efficiency, the systems ThermaBitum (FR) and ThermaMembrane (FR) use PU rigid foam, which is the most efficient insulation material currently used in the construction industry. This is very important especially for the ever-changing requirements of the thermal insulation of roofs that need to meet increasingly stringent energy standards.

The integration of the waterproofing with thermal insulation core has also the advantage of the entire surface of the panel featuring a complete adhesion between the two elements. 100% adherence means no voids, and thus the lack of possible emergence of typical defects in the form, eg. air bubbles between the waterproofing and thermal insulation. The risk of deterioration of system parameters over the time does not occur, what in practice eliminates any possible repairs. As a result, membrane forming the outer cladding of ThermaMembrane (FR) panels is "relieved" and compared to traditional tiered system is not working as hard as mechanically fastened membrane.



Roofing Felt

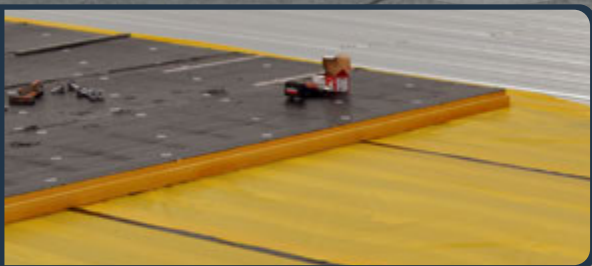
ThermaBitum FR

Glass veil

0.20 mm PE vapor barrier

Trapezoidal sheet / concrete

ThermaBitum FR is a specialized system for flat roof covering, fire resistant (FR = Fire Resistant). The study achieved a result of 30 minutes of fire resistance under load, which is the highest classification for roof covering layer provided by law. Thanks to the latest technology, it is possible to provide a panel length optimized to the dimensions of the roof, thus reducing the number of connections and reducing the installation time.



ThermaBitum FR system is designed for use on new and existing flat roofs with the angle of inclination from 0° to 15°, and steel or concrete structure (eg. concrete, string, duct, TT). Thanks to the technology, compared to other systems (eg. with mineral wool or polystyrene), ThermaBitum FR is insensitive to moisture and can be installed in all weather conditions, and does not absorb water in the event of a puncture of waterproofing layer.

During assembly, the installation of waterproofing layer phase, sealing point (torch response) is **on the top of roofing felt contact with bitumen cladding of panels (underlay)** of ThermaBitum FR. As a result, the temperature of both welded elements is the same and there is no formation of air bubbles between the layers of the roofing felt. Due to the fire resistance of the system, during the welding of surface the phenomenon of insulation core melting does not occur , what is common in the case of Styrofoam.

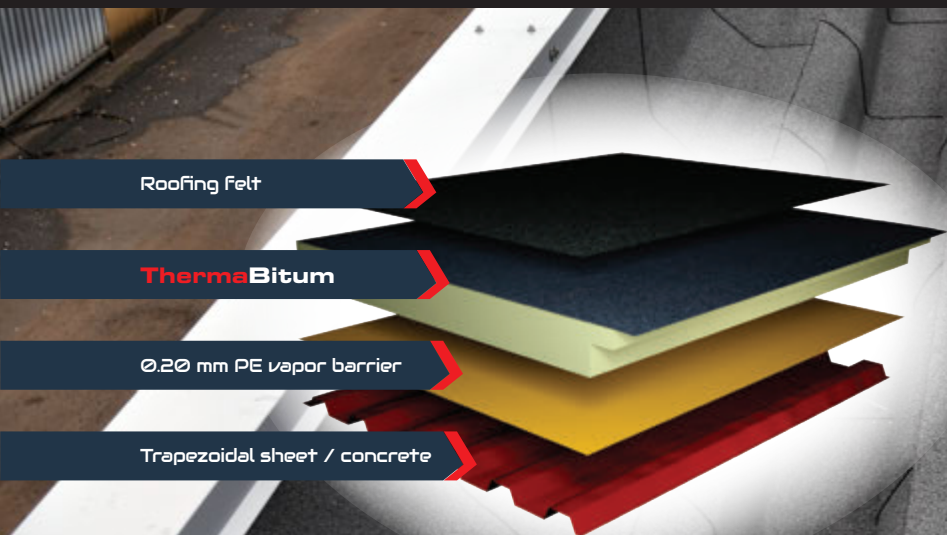


ThermaBitum FR SYSTEM BENEFITS:

- Fire resistance: REI 30
- Reaction to fire: B-s3, d0
- Resistance to external fire: B_{ROOF}(t1)
- An additional layer of glass veil
- No melting layer of insulation when welding the outer felt system
- Maximum resistance to extreme temperatures
- Guaranteed tightness and stability over time
- For steel systems: sheet strenuously 60.65%
- Can be used on new and existing flat roofs

Very good **compressive strength parameter** of up to **120 kPa** (at 10% deformation) causes that the system of ThermaBitum FR does not feature the risk of collapse of covering by, for example load due to the need to service access to devices mounted on the roof. Similarly, no damage was observed in the need for roof snow removal in winter (either manually or using small driving plows).

AVAILABLE THICKNESSES	100 mm	125 mm	140 mm	175 mm
Form	specialized thermal insulation PU panels with fire resistance class REI 30			
Purpose	new and modernized flat roofs, with an angle of inclination of 0 to 15°			
Modular width [mm]	1025			
Overall width [mm]	1060			
Overall length = modular [mm]	standard: 2400 (min. 2100, max. 8000) special: optimized to the dimensions of the roof (on request)			
Number of panels in a bundle [pcs.]	11	9	8	6
Longitudinal joint type	overlap of 75 mm (type B) with underlay for welding of adjacent panel			
Transverse joint type	simple, dilatation necessary for installation of 20 mm to the next panel filled with mounting foam, ending to cover and seal with the 20 mm roofing felt underlay			
Top cladding	roofing felt underlay 2.3 mm with the overlap along the panel length			
The insulating core	European PU+ Insulation System Core - polyurethan rigid foam with a density of 33±3 kg/m ³			
Bottom cladding	polyester fiber FR 150			
Waterproofing	top felt having a thickness of 5.0 mm, with the polyester insert of 250 g/m ² , SBS modified class NRO, torch surface welding cladding panels of felt underlay as a single-layer system			
Required additional layers	apor barrier (PE film min. 0.2 mm or roofing felt underlay) glass veil of at least 120 g/m ² , (between the vapor barrier and the panel)			
Attaching to the base	mechanical telescopic system (sleeve + bond) over the entire surface			
1 m ² net product weight [kg]	6,65	7,53	8,28	9,47
Thermal conductivity λ_d [W/mK]	0,022			
Thermal resistance R [m ² K/W]	4,55	5,56	6,25	7,69
Thermal transmittance coefficient U [W/m ² K]	0,22	0,18	0,16	0,13
Resistance to fire	REI 30			
Roof resistance to external fire	B _{ROOF} (t1)			
Reaction to fire	B-s3, d0			
Resistance to compression (at 10% deformation)	120 kPa			
Reference document	compliance with the european standard PN-EN 13165+A1:2015-03			



ThermaBitum is a complete, versatile system designed primarily for thermo modernization of flat roofs covered with roofing felt. The system is ideally suited for use wherever there are strict fire requirements, and the most important is the service life, ease of installation and low cost of the investment. Factory quality of panels, excellent technical parameters and the use of commonly known techniques of roofing felt welding make this product an excellent alternative for eg. Styrofoam.



Due to the use of PU core, ThermaBitum panels may be about half as thick as the other systems, eg. with polystyrene foam and mineral wool. This is very crucial for the modernization of the existing flat roof due to the firewall height, restricting the freedom of "adding" successive layers of insulation.

The system can be used on new and existing flat roofs with an inclination of 0 to 15°, steel or concrete (eg. concrete, string, duct, TT). Due to the composition of the product consisting of a core of rigid insulating polyurethane foam PU, a closed bottom casing of Kraft paper, and the top cladding underlay, easy to transport and easy to install panels ThermaBitum are attached mechanically to the base by telescopic fasteners. Terminally, only one layer of hydroinsulation- external roofing felt is welded to the underlay product. During welding, flame resistant PU core is not melted or damaged.



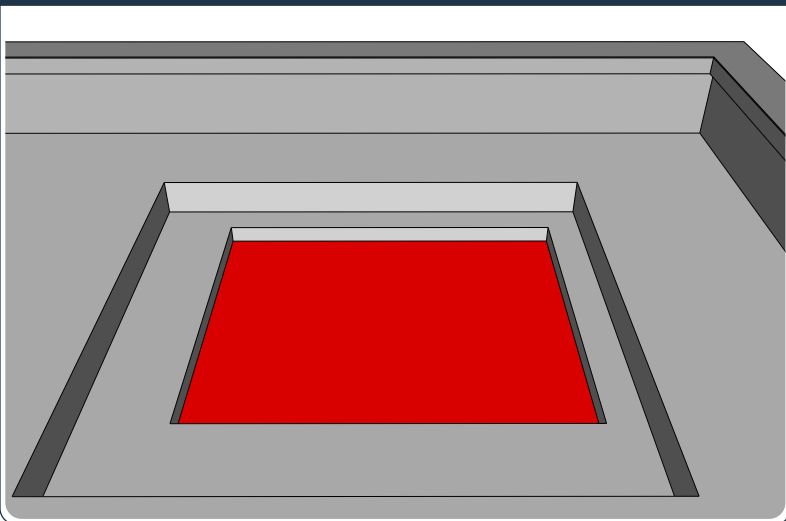
ThermaBitum SYSTEM BENEFITS:

- Complete system with a set of mounting accessories
- Factory quality workmanship
- Efficient insulation made of rigid polyurethane foam
- Welding only one layer of roofing felt surface
- Non- melting insulation layer
- Maximum resistance to extreme temperatures
- Guaranteed tightness and stability over time
- Simple, cheap and quick installation
- Can be used on new and existing flat roofs

In the case of thermal modernization of existing flat roofs, the use of ThermaBitum system allows for significant time and cost savings resulting from the implementation of mounting directly on existing overlap, without the need to uncover and disposal. In this case, the layer of existing covering forms a vapor barrier and anchor points must be determined opencast and should be chosen on this basis the appropriate length of the connector.

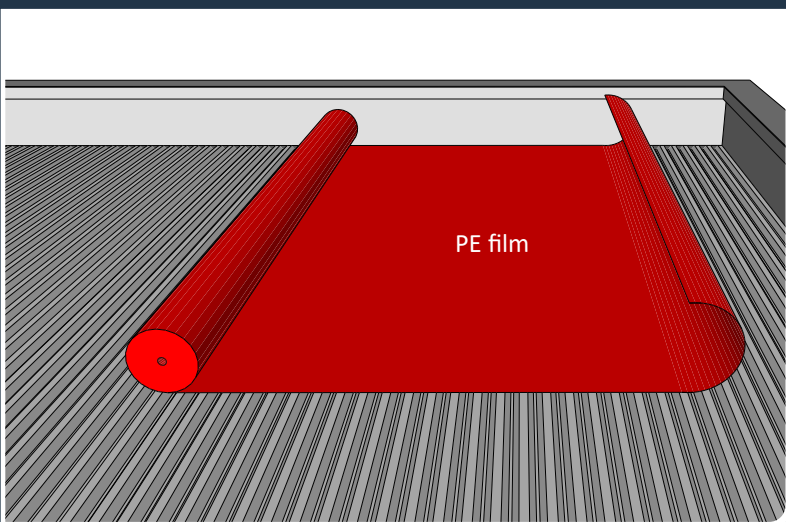
AVAILABLE THICKNESSES	60 mm	80 mm	100 mm	125 mm	140 mm	175 mm
Form	universal PU thermal insulation panels with underlay					
Purpose	new and modernized flat roofs, with an angle of inclination of 0 to 15°					
Modular width [mm]	1050	1025				
Overall width [mm]	1080	1060				
Overall length = modular [mm]	standard: 2400 (min. 2100, max. 8000) special: optimized to the dimensions of the roof (on request)					
Number of panels in a bundle [pcs.]	18	14	11	9	8	6
Longitudinal joint type	overlap of 50 mm (type A) 75 mm (type B) overlapping with overlapping fold with underlay for welding of adjacent panel					
Transverse joint type	simple, dilatation necessary for installation of 20 mm to the next panel filled with mounting foam, ending to cover and seal with the 20 mm roofing felt underlay					
Top cladding	roofing felt underlay 2.3 mm with the overlap along the panel length					
The insulating core	European PU Insulation System Core - rigid poliurethane foam with a density of 33±3 kg/m ³					
Bottom cladding	multilayer Kraft paper type composite, PE and ALU film					
Waterproofing	top felt having a thickness of 5.0 mm, with the polyester insert of 250 g/m ² , SBS modified class NRO, torch surface welding cladding panels of felt underlay as a single-layer system					
Required additional layers	vapor barrier (PE film min. 0.2 mm or roofing felt underlay)					
Attaching to the base	mechanical telescopic system (sleeve + bond) over the entire surface					
1 m ² net product weight [kg]	5,29	5,97	6,65	7,53	8,22	9,41
Thermal conductivity λ_g [W/mK]	0,022					
Thermal resistance R [m ² K/W]	2,70	3,57	4,55	5,56	5,25	7,69
Thermal transmittance coefficient U [W/m ² K]	0,37	0,28	0,22	0,18	0,16	0,13
Roof resistance to external fire	B _{ROOF} (t1)					
Reaction to fire	Bs-3, d0					
Resistance to compression (at 10% deformation)	120 kPa					
Reference document	compliance with the european standard PN-EN 13165+A1:2015-03					

PREPARING FOR INSTALLATION



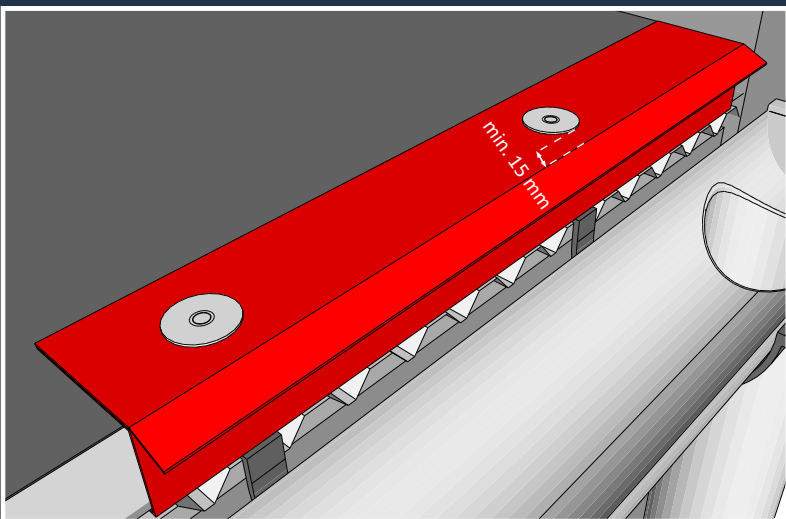
Installation on an existing flat roof without dismantling the roof covering (thermomodernisation) should be preceded by an experimental examination of anchoring layer depth (mainly roofs with concrete). This is done by cutting a cast of approx. 1 m² (made, to make sure, in a few places of the roof), in order to cross-examine the covering layers with determining the length of the connector, which must be embedded in a layer construction. This service can be done by EuroPanels by prior arrangement. Then, the deposited impurities must be removed from the roof surface and emergency repairs of any unevenness in the covering should be made, for example the air bubbles between the layers of roofing felt, by their intersection and welding with a torch. Depending on site conditions, ThermaBitum panels are given up on the roof in their original packages or individually. However, be careful not to damage the roofing felt overlaps along the longer side of panels.

VAPOR BARRIER



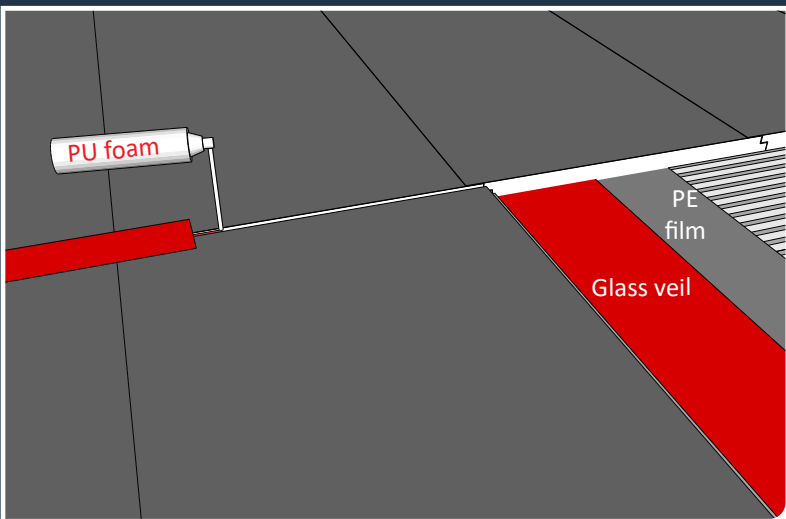
Like with the other systems using the layered products of the thermal insulation (PU core, EPS or MW), basic procedure having the task to prevent moisture of insulation layer through the ceiling is the use of a vapor barrier, as a protective barrier. If the ThermaBitum system is to be applied to the existing covering without its disassembly, an existing tar paper surface can be considered a sufficient vapor barrier. In the case of using ThermaBitum panels on new roofs, the cheapest will be vapor barrier film (PE type with a thickness of at least 0.2 mm) The lack of vapor barrier layer and / or installation of the system on the newly made roofs of concrete (non-seasoned) can lead to moisture and degradation of panels underneath, making it necessary to install additional ventilation chimneys to remove accumulated moisture.

PANEL FIXING



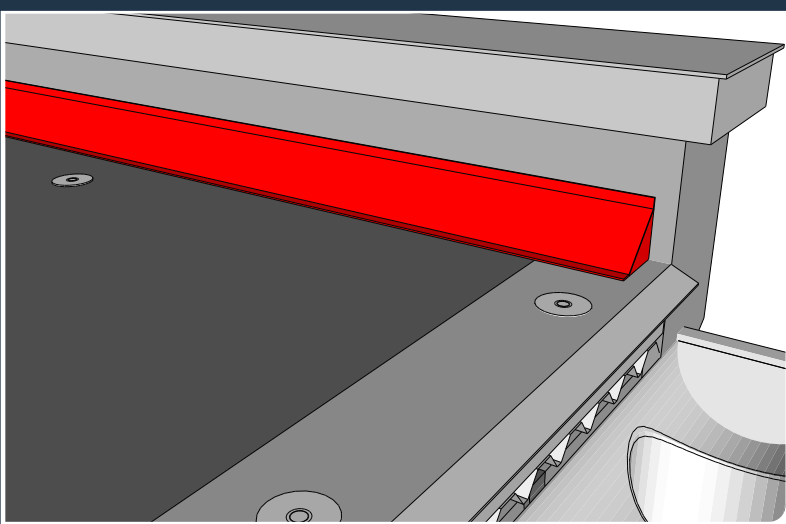
After spreading a vapor barrier, installation of the panels starts from the eaves. If gutter hooks are fixed in an over-rafter way they must first be bent to the appropriate angle and fastened onto concrete or on top of a wave of trapezoidal sheet. Spacing of 400-600 mm of the hooks in practice means mounting at every second wave of low trapeze or on each wave of high trapeze. Then place the first panel from the gable wall (dilatation distance from firewall 20 mm) against the edges of the eaves. The edge of the panel at eaves is inserted into the treatment of 009 C-section locking plate and we place the drip edge 003 on the whole. If hooks are face to face with installation, use the enhanced processing of 009B. Next, through C-section and the drip 003 we drill \varnothing 14 preliminary holes to a depth approx. of half of the thickness of the ThermaBitum panels in each upper wave of trapezoidal sheet and perpendicular to its surface. In the case of concrete base, the distance between the points of anchorage will be given individually. The prepared holes are filled with telescopic connectors (sleeve and screw) and tightened to the base. NOTE: Preliminary drilling shall be performed in such a way that after placing of the telescopic connector, the distance of approx. 15 mm remains between the edge of the sleeve and the edge of the panel in the eaves.

PANEL JOINTS, GLASS VEIL



Along the long side, each ThermaBitum FR panel has overlapping contact and fold of the outer cladding (roofing underlay), which after attaching the panels must be welded to the adjacent panel. Joining panels lengthwise (section contact) is with 20 mm expansion joint between the panels, which is filled with low pressure PU foam, similarly to dilatation at the firewall (gable wall), then, the joint prepared in such way is welded with additional underlay strip with a width of 100 mm. To achieve a parameter at the level of fire resistance of REI 30 it is required to use separators of glass veil with a density of at least 120 g / m², which is placed on a layer of vapor barrier before placing of ThermaBitum FR.

MOUNTING ACCESSORIES

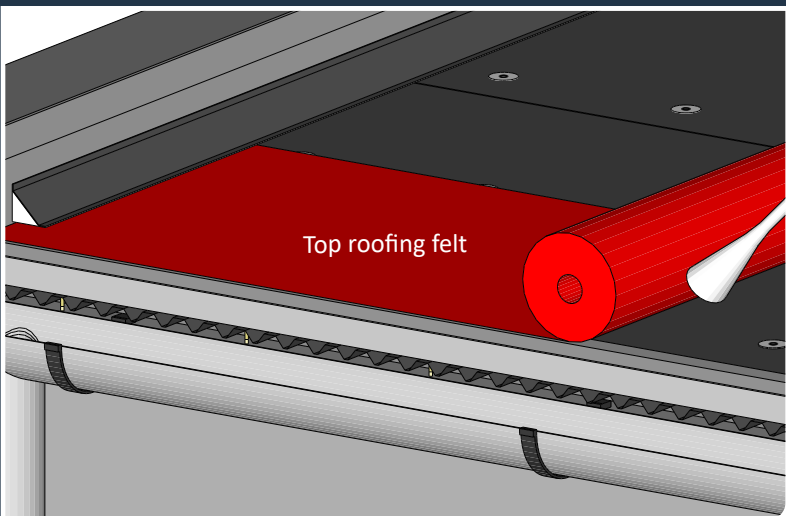


For proper, lasting and trouble-free installation of ThermaBitum FR it is necessary to use a range of system accessories, among which, mounting wedges are of special significance. These wedges are made in the same technology as the panels ThermaBitum FR (PU foam core + roofing underlay) and are used for mild refraction of the angle of the membrane surface at the contact points of covering with attics, firewalls, smoke flaps, ventilation channels, etc. objects occurring on the roof . Important are also flashings, fasteners, gutters, roofing surface and other accessories from the offer of EuroPanels. The number of connectors for attaching of panels per 1 m² depends on the location of the object in the snow and wind zone.

To facilitate working with the product, EuroPanels can determine the recommended number of connectors, but usually, the following amounts are taken into account:

- 3 pcs. in the central zone of the roof
- 6 pcs. in the edge zone.

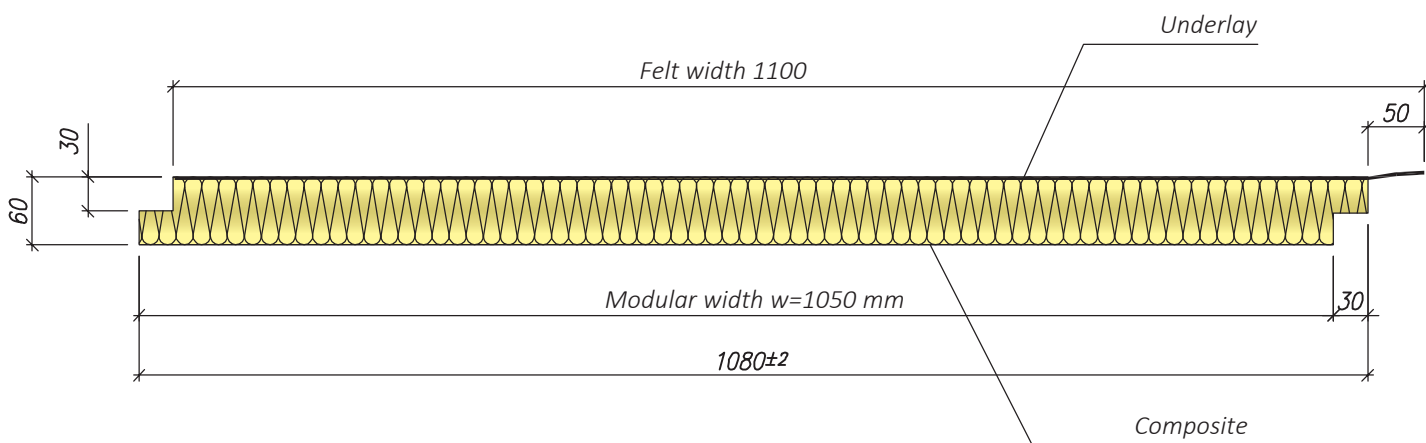
WATERPROOFING ASSEMBLY



One of the most important recommendations for system assembly of ThermaBitum FR is that on a given work day to install as many panels as can be covered with a layer of waterproofing. Leaving the panels themselves mounted to the base is inappropriate, since the lining of the underlay is not waterproofing; in addition, a large number of sleeves with holes for fasteners in the case of moisture may lead to significant loss of substance of the building. It is important in welding process that in contrast to tar styrofoam assembly- stream of fire from the torch should be directed at the point of contact of the top surface membrane with underlay (cladding of panels). In this way, the two layers of membrane have the same temperature, vulcanization is easier and air space is not formed between the layers. As a result, welded over the entire surface membrane creates an extremely tight and extremely durable covering. During surface membrane welding, an outflow of bitumen with a width of 10 mm should be achieved.

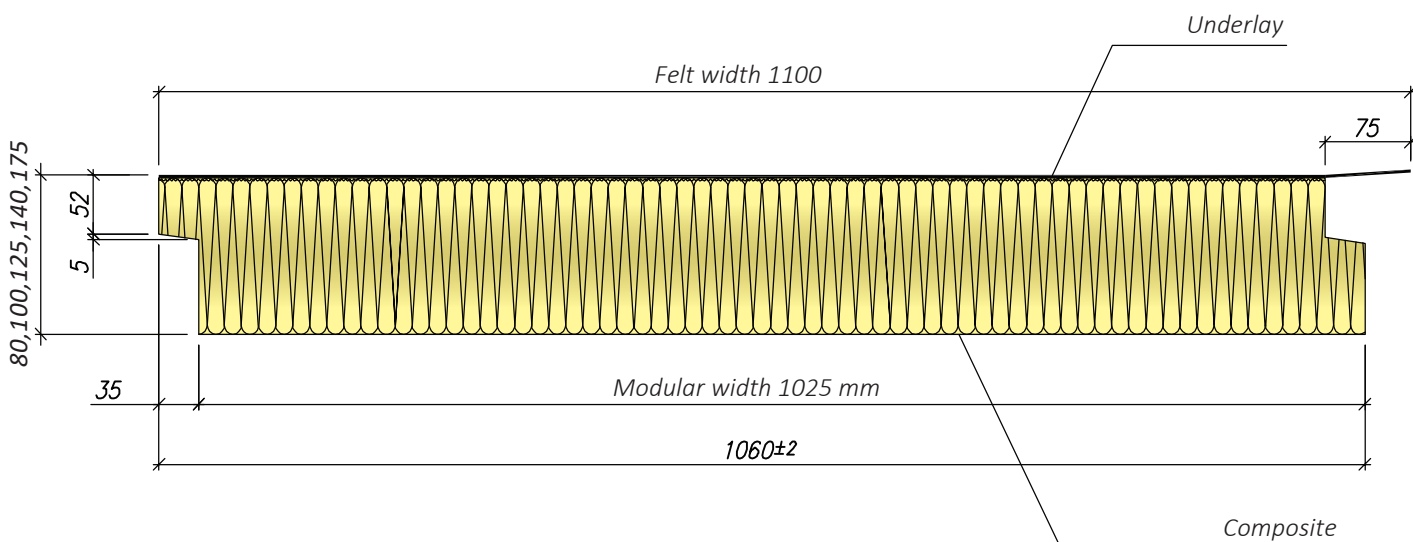
DIMENSIONS

TYPE A **ThermaBitum** - only for panel thickness of 60 mm



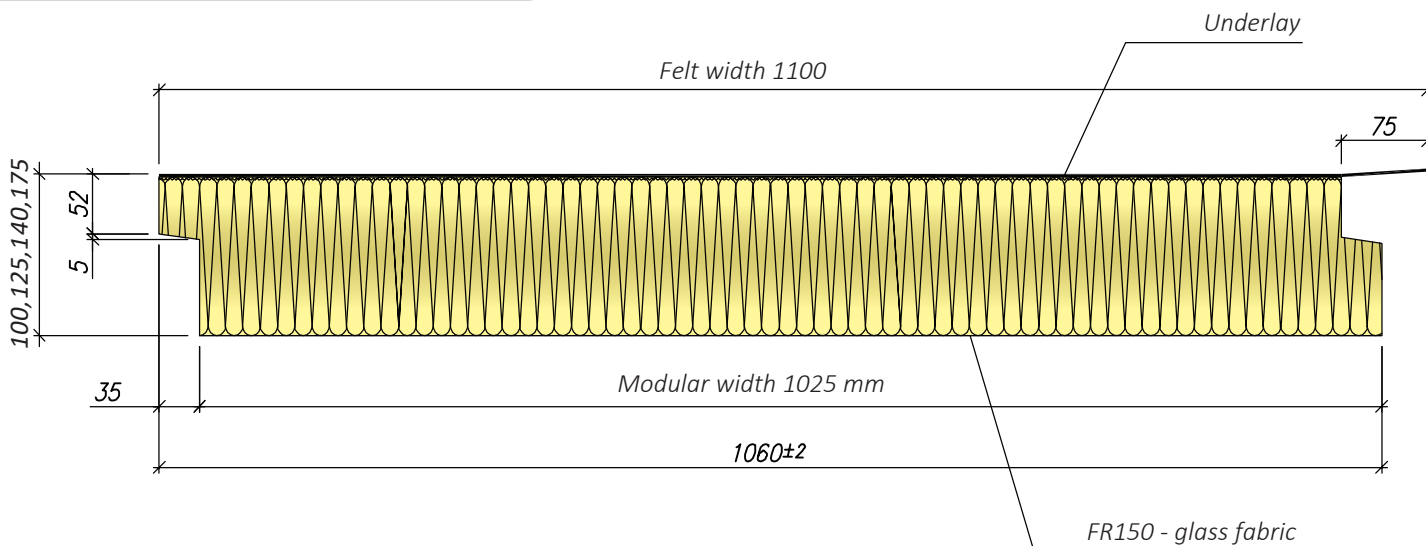
DIMENSIONS

TYP B **ThermaBitum** - for other panel thicknesses



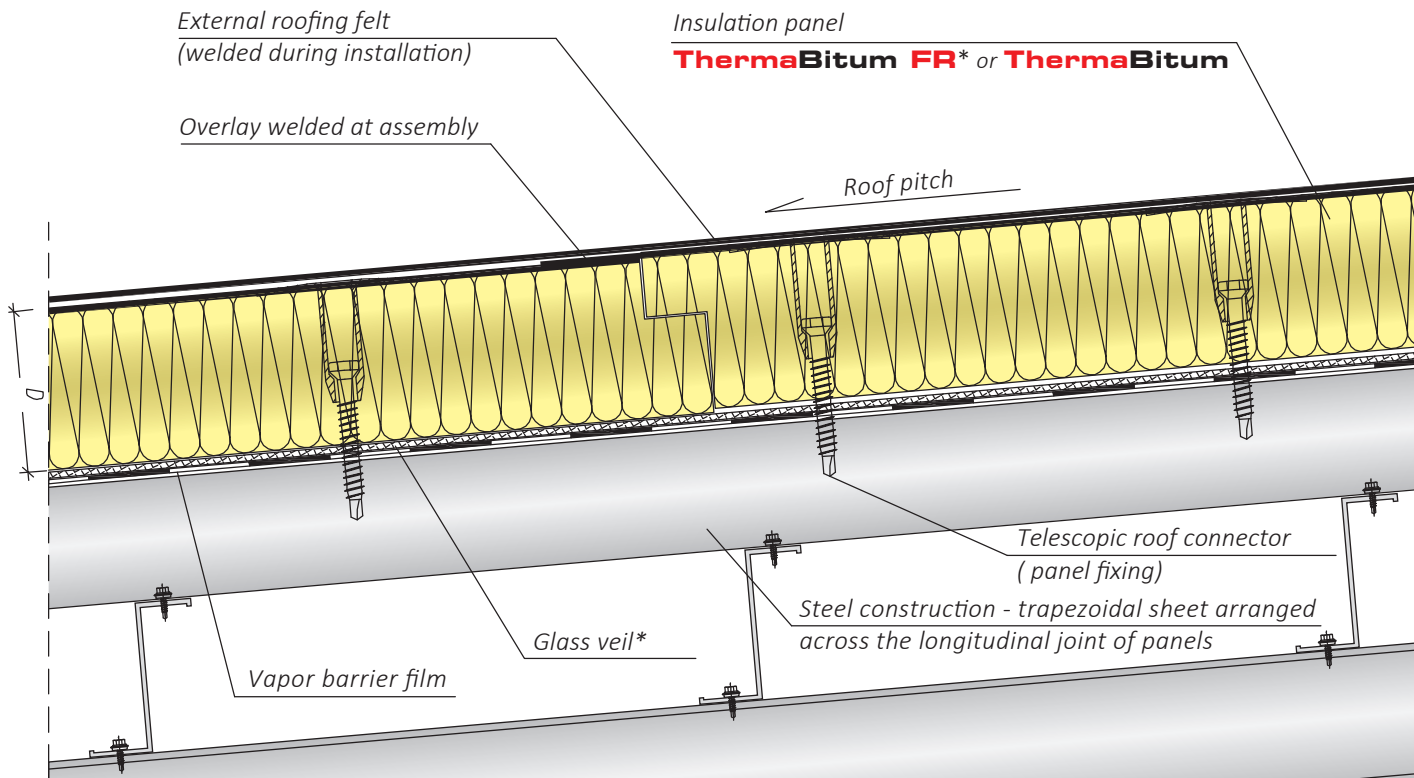
DIMENSIONS

ThermaBitum FR - for all thicknesses



LONGITUDINAL JOINT ON FLAT ROOF

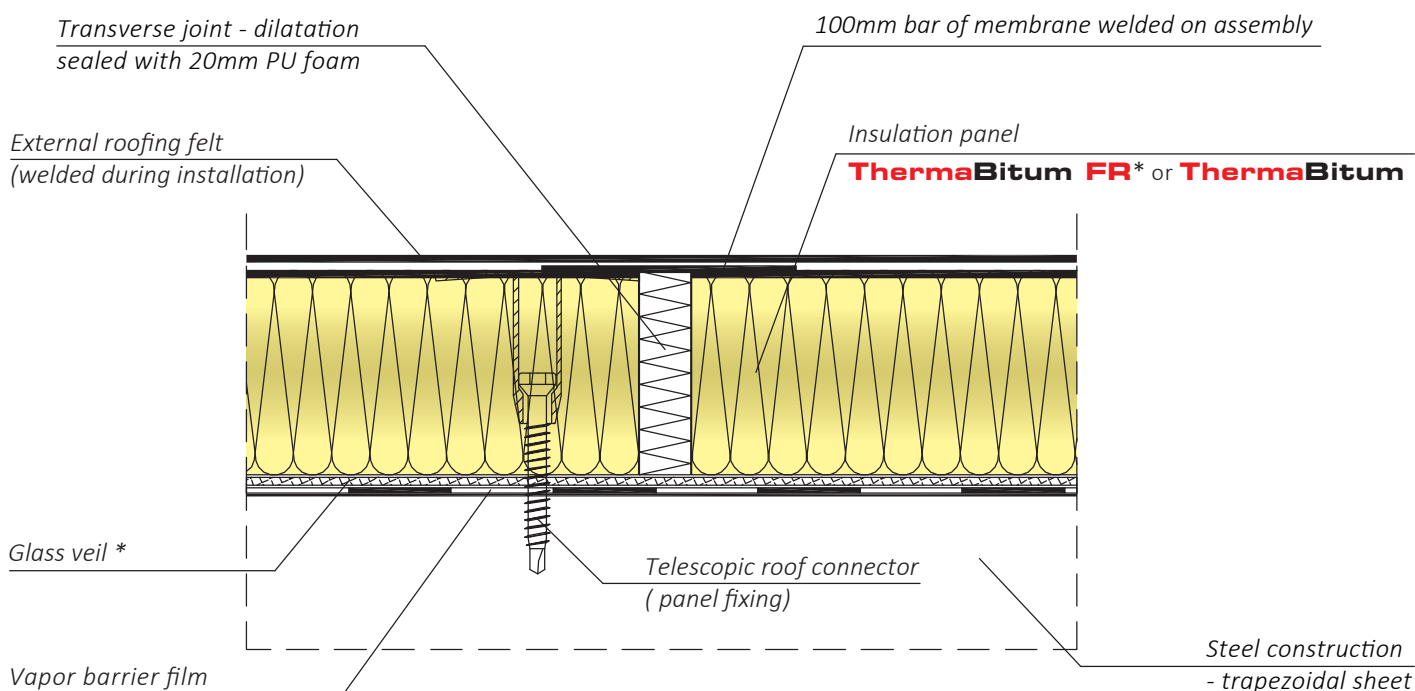
The system and method of assembling layers with trapezoidal sheet on a flat roof



* - Obligatory in order to obtain the REI 30 classification

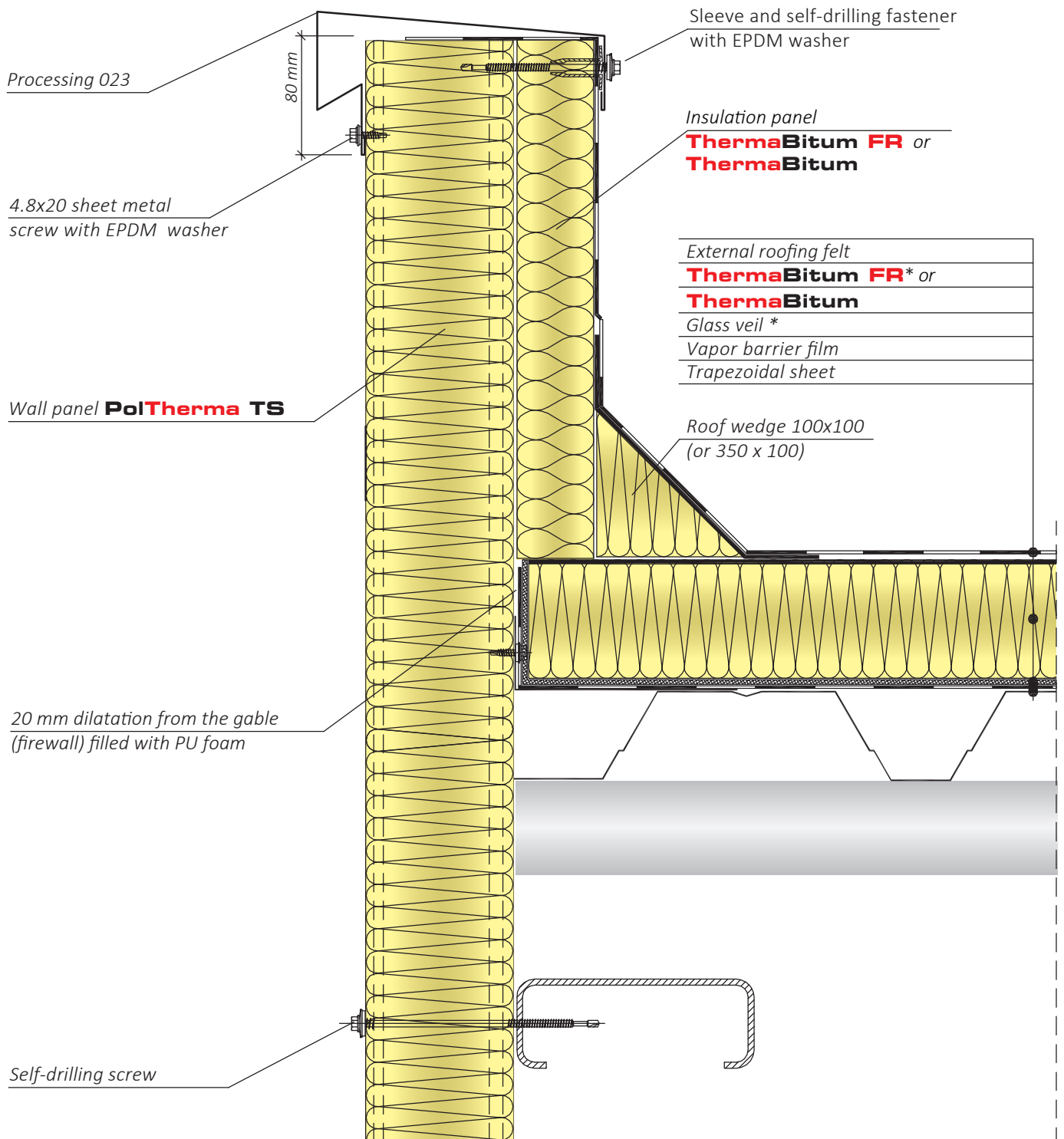
TRANSVERSE JOINT

Transverse joint of panels with 20 mm dilatation filled with PU foam, closed from the top with welded 100 mm membrane strip



* - Obligatory in order to obtain the REI 30 classification

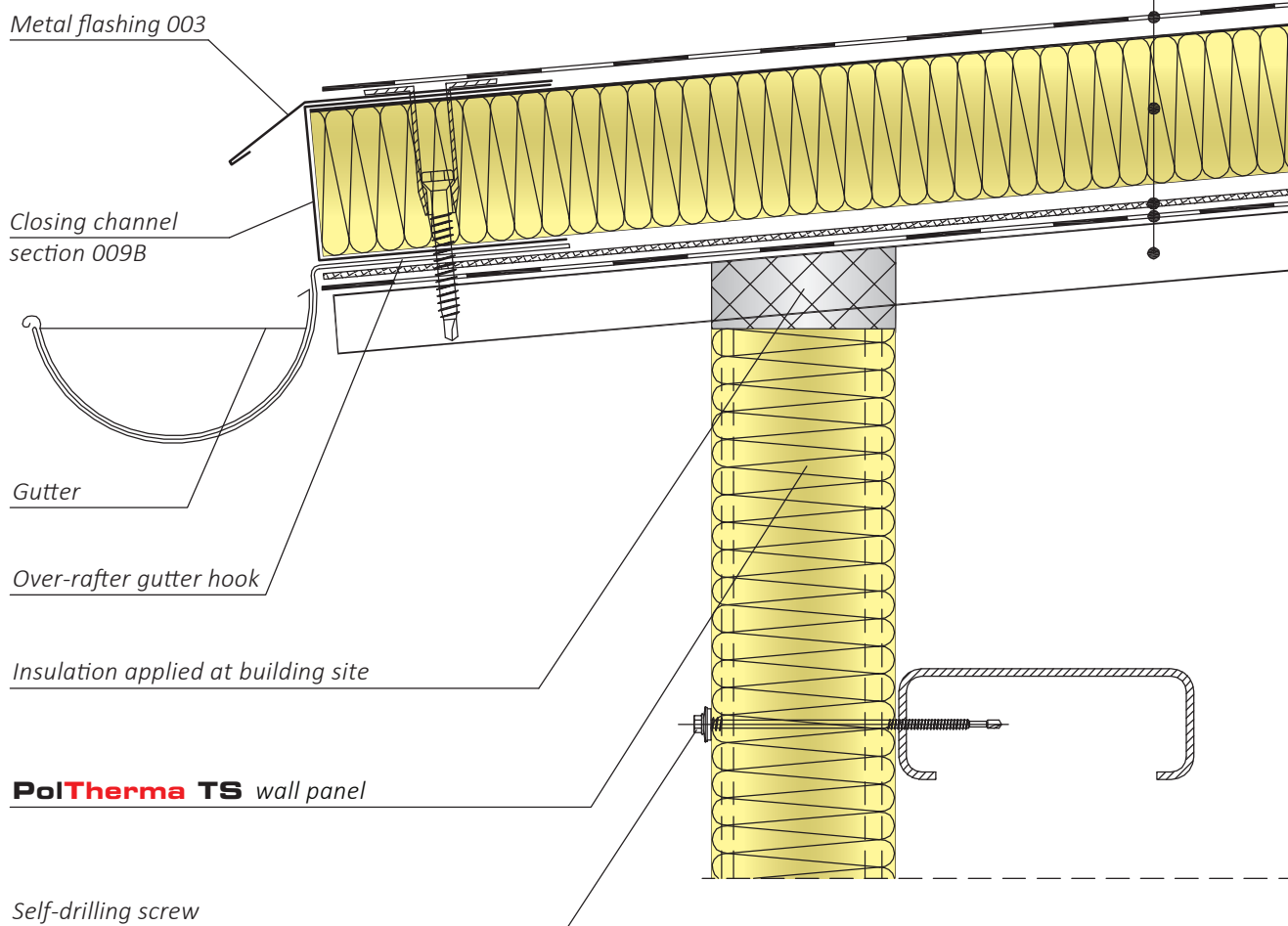
ATTIC



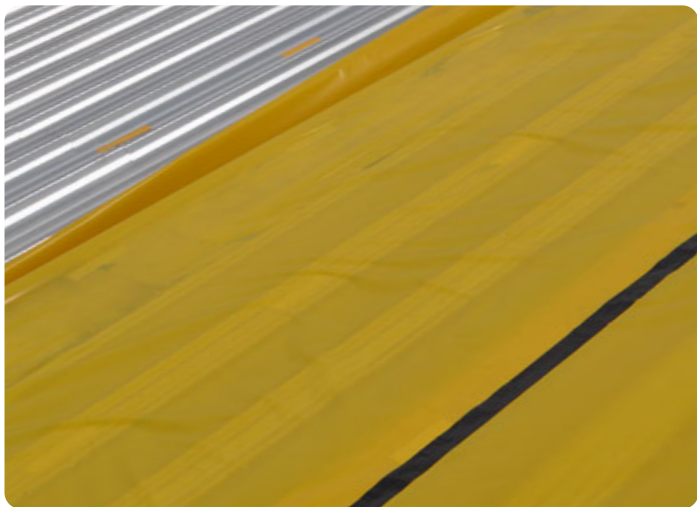
* - Obligatory in order to obtain the REI 30 classification

EAVES

External roofing felt
ThermaBitum FR* or ThermaBitum
Glass veil *
Vapor barrier film
Trapezoidal sheet



* - Obligatory in order to obtain the REI 30 classification



Preparation for installation: a vapor barrier on steel base



Anchoring of panels to the steel base



Gable wall insulation (firewall) with an internal gutter trough



View after installation



Installation in the ridge



Ridge after assembly



100x100 wedge at the junction with the smoke flap



Finishing- external roofing felt



Internal gutter trough during assembly



View after installation



Mounting of ThermaBitum panels on the roof



View after installation and welding of top roofing felt



Eaves prepared for welding of top roofing felt



Point of welding (torch) directed to contact of felts- underlay (cladding of panels) and top (developed from a roll)



HVAC installation on a flat roof made in ThermaBitum system



The flat roof in the system of ThermaBitum (FR)



Access to ventilation equipment



Rooftop view after the completion of ThermaBitum (FR) system



Installation of renewable energy systems



The inner gutter



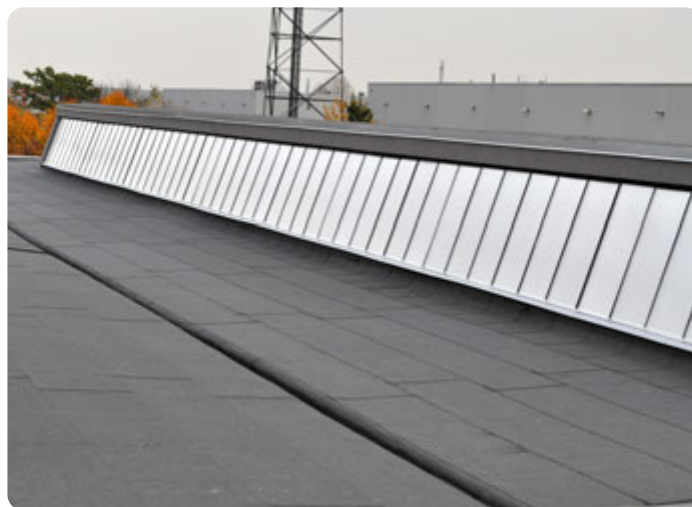
Installation of renewable energy on a flat roof insulated in the system of ThermaBitum



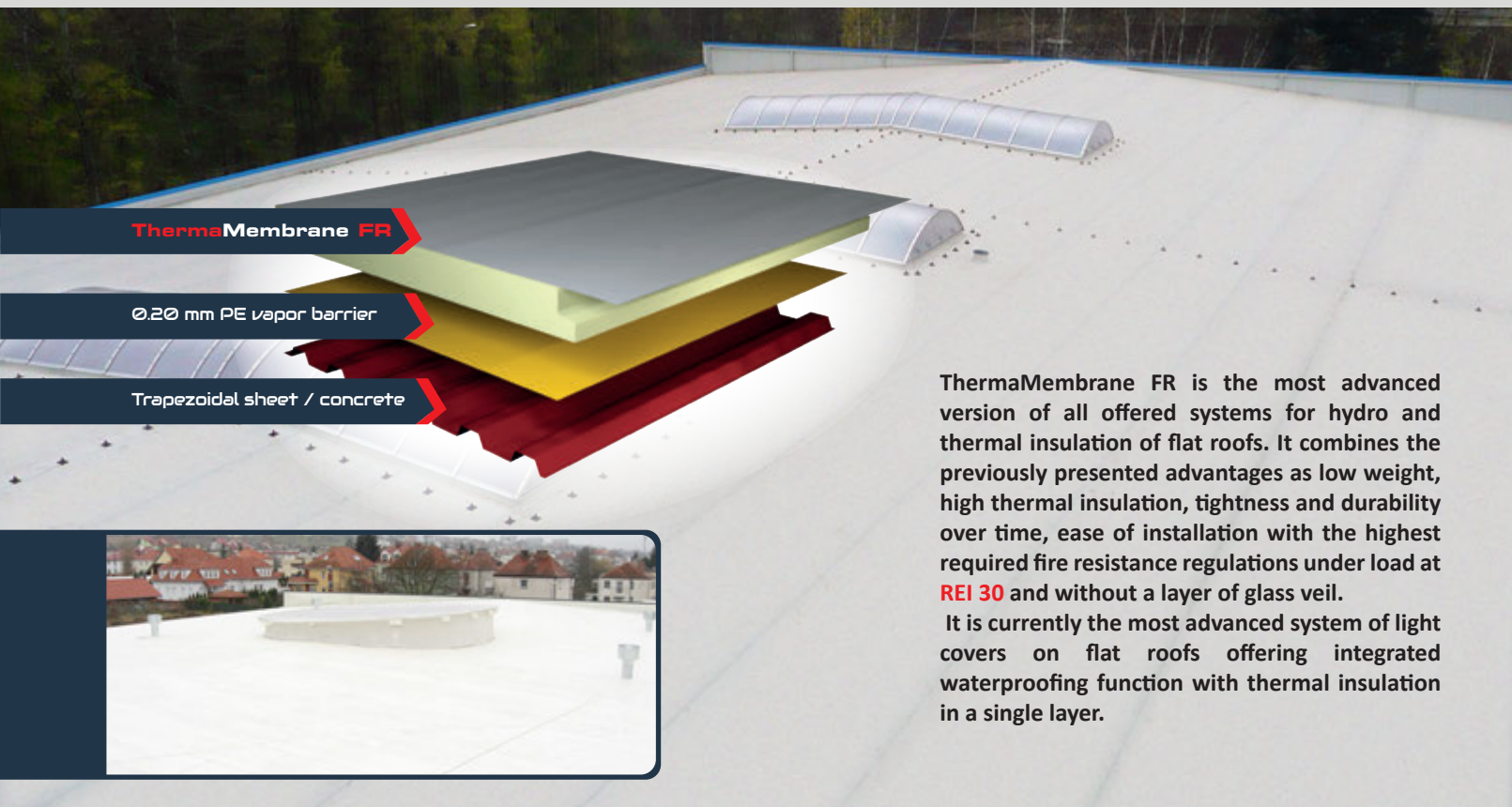
Flat roof- skylights



Access to renewable energy devices



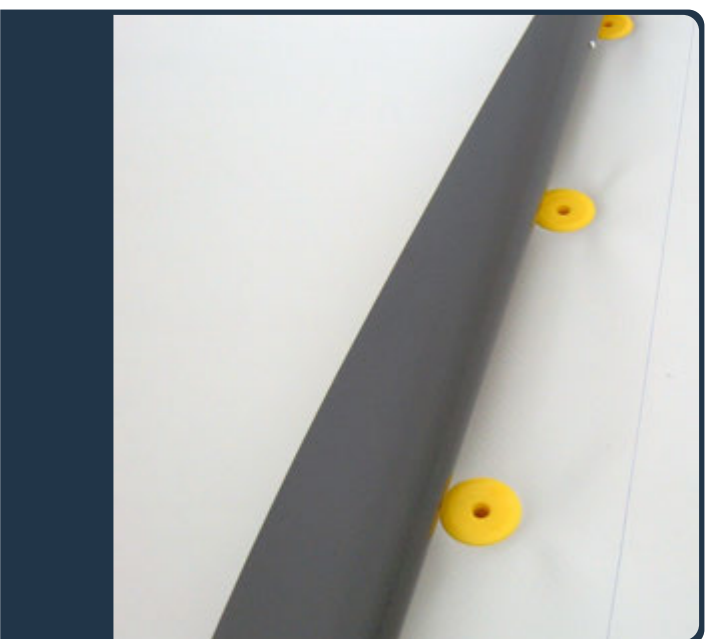
Internal gutter and skylights in the system of ThermaBitum



ThermaMembrane FR is the most advanced version of all offered systems for hydro and thermal insulation of flat roofs. It combines the previously presented advantages as low weight, high thermal insulation, tightness and durability over time, ease of installation with the highest required fire resistance regulations under load at **REI 30** and without a layer of glass veil.

It is currently the most advanced system of light covers on flat roofs offering integrated waterproofing function with thermal insulation in a single layer.

ThermaMembrane FR system gives the designer a level of comfort in the construction of flat roofs covering. Modular width of 1000 mm, can optimize the length of the panels to the size of the roof (standard length of 2400 mm of a single panel can be changed on individual request), a large range of thicknesses (from 100 to 175 mm), the minimum number of components of the system, technical specifications confirmed by tests and a simplified assembly with full availability of accessories and drawings- all this makes the design of covering of flat roofs activity creative and even artistic undertaking, rather than hard work.

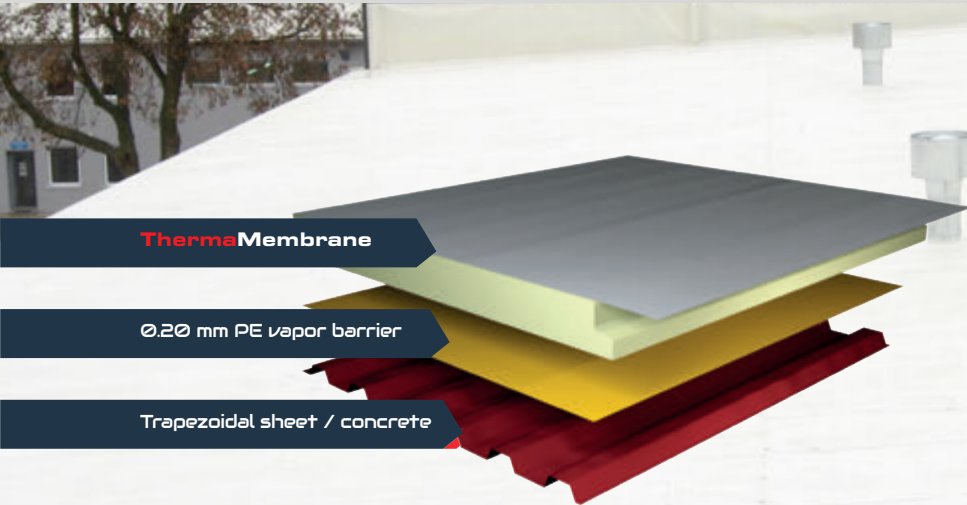


ThermaMembrane FR SYSTEM BENEFITS:

- ▶ Fire resistance: REI 30 without a layer of glass veil
- ▶ Reaction to fire: B-s3, d0
- ▶ Resistance to external fire: B_{ROOF}(t1)
- ▶ Real single-ply waterproofing system (outer cladding of membranes integrated with core of thermal insulation panels PU)
- ▶ Mechanical assembly in the panel joint
- ▶ Area of electric welding of membranes overlaps only in panel joints (contacts)
- ▶ Resistance to extreme temperatures, pressures and UV radiation
- ▶ Guaranteed tightness and stability over time
- ▶ Possibility to use on new and existing flat roofs

ThermaMembrane FR system will be willingly reached by the contractors, because it is the easiest of the currently available installation methods of covering flat roofs. Starting from the transport of material (lightweight panels can be handed over in packs or separately), through ease of installation and handling, up to the minimum amount of accessories and tools that are required. Everything has been designed with an attention to efficiency and safety at work on the roof with a minimum amount of time, cost, equipment and personnel.

AVAILABLE THICKNESSES	100 mm	125 mm	140 mm	175 mm
Form	specialized panels of thermal insulation with PU foam with resistance class REI 30			
Purpose	specialized flat roofs: new and modernized, with a slope from 0 to 15° on steel or concrete			
Modular width [mm]	1000			
Overall width [mm]	1120 (membrane), 1035 (core)			
Overall length = modular [mm]	standard: 2400 (min. 2100, max. 8000) special: optimized to the dimensions of the roof (on request)			
Number of panels in a bundle [pcs.]	11	9	8	6
Longitudinal joint type	overlapping the fold of overlap of 120 mm of membrane to electrical welding with contact with the adjacent plate			
Transverse joint type	simple, the assembly with necessary dilatation of 20 mm to next panel filled with mounting foam to cover and weld with the strip of 200 mm membrane with an adjacent panel			
Top cladding (waterproofing)	specialized membrane with a thickness of 1.2 mm with a fold of an overlap along the length of the panel, glass fiber reinforced with a geotextile			
The insulating core	Europan PU+ Insulation System Core - rigid polyurethane foam with a density of 33±3 kg/m ³			
Bottom cladding	galvanized steel sheet of 0.20±3 mm			
Required additional layers	vapor barrier (PE film min. 0.2 mm or roofing underlay)			
Attaching to the base	mechanical, telescopic system (sleeve + connector) in panel joint			
1 m ² net product weight [kg]	7,2	8,1	8,6	9,8
Thermal conductivity λ _d [W/mK]	0,022			
Thermal resistance R [m ² K/W]	4,55	5,56	6,25	7,69
Heat transfer coefficient U [W/m ² K]	0,22	0,18	0,16	0,13
Resistance to fire	REI 30			
Roof resistance to external fire	B _{ROOF} (t1)			
Reaction to fire	B-s3, d0			
Resistance to compression (at 10% deformation)	120 kPa			
Reference document	compliance with the european standard PN-EN 13165+A1:2015-03			



ThermaMembrane

0.20 mm PE vapor barrier

Trapezoidal sheet / concrete

ThermaMembrane system is the optimal solution for waterproofing and thermal insulation of most flat roofs: both new and existing ones (renovated).

The system is mechanically fastened to the steel or concrete base, but differently than in the case of ThermaBitum (FR), mounting is not carried out on the entire surface of the panels, but in the line of contact. Overlap of membranes along each panel allows to cover and seal the anchoring line using electric welding technique with external cladding of next panel, which does not coincide with any other finishing material.

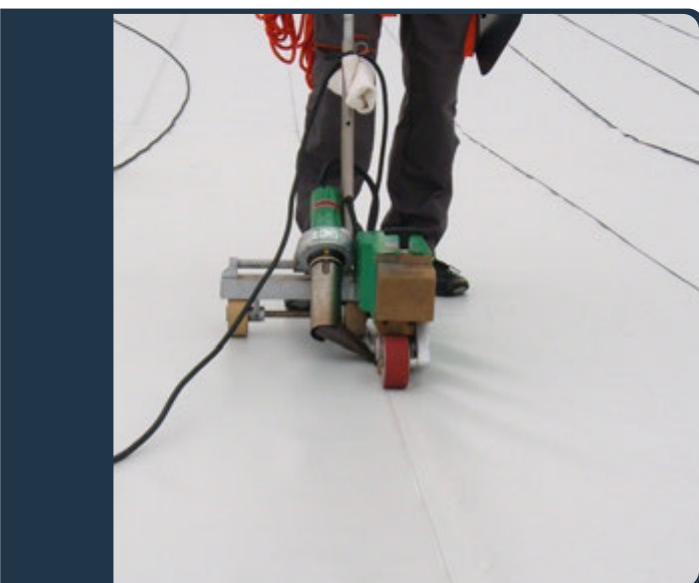
This way we get the lightest and currently most efficient waterproofing and thermal insulation system for flat roofs with the given thermal and strength parameters.



Core of ThermaMembrane panels uses one of currently most efficient in terms of thermal and mechanical properties materials, which is rigid polyurethane PU foam. During production, the core is fixedly combined with specialized flexible claddings.

External cladding, **which is also waterproof**, is in the form of a membrane with a thickness of 1.2 mm. This cladding is reinforced with glass fiber reinforcement and additionally comprises a layer of geotextile improving adhesion of PU foam. The membrane that we apply is resistant to UV, weathering, and also tear, puncture, impact, bending, etc.- all these features are in accordance with European standard EN 13956: 2012.

Internal cladding is formed by a multi-layer composite (Kraft paper, PE and AL films).



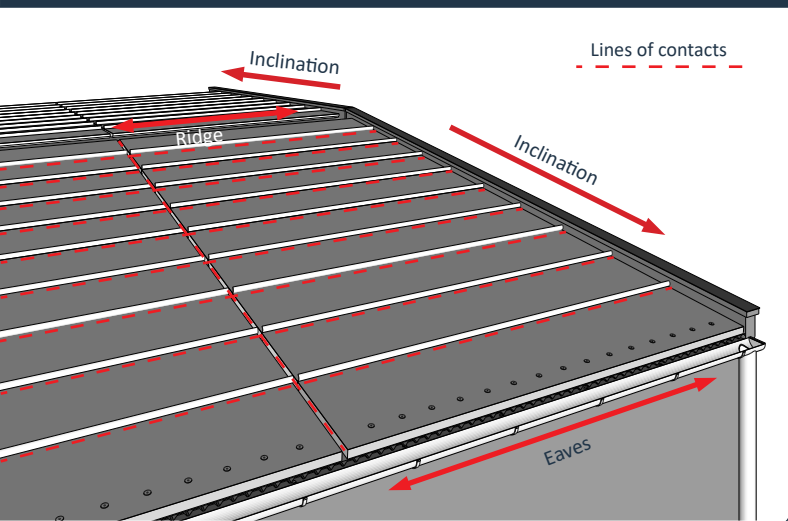
ThermaMembrane SYSTEM BENEFITS:

- ▶ A Complete system with a set of mounting accessories
- ▶ Factory quality
- ▶ High performance insulation made of rigid PU foam
- ▶ Waterproofing Integrated with thermal insulation
- ▶ Real single-ply waterproofing system
- ▶ Resistance to extreme temperatures and UV rays
- ▶ Guaranteed Tightness and stability over time
- ▶ Simple, cheap and quick installation
- ▶ To be applied on new and existing flat roofs

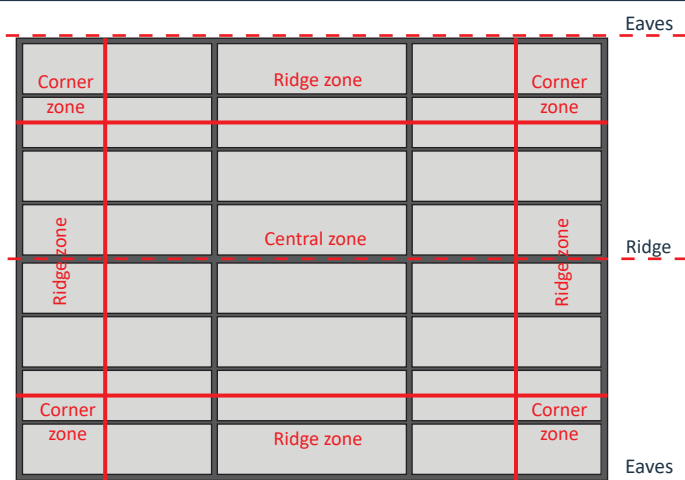
The use of PU foam as the core insulating and structural ThermaMembrane system means that even in the event of a puncture of the waterproofing layer (external cladding with membranes), any potential leak will not cause water penetration into the roof covering. This is because the PU foam does not absorb water (water absorption below 2%). This is another advantage of the system and ThermaMembrane advantage over other solutions for flat roofs.

AVAILABLE THICKNESSES	80 mm	100 mm	125 mm	140 mm	175 mm
Form	universal panels of thermal insulation with PU foam and integrated waterproofing				
Purpose	flat roofs- new and modernized, with an inclination angle from 0 to 15° on steel or concrete base				
Modular width [mm]	1000				
Overall width [mm]	1120 (membrane), 1035 (core)				
Overall length = modular [mm]	standard: 2400 (min. 2100, max. 8000) special: optimized to the dimensions of the roof (on request)				
Number of panels in a bundle [pcs.]	14	11	9	8	6
Longitudinal joint type	overlapping with the overlap of 120 mm membrane to weld electrically on contact with the adjacent plate				
Transverse joint type	simple, the assembly must have dilatation of 20 mm to the next panel filled with mounting foam to cover and weld with the strip of 200 mm of membranes with an adjacent panel				
Top cladding (waterproofing)	specialized membrane with a thickness of 1.2 mm with overlap along the length of the panel, reinforced with glass fibers, with a geotextile				
The insulating core	Europan PU Insulation System Core - rigid polyurethane foam with a density of 33±3 kg/m ³				
Bottom cladding	multilayer Kraft paper composite, PE and ALU film				
Required additional layers	vapor barrier (PE film min. 0.2 mm or felt roofing underlay)				
Attaching to the base	mechanical, telescopic system (sleeve + connector) in contact				
1 m ² net product weight [kg]	5,1	5,8	6,7	7,1	8,3
Thermal conductivity λ _d [W/mK]	0,022				
Thermal resistance R [m ² K/W]	3,57	4,55	5,56	6,25	7,69
Thermal transmittance coefficient U [W/m ² K]	0,28	0,22	0,18	0,16	0,13
Resistance to fire	REI 20				
Roof resistance to external fire	B _{ROOF} (t1)				
Reaction to fire	B-s3, d0				
Resistance to compression (at 10% deformation)	120 kPa				
Reference document	compliance with the european standard PN-EN 13165+A1:2015-03				

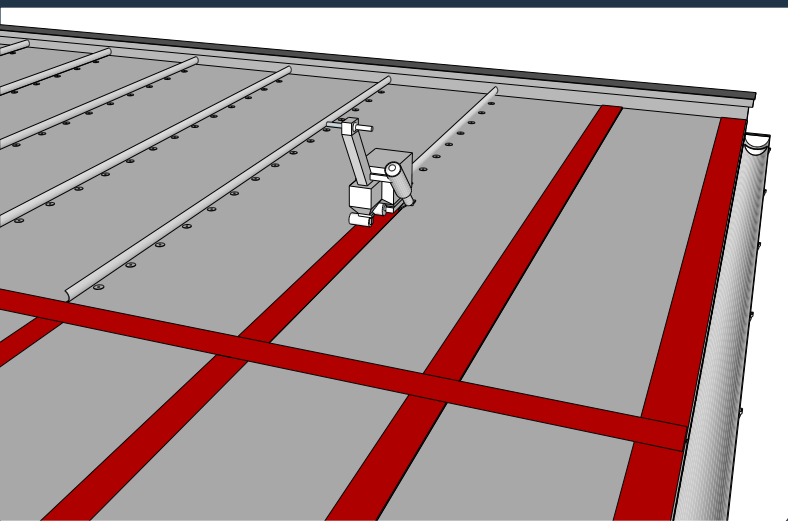
LAYOUT OF PANELS



PLACING AND FIXING PANELS TO THE BASE



WELDING OF THE OVERLAP



Layout of ThermaMembrane panels should not be arbitrary- this results from the way of their attachment to the base and the fact that the cladding is waterproofing, uncoated with another layer of covering. Hence, ThermaMembrane panels should not be put on the so-called "brick" but in a parallel way; in such a way that the transverse contacts (end of the panel) form one line. This is about the possibility of electric welding of strips of 200 mm membranes covering the lateral contacts in one line.

Starting the installation, position of the first panel and the use of treatments should be the same as for ThermaBitum system (p. 8). However, before installing you should measure the squareness of the roof (parallel eaves to the ridge and gable walls relative to each other). If, as the result of the measurement, you find out that, for example Gable walls (firewalls, attics) are not parallel, the first panel should be positioned firmly against this wall whose distance measurement result is smaller. This is about the need to preserve a weld line at the transverse junction and supplementing any deficiencies in panel lengths in the next stages of assembly.

The panels of ThermaMembrane system are attached to the base coated with a vapor barrier with a set of handlers (screw + mounting sleeve) generally only in the longitudinal contact points. Only the quantity and density of attachment points can sometimes be expected in the corner zone of the roof and then the additional installation takes place throughout the middle of the panel. However, that can be decided based on a detailed calculation made on the basis of PN-EN1991 Eurocode 1.

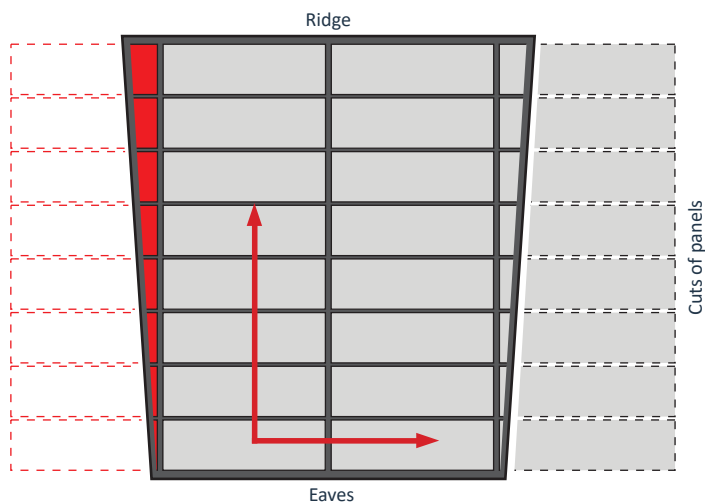
Unless the designer advises you otherwise, Europanel, within the extra service, can develop a detailed calculation of the amount and distribution of fasteners based on the location of the investment. Panels are joined together along the length with dilatation of 20 mm filled with assembly foam. Covering these points- contact strips of membranes should have a width of approx. 200 mm and be welded electrically at the end of the work day.

Welding of longitudinal contact overlaps and overlaps of transverse contacts shall be made using mobile, electric powered welders. They are lightweight and precise, and typically include adjustable welding parameters, such as temperature and pressure of rollers. Skillful use of such equipment ensures the correct and durable welding of membrane layers in the most efficient manner. Prior to installation, perform the test on site to determine the optimum temperature of the welding.

It is worth mentioning that the membrane forming the cladding of ThermaMembrane is a material made of plastic, hence it cannot be welded with a torch.

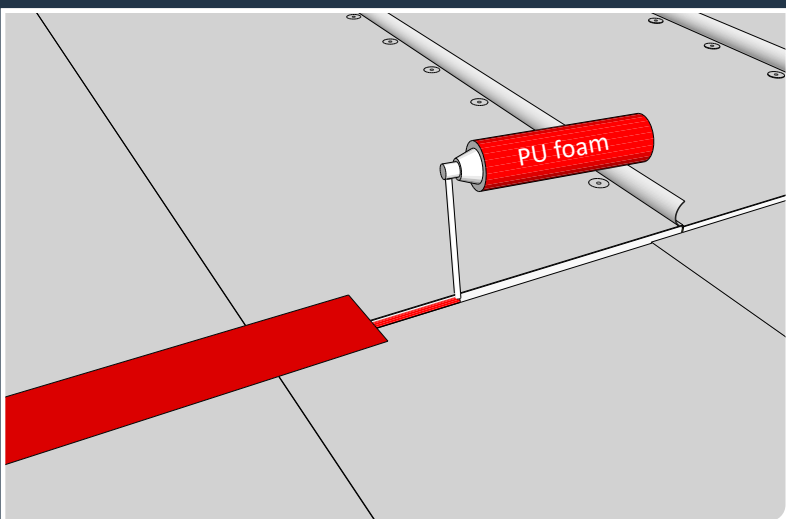
Additionally, in difficult accessibly places (eg. in the eaves) manual welding is used. The nozzles usually have a width of 20 mm or 40 mm, so the weld width is the same. Thus, natural is the situation, where on the width of the overlap (120 mm) part of the overlap (80 mm) is not welded, since the actual welding strip is 40 mm.

OPTIMIZATION OF WASTE



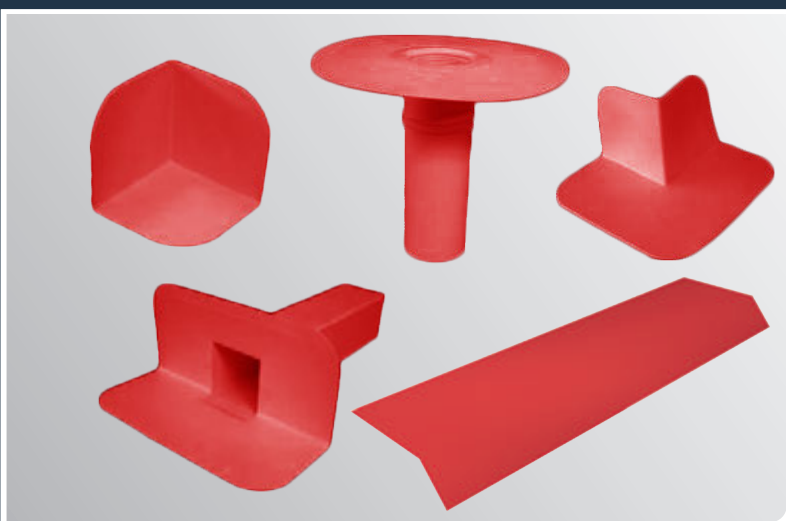
Because the panels of ThermaMembrane FR can be installed in only one orientation, it is very important to have economical and thoughtful distribution of panels on the base. Cuts should be used in places where there are deviations from parallelism of gables and eaves lines to each other. In these places, the replenishment of inequality- an exception from the general rule that contacts of the lateral ThermaMembrane FR panels should be in one line, is allowed. Because in practice it is difficult to get the perfect sizing of the roof, by adapting to these constraints and reducing waste we optimize the overall cost of the investment with ThermaMembrane FR system.

SECURING TRANSVERSE JOINTS



While the longitudinal contact protection is made by use and welding of outer cladding of overlaps, securing the transverse joints (connecting panels on the length) is made with additional strips of membranes with a width of 200 mm. The strips are available in the system of mounting accessories. Welding is made on the same principle as in the case of longitudinal contacts. The transverse contacts have 20 mm dilatation to be filled with a special PU foam- also available in the group of accessories. The foam is specially formulated and does not react with the membrane. Therefore it is not recommended to apply polyurethane foams for general use. Once fully bound, the foam excess should be cut in order to obtain a flat surface with the panels cladding. Thus prepared transverse contact should be covered by means of welding strip of 200 mm membrane (recommended weld width- 40 mm).

MOUNTING ACCESSORIES



On most flat roofs there are additional devices or components that need to be sealed and treated during or after the installation of ThermaMembrane FR panels. For all the typical solutions, eg. the panel contact with firewalls, skylights, the smoke flaps, roof penetrations, etc. there are ready, prefabricated mounting accessories with a layer of membrane. These accessories are an important part of the whole system, because they are exactly matched to the panel and perform an installation finishing in an efficient, durable and aesthetic way.

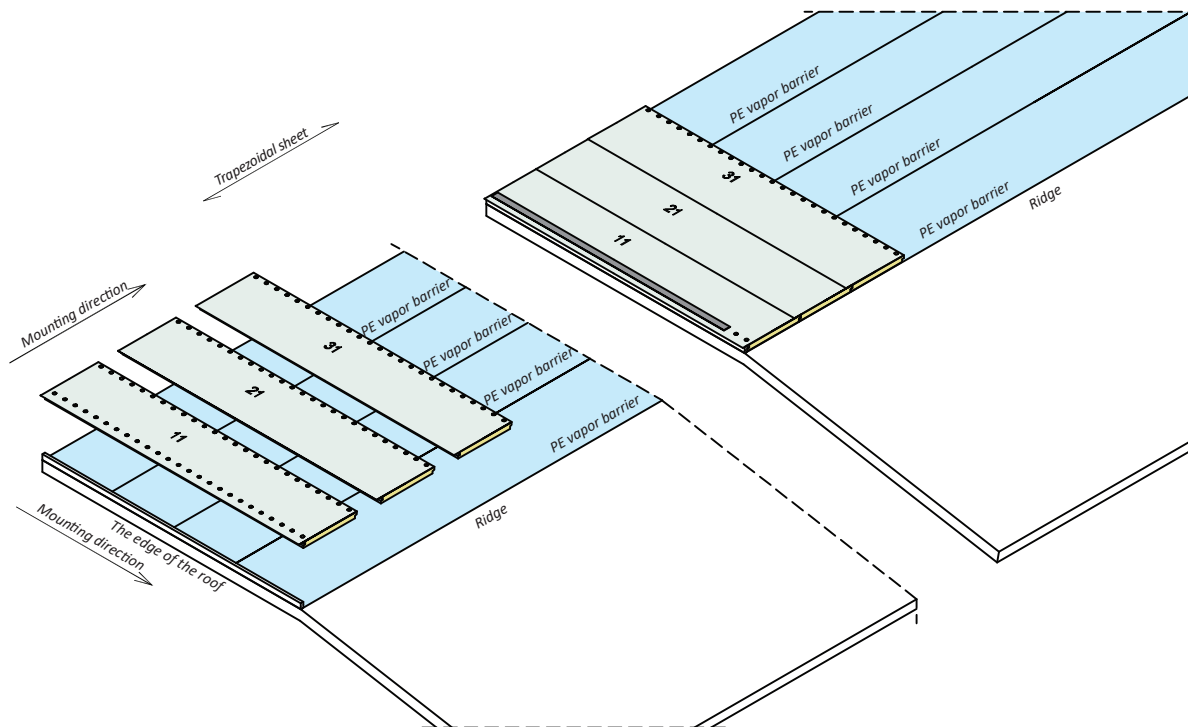
It is very important that the welding of membrane for flashings is possible only if the flashings are made of PVC. For standard coating eg. of polyester, effective welding of the membrane is not possible. That is why the use of a set of accessories is so important.

The offer also includes flashings and gutter systems.

NON-PURLIN ROOF

Column system

Trapezoidal sheet is placed "vertically" and the panel "horizontally" in the rows



DESIGN PRINCIPLES

- Place the panels transversely to the line of the eaves flashings- ridge
- Place the panels "bottom-up" (from the eaves flashings to the ridge)
- Place the panels from the corner of the gable wall and eaves flashings
- Panels are always placed transversely to the pressing profile of trapezoidal sheet
- Transverse connections of panels should be on the top shelf of trapezoidal sheet

ONE COLUMN

1. In panel 11 we cut off the lock with membrane overlap and place to the edge of the roof (gable wall and eaves flashings)
2. Attach the panel with connectors along the gable
3. Place panel 21 for closing the lock pin (you can gently lift the free edge of the longitudinal panel 11 to slide panel 21)
4. We unwind the membrane overlap from panel 21
5. Attach the mechanical fasteners in the panel 11 at fixing lines
6. We combine plate 11 and 21- longitudinal overlap welding

TWO OR MORE COLUMNS

1. We place the first panel from the first column
2. We put the second panel from the first column- we make a cross connection
3. The second panel from the first column is pushed to the first, leaving approx. 20 mm gap
4. The gap filled with foam
5. Excess foam after hardening is cut off to get even surface of the panels
6. After placing all the panels from the first column we place the panels from the second column
7. Spread the membrane strips on the cross joints and weld them

SELECTION AND PITCH OF CONNECTORS

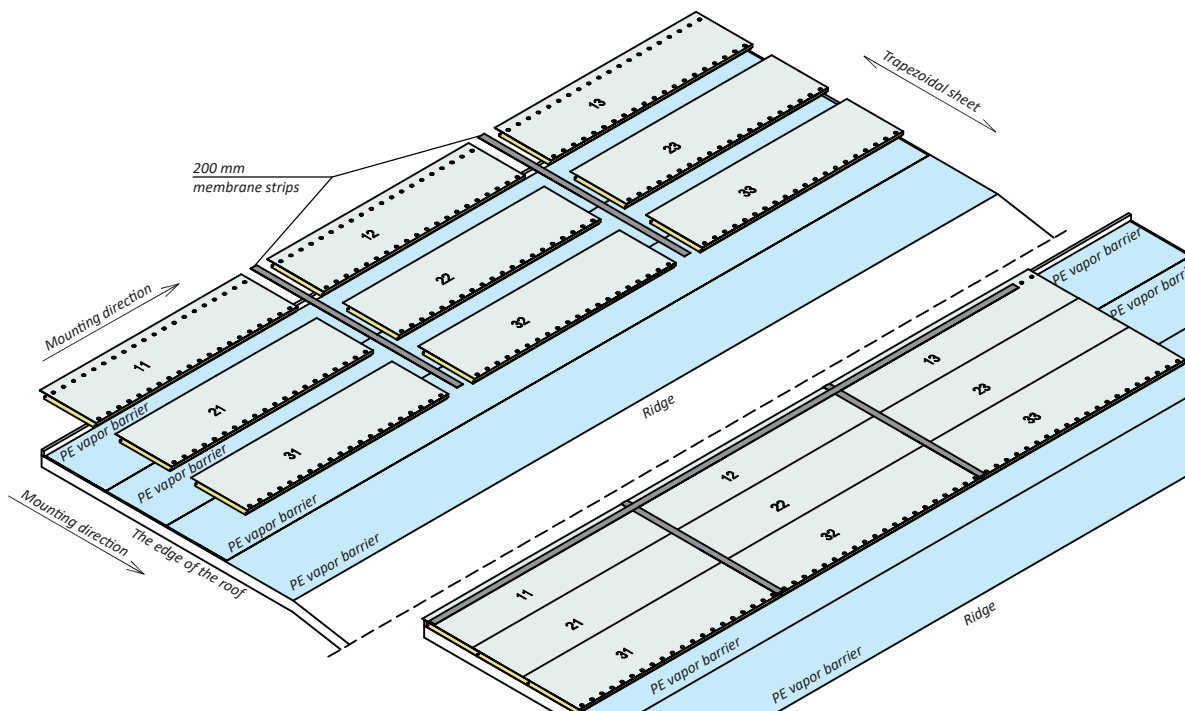
Should be made in accordance with the manufacturer of connectors' instructions, taking into account the thickness of the insulation and the value of wind suction loads (including the edge and corner zones) and the type and thickness of the material to which the insulation is fixed.

The calculation of the necessary number of mechanical fasteners is carried out on the basis of Eurocode 1 (PN-EN 1991-1-4).

PURLIN ROOF

Row system

Trapezoidal sheet is placed "horizontally" and the panel "vertically" in the columns



DESIGN PRINCIPLES

- Place the panels parallel to the eaves flashings- ridge
- Place the panels from the corner of the gable wall and gutter strip to the opposite gable
- Panels placed the "bottom-up" (from the gutter strip to the ridge)
- Panels are always placed transversely for pressing of trapezoidal sheet
- Transverse connections of panels should be on the top shelf of trapezoidal sheet

THE FIRST ROW OF PANELS

1. In panel 11 we cut off the lock with membrane overlap and place along the eaves flashings
2. Attach the panel 11 mechanically along the eaves flashings
3. Place panel 12 for transverse connection with panel 11, slide panel 12 to 11 and leave 20 mm gap
4. Fill the gap with foam and cut off its excess
5. Place next panels in the first row-panel 13 and next, till the end of the first row

NEXT ROW OF PANELS

6. We place panel 21
7. We push panel 21 to the locking contact (free longitudinal edge of panel 11 can be slightly lifted to slide panel 21)
8. Unwind overlap from 21
9. Fix the connectors mechanically in panel 11 on fixing line
10. We combine 11 and 21- longitudinal lap welding
11. We place other panels in the second row
12. We make transverse welding after installing all the panels- welding of 200 mm wide membrane strips on transverse contacts

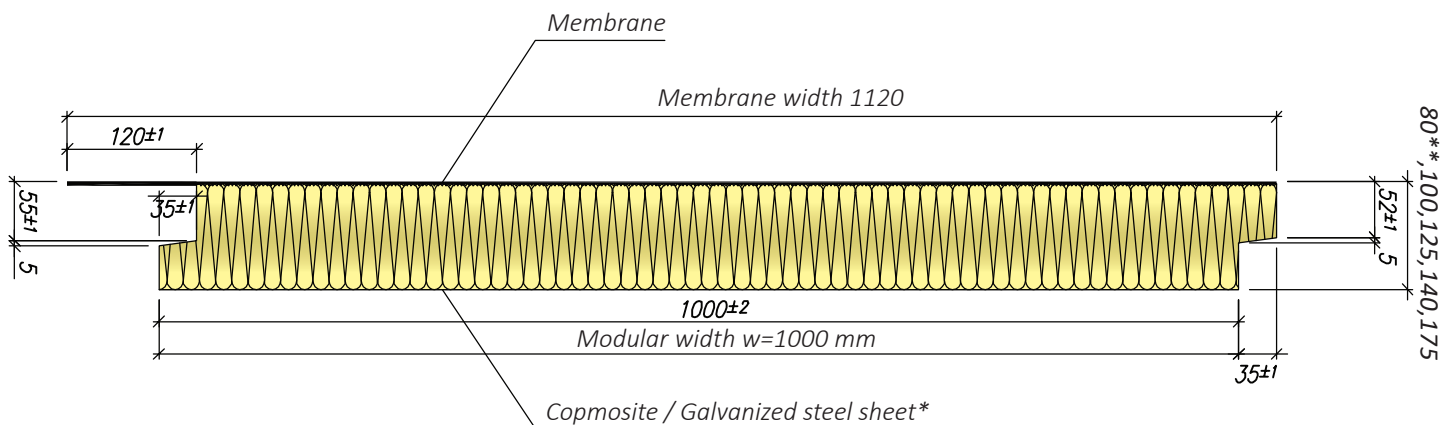
SELECTION AND PITCH OF CONNECTORS

Should be made in accordance with the manufacturer of connectors' instructions, taking into account the thickness of the insulation and the value of wind suction loads (including the edge and corner zones) and the type and thickness of the material to which the insulation is fixed.

The calculation of the necessary number of mechanical fasteners is carried out on the basis of Eurocode 1 (PN-EN 1991-1-4).

DIMENSIONS

ThermaMembrane FR
ThermaMembrane

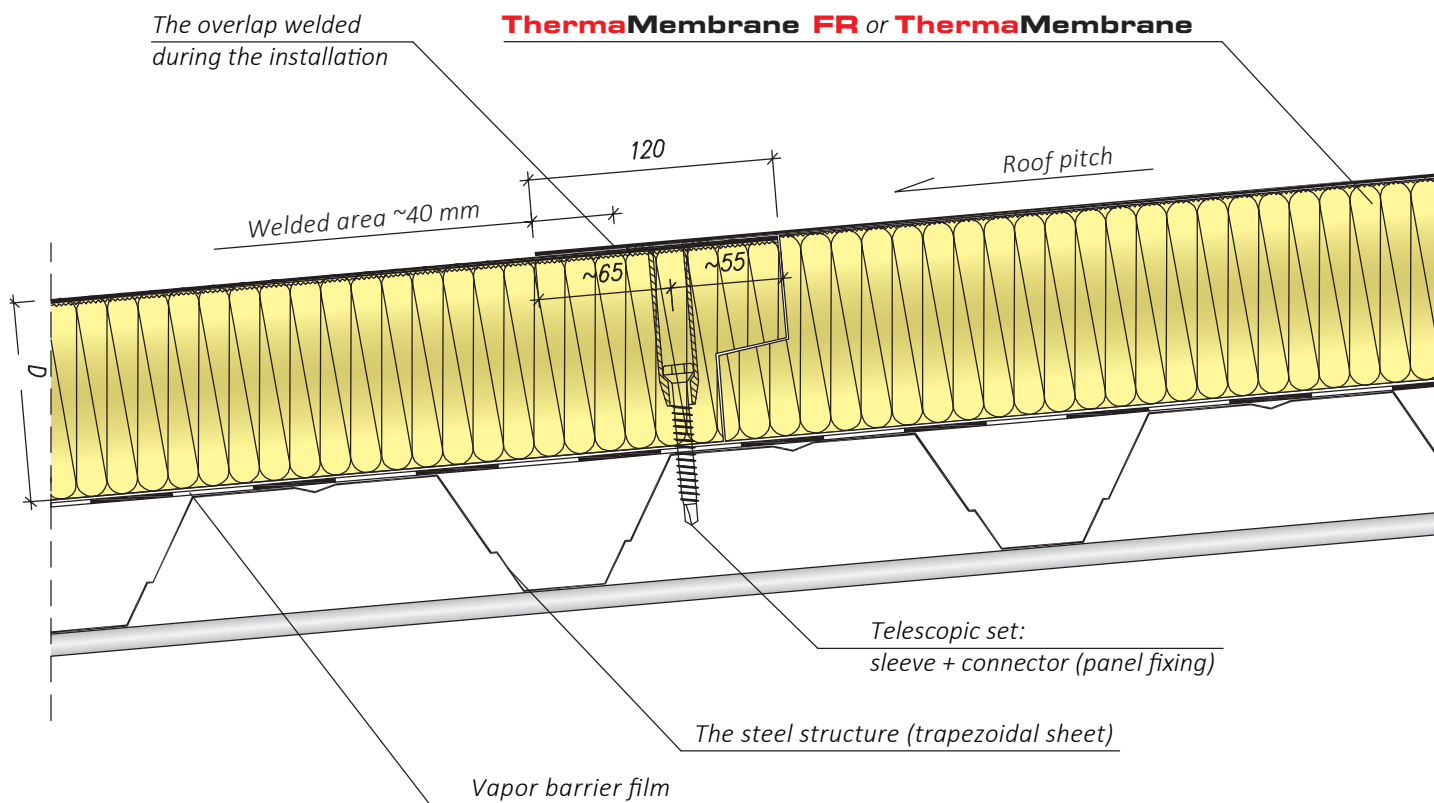


* - With use of ThermaMembrane FR in order to obtain the REI 30 classification

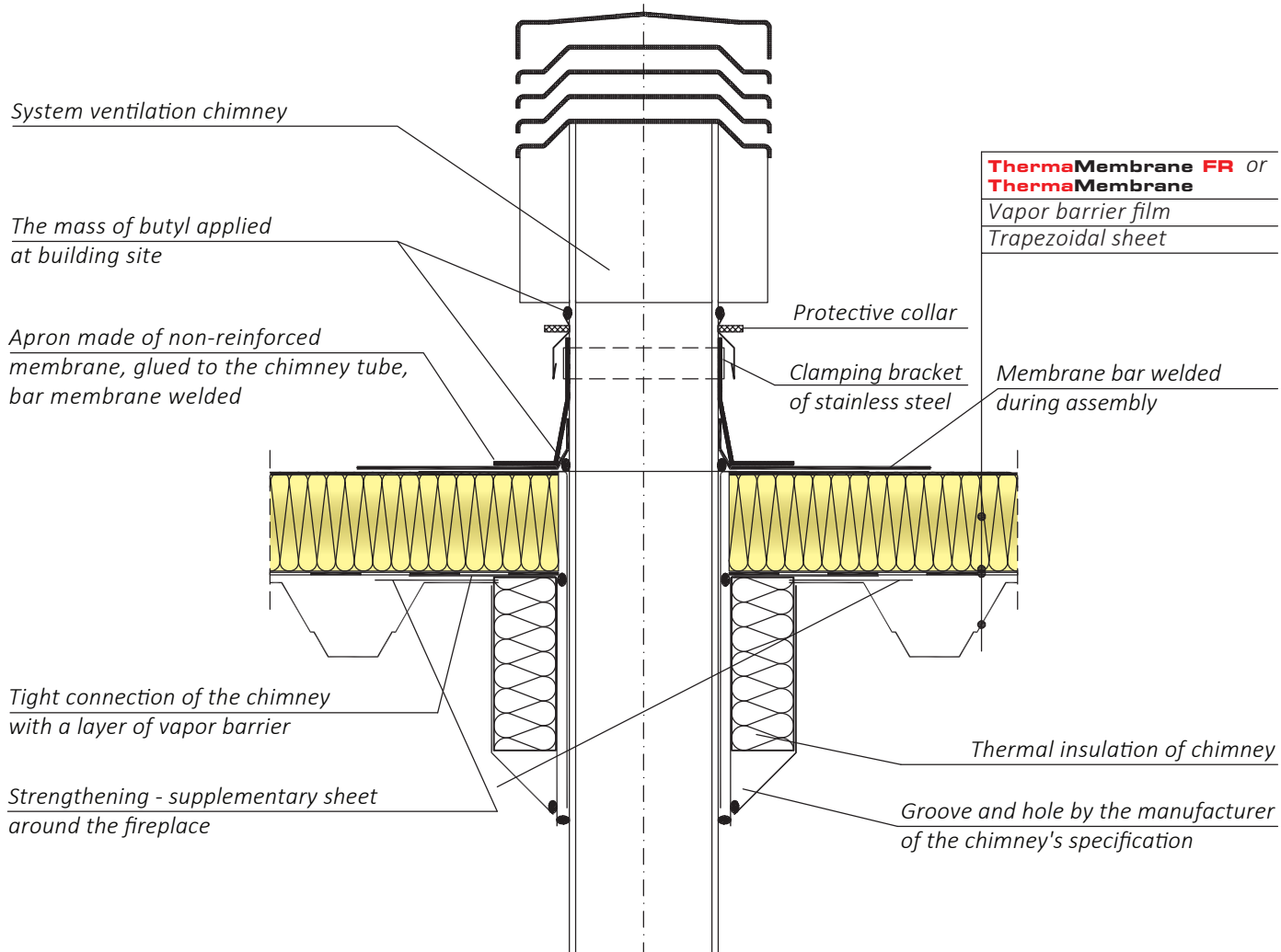
** - Thickness available only for ThermaMembrane panels

LONGITUDINAL JOINT ON FLAT ROOF

Layer system and method of mounting on a flat roof from trapezoidal sheet

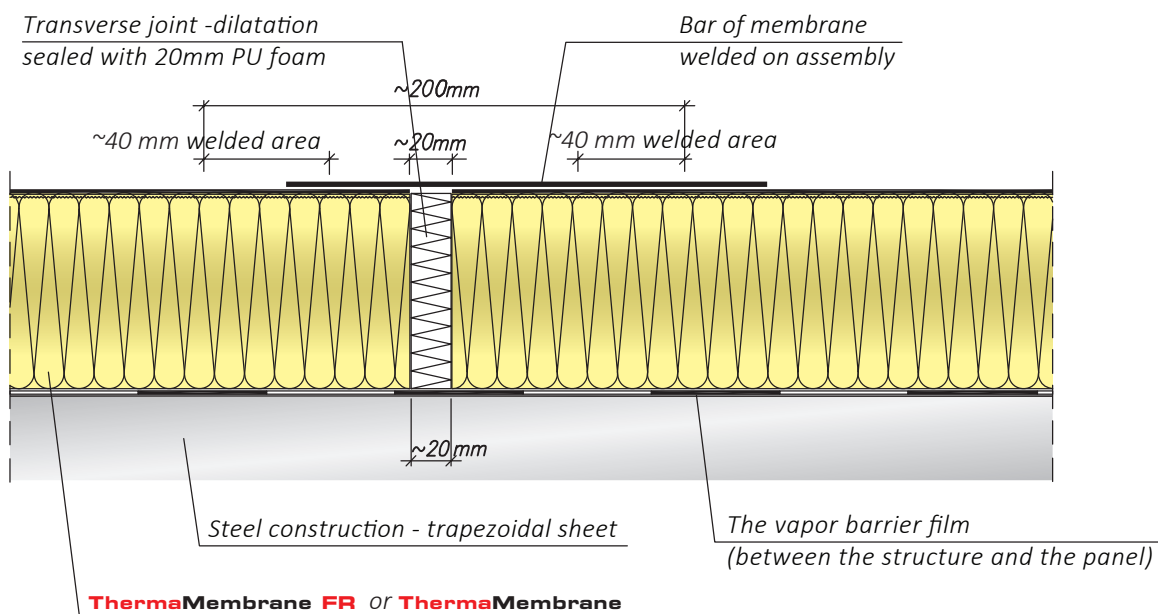


VENTILATION CHIMNEY

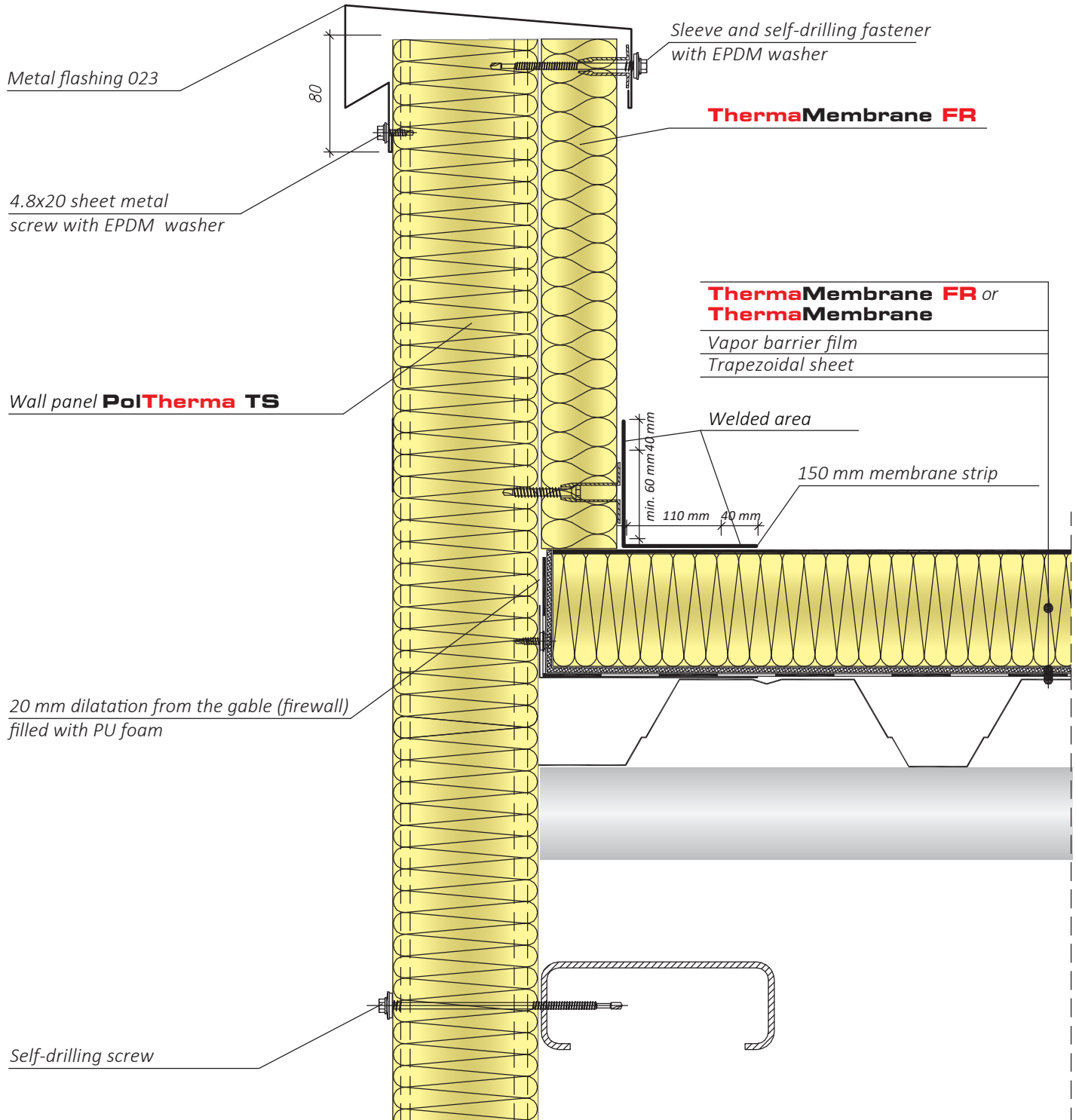


TRANSVERSE JOINT

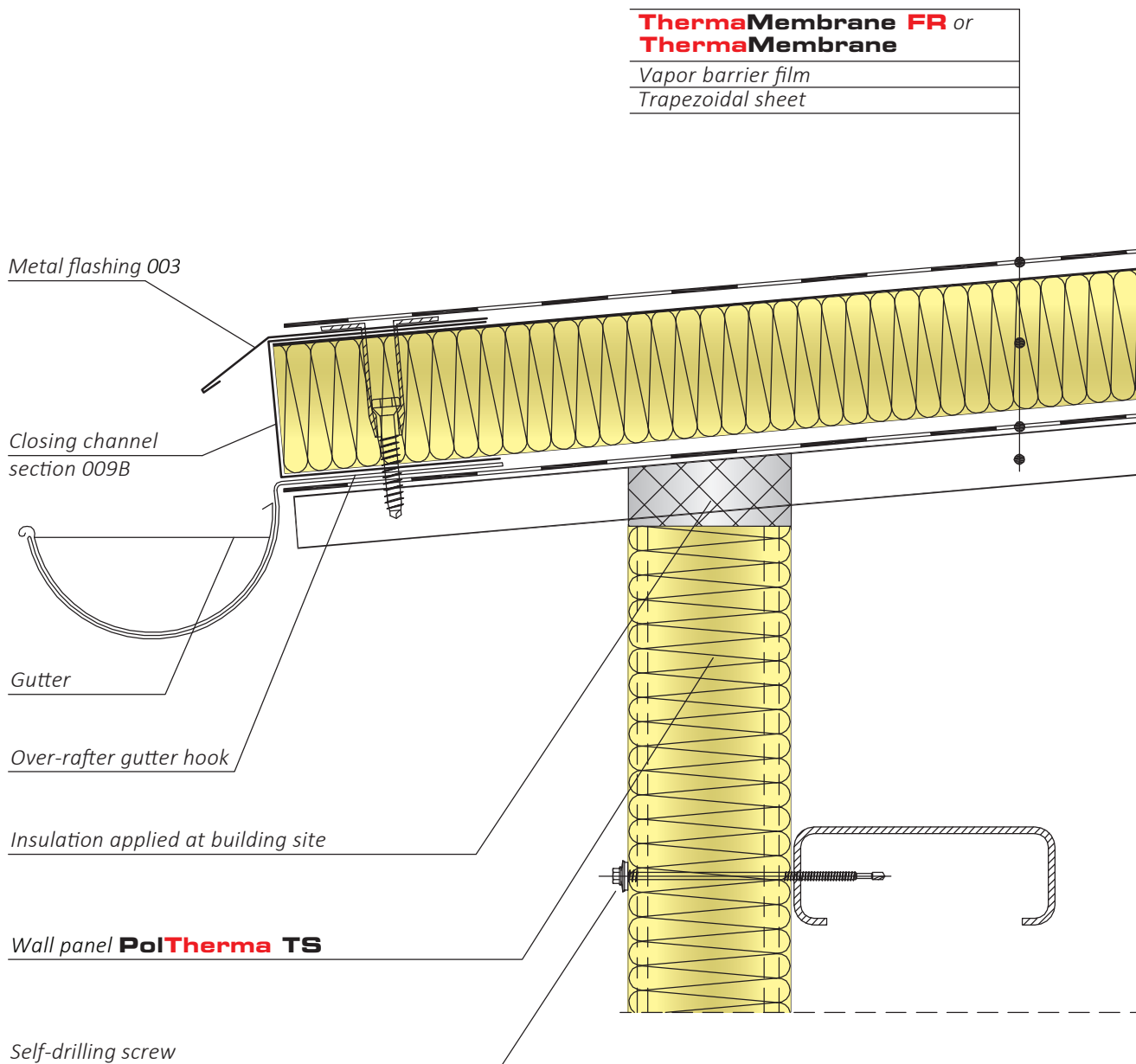
Transverse joint of panels with 20 mm dilatation filled with PU foam, closed from the top with 200 mm welded membrane strip



ATTIC



EAVES





The combination of an attic with roof / gable



Tooling of corner



Tooling of skylight / smoke flap



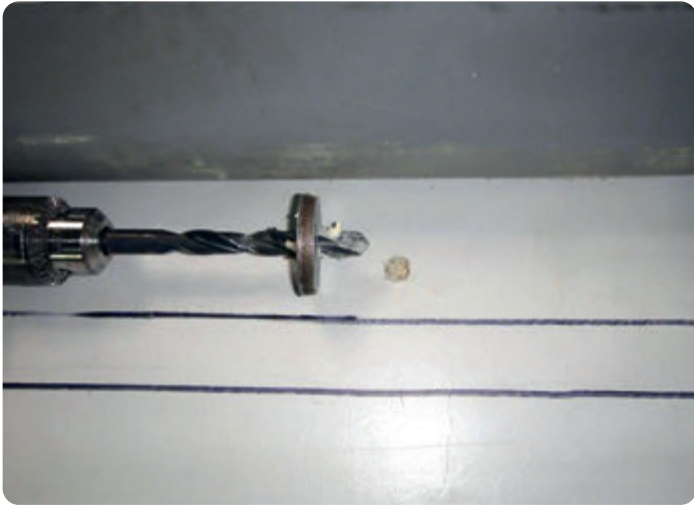
View of the roof



Tooling of ventilation channel



Transverse panel joint covered by welded FLAGON SV membrane strip



The elements of ventilation system on a flat roof



Overlap along the longitudinal panel joint



View of the roof



Manual welding of membrane strip on transverse panel joint



The roof after assembly



Welding longitudinal contact overlap with use of mobile, electric powered welder



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