



PIR INSULATION PRODUCTS

# TECHNICAL CATALOGUE

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## INTRODUCTION

The subject of the present study is presentation of the company and its products for the participants of the construction process, such as investors, designers and contractors. It also contains detailed technical data as well as typical insulation solutions for structures with use of GORLICKA TERM polyurethane panels.

## ABOUT COMPANY

GÓR-STAL, present on the market since 2003, is a dynamically developing Polish manufacturer of sandwich panels with polyurethane core. In 2006 the company launched production of sandwich panels under trade name GORLICKA. The panels have been applied since then in hundreds of structures all over Poland, Ukraine, Lithuania, Slovakia, Hungary, Romania, Moldavia and other European countries.

The next stage of the company's development include increasing the range of products and introducing a modern thermal insulation system made of polyurethane panels in soft facing to the Polish market.

## ABOUT PRODUCT

GORLICKA TERM PIRAL panel is an insulation panel with a polyisocyanurate foam (PIR) core in aluminium laminated paper facing. PIR is a chemically modified polyurethane, of maintained hardness, perfect thermal insulation properties and increased fire resistance. Being popular in Europe and all over the world, this product successfully replaces thermal insulation systems based on mineral wool and styrofoam. This is due to the best-in-class thermal insulation properties, hardness, quick and easy assembly, fire resistance properties as well as the material's weight equal approx. 30 kg per 1 cubic meter.

Thermal insulation PIR panel complements the light sandwich panels cladding system and allows a complete thermal insulation of buildings all the way up to the roof, using a modern, durable, rodent-resistant and chemically resistant material, namely, polyurethane.

## APPLICATIONS

GORLICKA TERM panels are mainly designed for thermal insulation of flat roofs on concrete, wooden or steel sheet bases. This type of roofs is designed mostly for large structures – industrial halls, commercial and office buildings. Roof covering can be provided in the form of a two-ply roofing membrane or a single-ply membranes made of e.g. PVC, TPO or EPDM.

Panels can also be used as insulation of floors and ceilings. Their hardness and the minimum water absorption make them suitable for thermal insulation of floors and most ground slabs. The panels are also suitable as a permanent insulation material for three-ply walls and attics insulation in residential buildings.

PIR panels in mineral wool facing can also be used as two-ply walls thermal insulation and as the additional thermal insulation of the existing buildings walls in the light wet technique.

Specifics and drawings of typical details of main applications, namely, the additional thermal insulation of old flat roofs are presented further in the study.

## CERTIFICATES AND STANDARDS

GORLICKA TERM panel is certified with CE marking and authorized for use in construction in the entire Europe.

Manufacture of thermal insulation panels complies with the requirements of PN:EN 13165:2003 standard as amended by A1:2005, A2:2005, AC:2006.

## MANUFACTURING PROGRAMME

GORLICKA TERM panel is produced in six thickness versions: **40, 50, 60, 80, 100 and 120 mm**. Typical dimensions of a single panel are 1000 x 2000 mm (**1x2 m**), however, panels of different dimensions are also available, of the length from 2000 to 8000 mm.

Edges of a standard panel are perpendicular. Optionally they can be provided with a 25 mm deep groove, to limit possibilities of a thermal bridge in case a single-ply thermal insulation is applied. Standard and custom-made (according to client's design) **flashing**, maximum 6 m long. Gór-Stal provides also a set of accessories for the assembly its products. Detailed characteristics of the products are presented further in the study.

## TRANSPORTATION RECOMMENDATIONS

**Packing and dispatch.** GORLICKA insulation panels are provided in packs of size 50 x 100 x 200 cm and weight approx. 30 kg. Typical height of a package equals approx. 500 mm. The table below specifies number of panels in a pack (of 1 m<sup>2</sup>) depending on their thickness.

Panel thickness [mm]	40	50	60	80	100	120
Number of panels in a pack [pcs.]	60	50	40	30	25	20
Area of panels [m <sup>2</sup> ]	144	120	96	72	60	48

**Loading and unloading** is performed manually by individual packs or with use of a forklift truck equipped with a grab for several packs. In case of longer, non-standard panels a suitable equipment should be provided for the unloading or more people, in order to prevent panels from breaking or damage. Note! Panels are sensitive to damage, also when packed. Packs cannot be thrown or rolled!

**Transportation** of insulation panels should be provided by suitable trucks, with the following conditions provided:

- loading platform should be covered
- surface of the loading platform should be flat, free from contaminations
- load should be fastened in such a way as to avoid its falling, slipping or any other damage
- truck should be equipped with belts for fastening of the load, flexible spacers should be placed under the belts. Tight belts should not cause deformation of panels.

During the **acceptance** of insulation panels, the quantity and quality of the delivered products should be checked. Any inconsistency should be recorded in the transport documents with an immediate notice to the manufacturer. Any damage of panels in the truck should be photographed.

The following should be kept in mind during **storage** of insulation panels:

- packages should be stored in a dry place, not directly on the ground but on supports, approx. every 1 m.
- no heavy objects should be placed on panels to avoid damage
- panels should be protected against wind, which could move panels or packages.
- Individual panels should be **carried** in vertical position, so that they don't fold.

## TECHNICAL SUPPORT

Gór-Stal company provides technical support and assistance at every stage of implementation of your investment. Our sales representatives as well as our technical department will be happy to assist investors, designers and contractors during designing, ordering and assembly of the light cladding. We can also design a building cladding or verify such a design for you.

Visit our website: **[www.gor-stal.pl](http://www.gor-stal.pl)**

## PHYSICAL FEATURES AND TECHNICAL PARAMETERS OF PANELS

The most important features of GORLICKA TERM panel are presented in the table below:

Core:	Rigid polyisocyanurate foam (PIR)					
Core apparent density	$\rho = 30^{+6}_{-2} \text{ kg/m}^3$					
Declared thermal conductivity coefficient	$\lambda_D = 0.023 \text{ W/mK}$					
Panel facing	PK - Paper KRAFT AL - Paper KRAFT covered with aluminium BT - Bitumen lining WS - StoneGlass AGRO AL - Aluminium 50 microns					
Panel dimensions: typical / available	1000 x 2400 mm / 1000 x 1200 mm					
Panel thickness [mm]	40	50	60	80	100	120
Thermal resistance R [ $\text{m}^2\text{K/W}$ ]	1.88	2.17	2.6	3.48	4.41	5.22
Heat transfer coefficient U [ $\text{W/m}^2\text{K}$ ]	0.58	0.46	0.38	0.29	0.22	0.19
Compressive strength at 10% deformation	$\sigma = 120 \text{ kPa}$					
Fire rating (panel only)	E – self-extinguishing for TERM AL, TERM PK, TERM AGRO AL F - else					
Volume absorption	$\leq 2.0 \%V$					

## ADVANTAGES OF PIR PANELS

**Reduced thickness** of thermal insulation. Thermal insulation properties of GORLICKA TERM panels are almost twice as good as other insulation materials commonly used.

The following thicknesses assure panels' compliance with the requirements for thermal insulation of buildings ( $t > 16^\circ\text{C}$ ):

- for external walls ( $U_{\text{max}} = 0.30 \text{ W/m}^2\text{K}$ ) - 80 mm thick panel (or 2 x 40mm)
- for roofs ( $U_{\text{max}} = 0.25 \text{ W/m}^2\text{K}$ ) - 100 mm thick panel (or 2 x 50mm)

**Reduced weight** of thermal insulation. Weight of 1 square meter of GORLICKA TERM panel 100 mm thick ( $U = 0.22 \text{ W/m}^2\text{K}$ ) equals **only ~ 3 kg!** Compared to 1 square meter of mineral wool 180 mm thick ( $U = 0.22 \text{ W/m}^2\text{K}$ ) which weights ~27 kg, it's nine times less!

**High mechanical strength.** Compressive stress at 10% deformation for PIR panels is up to 200 kPa. This corresponds to permanent loading of **15 tons per 1 m<sup>2</sup>**. This strength allows pedestrian traffic during assembly and operation without damages to the cover caused by deformation of the thermal insulation. This value is three times lower for mineral wool.

**Quick, easy and inexpensive assembly.** Panels can be transported to the roof level without a crane. Relocation of panels on the roof does not require special lifts, which could cause – as shows the experience – damage to the supporting slab. Assembly of the insulation requires less work and equipment than in case of mineral wool.

**Increased fire resistance.** Based on PN-EN-13501-1:2008 insulation panels are certified with "E" fire rating, which means it is made of self-extinguishing material. In a roof cover based on trapezoidal steel sheet according to PN-EN-13501-2:2008 standard they reached fire rating of **REI 15** for 80 mm thick insulation and **REI 20** for 100 mm thick insulation.

Time and money savings. PIR panels allow costs reduction of thermal insulation of roofs thanks to:

- lower price of product per 1 cubic mete
- thinner insulation layer required which also reduces the costs
- few times lower weight, which make transportation and assembly much shorter and cheaper
- if included in the original design of a building, they allow much thinner structure of the building as compared to a heavier thermal insulation material, which can significantly limit the costs of the entire investment

## COMPARISON OF INSULATION MATERIALS

Table below summarizes parameters of thermal insulation made of PIR panels and of mineral wool, depending on heat transfer coefficient U, including current requirements for insulation parameters of space divisions.

Scope of application of the insulation, maximum acceptable value of space division heat transfer coefficient U	[W/m <sup>2</sup> K]	Required thickness, thermal performance and weight of <b>GORLICKA TERM</b> panels			Required thickness, thermal performance and weight of mineral wool panels		
		[mm]	[W/m <sup>2</sup> K]	[kg/m <sup>2</sup> ]	[mm]	[W/m <sup>2</sup> K]	[kg/m <sup>2</sup> ]
External walls for room temp. < 16°C	0,65	<b>40</b>	<b>0,58</b>	<b>1,3</b>			
Roofs and flat roofs for room temp. < 16°C	0,50	<b>50</b>	<b>0,46</b>	<b>1,6</b>	80	0,48	12
Ground slabs, ceilings above basement	0,45	<b>60</b>	<b>0,38</b>	<b>1,9</b>	100	0,38	15
External walls for room temp. > 16°C	0,30	<b>80</b>	<b>0,29</b>	<b>2,6</b>	150	0,25	22,5
Roofs and flat roofs for room temp. > 16°C	0,25	<b>100</b>	<b>0,22</b>	<b>3,2</b>	180	0,22	27
		<b>120</b>	<b>0,19</b>	<b>3,8</b>	200	0,19	30
Floors for cold stores		<b>160</b>	<b>0,14</b>	<b>5,1</b>			
		<b>180</b>	<b>0,13</b>	<b>5,8</b>			
		<b>200</b>	<b>0,12</b>	<b>6,4</b>			

## SAVINGS ON STEEL STRUCTURE

As mentioned before, the weight of the building's thermal insulation made of PIR foam is much lower than weight of respective insulation made of mineral wool. It has a significant consequences for the structure of the entire building.

Savings on reduced weight of the structure depend on the design (span, spacing of supporting frames, etc.) and can reach even up to 20%.

Table below presents a summary of building's roof loading in two variants – PIR panels and mineral wool panels (MIWO).

The summary is made for a flat roof building (2° slope), of a foundation level up to 300 m a.s.l., roof covered with EPDM membrane.

Computational load [kN/m <sup>2</sup> ] of:	Location of the building in a snow load zone				
	1	2	3	4	5
snow	0.84	1.08	1.44	1.92	2.4
roof cover and vapour barrier (EPDM + PE membrane)	0.022				
trapezoidal sheet 0.8 mm thick	0.069				
total with thermal insulation – PIR 100 mm thick	0.97	1.2	1.57	2.05	2.53
total with thermal insulation – MIWO 180 mm thick	1.23	1.47	1.83	2.31	2.71
reduced load of the roof structure [%]	<b>21</b>	<b>18</b>	<b>14</b>	<b>11</b>	<b>9</b>

Using GORLICKA TERM thermal insulation panels benefits the Investor, designer and contractor!



## DESCRIPTION OF FLAT ROOF

Flat roof is made on industrial, commercial, office and residential buildings. It is the best and often the only possible solution for the large structures covering. Properly constructed flat roof should provide a tight stormwater protection and efficient thermal insulation, i.e. protection against both excessive and insufficient heat in the structure.

The roof supporting structure is usually performed as a reinforced concrete roof or a trapezoidal steel sheet. Polyethylene membranes are applied as vapour barrier. Roof covering can be provided in the form of single-ply membranes made of PVC, TPO or EPDM or a two-ply roofing membrane.

GORLICKA TERM panel is the best thermal insulation material for flat roofs.

Assembly details for the thermal insulation are presented further in the study.

## ASSEMBLY RECOMMENDATIONS

All the subsequent plies should be assembled in such a way as to ensure permanent efficient operation of flat roof and to avoid any damage to the covering or water penetration of thermal insulation during operation of the roof. Individual elements should be assembled in accordance with good engineering practice and manufacturers' guidelines.

Vapour insulation should be provided on the even and clean surface of the supporting layer. Thermal insulation is installed afterwards. GORLICKS TERM panels can be mounted in one or two plies. Two-ply assembly is recommended due to its better thermal properties. Panels should be placed with staggered joints so that they match tightly, and so that joints of neighbouring rows (dwg.1) and plies (dwg.2) do not match.

On **trapezoidal sheet** base panels should be placed with their longer sides perpendicular to the sheet ribbings so that the number and length of unsupported joints is limited. Additionally, panels should not be thinner than 1/3 of the distance from the neighbouring ribbings of the trapezoidal sheet applied. In case of 40 mm thick panels, the joints should be placed on the top ribbing of the supporting sheet. PIR insulation panels should be **mechanically** fastened to the base.

**Fastening** connector is provided in a form of a flat steel spacer for assembly of insulation material together with a screw suitable for the given supporting layer.

The first layer is fastened with use of connectors in quantity allowing a proper assembly of the entire roof (in order to avoid relocation of the bottom layer, in fact: 1 connector/1 panel).

The top layer (and single-ply thermal insulation) is fastened depending on the roof area:

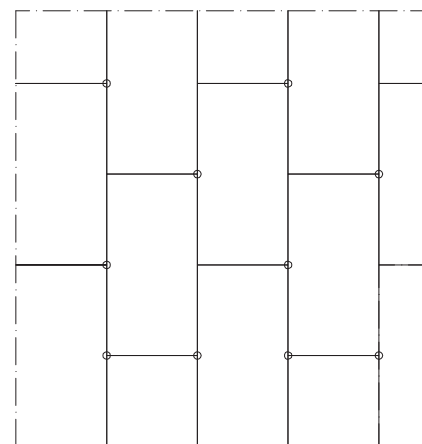
- the centre part requires use of six connectors per 1 panel (3 connectors / 1 m<sup>2</sup>)
- the edges (2 m from the roof edge) require use of twelve connectors per 1 panel (6 connectors / 1 m<sup>2</sup> of roof).

In case of buildings located high or in the 5th wind zone the minimum number of connectors should be specified for each particular building. In case of green roofs or ballasted roofs, additional mechanical fastening is not necessary. This should be subject to the designer's decision based on roof load computations.

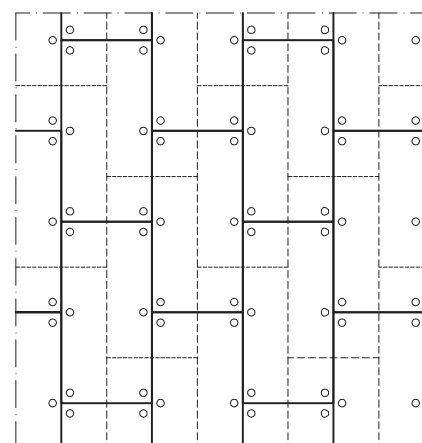
If the roof is covered with a roofing membrane, it should be remembered that its first layer is mechanically fastened and welded together only on the edges. The entire surface of the second layer is welded to the bottom layer.

Further the study presents drawings of typical details of standard flat roofs with single-ply covering.

Dwg.1 Arrangement of panels in the first layer



Dwg. 2 Arrangement of panels in the second layer



## Selected details of roofs insulated with GORLICKA TERM PIR AL panels

### FLAT ROOF with single-ply covering on concrete base

- Cross-section of roof layers including connectors
- Details of roof expansion joints
- Detail of roof drainage – roof drain
- Detail of roof drainage – water evacuation to gutters
- Detail of thermal insulation of a low attic
- Detail of roof at neighbouring wall or high attic
- Detail of skylight

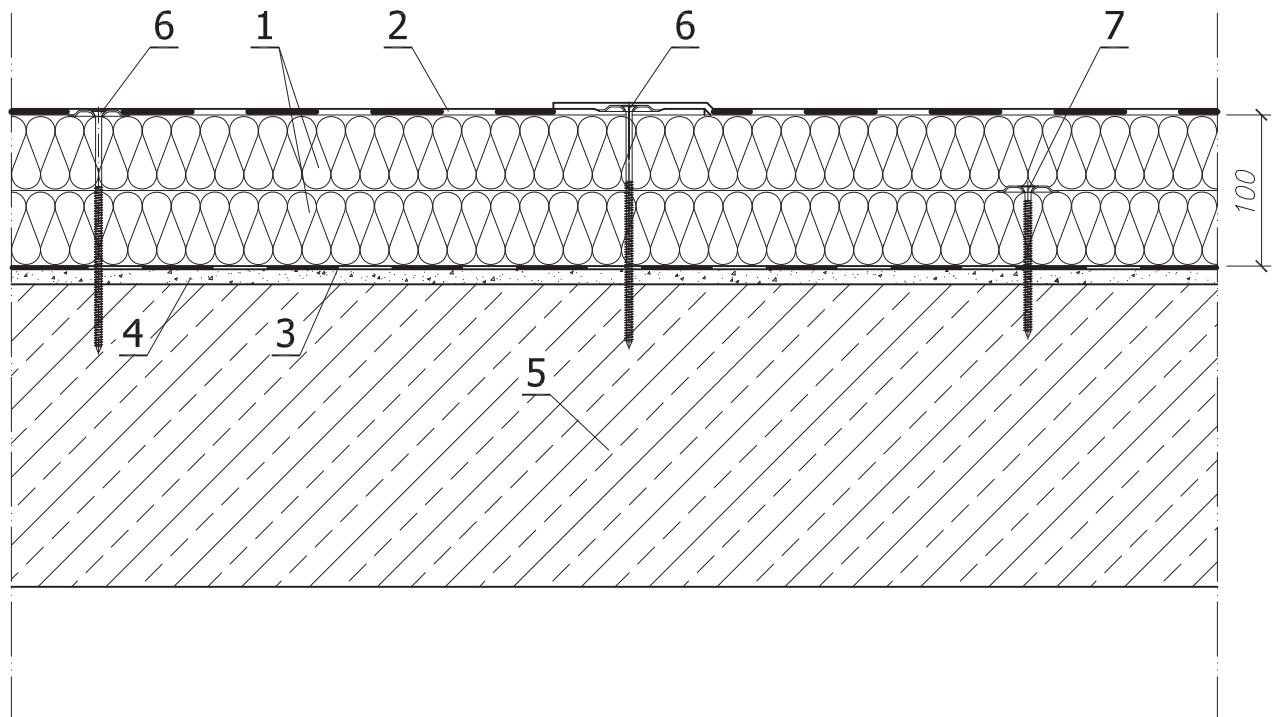
### FLAT ROOF with single-ply covering on trapezoidal sheet base

- Cross-section of roof layers including connectors
- Details of roof expansion joints
- Detail of roof drainage – roof drain
- Detail of roof drainage – water evacuation to gutters
- Detail of thermal insulation of a low attic
- Detail of roof at neighbouring wall or high attic
- Detail of skylight

### FLAT ROOF with single-ply covering on purlins and trapezoidal sheet

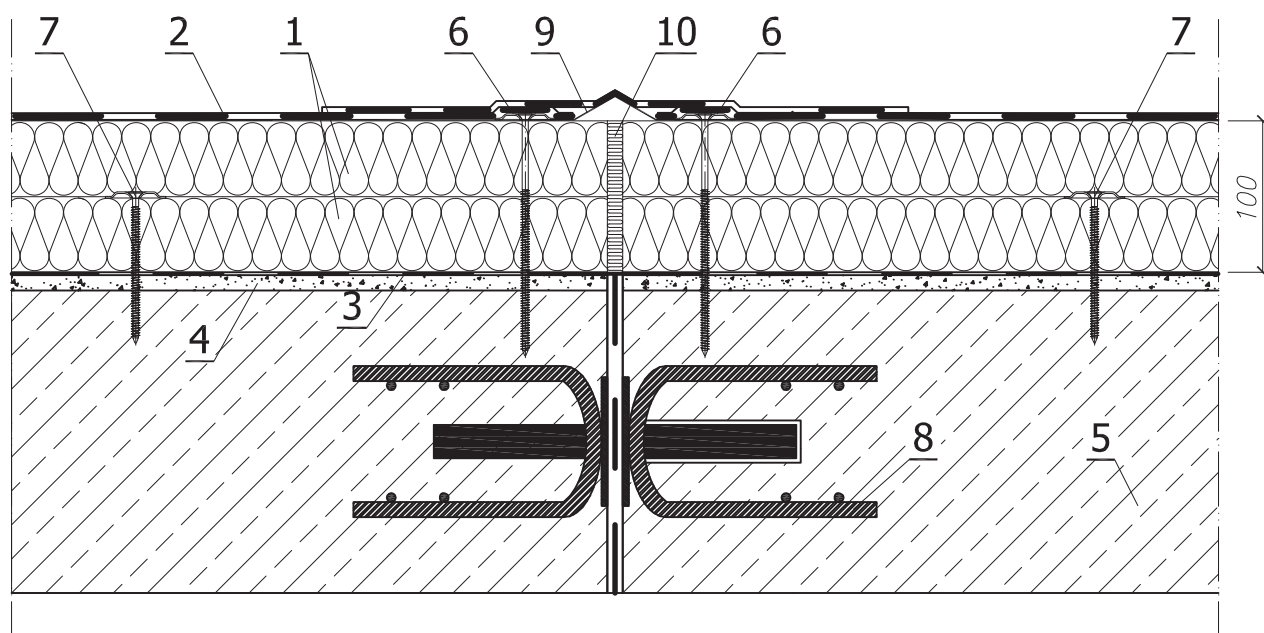
- Cross-section of roof layers including connectors
- Details of roof expansion joints
- Detail of roof drainage – roof drain
- Detail of roof drainage – water evacuation to gutters
- Detail of thermal insulation of a low attic
- Detail of roof at neighbouring wall or high attic
- Detail of skylight





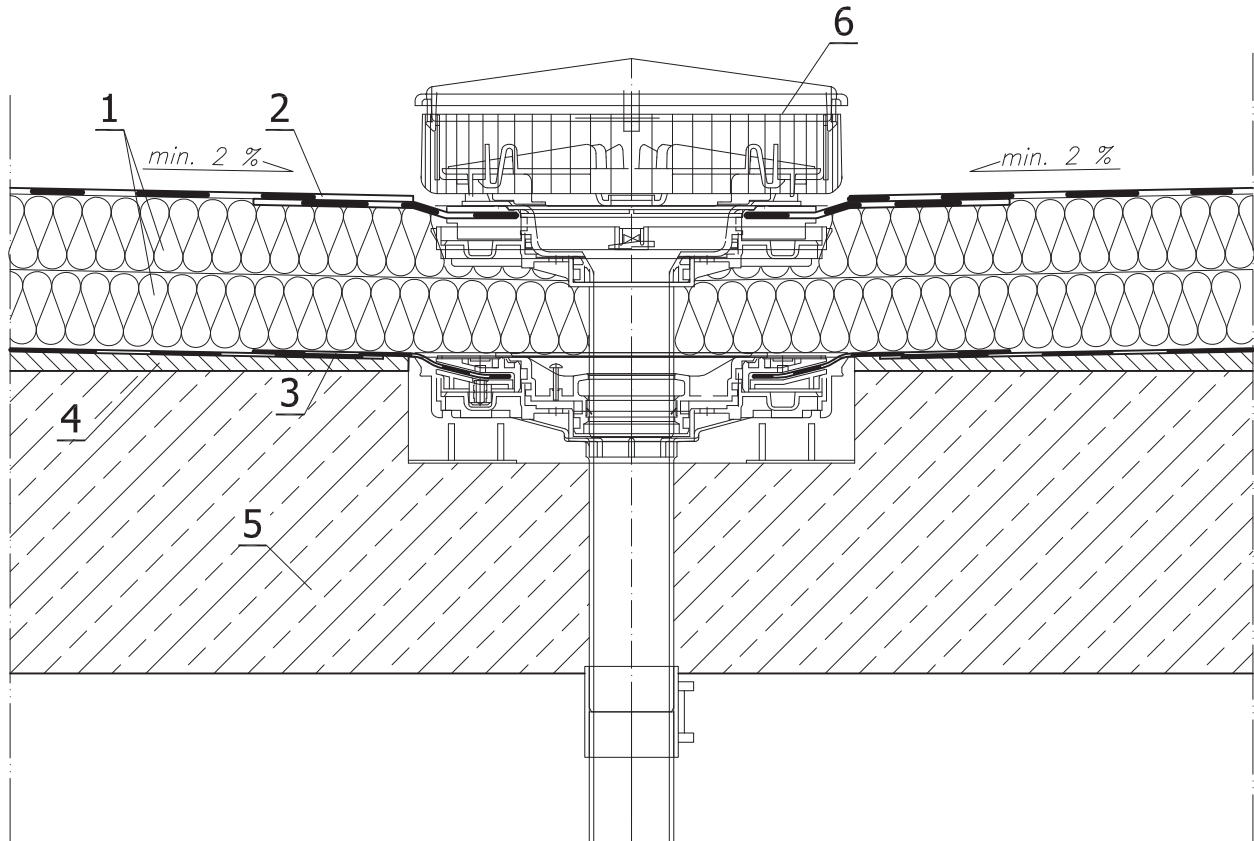
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Connector for concrete with a spacer for fastening of insulation
7. Fastening of the bottom slab



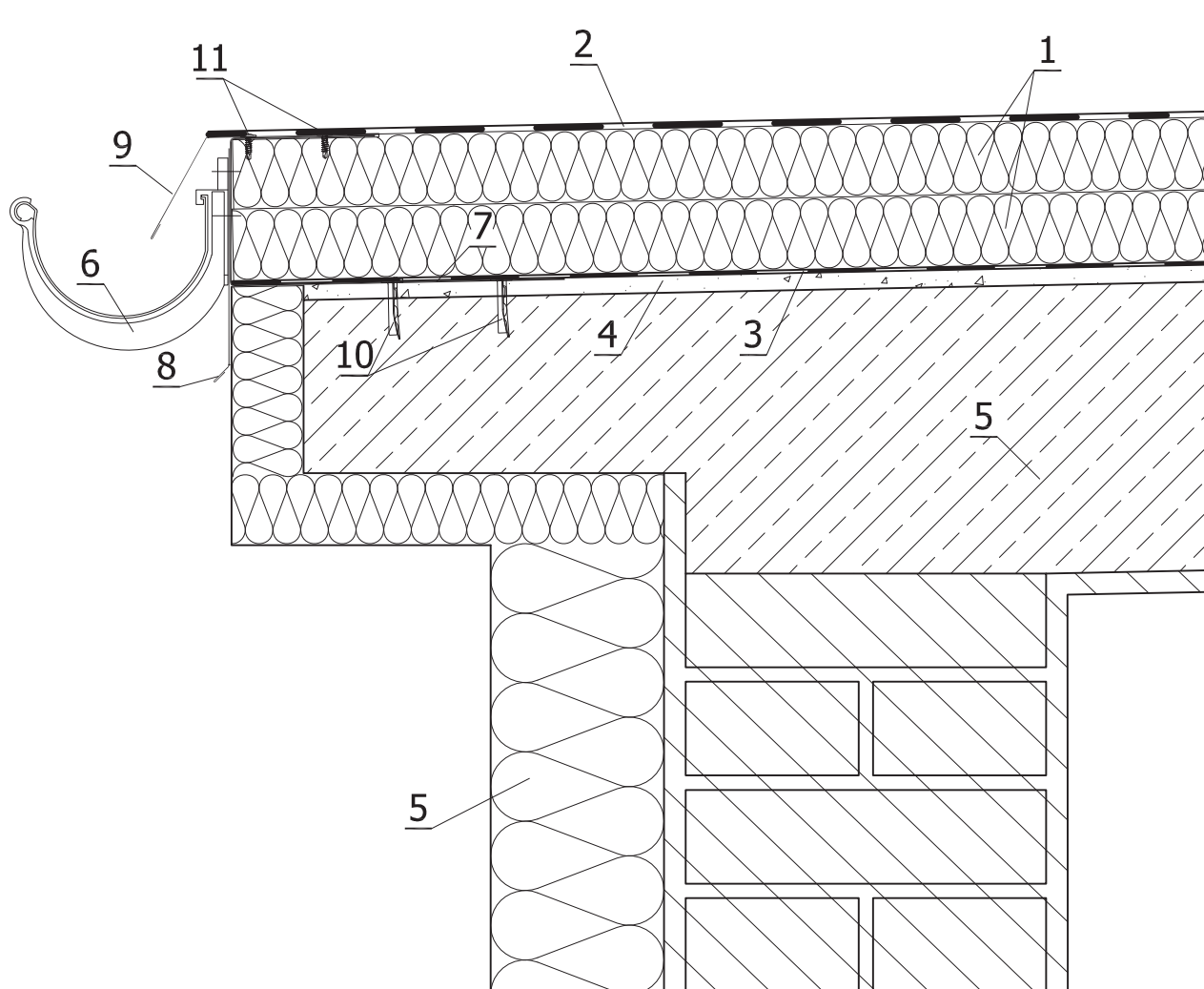
## LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Connector for concrete with a spacer for insulation fastening
7. Fastening of the bottom slab
8. Expansion joint dowel
9. Expansion joint flashing
10. Soft thermal insulation on the fastening



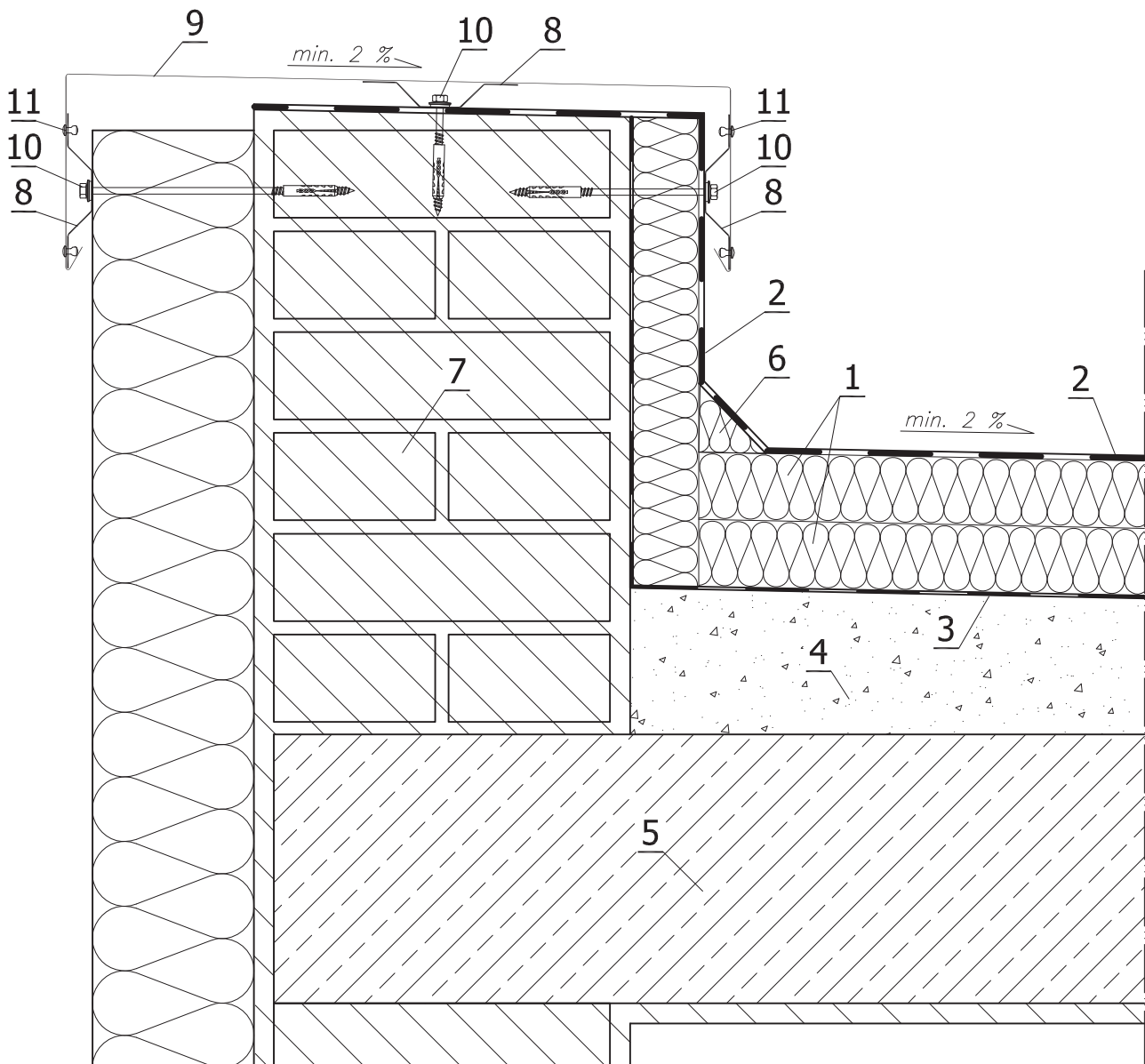
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Levelling layer
5. Reinforced concrete floor
6. Roof drain



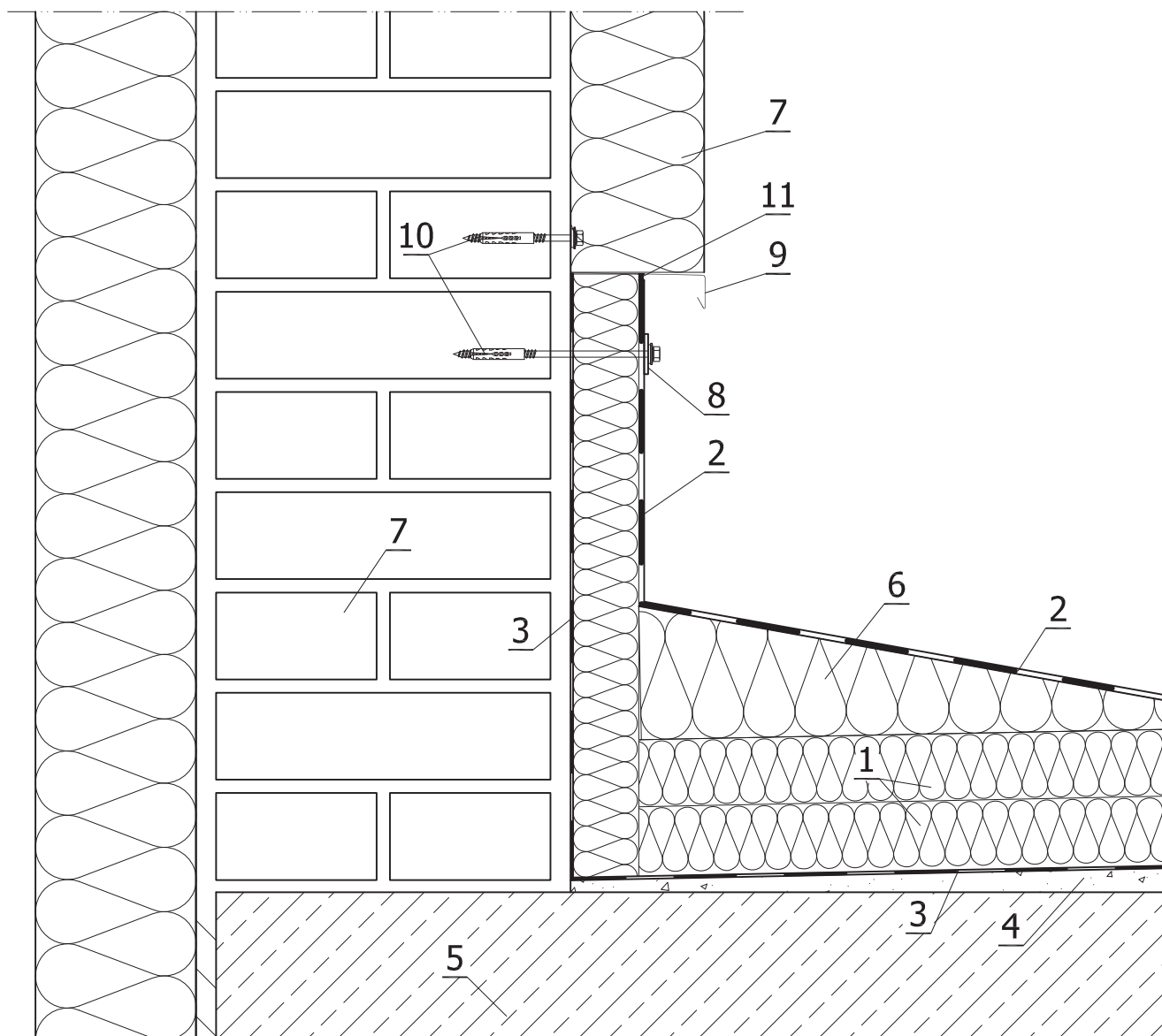
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Levelling layer
5. Building structure with thermal insulation
6. Gutter
7. Edging profile
8. Under-gutter covering flashing
9. Drip edge
10. Fastening expansion bolt
11. Self-drilling connector for steel sheet



**LEGEND:**

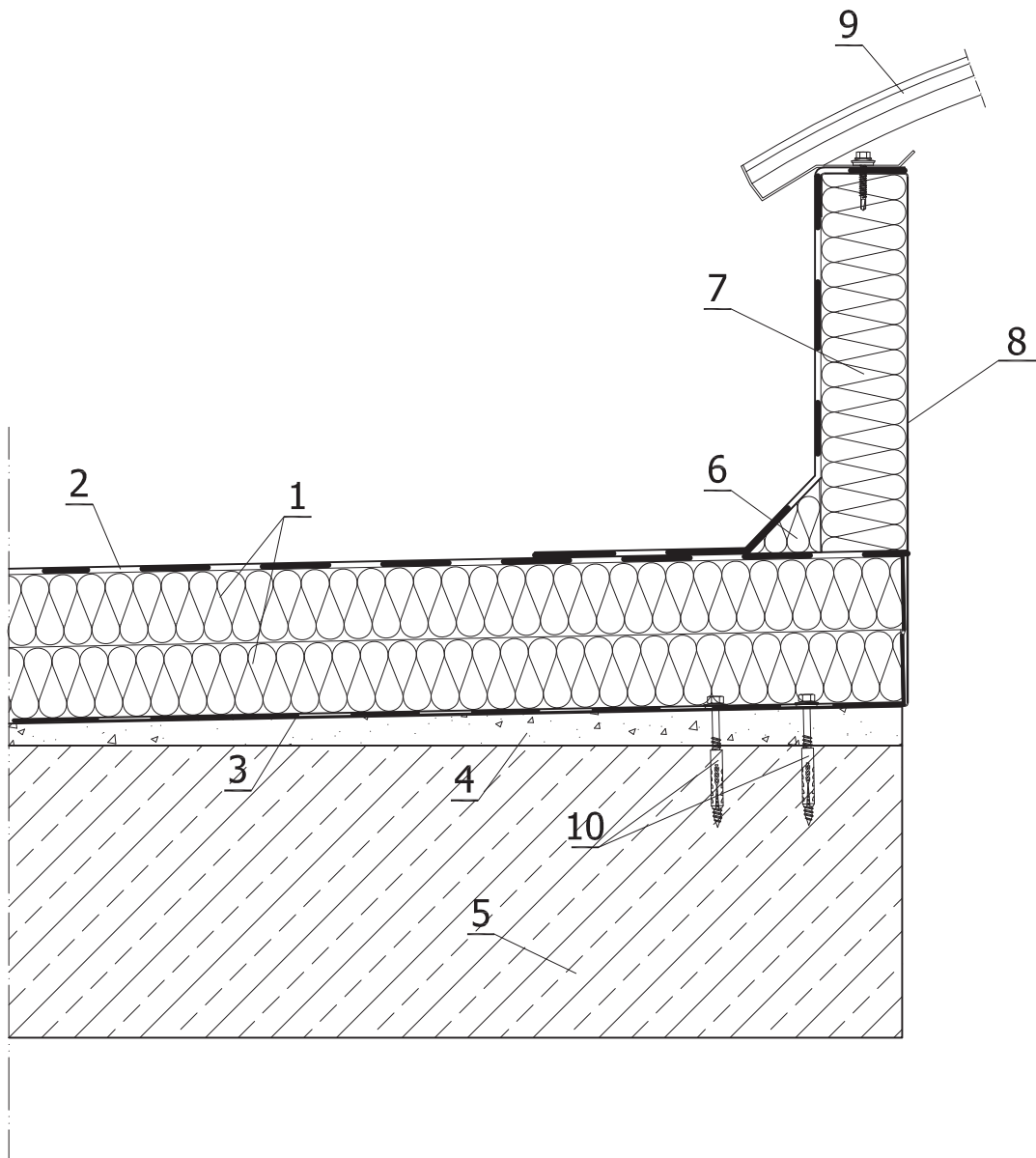
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Roof wedge
7. Masonry attic with thermal insulation
8. Flashing – flashing strip
9. Attic flashing
10. Fastening expansion bolt
11. Tight blind rivet 4.0 x 8



## LEGEND:

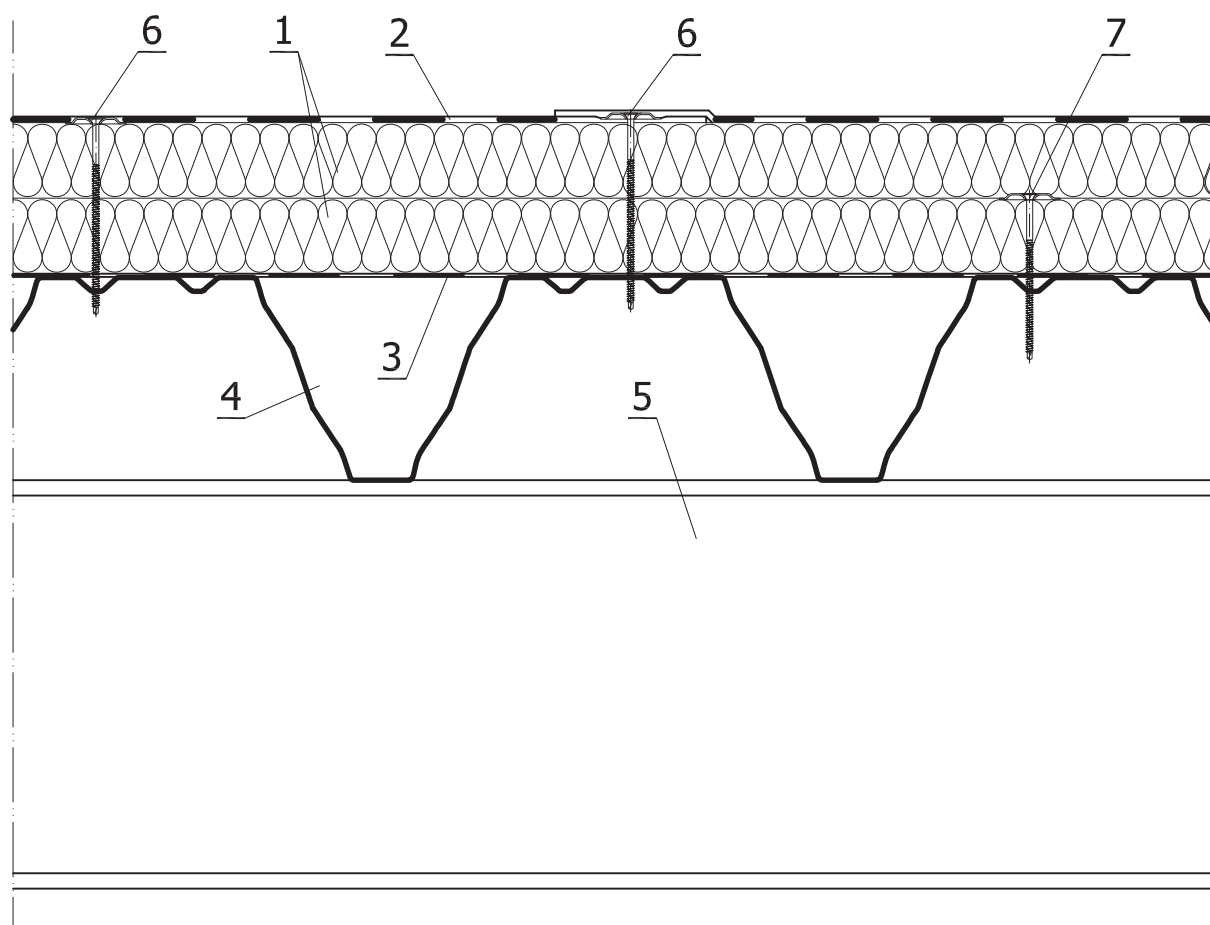
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Roof wedge
7. High masonry attic with thermal insulation
8. Flashing strip – flat bar
9. Drip edge
10. Fastening expansion bolt
11. Permanently elastic sealing compound





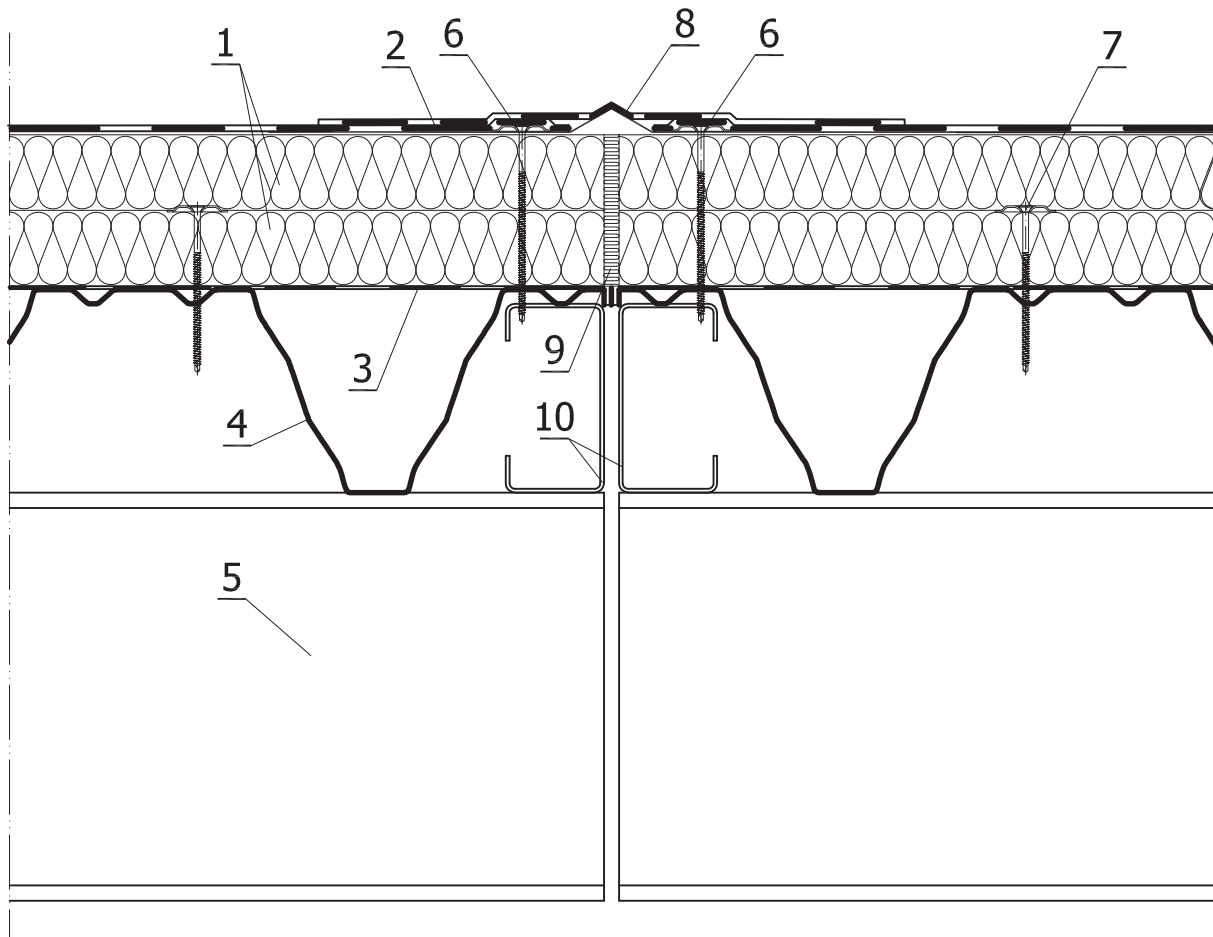
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Roof wedge
7. Thermal insulation of skylight
8. Steel base of skylight
9. Skylight cover
10. Fastening expansion bolt



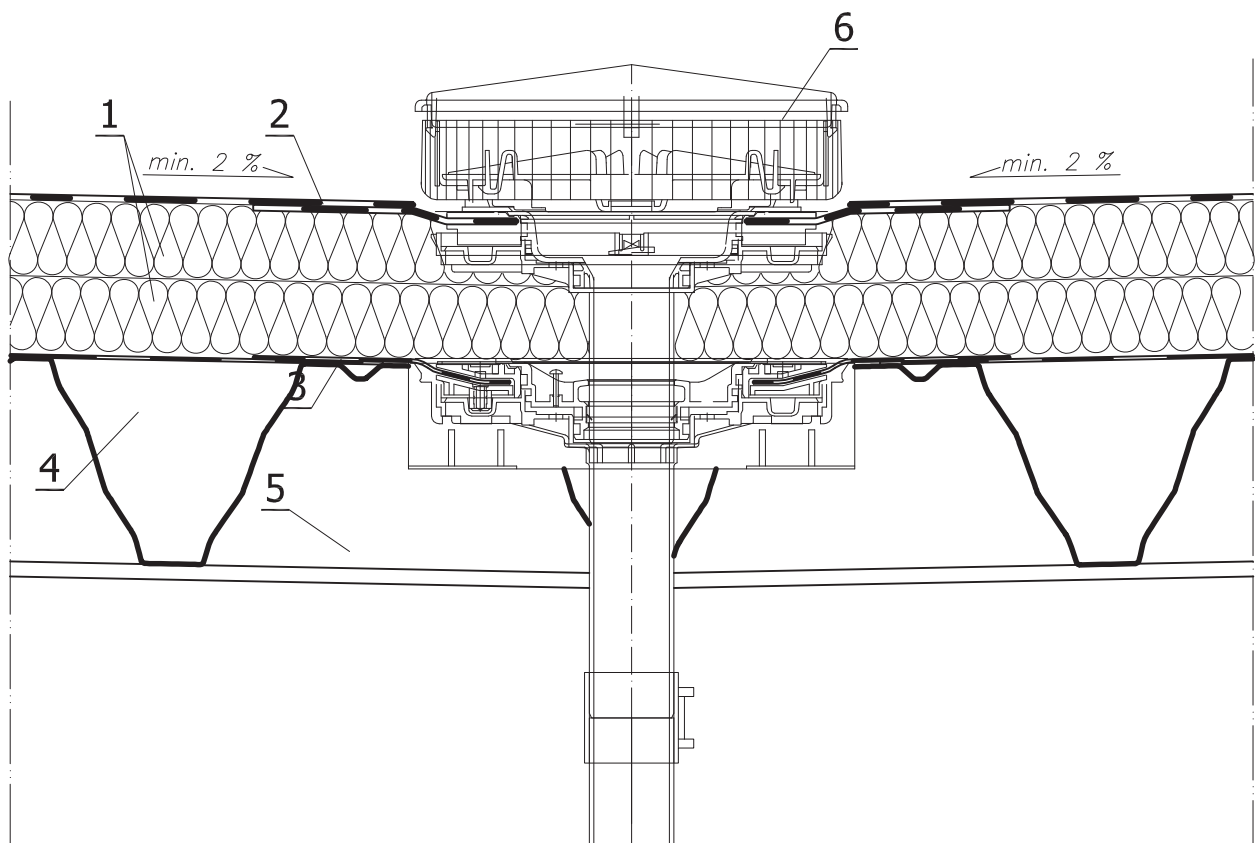
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Connector for steel with a spacer for fastening of insulation
7. Fastening of the bottom slab



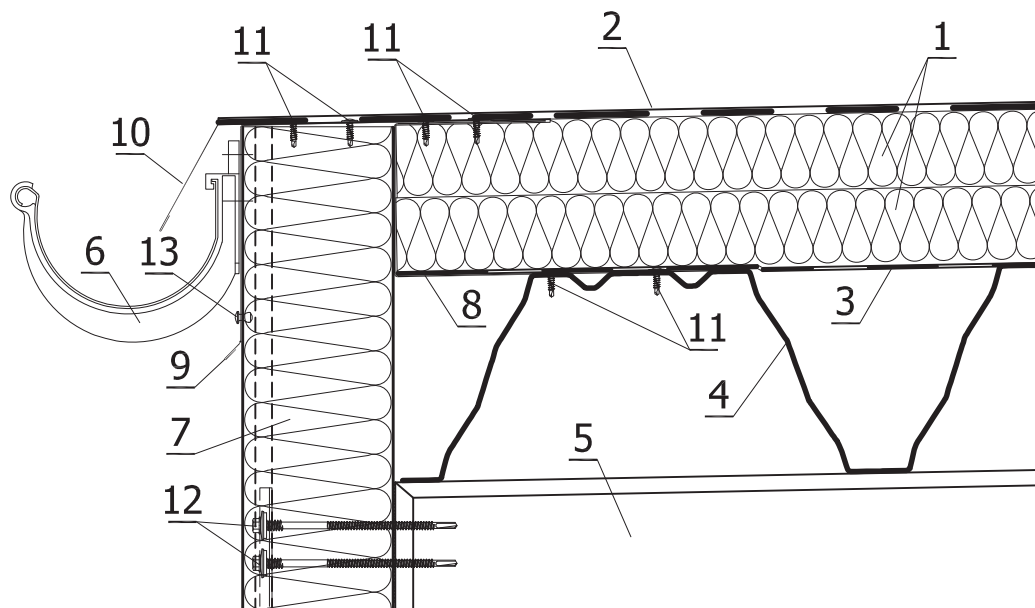
LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Sloping layer
5. Reinforced concrete floor
6. Roof wedge
7. Thermal insulation of skylight
8. Steel base of skylight
9. Skylight cover
10. Fastening expansion bolt



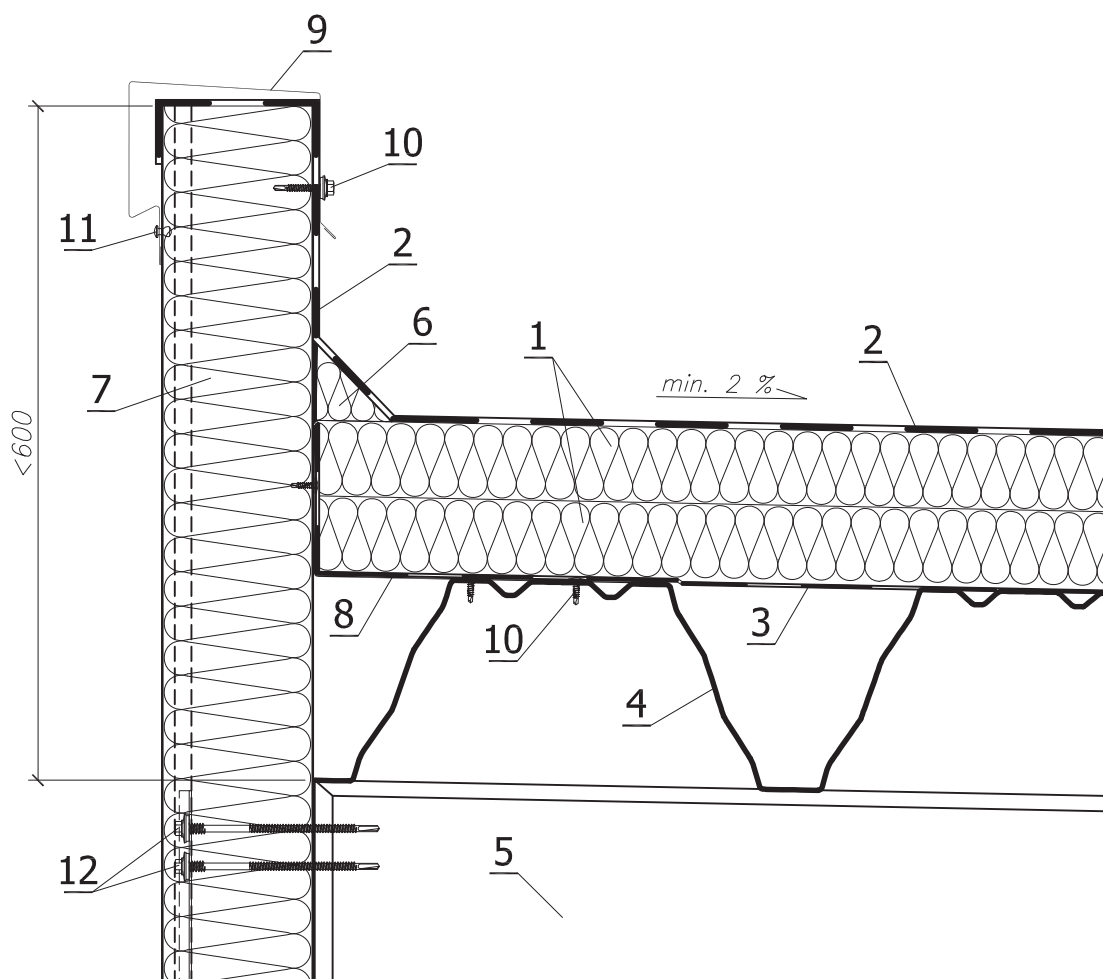
## LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Roof drain



**LEGEND:**

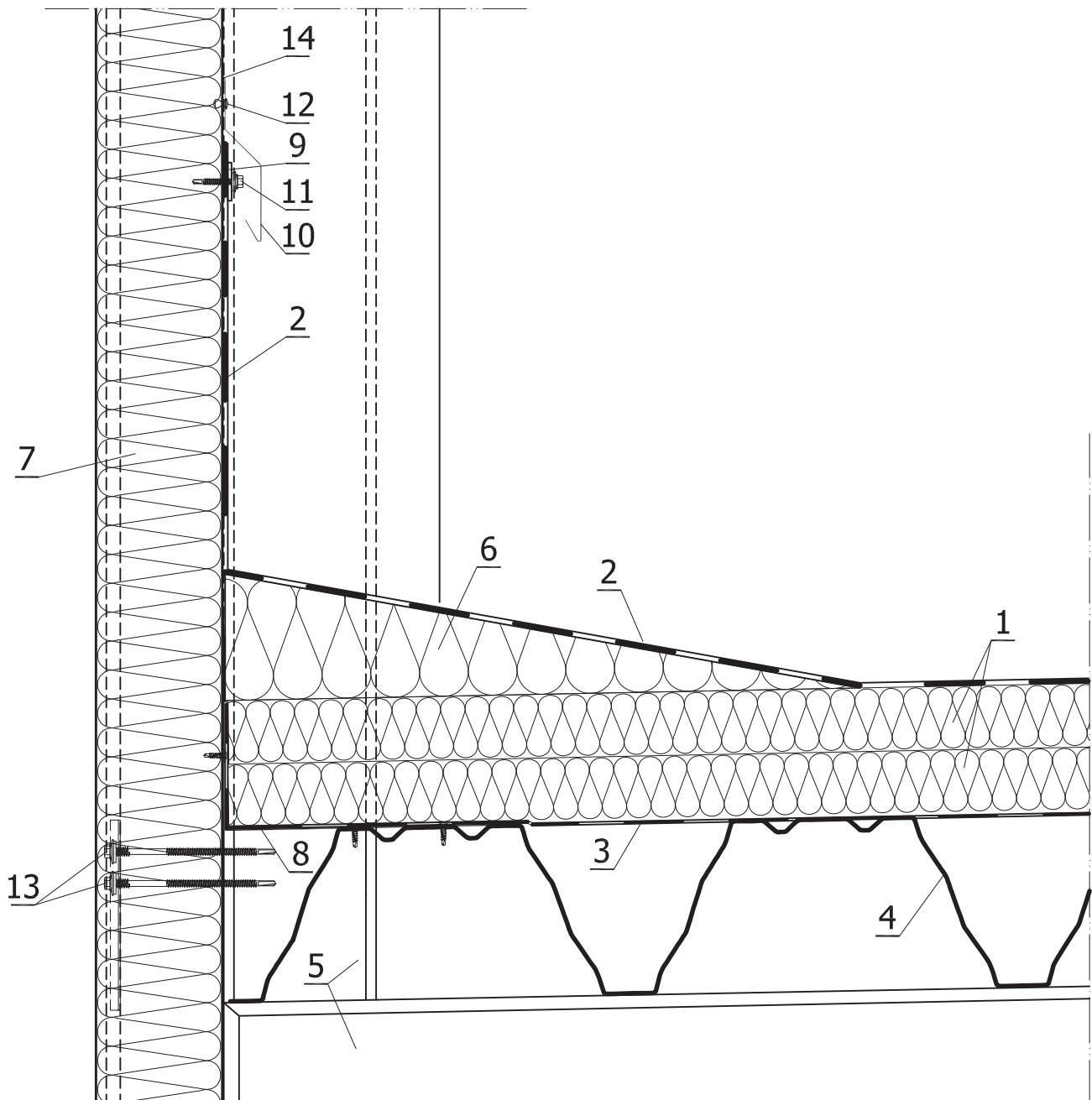
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Gutter
7. GORLICKA U 1000 sandwich panel in vertical position
8. Edging profile
9. Under-gutter covering flashing
10. Drip edge
11. Self-drilling connector for steel sheet
12. Self-drilling connector for sandwich panels
13. Tight blind rivet 4.0 x 8



## LEGEND:

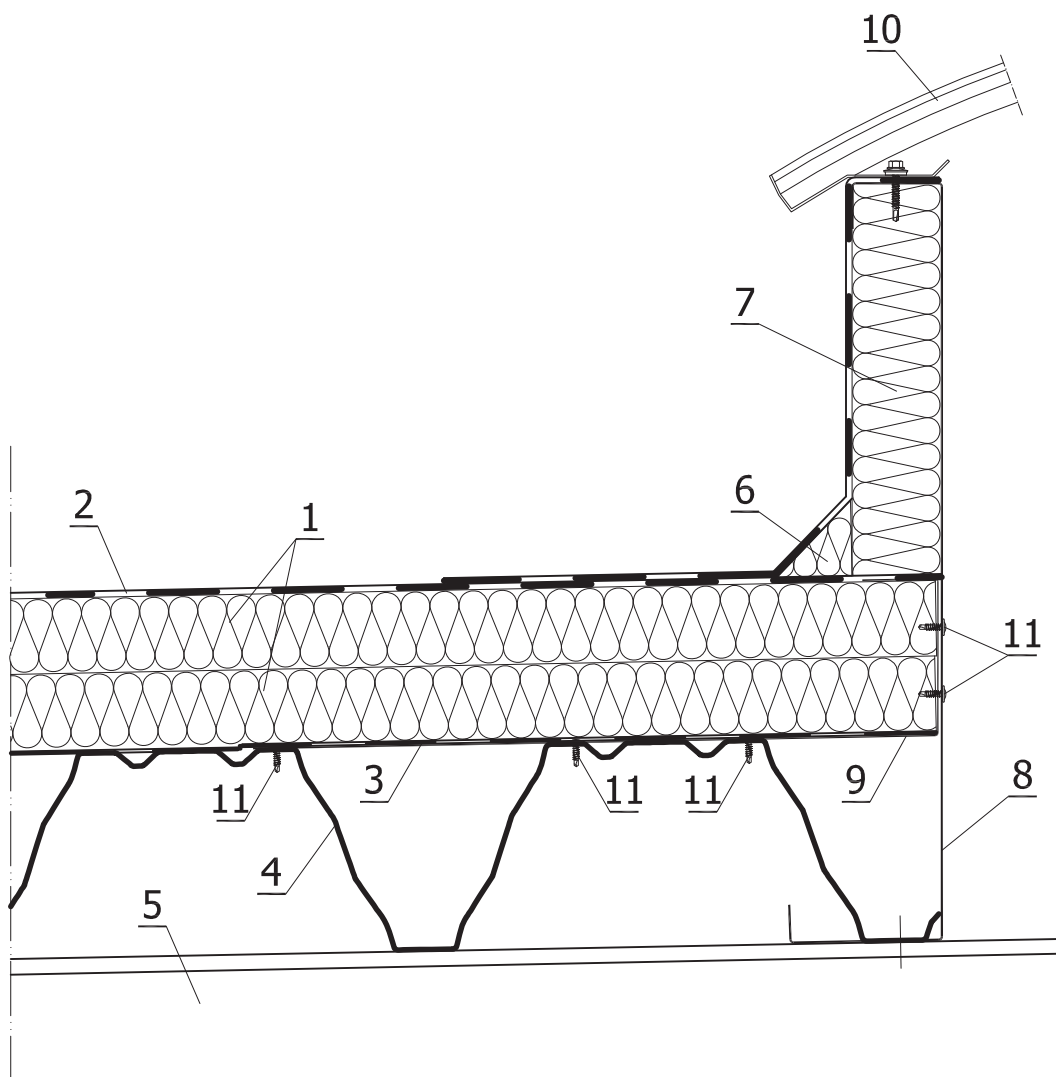
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Roof wedge
7. Low attic - GORLICKA U 1000 sandwich panel in vertical position
8. Angle bar
9. Attic flashing
10. Self-drilling connector for steel sheet
11. Tight blind rivet 4.0 x 8
12. Self-drilling connector for sandwich panels



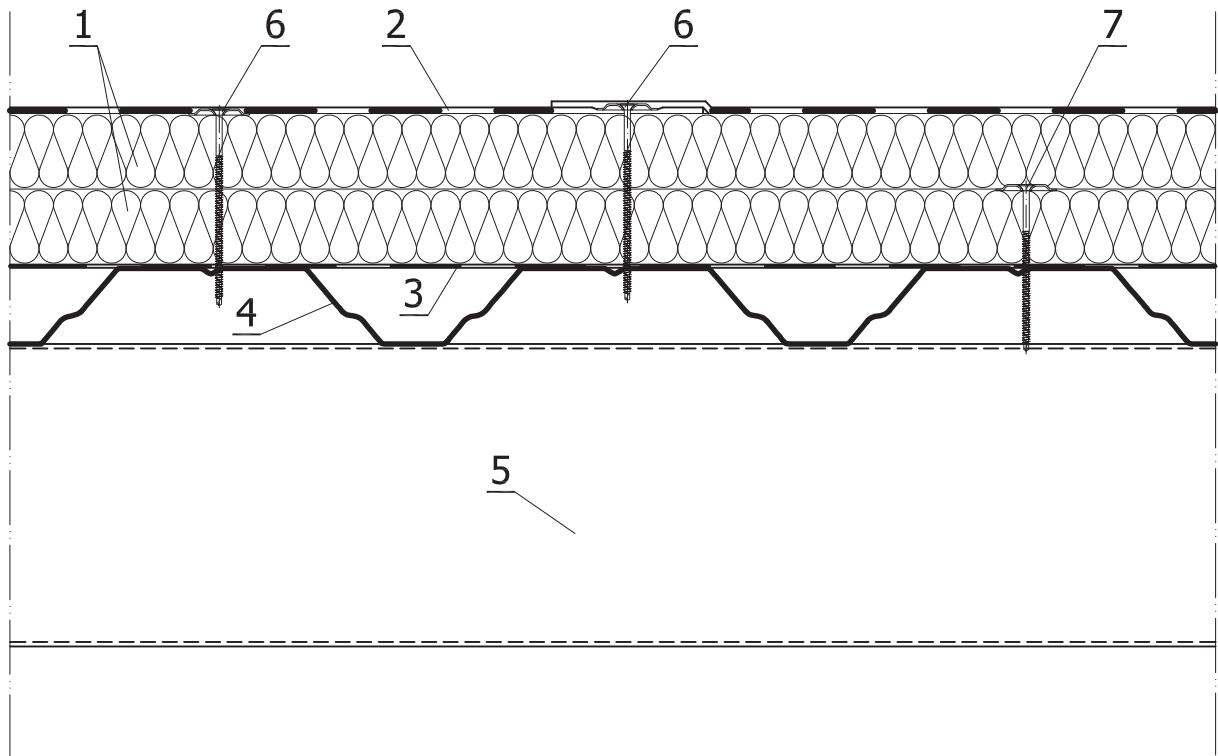


LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Roof wedge
7. High attic – GORLICKA U 1000 sandwich panel in vertical position
8. Angle bar
9. Flashing strip – flat bar
10. Drip edge
11. Self-drilling connector for steel sheet
12. Tight blind rivet 4.0 x 8
13. Self-drilling connector for sandwich panels
14. Permanently elastic sealing compound

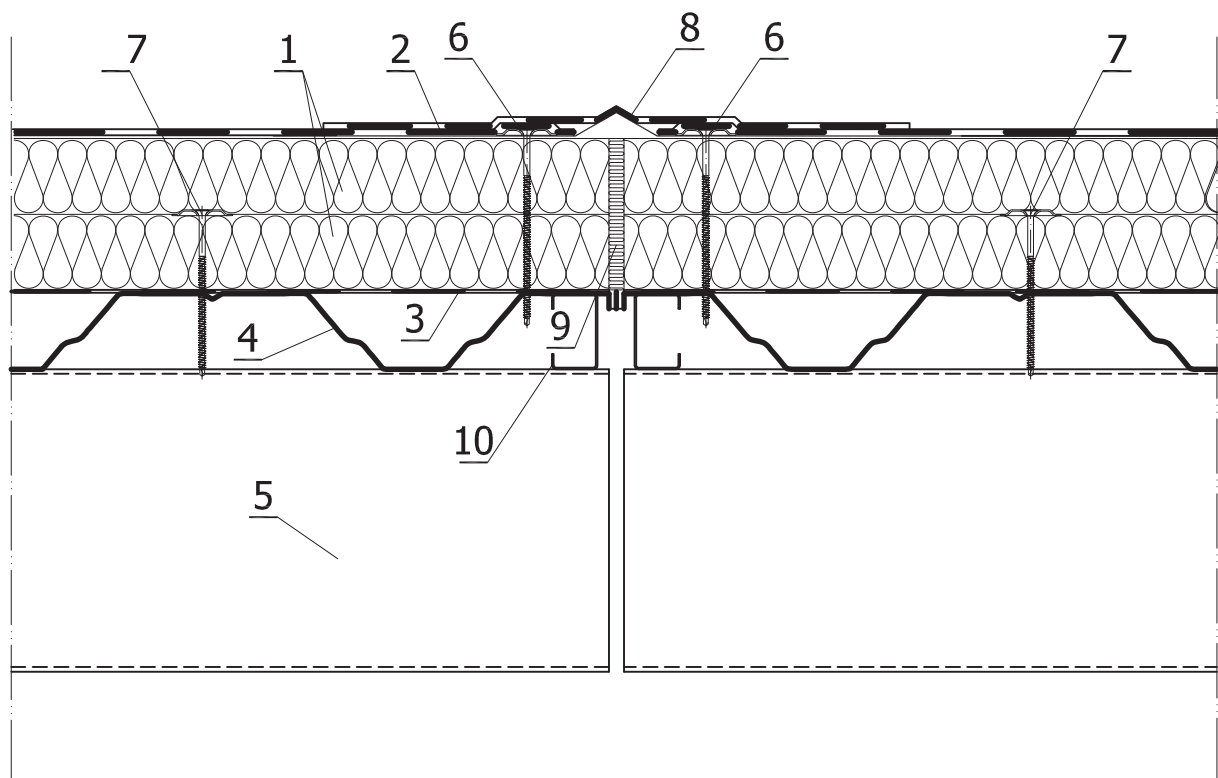
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Supporting structure
6. Roof wedge
7. Thermal insulation of skylight
8. Steel base of skylight
9. Longitudinal trimmer
10. Skylight cover
11. Self-drilling connector for steel sheet

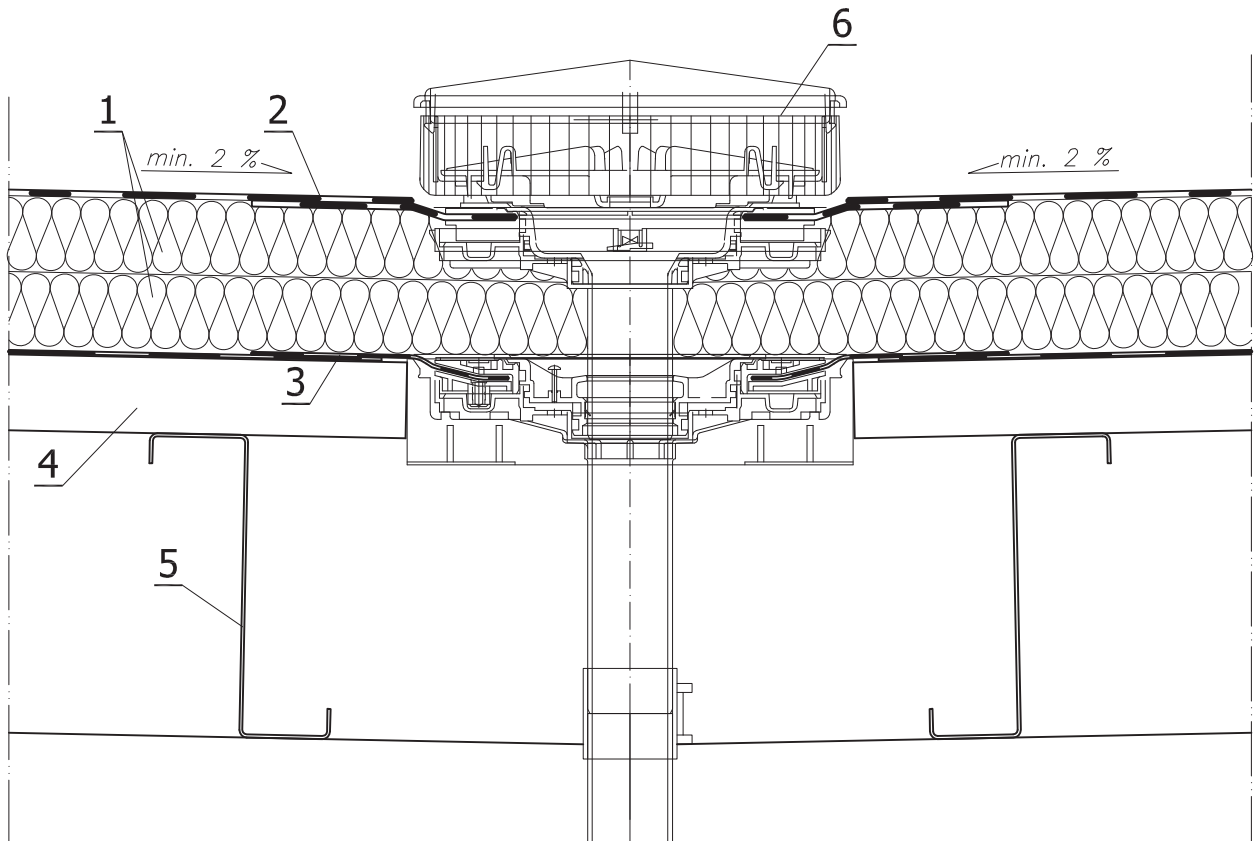


LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Connector for steel with a spacer for fastening of insulation
7. Fastening of the bottom slab

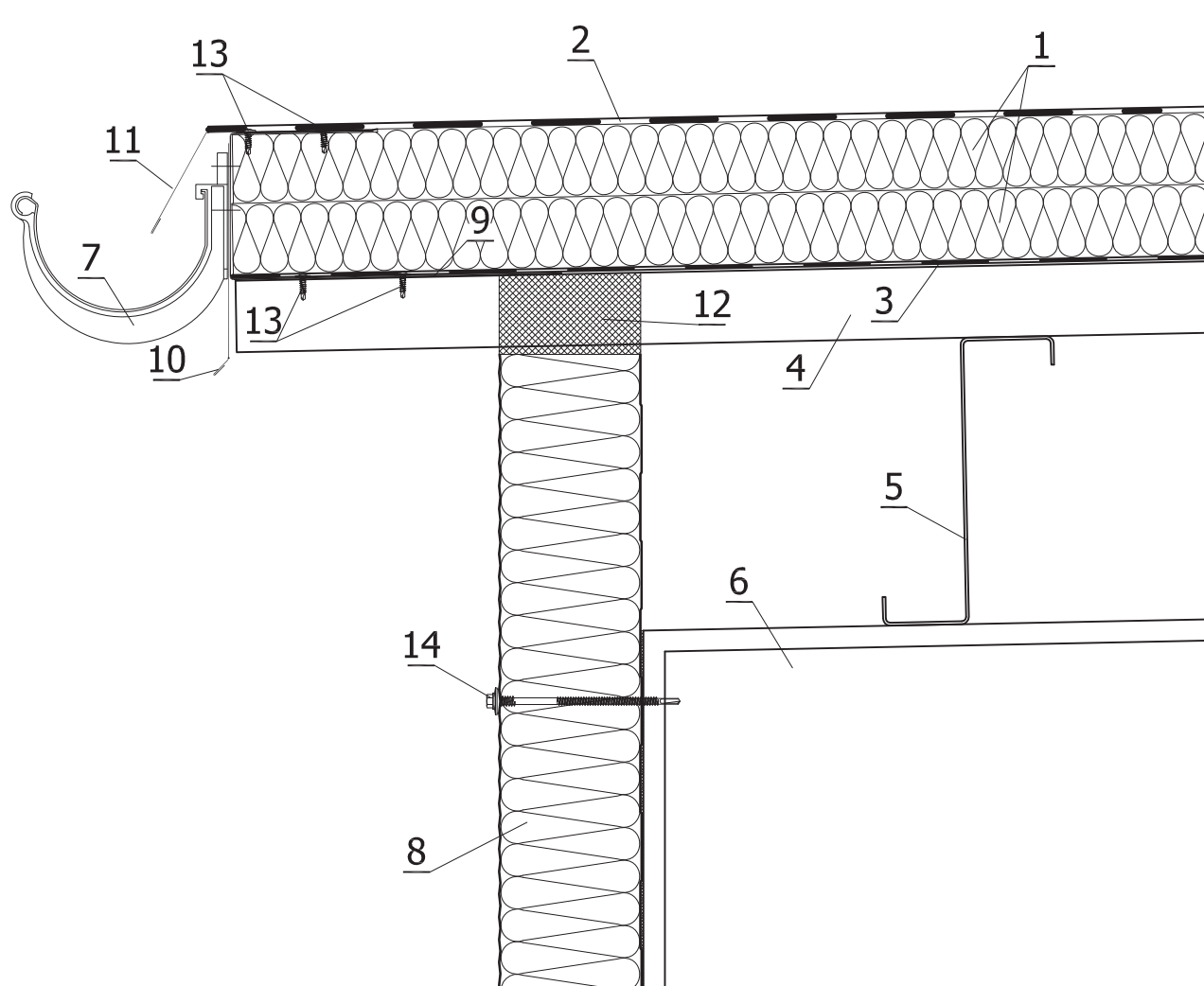
**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Connector for steel with a spacer for insulation fastening
7. Fastening of the bottom slab
8. Expansion joint flashing
9. Soft thermal insulation on the fastening
10. Strengthening profile



**LEGEND:**

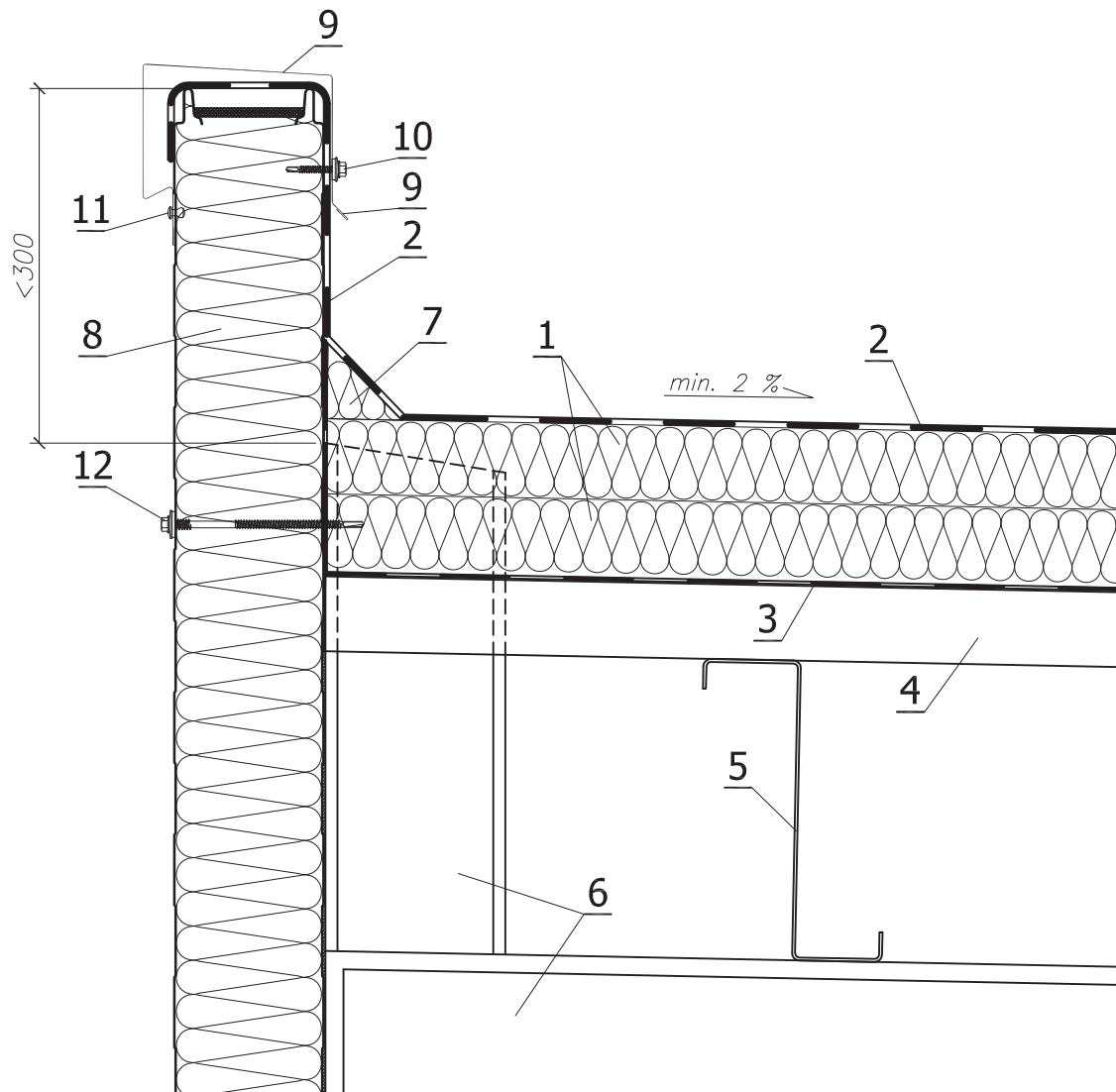
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Building's supporting structure
7. Roof drain



## LEGEND:

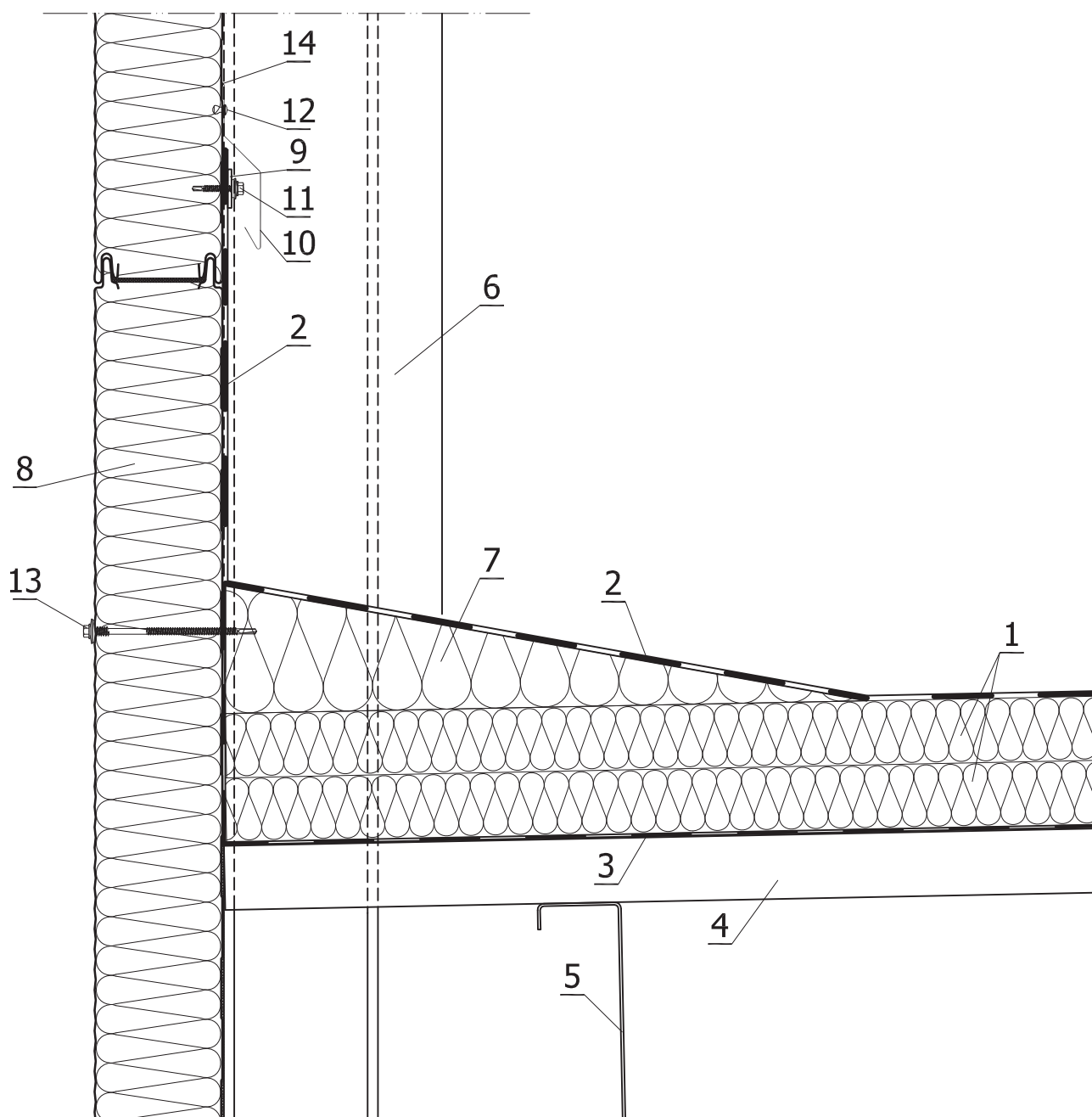
1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Building's structure
7. Gutter
8. GORLICKA U 1000 sandwich panel in horizontal position
9. Edging profile
10. Under-gutter covering flashing
11. Drip edge
12. Profiled PE seal
13. Self-drilling connector for steel sheet
14. Self-drilling connector for sandwich panels





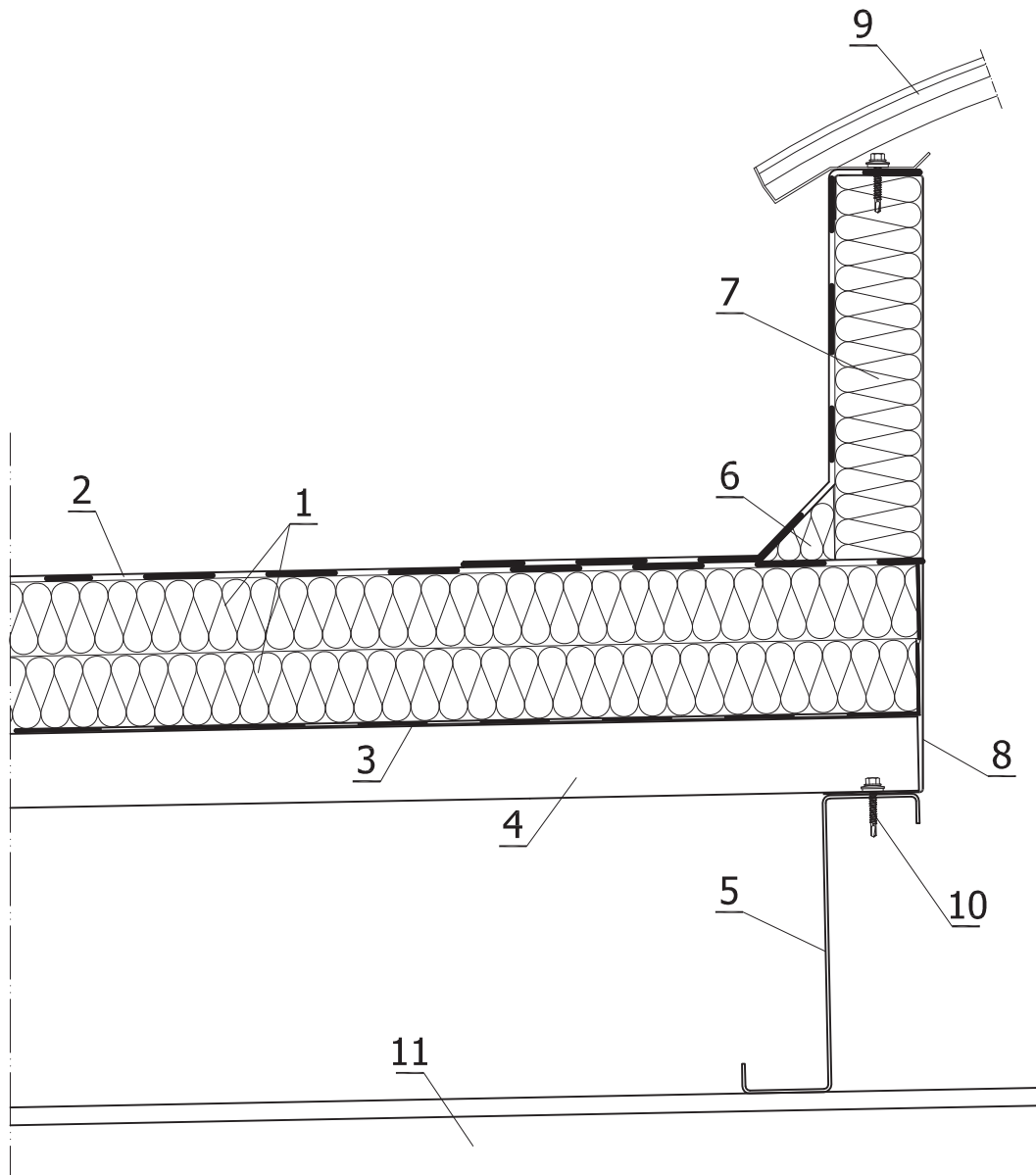
LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Building's supporting structure
7. Roof wedge
8. Low attic - GORLICKA U 1000 sandwich panel in horizontal position
9. Attic flashing
10. Self-drilling connector for steel sheet
11. Tight blind rivet 4.0 x 8
12. Self-drilling connector for sandwich panels



## LEGEND:

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-ply roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Structure – king post trusses with thermal insulation
7. Roof wedge
8. GORLICKA U 1000 sandwich panel in horizontal position
9. Flashing strip – flat bar
10. Drip edge
11. Self-drilling connector for steel sheet
12. Tight blind rivet 4.0 x 8
13. Self-drilling connector for sandwich panels
14. Permanently elastic sealing compound



**LEGEND:**

1. GORLICKA TERM thermal insulation panel – placed with staggered joints
2. Single-layer roof covering – synthetic membrane
3. Vapour barrier – PE membrane
4. Trapezoidal steel sheet
5. Purlin
6. Roof wedge
7. Thermal insulation of skylight
8. Steel base of skylight
9. Skylight cover
10. Self-drilling connector for steel sheet
11. Supporting structure

## GROUND SLABS

GORLICKA TERM panels are used not only for flat roofs but also as thermal insulation for ground slabs. Polyurethane insulation, thanks to its properties, is perfect for that. It is **durable, chemical and biological corrosion resistant**. It deters insects and rodent nesting. It has a very low absorption. It is resistant to most of chemicals. In order to comply with insulation requirements for ground slabs as specified in a technical conditions regulation, a **60 mm thick PIR panel** can be applied.

In case of cold stores panel layer should be thicker and, depending on the solution, equal to thickness of thermal insulation of cold and freezing rooms. Insulation pays its role if all layers of the ground slab are properly performed.

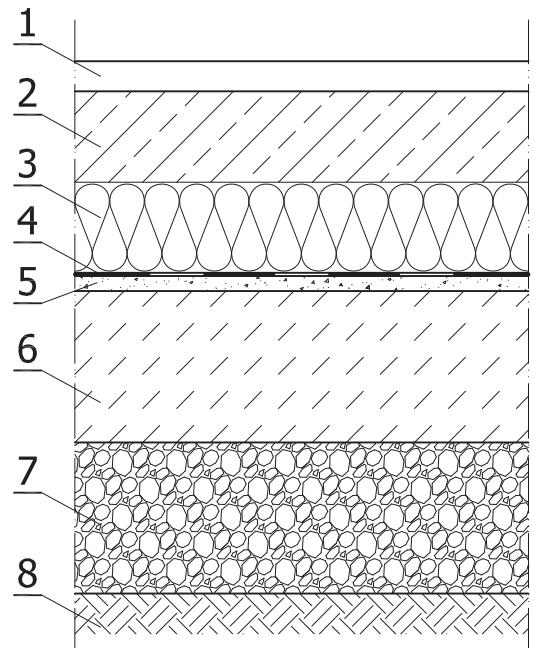
Soil and aggregate layer should be properly compacted in order to avoid excessive settlement of elements of the slab.

A tight damp proof layer should be placed under PIR panels, connected with walls' insulation.

Panels should be placed in tight contact to avoid thermal bridges and relocation of the insulation during further works.

Drawing no. 1 presents one of the options of properly performed ground slab.

Layers description: 1- floor, 2- reinforced levelling screed, 3- PIR panels thermal insulation 4- hydro-insulation, 5- levelling layer, 6- lean concrete, 7- drainage layer, 8- compacted natural soil



Dwg. 1 Cross-section of ground slab layers

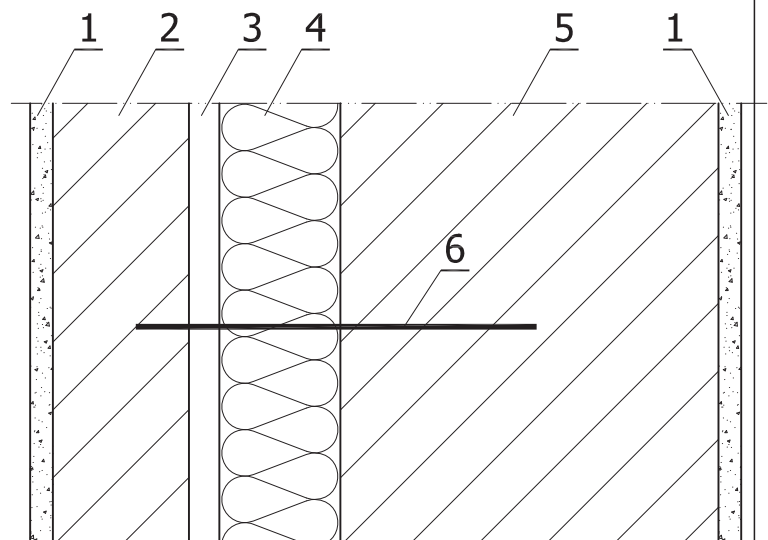
## SANDWICH WALLS

GORLICKA TERM insulation panels are also suitable for thermal insulation of sandwich walls. This type of walls is one of the best solutions for residential buildings, as they ensure protection of the insulation layer against weather conditions. They have excellent thermal and damp insulation parameters.

In order to comply with insulation requirements for external walls of rooms temp.  $t > 16^{\circ}\text{C}$  as specified in a technical conditions regulation, an 80 mm thick PIR panel can be applied. Insulation pays its role if the wall is properly performed. Internal wall should be even, and the mortar should not protrude from the external face of the wall.

Panels should be placed in tight contact to avoid thermal bridges. Insulation should be fastened to the load bearing wall by anchors. It is recommended to provide an air gap to remove moisture. Drawing no.2 presents one of the options of properly performed sandwich wall.

Layers description: 1- plaster, 2- screening wall, 3- air gap, 4- **PIR panels thermal insulation**, 5- load bearing wall, 6- steel anchor connecting wall layers



Dwg. 2 Cross-section of sandwich wall

## ACCESSORIES

GORLICKA TERM insulation system is supplemented with flashing and connectors.

## FLASHING

Gór-stal company is equipped with a roll former, providing flashing up to 1.25 mm thick, maximum 6 m long, in standard colours as in the catalogue or custom-made. Sheet colours and thicknesses available are presented in the table below.

For transportation purposes, flashings are protected with a membrane on the top layer.

Sheet thickness [mm]	Sheet weight [kg/m <sup>2</sup> ]	Standard flashing length [m.]	Available flashing length [m.]	Standard sheet colours in RAL palette
0.50	4.00	6.0	1.0 – 6.0	9002, 9006, 9007, 9010, 5010
0.70	6.00			
1.00	8.00			galvanized

Types and length of screws depending on the base and insulation thickness are presented in the table below.

## CONNECTORS

PIR panels can be fastened to reinforced concrete, wooden and steel sheet base with use of appropriate connectors.

Fastening of the insulation requires spacers and screws for a particular base:

- flat round spacer  $\varnothing$  50
- flat round spacer  $\varnothing$  70
- flat oval spacer 82 x 40

Types and lengths of screws depending on the base and insulation thickness are presented in the table below.

Insulation base:	wood	sheet 0.9 mm thick	sheet 1.25 mm thick	reinforced concrete
Insulation screw:	standard GTS-S		self-drilling GTS-B	for concrete GTHD
Insulation thickness [mm]	screw length [mm]			
40	70	60	60	70
50	80	70	70	80
60	90	80	80	90
80	110	100	100	110
90	120	110	110	120
100	130	120	120	130
120	150	140	140	150

ORDER FORM of  
**INSULATION PANELS**

**ORDER**

No ..... of .....

**SUPPLIER:** (name, company address, phone/fax, TIN)

**Gór-Stal sp. z o.o.**

ul. Przemysłowa 11  
38-300 Gorlice

Phone/Fax: (18) 353 98 00

Account No: 79 1140 1081 0000 5859 5500 1001

Agent:



**Commercial Terms**

Payment method:

Advance (%): payable until:

Maturity:

Credit limit:

Remarks:

**SUPPLIER** (name, company address, phone/fax, TIN)

**DELIVERY PLACE** (recipient, address, city, post code, phone/fax)

**Agents:**

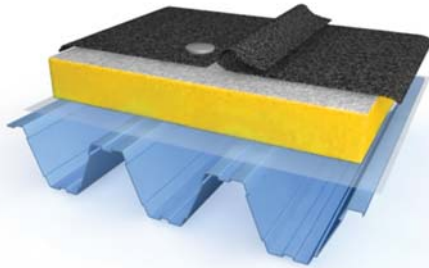
**REMARKS:**

L.P.	Plate type: GORLICKA TERM PK GORLICKA TERM AL GORLICKA TERM WS GORLICKA TERM BT GORLICKA TERM AGRO AL GORLICKA TERM AGRO P GORLICKA TERM AGRO F	Plate thickness: 40 50 60 80 100 120	Quantity		Price net: Unit/value	
			L [m]	pcs.	EUR/m <sup>2</sup>	EUR
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
<b>Total:</b>			[m <sup>2</sup> ]		EUR:	

Ordering Party's signature

**Sandwich Panel Manufacturer**

**PIR INSULATION PANEL - GORLICKA**  
consisting of stiff PIR foam in bilateral lining  
made from KRAFT paper



**TERM PK**  
 $\lambda = 0,023 \text{ W/m}\cdot\text{K}$

**PIR ( Poliisocyanouranium ) panel used for thermal insulation  
of flat roofs, cavity wall and floors**

- Heat transfer coefficient  $\lambda = 0,023 \text{ W/m}\cdot\text{K}$
- Compression strength min. **120 kPa** (with 10% deformation)
- Insulating core density **30 kg/m<sup>3</sup>** (<sup>2/46</sup>)
- Can be used with waterproof membranes **PVC, TPO** and **EPDM**
- Standard panel dimensions **1000 x 2400 mm** i **1000 x 1200 mm**
- Possibility of manufacturing plates with **milling** on their side edges
- Available thicknesses: **40, 50, 60, 80, 100, 120 mm**

Panel thickness [mm]	40	50	60	80	100	120
Heat resistance R [m <sup>2</sup> ·K/W]	1,74	2,17	2,61	3,48	4,35	5,22
Heat + Transfer Coefficient U [W/m <sup>2</sup> ·K]	0,58	0,46	0,38	0,29	0,22	0,19



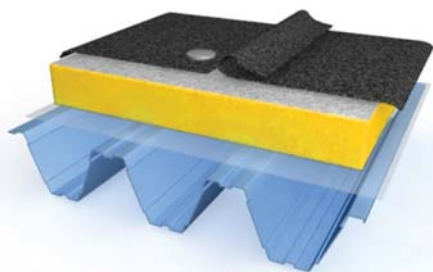
- European fire classification **E**
- Classification according to PE-EN 13165, **PIR-EN-13165-T2-DS(TH)7-CS(10/Y)150**
- **CE** mark



**Sandwich Panel Manufacturer**

## PIR INSULATION PANEL - GORLICKA

consisting of stiff PIR foam in bilateral lining made from KRAFT paper covered with aluminum



**TERM AL**  
 $\lambda = 0,023 \text{ W/m}\cdot\text{K}$

**PIR ( Poliisocyanouranium ) panel used for thermal insulation of flat roofs, cavity wall and floors**

- Heat transfer coefficient  $\lambda = 0,023 \text{ W/m}\cdot\text{K}$
- Compression strength min. **120 kPa** (with 10% deformation)
- Insulating core density **30 kg/m<sup>3</sup>** (<sup>-2/+6</sup>)
- Can be used with waterproof membranes **PVC, TPO and EPDM**
- Standard panel dimensions **1000 x 2400 mm** i **1000 x 1200 mm**
- Possibility of manufacturing plates with **milling** on their side edges
- Available thicknesses: **40, 50, 60, 80, 100, 120 mm**

Panel thickness [mm]	40	50	60	80	100	120
Heat resistance R [m <sup>2</sup> ·K/W]	1,74	2,17	2,61	3,48	4,35	5,22
Heat + Transfer Coefficient U [W/m <sup>2</sup> ·K]	0,58	0,46	0,38	0,29	0,22	0,19



- European fire classification E
- Classification according to PE-EN 13165, **PIR-EN-13165-T2-DS(TH)7-CS(10/Y)150**
- **CE** mark



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 ul. Przemysłowa 11, 38-300 Gorlice  
 tel./fax: +48 18 353 98 00  
 email: [info@gor-stal.pl](mailto:info@gor-stal.pl)

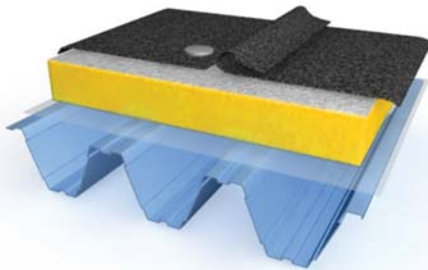
**WWW.GOR-STAL.PL**



**Sandwich Panel Manufacturer**

**PIR INSULATION PANEL - GORLICKA**

consisting of stiff PIR foam in bilateral lining made from StoneGlass (glass fiber with mineral coating)



**TERM WS**

$\lambda = 0,023 \text{ W/m}\cdot\text{K}$

**PIR ( Poliisocyanouranium ) panel used for thermal insulation of flat roofs, cavity wall and floors**

- Heat transfer coefficient  $\lambda = 0,023 \text{ W/m}\cdot\text{K}$
- Compression strength min. **120 kPa** (with 10% deformation)
- Insulating core density **30 kg/m<sup>3</sup>** (<sup>2/46</sup>)
- Can be used with waterproof membranes **PVC, TPO** and **EPDM**
- Standard panel dimensions **1000 x 2400 mm** i **1000 x 1200 mm**
- Possibility of manufacturing plates with **milling** on their side edges
- Available thicknesses: **40, 50, 60, 80, 100, 120 mm**

Panel thickness [mm]	40	50	60	80	100	120
Heat resistance R [m <sup>2</sup> ·K/W]	1,74	2,17	2,61	3,48	4,35	5,22
Heat + Transfer Coefficient U [W/m <sup>2</sup> ·K]	0,58	0,46	0,38	0,29	0,22	0,19

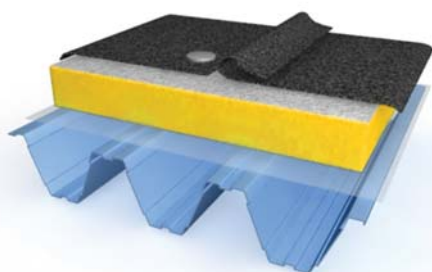


- European fire classification E
- Classification according to PE-EN 13165, **PIR-EN-13165-T2-DS(TH)7-CS(10/Y)150**
- **CE** mark

**Sandwich Panel Manufacturer**

## **PIR INSULATION PANEL - GORLICKA**

consisting of stiff PIR foam in bilateral bitumen lining



**TERM BT**  
 $\lambda = 0,023 \text{ W/m}\cdot\text{K}$

**Polyisocyanurate thermal insulation panels (PIR), as insulation to renovate the flat roofs of residential buildings.**

**Possibility of using directly on panel various types of roofing**

- Heat transfer coefficient  $\lambda = 0,023 \text{ W/m}\cdot\text{K}$
- Compression strength min. **120 kPa** (with 10% deformation)
- Insulating core density **30 kg/m<sup>3</sup>** (<sup>2/16</sup>)
- Can be used with waterproof membranes **PVC, TPO and EPDM**
- Standard panel dimensions **1000 x 2400 mm** i **1000 x 1200 mm**
- Possibility of manufacturing plates with **milling** on their side edges
- Available thicknesses: **40, 50, 60, 80, 100, 120 mm**

Panel thickness [mm]	40	50	60	80	100	120
Heat resistance R [m <sup>2</sup> ·K/W]	1,74	2,17	2,61	3,48	4,35	5,22
Heat + Transfer Coefficient U [W/m <sup>2</sup> ·K]	0,58	0,46	0,38	0,29	0,22	0,19

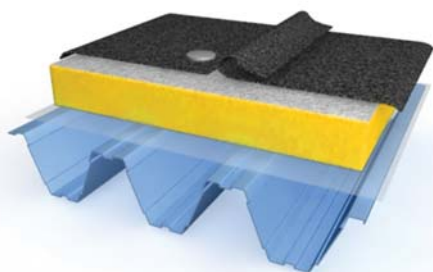


- European fire classification **E**
- Classification according to PE-EN 13165, **PIR-EN-13165-T2-DS(TH)7-CS(10/Y)150**
- **CE** mark

**Sandwich Panel Manufacturer**

**PIR INSULATION PANEL - GORLICKA**

consisting of stiff PIR foam in bilateral lining covered with aluminum thickness of 50 microns



**TERM AGRO AL**

$\lambda = 0,023 \text{ W/m}\cdot\text{K}$

**PIR ( Poliisocyanouranium ) panel used for thermal insulation of agricultural and industrial facilities**

- Heat transfer coefficient  $\lambda = 0,023 \text{ W/m}\cdot\text{K}$
- Compression strength min. **120 kPa** (with 10% deformation)
- Insulating core density **30 kg/m<sup>3</sup>** (<sup>2/46</sup>)
- Can be used with waterproof membranes **PVC, TPO** and **EPDM**
- Standard panel dimensions **1000 x 2400 mm** i **1000 x 1200 mm**
- Possibility of manufacturing plates with **milling** on their side edges
- Available thicknesses: **40, 50, 60, 80, 100, 120 mm**

Panel thickness [mm]	40	50	60	80	100	120
Heat resistance R [m <sup>2</sup> ·K/W]	1,74	2,17	2,61	3,48	4,35	5,22
Heat + Transfer Coefficient U [W/m <sup>2</sup> ·K]	0,58	0,46	0,38	0,29	0,22	0,19



- European fire classification E
- Classification according to PE-EN 13165, **PIR-EN-13165-T2-DS(TH)7-CS(10/Y)150**
- **CE** mark

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Aktualizacja: Maciej Kluba, 05.2015r.



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