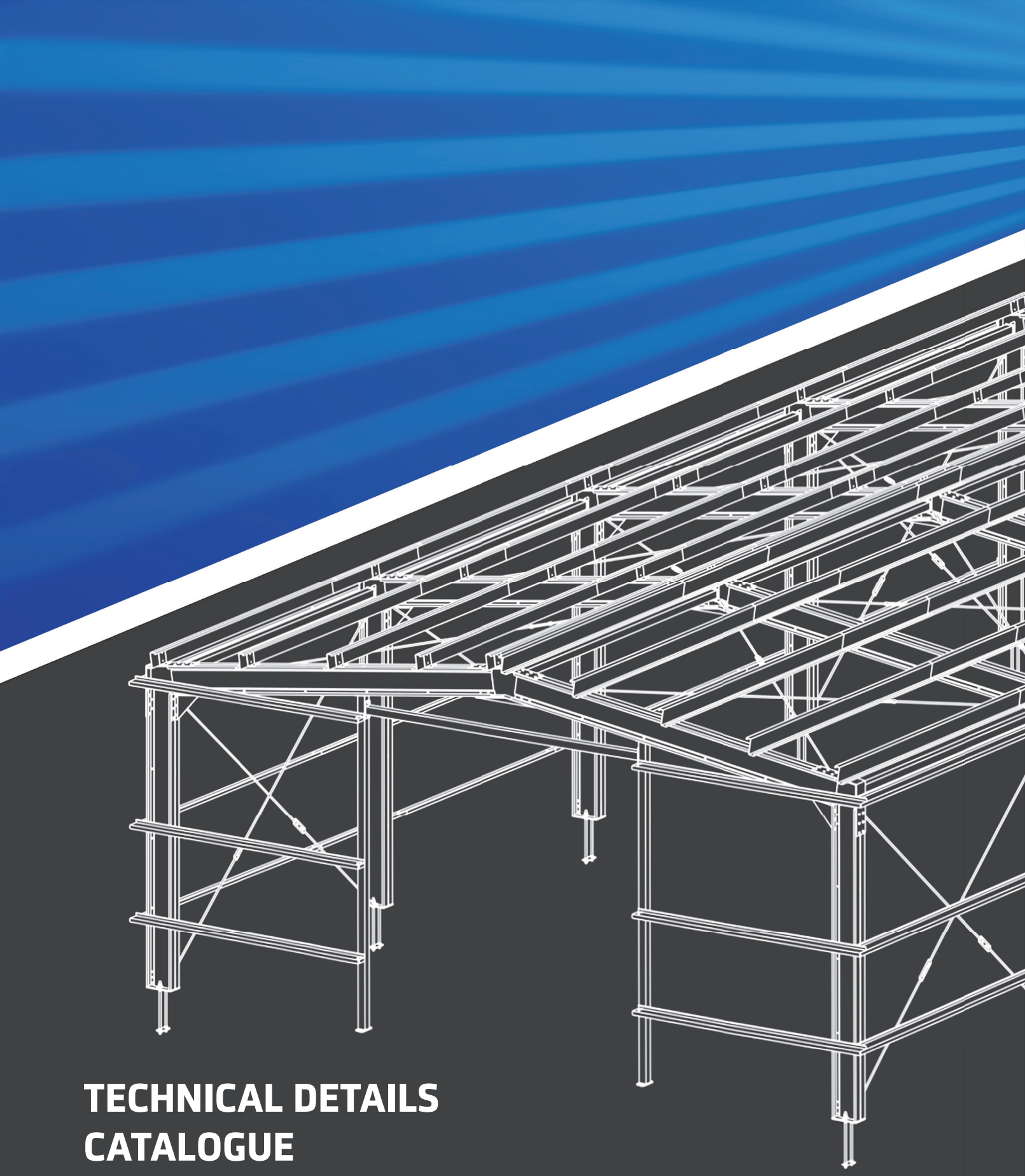

TECHNICAL DETAILS CATALOGUE

Thermal insulating **wall panels**

plastsistem

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INTRODUCTION

SUMMARY

Chapters 1 and 2

Chapters 1 and 2 of this technical catalogue were carried out in collaboration with Technical University of Cluj Napoca, Faculty of Construction - Structures Department, under a research contract.

Chapter 1 presents the hypotheses on which the calculation has been made and the static systems analyzed.

Chapter 2 contains tables with loadbearing capacities depending on maximum spans allowed for thermal insulating sandwich panels with standard faces and visible joints.

Chapter 3

Chapter 3 was developed by the Design Department of the company Plastsistem.

Chapter 3 contains details of assembling the wall panels.

Loading tables

Loading tables refer solely to the types of polyurethane foam panels with standard faces for wall applications, produced by our company. The tables present load bearing capacities of panels analyzed according the types and sizes of the manufactured sections and the related physical and mechanical characteristics.
The calculations were carried out according the standard EN 14509: 2013 - Appendix E " Self-supporting insulated panels, with two metal faces", regulating the design of sub- assemblies made from sandwich panels.

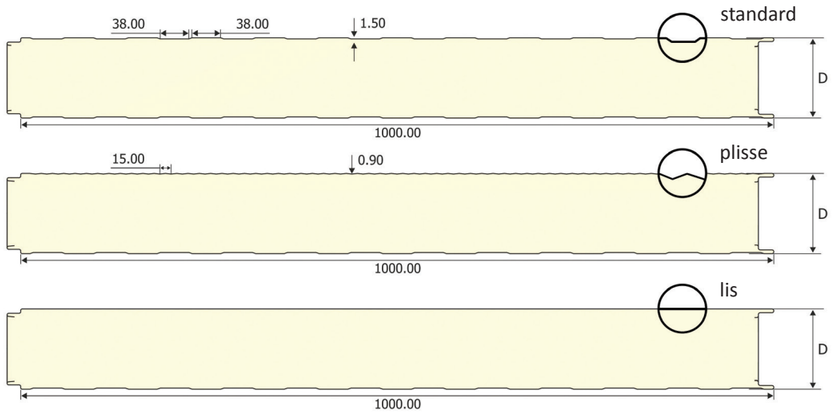
Chapter 1

TECHNICAL CHARACTERISTICS OF PANELS. COMPUTING HYPOTHESIS

Technical characteristics of panels

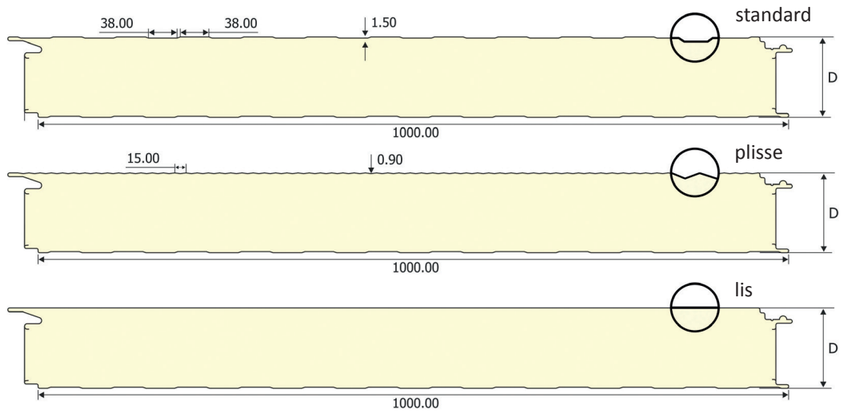
Thicknesses

The analysis considered the types of thermal insulating wall panels with standard faces, included in Plastsistem's portfolio, having the geometrical characteristics listed below. The small differences between the moment of inertia of the standard face, plisse (waves) and lis (flat), allow the use of tables developed for standard, plisse and lis face types.



Type. 1: Visible joint wall panel - ISOPER N
Thickness D=30, 40, 50, 60, 80,100, 120, 150, 200 mm

Since the faces of the panels are identical in the two fastening systems (visible and hidden) it can be accepted that the values of loadbearing capacities are similar under the action of wind pressure.



Type. 2: Hidden joint wall panel - ISOPER A
Thickness D=40, 50, 60, 80,100,120 mm

Characteristics

Materials / Thicknesses / Hypothesis

Steel qualities considered in the calculation are according to EN 10346: 2009 "Continuously hot-dip coated steel flat products - Technical delivery conditions". The analyzed thermal insulating panels have the following typo dimensions:

· exterior steel sheet made of prepainted galvanized steel
S250GD+Z180
with corrosion protection by hot galvanizing, of thickness **25µm, thickness of the steel sheet 0.45 mm**

· interior steel sheet made of prepainted galvanized steel
S220GD+Z100
with corrosion protection by hot galvanizing, of thickness **15µm, thickness of the steel sheet 0.40 mm**

· thickness of panel (polyurethane foam core) **30-40-50-60-80-100-120-150-200 mm**

Characteristics of the steel used for the exterior face, with reference to steel grade S250GD + Z180, are as follow:

· yield strength **f_y = 250 N/mm²**

· thermal expansion coefficient **α_{Ti}=1.20x10^{-5} /°C**

· elasticity modulus **E = 210000 N/mm²**

Characteristics of the steel used for the interior face, with reference to steel grade S220GD + Z100, are as follow:

· yield strength **f_y = 220 N/mm²**

· thermal expansion coefficient **α_{Ti}=1.20x10^{-5} /°C**

· elasticity modulus **E = 210000 N/mm²**

The characteristics of the foam forming the core of the panel and the bending effort of the faces, obtained from the laboratory tests were used in determining the load bearing capacity of the panels.

Types of panels, for which loadbearing capacity tables were drafted:

· Thickness of panels with visible joints **30-40-50-60-80-100-120-150-200 mm**

· **Maximum manufacturing length** **L_{max} = 13.5 m**

Drafting the tables referring to capable loads of thermal insulating sandwich panels

Computing hypothesis

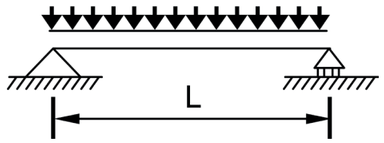
Thermal insulating panels are most often used as the outer enclosures. Following the arrangement on the roof purlins or wall rulers, simply supported or continuously supported static schemes may result. Therefore static schemes were analyzed, on simply supported beam or continuous beam with two spans, under the effect of wind pressure and suction.

The calculation model to determine the loadbearing capacity of sandwich panels has considered the following hypotheses:

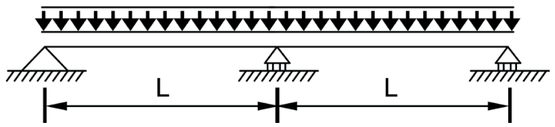
- load is uniformly distributed over the entire length of the panel;
- load may come from its own weight combined with the action of wind load (pressure);
- load may come from its own weight combined with the action of wind load (suction);
- according to EN 14509: 2013, the exterior face color can affect the loadbearing capacity (additional effort from differentiated / prevented expansions and contractions, overlapping the efforts resulted from suction and pressure), so analysis was done panels we considered both long and short-term effects;
- according to EN 14509: 2013, the loadbearing capacity of the panel is affected by the effect of creep , so when sizing the panourilor s-au considerat efectele de lungă și scurtă durată;
- temperature gradient between the faces of the panel was considered:

o **Δt**=40°C for color group I
o **Δt**=45°C for color group II
o **Δt**=60°C for color group III

Thus, we analyzed two types of static systems, each with two loading situations (wind pressure and suction):



Static system No. 1: Simply supported beam



Static system No. 2: Continuous beam over two spans

Drafting the tables referring to capable loads of thermal insulating sandwich panels

Computing hypothesis

Depending on the color of the thermal insulating panels considered within the project, 3 cases of sizing shall be referenced in the loadbearing capacities tables:

o Δt=40°C - For color group I

presents the loadbearing capacity with its allowable span, specified in meters (capacity in kN / m2 - computing value is obtained by multiplying the characteristic value with the safety coefficient) for very light colors. This group may include **colors as RAL 1015, 1016, 1018, 6019, 7035, 9001, 9002, 9010**.

o Δt=45°C - For color group II

presents the loadbearing capacity with its allowable span, specified in meters (capacity in kN / m2 - computing value is obtained by multiplying the characteristic value with the safety coefficient) for light colors. This group may include **colors as RAL 1001, 1002, 1003, 1004, 1014, 1017, 1019, 1021, 1023, 1035, 2000, 2003, 2004, 2008, 2009, 2011, 5012, 5018, 5024, 6018, 6021, 6033, 7000, 7004, 7032, 7037, 7040, 7042, 7045, 7046, 9006, 9022**.

o Δt=60°C - For color group III

presents the loadbearing capacity with its allowable span, specified in meters (capacity in kN / m2 - computing value is obtained by multiplying the characteristic value with the safety coefficient) for dark colors. This group may include **colors as RAL 3000, 3002, 3003, 3005, 3009, 3011, 3013, 3020, 5002, 5005, 5007, 5009, 5010, 5011, 5012, 5014, 5017, 5022, 6000, 6003, 6005, 6011, 6020, 6024, 6029, 7011, 7012, 7015, 7016, 7021, 7022, 7024, 8004, 8016, 8017, 8023, 9005, 9007.**

According to EN 14509: 2013 the allowed threshold value for deformation was considered L / 100.

Example of selecting

Computing values

the appropriate panel for an assessed load in wall panels

Input:
It is exemplified the selection of the appropriate panel, considering the distributed wind load (according to norm CR 1-1-4-2012).

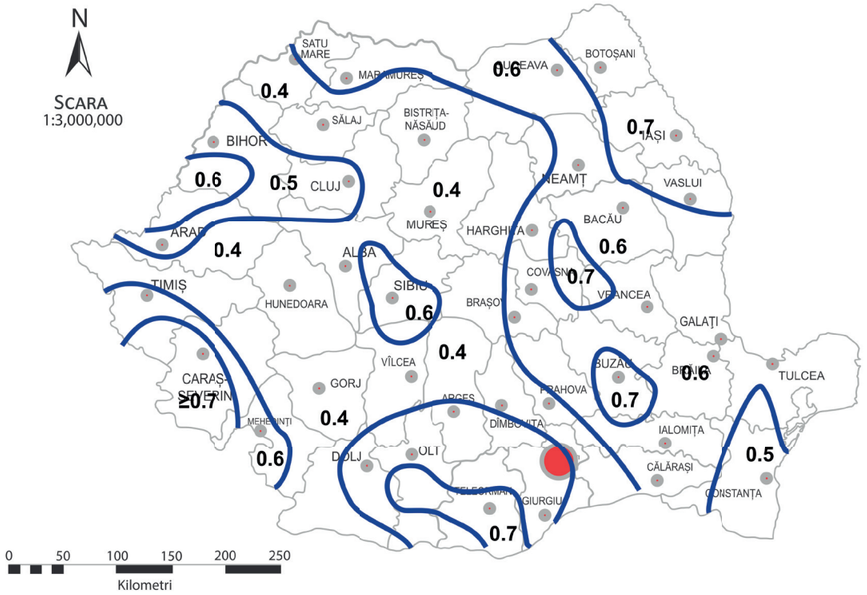
a) The characteristic value of wind load on the outer wall is determined by several parameters, with the formula:

$$w_e = g_{lw} \times c_{pe} \times q_p (ze)$$

For simplicity, we shall assume the coefficients in the formula below:

- reference pressure: qref =0.5kN/m2 (fig. 2.1)
- reference height: ze=8.20m
- ground roughness : Z0=0.05m (according to Chapter 2, Table 2.1, Category II)
- roughness factor: Cr(z)=0.9639 (Kr(Z0)=0.189 for Category II)
- gust of wind blowing factor : Cg(z)=1.8954
- topographical factor : Ct=1
- exposure factor : Ce(z)=Cg(z) x Cr(z) x Ct(z) = 1.761 (according to Chapter 2)
- from aerodynamic coefficients we consider CD=0,8 for area D

We obtain for area D the wind pressure value = 0.71 kN / m2



The zoning of reference values of the dynamic wind pressure qb, in kPa, with IMR=50 years
Note: For altitudes above 1000m, the values of the dynamic wind pressure
shall be corrected with the formula in CR 1-1-4-2012

Example of selecting

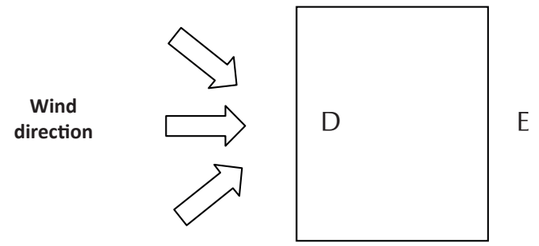
Computing values

the appropriate panel for an assessed load in wall panels

Load coefficients for final limit state (SLU) and serviceability limit state (SLS) are as follow:

- **n =1.50** - final limit state of resistance and stability, under the action of fundamental grouping
- **n =1.00** - limit state of normal exploitation, under the action of total serviceability loads

According to the above, this results in a characteristic load for a building enclosure in Bucharest, subjected to the action of wind on the wall panels from area **D, w_k=0,71 kN/m²**, respectively the computing value of action **w_d=0,71x1,065= kN/m².**

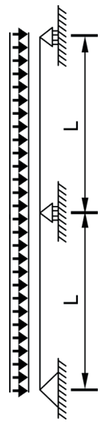


Building plan, with area D, directly exposed to wind

When determining the load bearing capacity of the panels, load coefficients were taken into account for the specific load types analyzed (permanent load from self-weight with safety coefficient YG = 1.35 and wind load, with YQ = 1.5) thus the tables assessed shall identify the allowed span only with the dominant wind load, without multiplying it by the coefficient YQ = 1.5.

Selecting the appropriate panel according the assessed tables should be as follows:

Step 1
Select the type, thickness of insulation and static scheme of the desired panel. Assuming we choose a 60 mm thick panel, supported on at least two spans, we shall identify the table referring to the type and thickness of the desired panel.



Static scheme of wall panel

Example of selecting

the appropriate panel for an assessed load in wall panels

Tip panou ISOPERn	Date generale	Capacităţi portante calculate de:
Panou ISOPERn 60	D=59.33 mm $t_{nom,1}$=0.45 mm $t_{nom,2}$=0.40 mm	UNIVERSITATEA TEHNICĂ CLUJ-NAPOCA; plastsistem
Faţă ext. S250 GD+Z180, Faţă int. S220GD+Z100		
Panou cu o deschidere		

Grupa de culori	Valori de calcul, încărcare din vânt la presiune [kN/m²]																				
	0.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50	4.88	5.25	5.63	6.00	6.38	6.75	7.13	7.50
	Distanţa admisă dintre reazeme [m]																				
I	9.48	6.49	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
II	9.48	6.49	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
III	6.90	6.49	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11

Grupa de culori	Valori de calcul, încărcare din vânt la suţiune [kN/m²]																				
	0.00	-0.38	-0.75	-1.13	-1.50	-1.88	-2.25	-2.63	-3.00	-3.38	-3.75	-4.13	-4.50	-4.88	-5.25	-5.63	-6.00	-6.38	-6.75	-7.13	-7.50
	Distanţa admisă dintre reazeme [m]																				
I	9.48	7.08	5.59	4.57	3.96	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
II	9.48	6.49	5.41	4.57	3.96	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
III	6.90	5.49	4.84	4.42	3.96	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11

Panou cu două deschideri

Grupa de culori	Valori de calcul, încărcare din vânt la presiune [kN/m²]																				
	0.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50	4.88	5.25	5.63	6.00	6.38	6.75	7.13	7.50
	Distanţa admisă dintre reazeme [m]																				
I	6.98	6.98	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
II	6.98	6.98	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
III	6.98	6.98	5.05	4.12	3.57	3.20	2.92	2.70	2.53	2.38	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11

Grupa de culori	Valori de calcul, încărcare din vânt la suţiune [kN/m²]																				
	0.00	-0.38	-0.75	-1.13	-1.50	-1.88	-2.25	-2.63	-3.00	-3.38	-3.75	-4.13	-4.50	-4.88	-5.25	-5.63	-6.00	-6.38	-6.75	-7.13	-7.50
	Distanţa admisă dintre reazeme [m]																				
I	7.91	7.91	5.59	4.57	3.96	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
II	7.91	7.91	5.59	4.57	3.96	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11
III	6.25	6.25	4.86	4.23	3.85	3.54	3.23	2.99	2.77	2.46	2.22	2.02	1.85	1.71	1.59	1.48	1.39	1.31	1.23	1.17	1.11

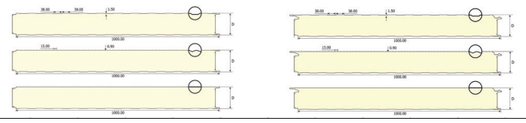
Notă:

1. Faţa exterioară este din tablă S250 GD+Z180-0.45 mm, faţa interioară ce reazemă pe pane este din tablă S220 GD+Z100-0.40 mm

2. Valorile de calcul includ factorul de siguranţă γ_Q=1.50

3. Condiţia de săgeată la care s-au determinat deschiderile limită admise sunt conform

SR EN 14509:2013: L/100



Step 2 Identify the color group (I, II, III) depending on the color chosen for the desired panel. Assuming we choose a white color panel (RAL 9010), it falls in Group I of colors.

Colour groups - sandwich panels

Group I.	Group II.				Group III.				
RAL 1015	RAL 1001	RAL 1023	RAL 5012	RAL 7032	RAL3000	RAL 3013	RAL 5012	RAL 6020	RAL 7022
RAL 1016	RAL 1002	RAL 1035	RAL 5018	RAL 7037	RAL 3002	RAL 3020	RAL 5014	RAL 6024	RAL 7024
RAL 1018	RAL 1003	RAL 2000	RAL 5024	RAL 7040	RAL 3003	RAL 5002	RAL 5017	RAL 6029	RAL 8004
RAL 6019	RAL 1004	RAL 2003	RAL 6018	RAL 7042	RAL 3005	RAL 5005	RAL 5022	RAL 7011	RAL 8016
RAL 7035	RAL 1014	RAL 2004	RAL 6021	RAL 7045	RAL 3009	RAL 5007	RAL 6000	RAL 7012	RAL 8017
RAL 9001	RAL 1017	RAL 2008	RAL 6033	RAL 7046	RAL 3010	RAL 5009	RAL 6003	RAL 7015	RAL 8023
RAL 9002	RAL 1019	RAL 2009	RAL 7000	RAL 9006	RAL 3011	RAL 5010	RAL 6005	RAL 7016	RAL 9005
RAL 9010	RAL 1021	RAL 2011	RAL 7004	RAL 9022	RAL 3013	RAL 5011	RAL 6011	RAL 7021	RAL 9007

Step 3

For the assessed load from wind of 1.065 kN/m2 (computing value) presented as input data, we shall identify in the table the permissible span between the supports of the panel, which defines the arrangement on the resistance structure of the wall rulers system. When having a load value that can not be found among the calculated load values from the header row of the table, we can easily perform a linear interpolation to determine the precise distance between supports.

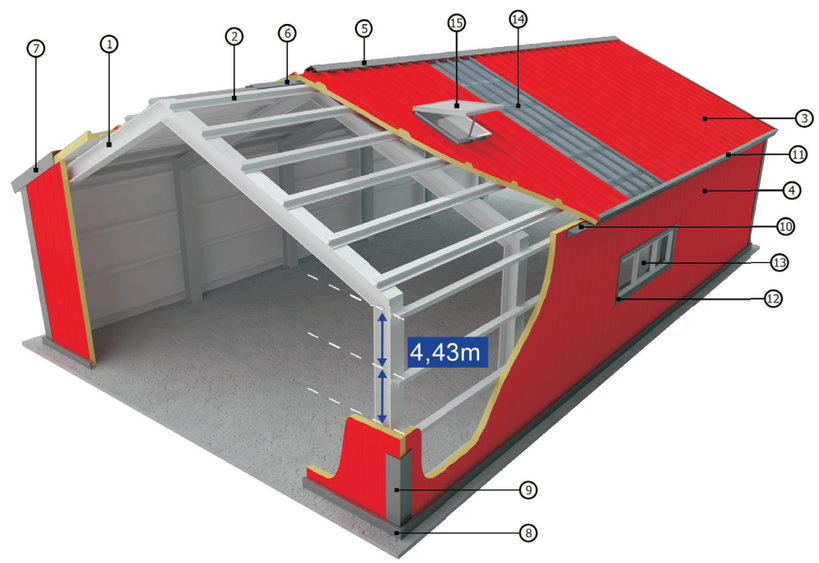
For 0,75 kN/m2 - the allowed distance between supports, according the table is 5,05m
For 1,13 kN/m2 - the allowed distance between supports, according the table is 4,12m
By linear interpolation for 1,065 kN/m2, according to the table, it results a permissible distance between supports, for the wall panel of approx. 4.43 m.

Computing values

Example of selecting

the appropriate panel for an assessed load in wall panels

Layout of wall rules shall be as follows:

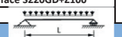


Chapter 2

LOAD BEARING CAPACITIES OF PANELS

Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data	Load bearing capacities calculated by:
Panel ISOPERn 30	D=29.33 mm $t_{nom,1}$=0.45 mm $t_{nom,2}$=0.40 mm	UNIVERSITATEA TEHNICA CLUJ-NAPOCA
Exterior face S250 GD+Z180, Interior face S220GD+Z100		
Panel with one span		

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	4,53	3,42	2,94	2,58	2,30	2,09	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
II	4,53	3,42	2,94	2,58	2,30	2,09	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
III	3,30	3,30	2,94	2,58	2,30	2,09	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	4,53	3,94	3,16	2,71	2,39	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
II	4,53	3,42	2,94	2,58	2,30	2,09	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
III	3,30	2,79	2,49	2,28	2,12	1,96	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53

Panel with two spans		

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	16,35	5,08	3,60	2,94	2,54	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
II	16,35	5,08	3,60	2,94	2,54	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
III	11,70	5,08	3,60	2,94	2,54	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53

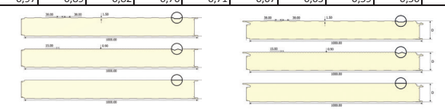
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	16,35	5,12	3,63	2,96	2,56	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
II	16,35	5,12	3,63	2,96	2,56	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53
III	11,70	4,87	3,63	2,96	2,56	2,12	1,77	1,52	1,33	1,18	1,06	0,97	0,89	0,82	0,76	0,71	0,67	0,63	0,59	0,56	0,53

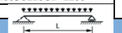
Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_G=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Panel type ISOPERn	General data	Load bearing capacities calculated by:
Panel ISOPERn 40	D=39.33 mm $t_{nom,1}$=0.45 mm $t_{nom,2}$=0.40 mm	UNIVERSITATEA TEHNICĂ CLUJ-NAPOCA
Exterior face S250 GD+Z180, Interior face S220GD+Z100		
Panel with one span		

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	6,18	4,50	3,85	3,34	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
II	6,18	4,50	3,85	3,34	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
III	4,50	4,50	3,85	3,34	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	6,18	5,11	4,05	3,49	3,07	2,76	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
II	6,18	4,50	3,85	3,34	3,00	2,74	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
III	4,50	3,72	3,31	3,03	2,82	2,59	2,40	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73

Panel with two spans		

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	16,15	5,89	4,17	3,40	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
II	16,15	5,89	4,17	3,40	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
III	16,15	5,89	4,17	3,40	2,95	2,64	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73

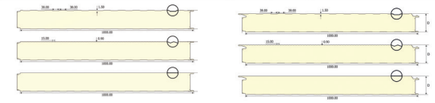
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	16,15	6,16	4,36	3,56	3,08	2,76	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
II	16,15	6,16	4,36	3,56	3,08	2,76	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73
III	16,15	5,48	4,22	3,56	3,08	2,76	2,41	2,07	1,81	1,61	1,45	1,32	1,21	1,11	1,04	0,97	0,91	0,85	0,81	0,76	0,73

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_G=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 50	D=49,33 mm
	$t_{nom,1}$=0.45 mm
	$t_{nom,2}$=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICA CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	7,83	5,49	4,62	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
II	7,83	5,49	4,62	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
III	5,70	5,49	4,62	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	7,83	6,09	4,83	4,10	3,55	3,18	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
II	7,83	5,49	4,62	4,01	3,55	3,18	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
III	5,70	4,60	4,07	3,71	3,40	3,12	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	6,57	6,57	4,65	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
II	6,57	6,57	4,65	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
III	6,57	6,57	4,65	3,80	3,29	2,94	2,69	2,49	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92

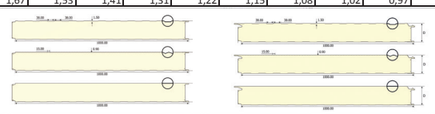
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	7,10	7,10	5,03	4,10	3,55	3,18	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
II	7,10	7,10	5,03	4,10	3,55	3,18	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92
III	6,01	6,01	4,66	4,05	3,55	3,18	2,90	2,62	2,29	2,04	1,83	1,67	1,53	1,41	1,31	1,22	1,15	1,08	1,02	0,97	0,92

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 80	D=79.33 mm
	$t_{nom,1}$=0.45 mm
	$t_{nom,2}$=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICA CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	12,78	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50
II	12,78	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50
III	9,30	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	12,78	8,67	6,13	5,01	4,34	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50
II	12,78	8,28	6,13	5,01	4,34	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50
III	9,30	7,11	6,13	5,01	4,34	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	7,61	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50
II	7,61	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50
III	7,61	7,61	5,38	4,39	3,81	3,40	3,11	2,88	2,69	2,54	2,41	2,30	2,20	2,11	2,04	1,97	1,87	1,76	1,66	1,58	1,50

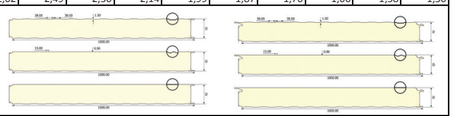
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	8,67	8,67	6,13	5,01	4,34	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50
II	8,67	8,67	6,13	5,01	4,34	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50
III	6,84	6,84	5,39	4,73	4,32	3,88	3,54	3,28	3,07	2,89	2,75	2,62	2,49	2,30	2,14	1,99	1,87	1,76	1,66	1,58	1,50

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 60	D=59.33 mm
	$t_{nom,1}$=0.45 mm
	$t_{nom,2}$=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICA CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	9,48	6,49	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
II	9,48	6,49	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
III	6,90	6,49	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	9,48	7,08	5,59	4,57	3,96	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
II	9,48	6,49	5,41	4,57	3,96	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
III	6,90	5,49	4,84	4,42	3,96	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	6,98	6,98	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
II	6,98	6,98	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
III	6,98	6,98	5,05	4,12	3,57	3,20	2,92	2,70	2,53	2,38	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11

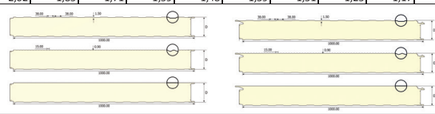
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	7,91	7,91	5,59	4,57	3,96	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
II	7,91	7,91	5,59	4,57	3,96	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11
III	6,25	6,25	4,86	4,23	3,85	3,54	3,23	2,99	2,77	2,46	2,22	2,02	1,85	1,71	1,59	1,48	1,39	1,31	1,23	1,17	1,11

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow conditions , under which the permissible limit spans were determined , are according to EN 14509/2013: L / 200 for short-term load and L / 100 long term load



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 100	D=99.33 mm
	$t_{nom,1}$=0.45 mm
	$t_{nom,2}$=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICA CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	16,08	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83
II	16,08	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83
III	11,56	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83

Color group	Computing values, wind load under suction [kN/m²]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	16,08	9,39	6,64	5,42	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88
II	16,08	9,39	6,64	5,42	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88
III	11,56	8,64	6,64	5,42	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																				
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	8,15	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83
II	8,15	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83
III	8,15	8,15	5,77	4,71	4,08	3,65	3,33	3,09	2,89	2,72	2,58	2,46	2,36	2,27	2,18	2,11	2,04	1,98	1,93	1,87	1,83

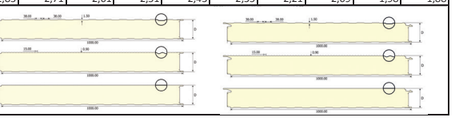
Color group	Computing values, wind load under suction [kN/m2]																				
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	9,39	9,39	6,64	5,42	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88
II	9,39	9,39	6,64	5,42	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88
III	7,34	7,34	5,86	5,17	4,70	4,20	3,84	3,55	3,32	3,13	2,97	2,83	2,71	2,61	2,51	2,43	2,35	2,21	2,09	1,98	1,88

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 120	D=119.33 mm
	t_{nom_1}=0.45 mm
	t_{nom_2}=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICĂ CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	14,10	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98
II	14,10	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98
III	14,10	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98

Color group	Computing values, wind load under suction [kN/m²]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	14,10	10,36	7,33	5,99	5,18	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27
II	14,10	10,36	7,33	5,99	5,18	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27
III	14,10	10,12	7,33	5,99	5,18	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	8,84	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98
II	8,84	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98
III	8,84	8,84	6,26	5,11	4,42	3,96	3,61	3,35	3,13	2,95	2,80	2,67	2,56	2,46	2,37	2,29	2,21	2,15	2,09	2,03	1,98

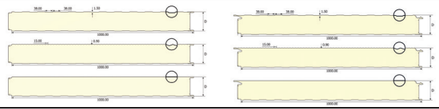
Color group	Computing values, wind load under suction [kN/m2]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	10,36	10,36	7,33	5,99	5,18	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27
II	10,36	10,36	7,33	5,99	5,18	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27
III	7,60	7,60	6,19	5,50	5,06	4,64	4,23	3,92	3,67	3,46	3,28	3,13	3,00	2,88	2,77	2,68	2,59	2,52	2,45	2,38	2,27

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Panel type ISOPERn	General data
Panel ISOPERn 150	D=149.33 mm
	t_{nom_1}=0.45 mm
	t_{nom_2}=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICĂ CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	17,70	9,85	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21
II	17,70	9,85	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21
III	17,70	9,85	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21

Color group	Computing values, wind load under suction [kN/m²]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	17,70	11,70	8,28	6,76	5,85	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62
II	17,70	11,70	8,28	6,76	5,85	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62
III	17,70	11,70	8,28	6,76	5,85	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	9,85	9,85	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21
II	9,85	9,85	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21
III	9,76	9,76	6,97	5,69	4,93	4,41	4,02	3,73	3,49	3,29	3,12	2,97	2,85	2,74	2,64	2,55	2,47	2,39	2,33	2,26	2,21

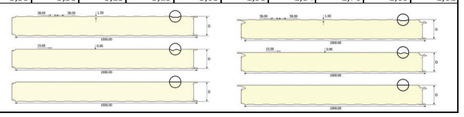
Color group	Computing values, wind load under suction [kN/m2]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	11,70	11,70	8,28	6,76	5,85	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62
II	11,70	11,70	8,28	6,76	5,85	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62
III	8,58	8,58	6,94	6,16	5,67	5,24	4,78	4,43	4,14	3,90	3,70	3,53	3,38	3,25	3,13	3,03	2,93	2,84	2,76	2,69	2,62

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Load bearing capacities of panels

Computing values

Panel type ISOPERn	General data
Panel ISOPERn 200	D=199.33 mm
	t_{nom_1}=0.45 mm
	t_{nom_2}=0.40 mm

Exterior face S250 GD+Z180, Interior face S220GD+Z100

Load bearing capacities calculated by:

UNIVERSITATEA TEHNICĂ CLUJ-NAPOCA

plastsistem

Panel with one span

Color group	Computing values, wind load under pressure [kN/m²]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56
II	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56
III	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56

Color group	Computing values, wind load under suction [kN/m²]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	13,94	13,94	9,86	8,05	6,97	6,24	5,70	5,27	4,93	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12
II	13,94	13,94	9,86	8,05	6,97	6,24	5,70	5,27	4,93	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12
III	13,94	13,94	9,86	8,05	6,97	6,24	5,70	5,27	4,93	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12

Panel with two spans

Color group	Computing values, wind load under pressure [kN/m2]																			
	0,00	0,38	0,75	1,13	1,50	1,88	2,25	2,63	3,00	3,38	3,75	4,13	4,50	4,88	5,25	5,63	6,00	6,38	6,75	7,13	7,50
	Allowed distance between supports [m]																				
I	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56
II	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56
III	11,42	11,42	8,08	6,59	5,71	5,11	4,66	4,32	4,04	3,81	3,61	3,45	3,30	3,17	3,06	2,95	2,86	2,77	2,70	2,62	2,56

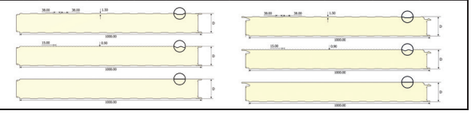
Color group	Computing values, wind load under suction [kN/m2]																			
	0,00	-0,38	-0,75	-1,13	-1,50	-1,88	-2,25	-2,63	-3,00	-3,38	-3,75	-4,13	-4,50	-4,88	-5,25	-5,63	-6,00	-6,38	-6,75	-7,13	-7,50
	Allowed distance between supports [m]																				
I	13,94	13,94	9,86	8,05	6,97	6,24	5,70	5,27	4,93	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12
II	12,17	12,17	9,28	8,01	6,97	6,24	5,70	5,27	4,93	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12
III	7,85	7,85	6,74	6,14	5,75	5,46	5,23	5,04	4,88	4,65	4,41	4,21	4,03	3,87	3,73	3,60	3,49	3,39	3,29	3,20	3,12

Note:

1. Exterior face is made of steel sheet S250 GD+Z180-0.45 mm, interior face which stands on wedges is made of steel sheet S220 GD+Z100-0.40 mm

2. Computing values include safety factor γ_Q=1.50

3. The arrow condition , under which the permissible limit spans were determined , is according to EN 14509/2013: L / 100



Chapter 3

TECHNICAL DETAILS OF PANELS' ASSEMBLY

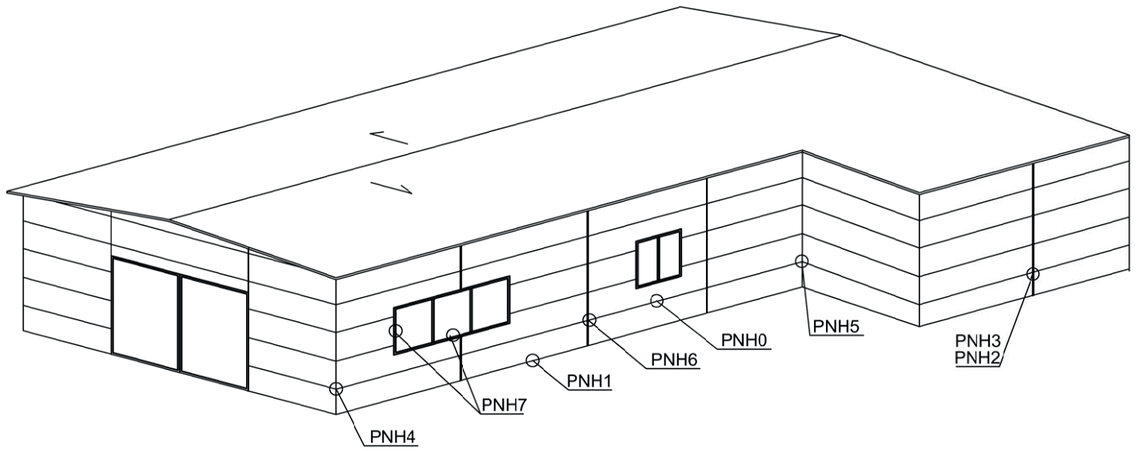
1. Technical details

Part .01

Visible joint wall panels - horizontal assembly

3D view

Presentation of details

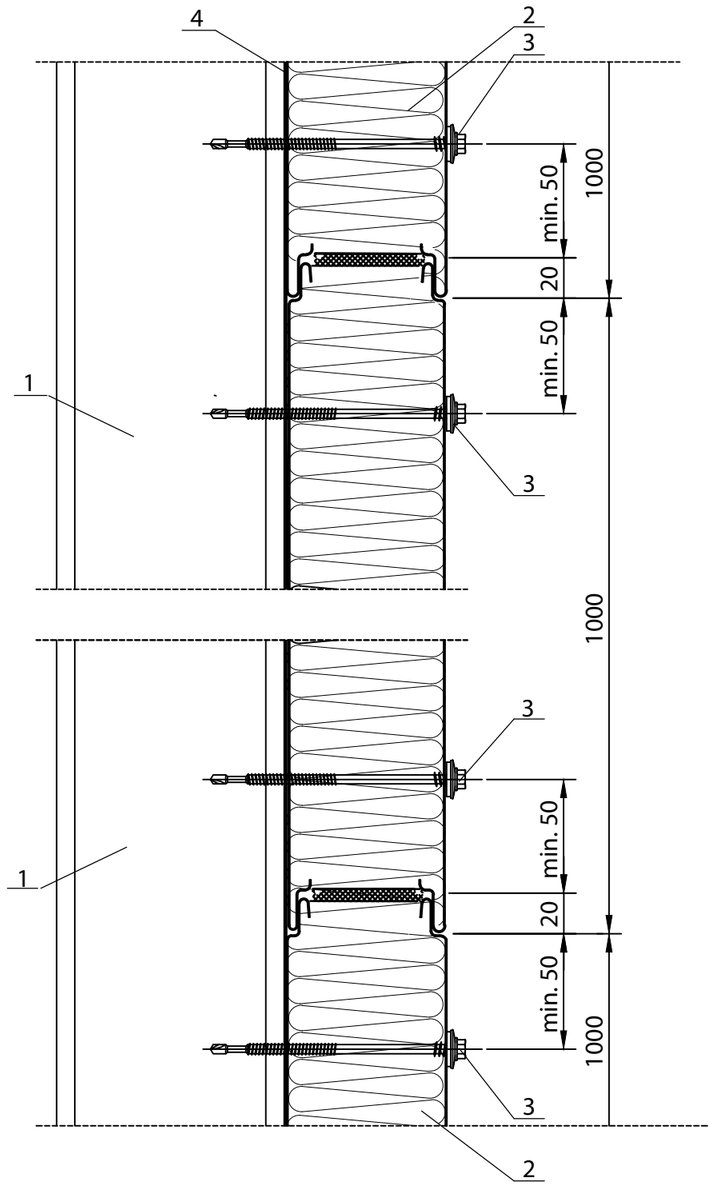


KEY

PNH0 Fixing details ISOPER N
PNH1 Socle detail - version 1 and 2
PNH2 Gap detail for fixing on the metal structure
PNH3 Gap detail for fixing on the reinforced concrete
PNH4 Exterior corner detail - type 1
PNH5 Exterior corner detail - type 2
PNH6 Gap detail for thermal expansion
PNH7 Windows details

PNH0 Detail

Fixing details ISOPER N



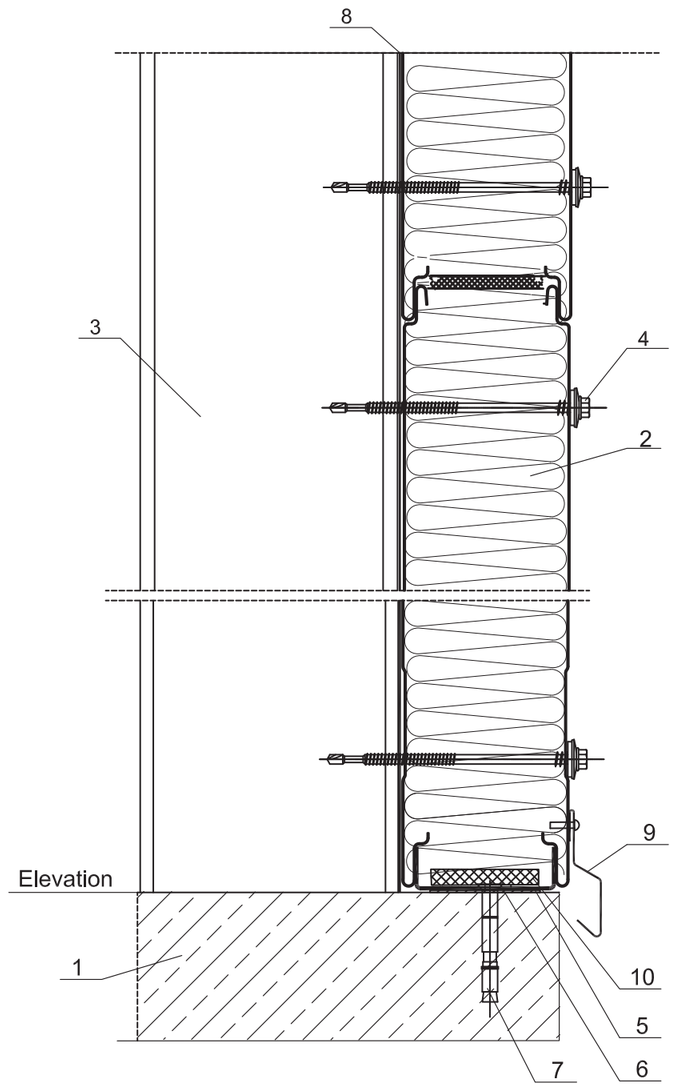
KEY

1. Support structure - thermal insulating panel
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Self-adhesive sealing tape PE 20x5

PNH1 Detail

PNH1 - 1

Socle detail - VERSION 1



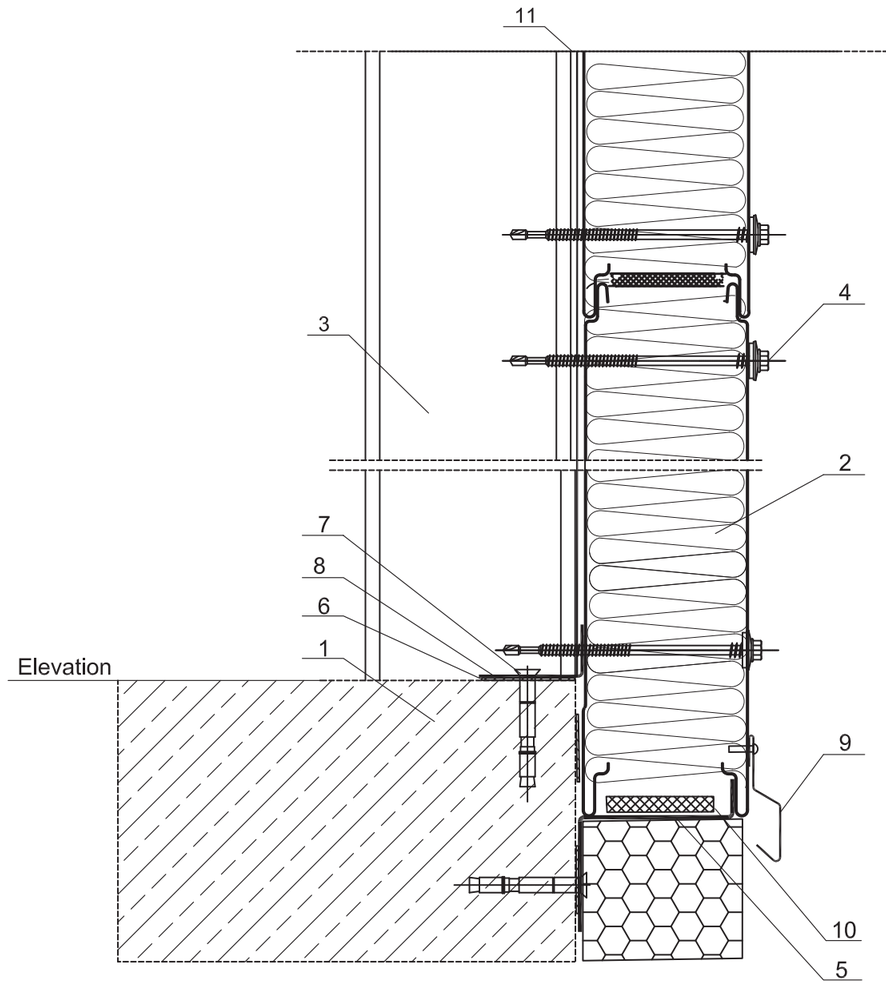
KEY

1. Support structure made of concrete
2. ISOPER N - thermal insulating panel with normal joint
3. Support structure - thermal insulating panel
4. Screw for fixing the thermal insulating panel on the support structure
5. Flashing - for supporting the panel to the socle, 01pnh
6. Self-adhesive sealing tape PU 20x4
7. Dowel for fixing the galvanized flashing onto the reinforced concrete structure
8. Self-adhesive sealing tape PE 20x5
9. Flashing - Socle dripping, 02pnh
10. Self-adhesive sealing tape PE 20x5

PNH1 Detail

PNH1 - 2

Socle detail - VERSION 2



KEY

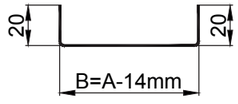
1. Support structure made of concrete
2. ISOPER N - thermal insulating panel with normal joint
3. Support structure - thermal insulating panel
4. Screw for fixing the thermal insulating panel on the support structure
5. Flashing - for supporting the panel to the socle, 03pnh
6. Self-adhesive sealing tape PU 20x4 (expandable)
7. Dowel for fixing the galvanized flashing onto the concrete structure
8. Flashing - for guiding the panel, 04pnh
9. Flashing -Socle dripping, 02pnh
10. Self-adhesive sealing tape
11. Self-adhesive sealing tape

Note: Concrete socles of height > 20cm shall be insulated with polystyrene.

01pnh - flashing - for supporting the panel to the socle

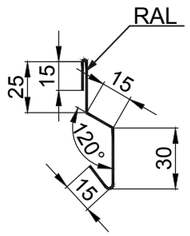
Material: Galvanized steel sheet
Thickness: 2.50mm

Panel thickness (mm)	B(mm)	Unfolded width (mm)
30	16	56
40	26	66
50	36	76
60	46	86
80	66	106
100	86	126
120	106	146



02pnh - flashing - Socle dripping

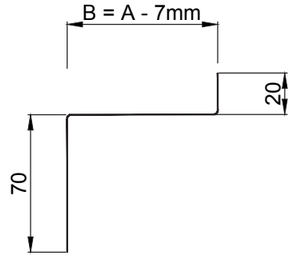
Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width : 75mm



03pnh - flashing - for supporting the panel to the socle

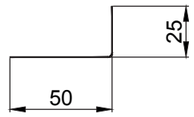
Material: Galvanized steel sheet
Thickness: 2.50mm

Panel thickness (mm)	B(mm)	Unfolded width (mm)
30	23	113
40	33	123
50	43	133
60	53	143
80	73	163
100	93	183
120	113	203



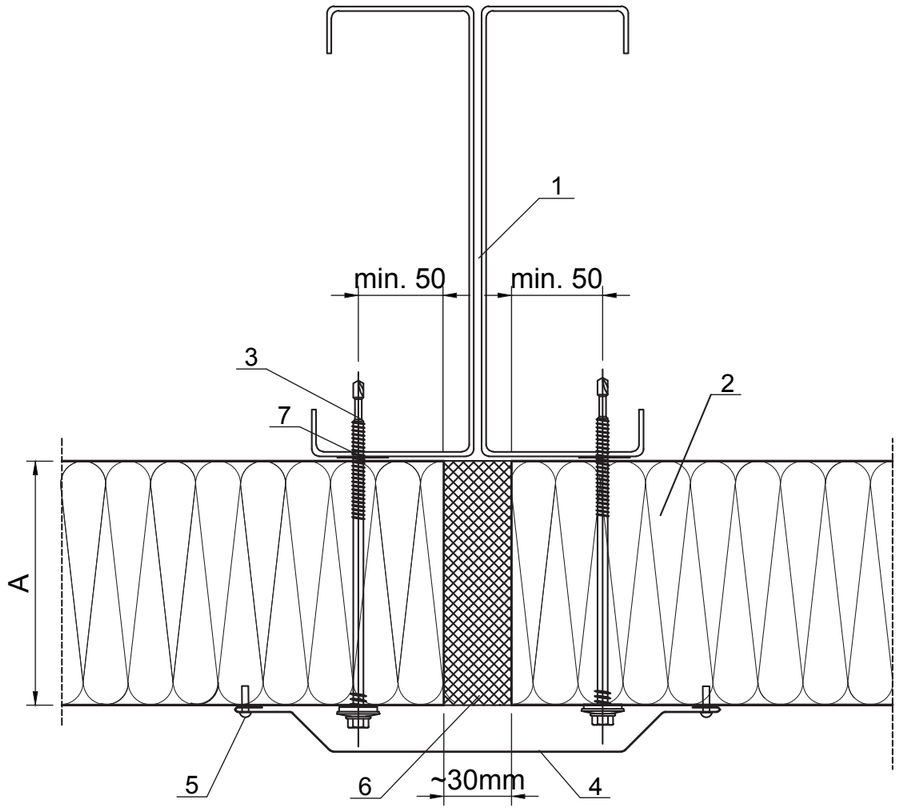
04pnh - flashing - for guiding the panel to the socle

Material: Galvanized steel sheet
Thickness: 2.00mm
Unfolded width: 75mm



PNH2 Detail

Gap detail for fixing on the metal structure



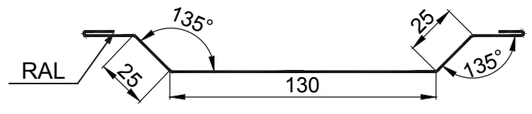
KEY

1. Support structure - thermal insulating panel (metal structure)
2. ISOPER N - thermal insulating panel with normal joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing the gaps between panels, 05pnh
5. Screw for fixing the concealing profile/rivet (~ 300mm)
6. IInsulation that shall be applied on site
7. Self-adhesive sealing tape PE 20x5

PNH2 Detail / Accessories

05pnh - flashing for concealing the gaps between panels and metal structure

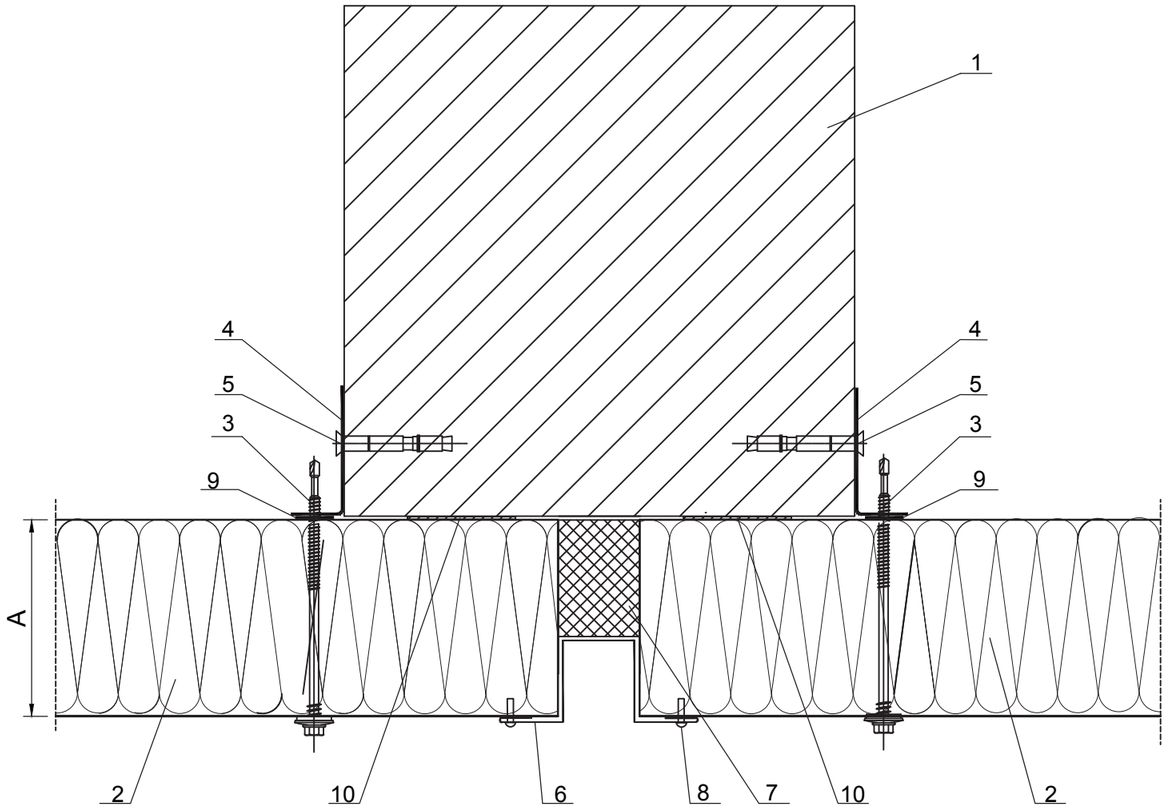
Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 260mm



PNH3 Detail

PNH3 - 1

Gap detail for fixing on the reinforced concrete structure



KEY

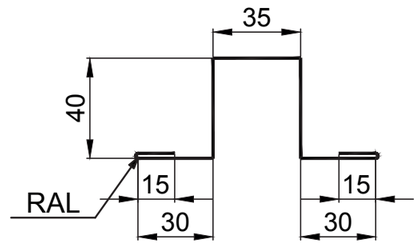
1. Support structure - thermal insulating panel (pillar made of reinforced concrete)
2. ISOPER N - thermal insulating panel with normal joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Galvanized flashing for fixing thermal insulating panel, 07pnh
5. Screw for fixing the support profile on the pillar made of reinforced concrete
6. Flashing for concealing the gaps between thermal insulating panels, type omega, 06pnh
7. Insulation that shall be applied on site
8. Screw for fixing the concealing profile/rivet (~ 300mm)
9. Self-adhesive sealing tape PE 20x5
10. Self-adhesive sealing tape PU 20x4

PNH3 Detail / Accessories

PNH3 - 2

06pnh - flashing type omega - for concealing gaps between panels and the reinforced concrete structure

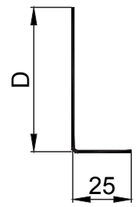
Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width : 205mm



07pnh - galvanized flashing for fixing the thermal insulating panel

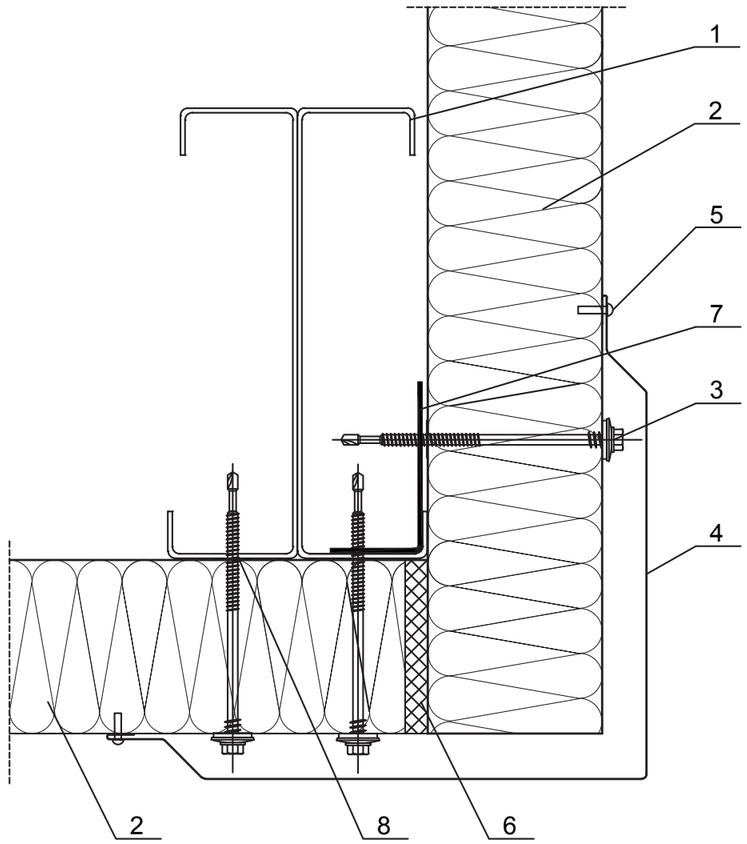
Material: galvanized steel sheet

Note:
1. The thickness of the flashing shall be determined by the designer, who will consider the possibility to undertake the deviations of the concrete structure.
2. “D” shall be established by measurements on site, considering the deviations of the concrete



PNH4 Detail

Exterior corner detail - type 1



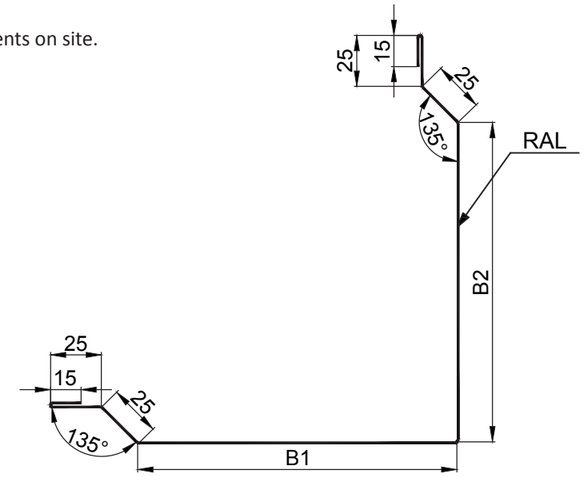
KEY

1. Support structure - thermal insulating panel (metal structure)
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing for concealing the exterior corner of thermal insulating panels, 08pnh
5. Screw /rivet for fixing the concealing flashing (~ 300mm)
6. Polyurethane foam
7. Flashing - for supporting the panel, 09pnh
8. Self-adhesive sealing tape PE 20x5

PNH4 Detail / Accessories

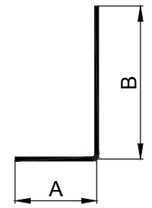
08pnh - flashing - exterior corner - type 1

Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: B1+B2+130mm
Note: B1, B2 shall be determined by measurements on site.



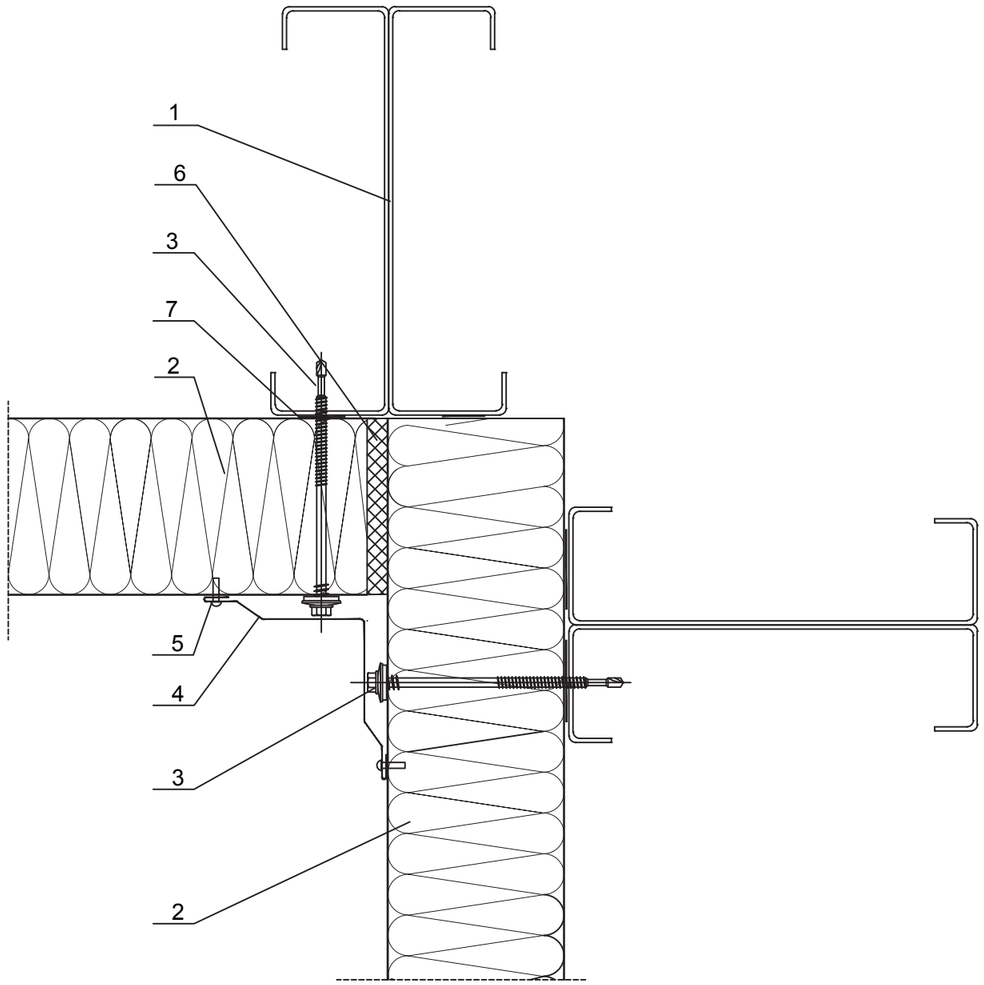
09pnh - flashing - exterior corner support

Material: galvanized steel sheet
Thickness: 2.0mm
Note: A, B shall be determined by the project designer.



PNH5 Detail

Exterior corner detail - type 2



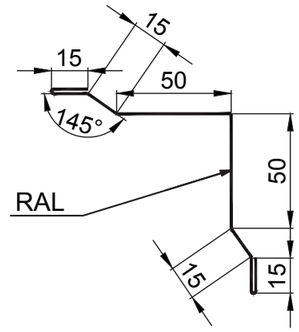
KEY

1. Support structure - thermal insulating panel (metal structure)
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing for concealing the exterior corner of thermal insulating panels, 10pnh
5. Screw/rivet for fixing the concealing flashing (~ 300mm)
6. Polyurethane foam
7. Self-adhesive sealing tape PE 20x5

PNH5 Detail / Accessories

10pnh - flashing - exterior corner - type 2

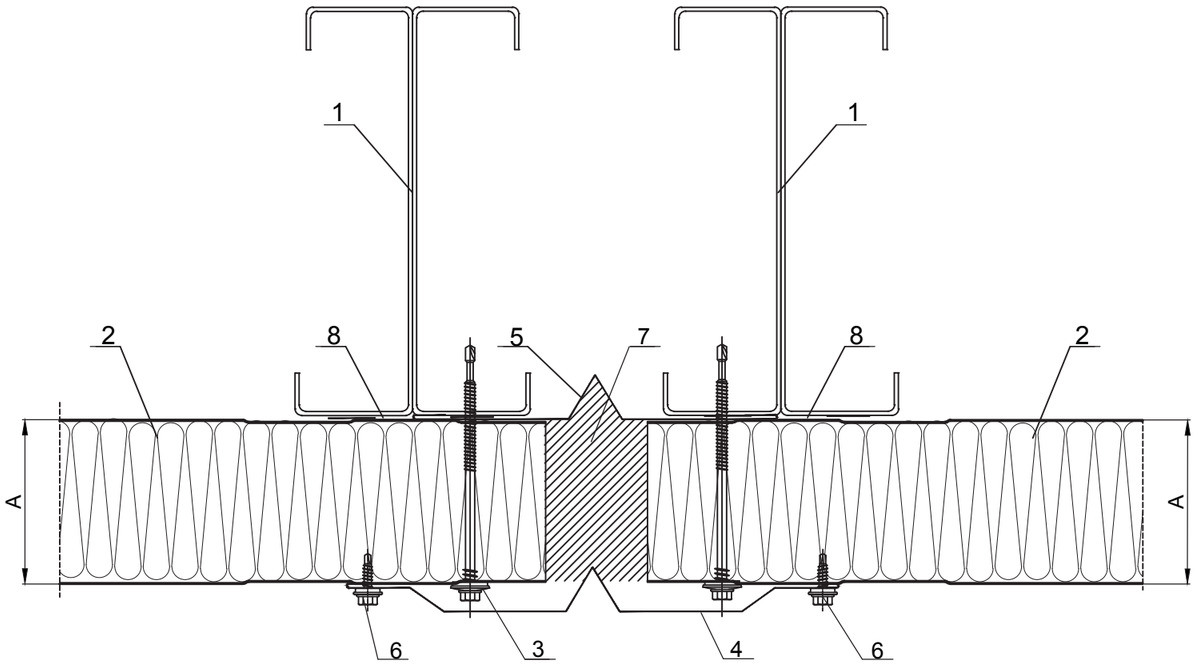
Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 190mm



PNH6 Detail

PNH6 - 1

Thermal expansion gap detail



KEY

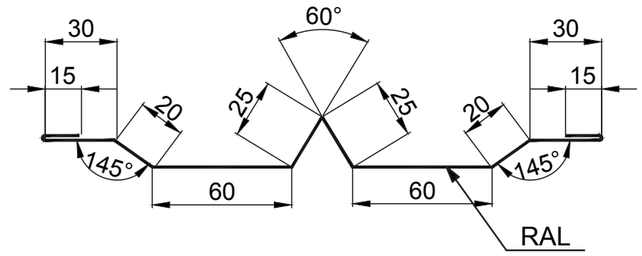
1. Support structure - thermal insulating panel
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for exterior thermal expansion gap, 11pnh
5. Flashing - for interior thermal expansion gap, 12pnh
6. Screw/rivet for fixing the concealing flashing
7. Insulation to be applied on site
8. Self-adhesive sealing tape PE 20x5

PNH6 Detail / Accessories

PNH6 - 2

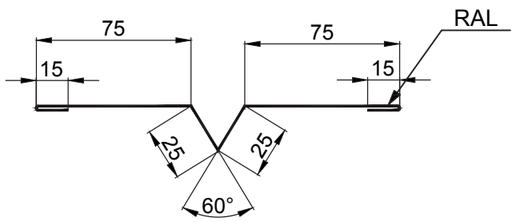
11pnh - flashing - exterior thermal expansion gap

Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 300mm



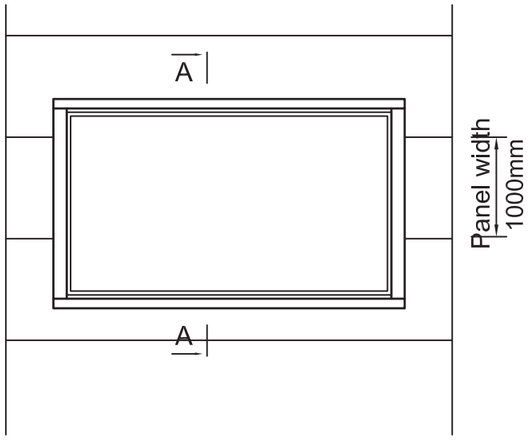
12pnh - flashing - interior thermal expansion gap

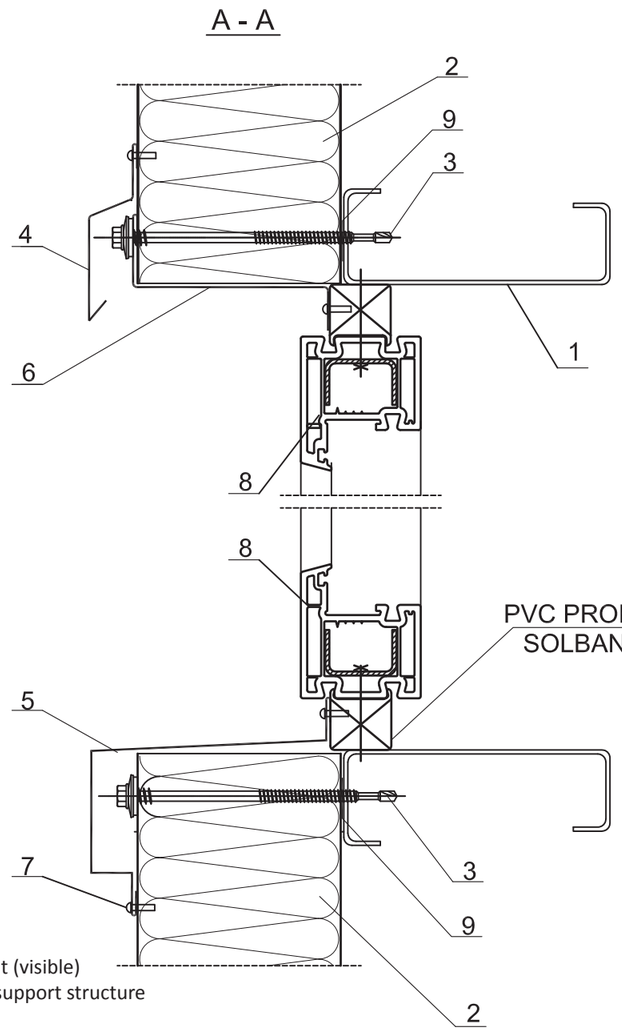
Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 230mm



PNH7 Detail / Windows details

PNH7 - 1



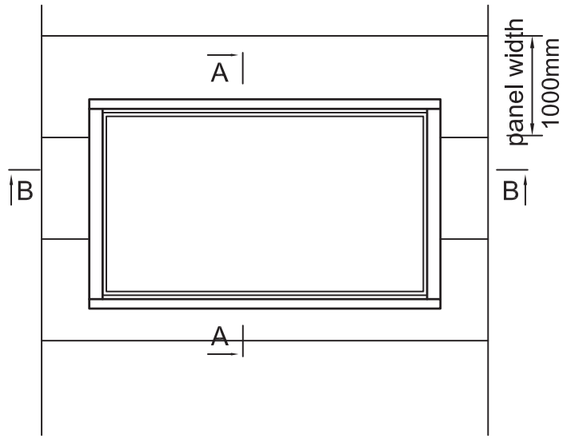


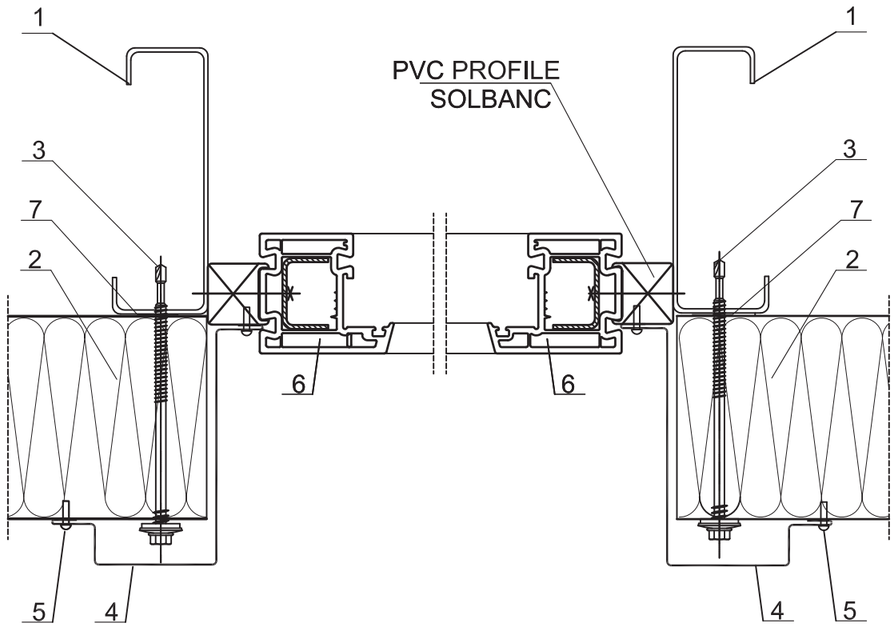
KEY

1. Support structure
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
5. Flashing - Dripper for windows moulding, 14pnh
4. Flashing - Dripper for windows socle, 13pnh
6. Flashing - Bordering the exterior moulding, 15pnh
7. Screw /rivet for fixing the concealing flashing
8. PVC window
9. Self-adhesive sealing tape PE 20x5

PNH7 Detail / Windows details

PNH7 - 2





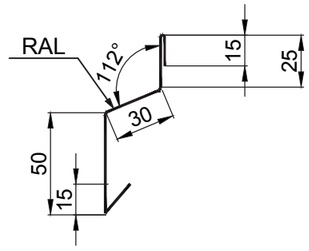
KEY

1. Support structure
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing window jambs, 16pnh
5. Screw/rivet for fixing the concealing flashing
6. PVC window
7. Self-adhesive sealing tape PE 20x5

PNH7 Detail / Accessories

13pnh - flashing - dripper for windows moulding

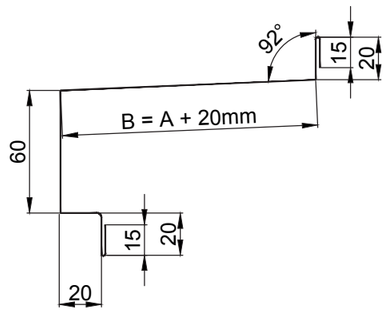
Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 135mm



14pnh - flashing - dripper for windows socle

Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	50	200
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270
120	140	290

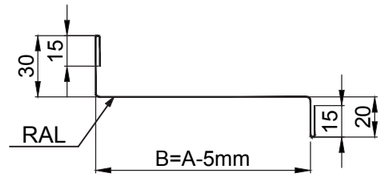


PNH7 Detail / Accessories

15pnh - flashing - bordering the exterior moulding

Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

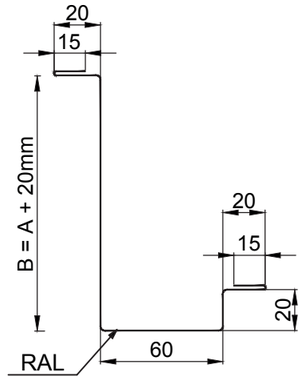
Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	25	105
40	35	115
50	45	125
60	55	135
80	75	155
100	95	175
120	115	195



16pnh - flashing - for concealing window jambs

Material: Prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	50	200
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270
120	140	290

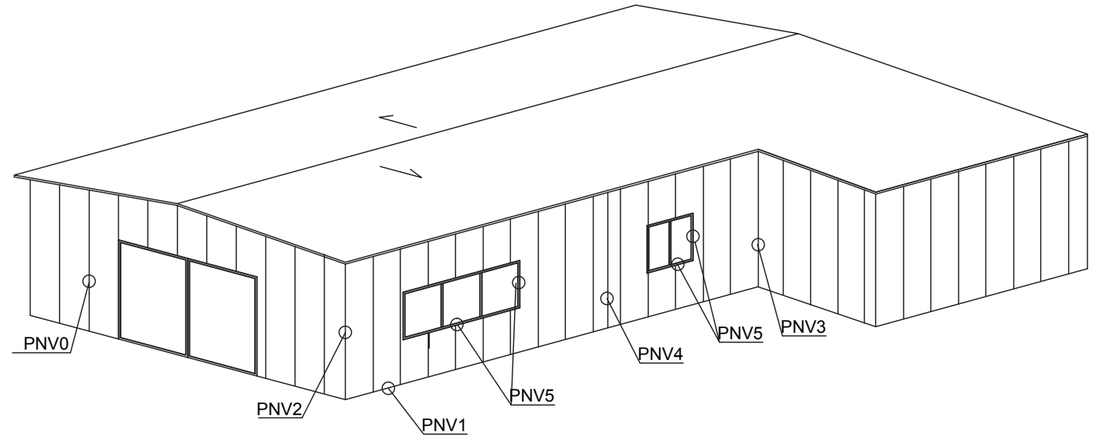


2. 2. Technical details

Visible joint wall panels - vertical assembly

3D view

Presentation of details



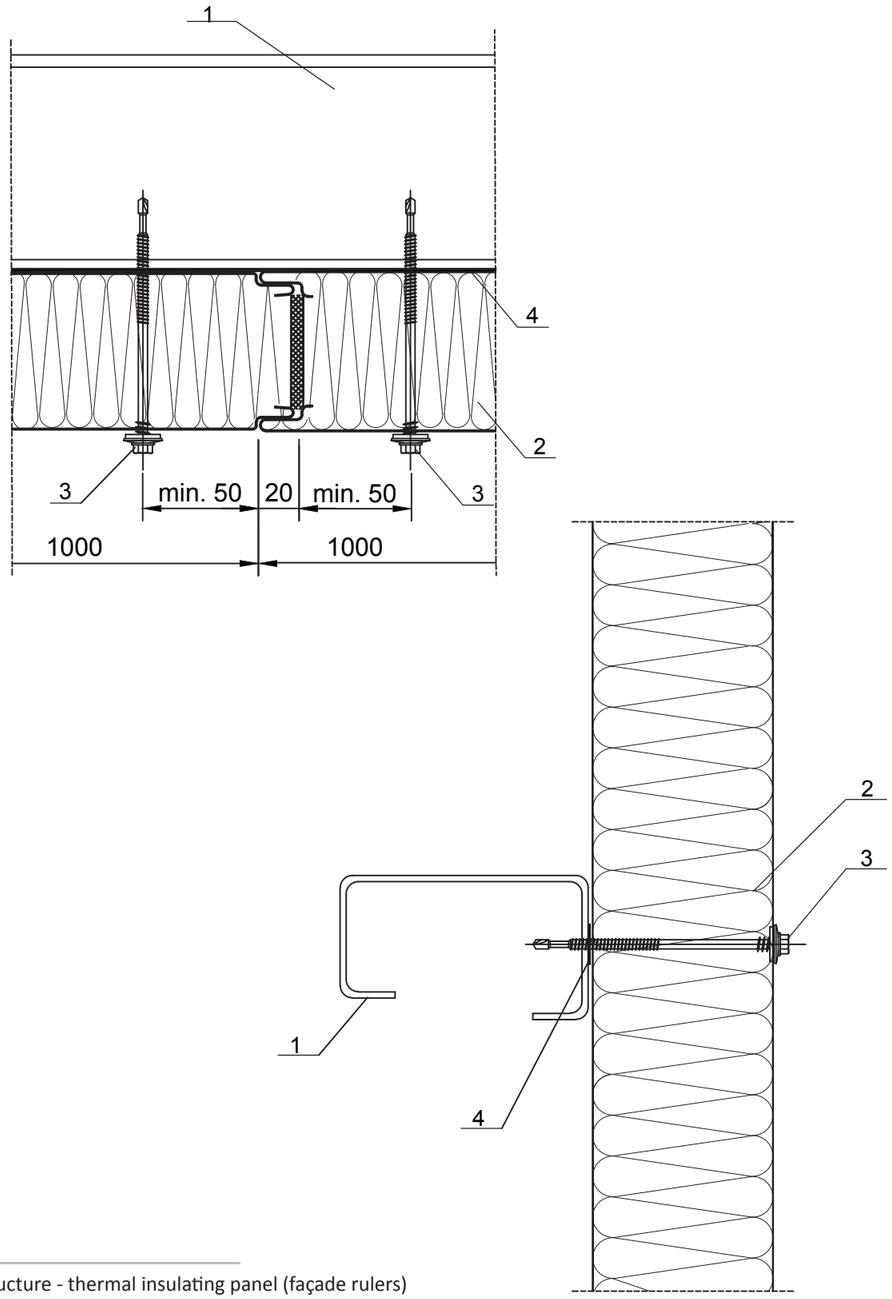
KEY

PNV0 Fixing details ISOPER N
PNV1 Socle detail - version 1 and 2
PNV2 Exterior corner detail - type 1
PNV3 Exterior corner detail - type 2
PNV4 Gap detail for thermal expansion
PNV5 Windows details

PNV0 Detail

PNV0

Fixing details ISOPER N



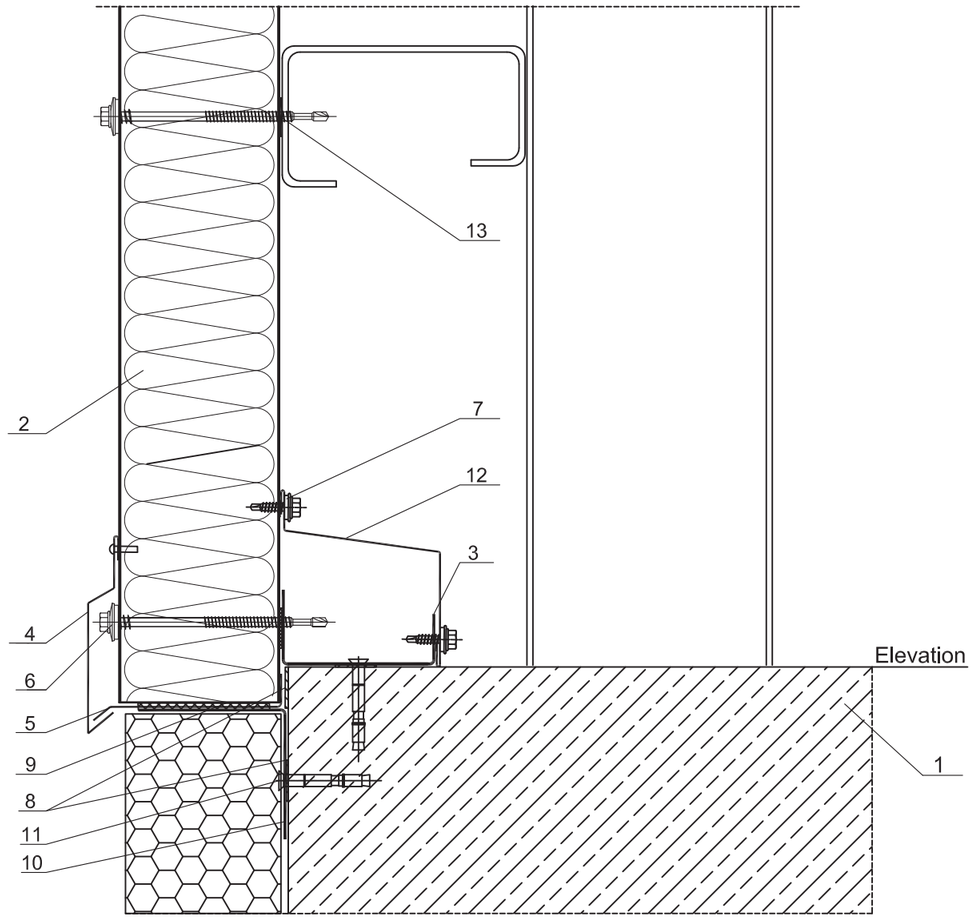
KEY

1. Support structure - thermal insulating panel (façade rulers)
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Self-adhesive sealing tape PE 20x5

PNV1 Detail

PNV1 - 1

Socle detail - VERSION 1



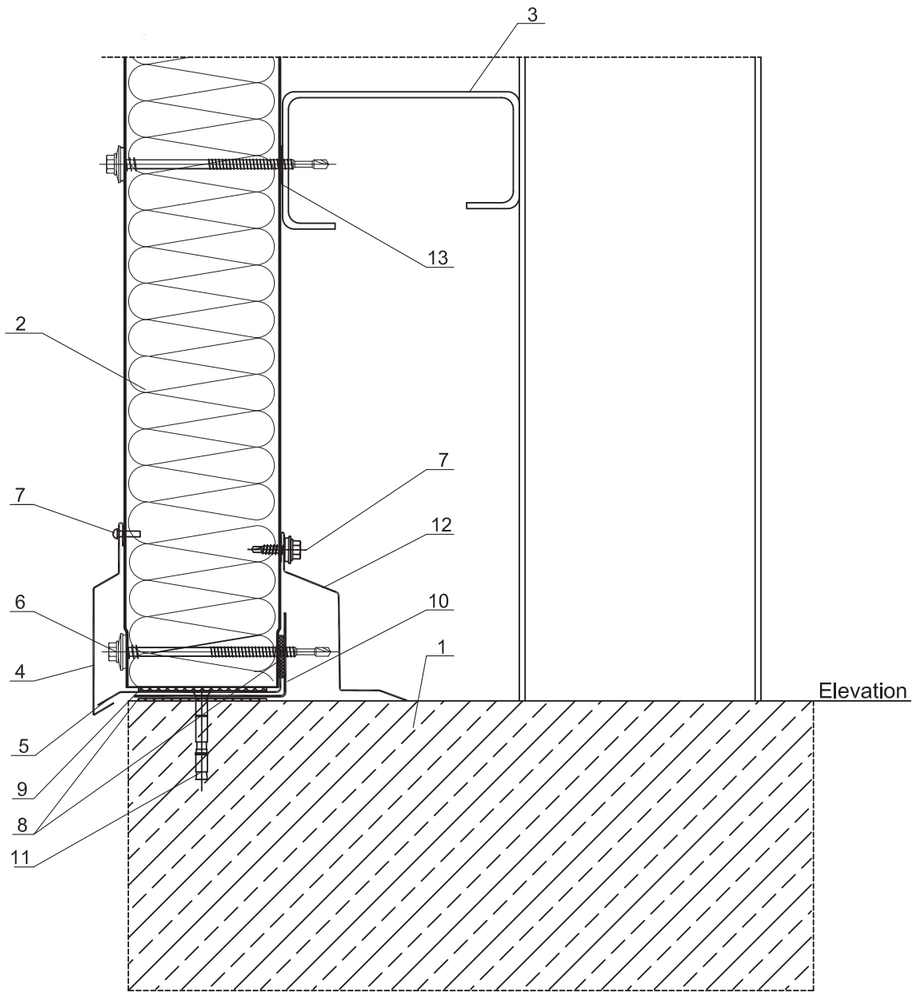
KEY

1. Support structure made of concrete
2. ISOPER N - thermal insulating panel with normal joint
3. Support structure - thermal insulating panel (according the resistance project)
4. Flashing - Socle dripper , 01pnv
5. Flashing - for concealing the socle dripper, 02pnv
6. Screw for fixing the thermal insulating panel on the support structure
7. Screw for fixing the concealing flashing
8. Self-adhesive sealing tape PU 20x4.0
9. Insulation to be applied on site
10. Galvanized flashing - for supporting the panel, 03pnv
11. Dowel for fixing the galvanized flashing onto the reinforced concrete structure
12. Flashing - for the interior concealing of the socle, 04pnv
13. Self-adhesive sealing tape PE 20x5

Note: The concrete socle of height>20cm shall be insulated with polystyrene

PNV1 Detail

Socle detail - VERSION 2



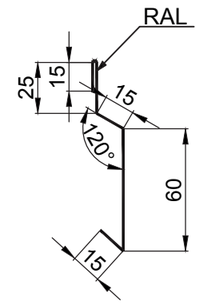
KEY

1. Support structure made of concrete
2. ISOPER N - thermal insulating panel with normal joint
3. Support structure - thermal insulating panel (according the resistance project)
4. Flashing - Socle dripper, 01pnv
5. Flashing - for concealing the socle dripper, 02pnv
6. Screw for fixing the thermal insulating panel on the support structure
7. Screw for fixing the concealing flashing
8. Self-adhesive sealing tape PU 20x4.0
9. Insulation to be applied on site
10. Galvanized flashing type L for supporting the thermal insulating panel, 05 pnv
11. Dowel for fixing the galvanized flashing onto the reinforced concrete beam
12. Flashing - for the interior concealing of the socle, 06pnv
13. Self-adhesive sealing tape PE 20x5

PNV1 Detail / Accessories

01pnv - flashing - socle dripper

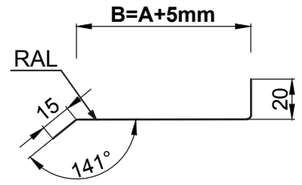
Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width : 130mm



02pnv - flashing - for concealing the socle dripper

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

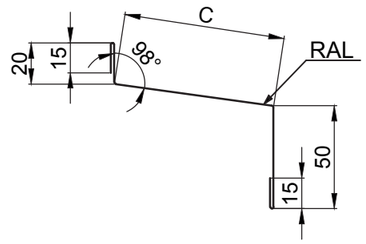
Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	35	70
40	45	80
50	55	90
60	65	100
80	85	120
100	105	140
120	125	160



PNV1 Detail / Accessories

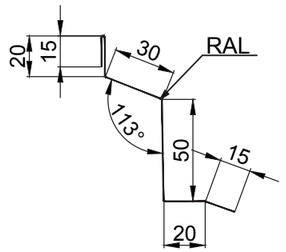
04pnv - flashing - for the interior concealing of the socle

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width : C + 100mm
Note: Dimension C shall be determined by measurements on site.



06pnv - flashing - for the interior concealing of the socle

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 150mm

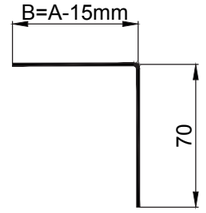


Detaliu PNV1 / Accessories

03pnv - galvanized flashing - for supporting the panel to the socle

Material: galvanized steel sheet
Thickness: 2.50mm

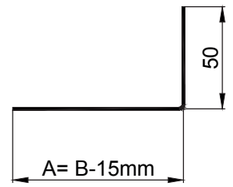
Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	15	85
40	25	95
50	35	105
60	45	115
80	65	135
100	85	155
120	105	175



05pnv - galvanized flashing type L for supporting the thermal insulating panel to the socle

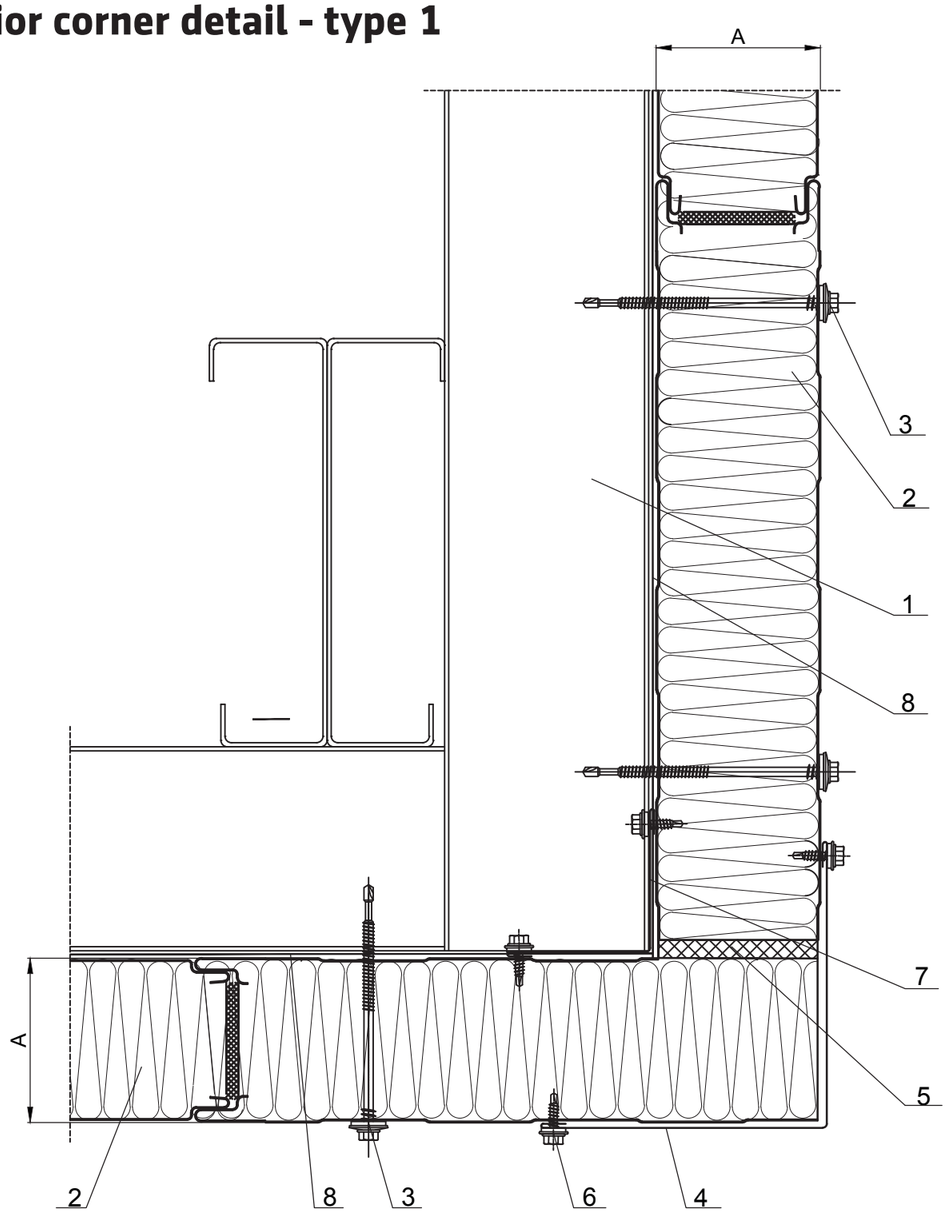
Material: galvanized steel sheet
Thickness: 2.50mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	15	65
40	25	75
50	35	85
60	45	95
80	65	115
100	85	135
120	105	155



PNV2 Detail

Exterior corner detail - type 1



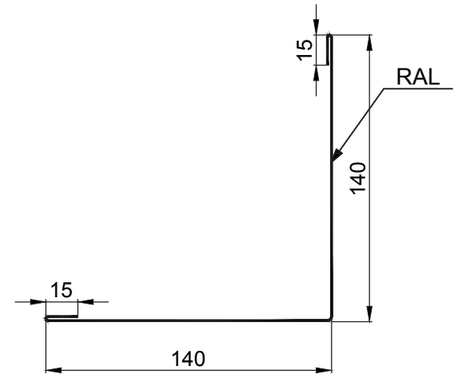
KEY

1. Support structure - thermal insulating panel
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior corner, 07pnv
5. Polyurethane foam
6. Screw for fixing the concealing flashing
7. Flashing - Interior corner, 08pnv
8. Self-adhesive sealing tape PE 20x5

PNV2 Detail / Accessories

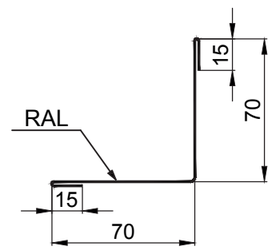
07pnv - flashing - exterior corner

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 310mm



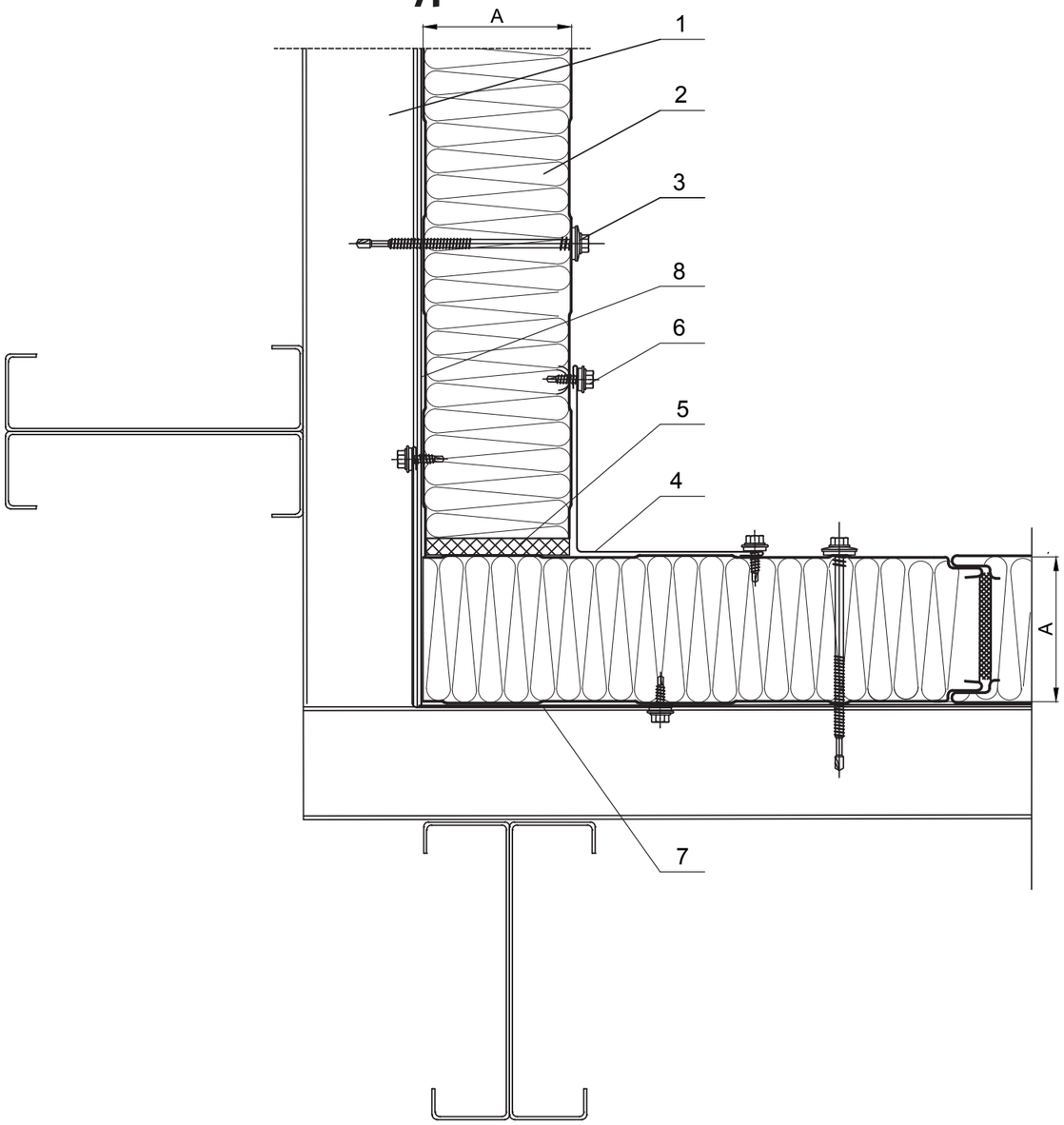
08pnv - flashing - Interior corner

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 170mm



PNV3 Detail

Exterior corner detail - type 2



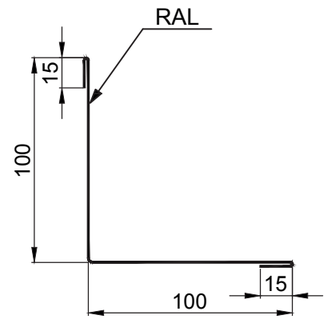
KEY

1. Support structure - thermal insulating panel
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - exterior corner, 09pnv
5. Polyurethane foam
6. Screw for fixing the concealing profile
7. Flashing - Interior corner, 10pnv
8. Self-adhesive sealing tape PE 20x5

PNV3 Detail / Accessories

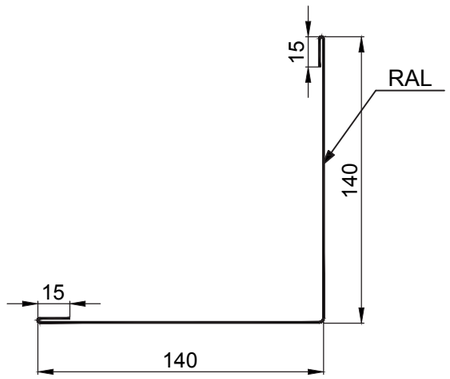
09pnv - flashing - exterior corner

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 230mm

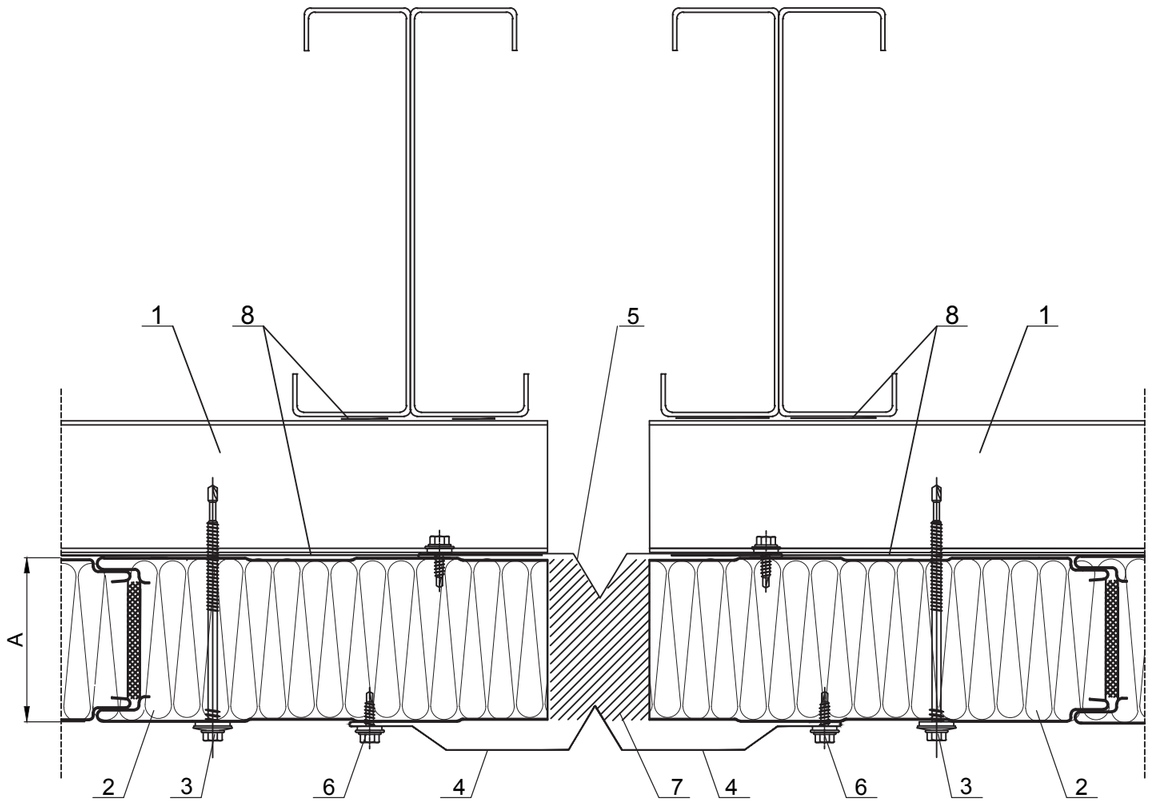


10pnv - flashing - interior corner

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 310mm



Thermal expansion gap detail

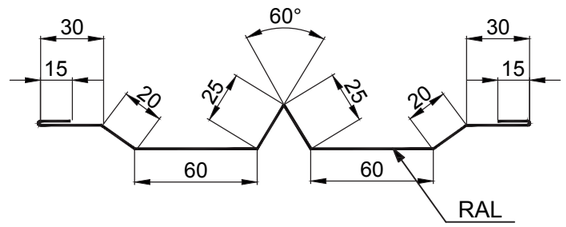


KEY

1. Support structure - thermal insulating panel
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - exterior thermal expansion gap, 11pnv
5. Flashing - interior thermal expansion gap, 12pnv
6. Screw for fixing the concealing flashing
7. Insulation to be applied on site
8. Self-adhesive sealing tape PE 20x5

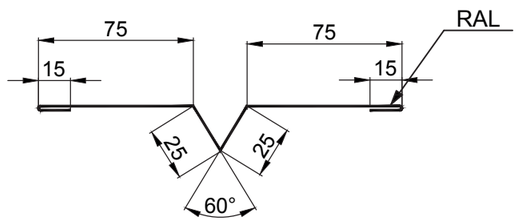
11pnv - flashing - exterior thermal expansion gap

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 300mm



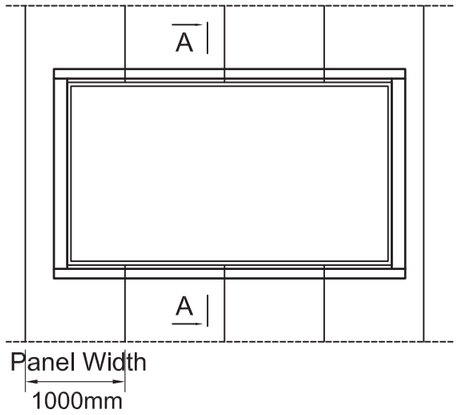
12pnv - flashing - interior thermal expansion gap

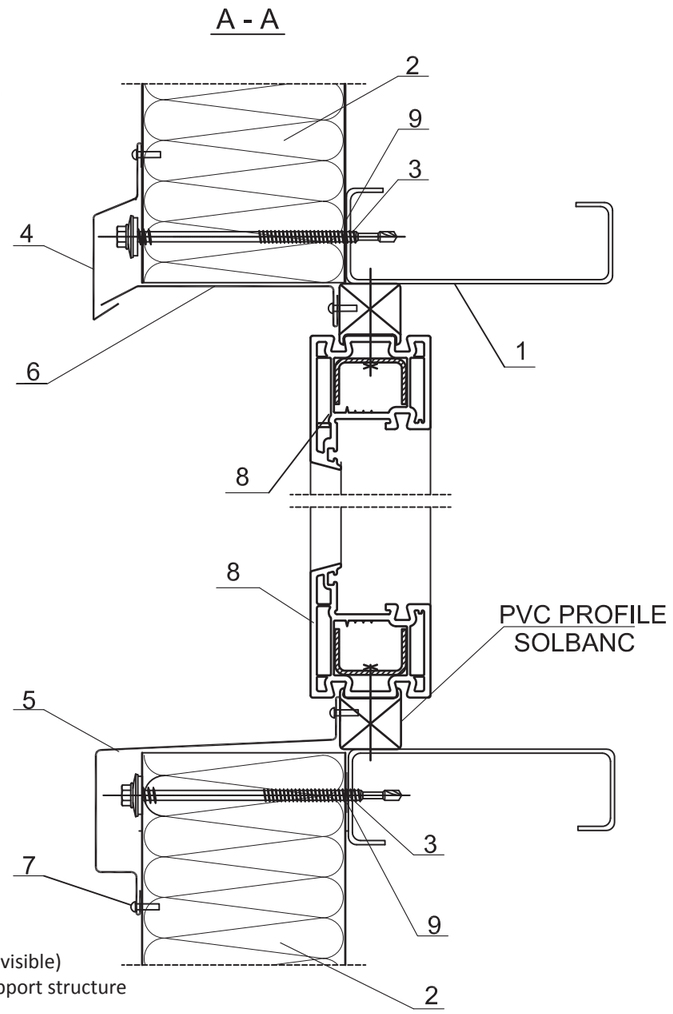
Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 230mm



PNV5 Detail / Windows details

PNV5 - 1



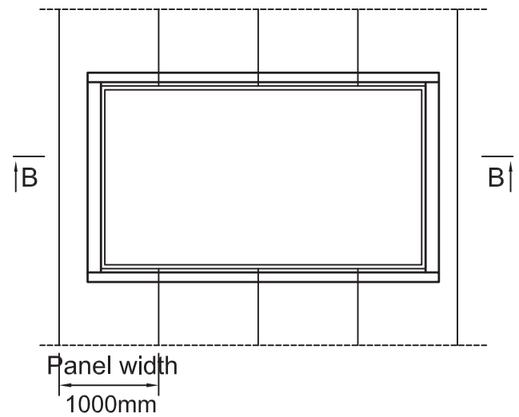


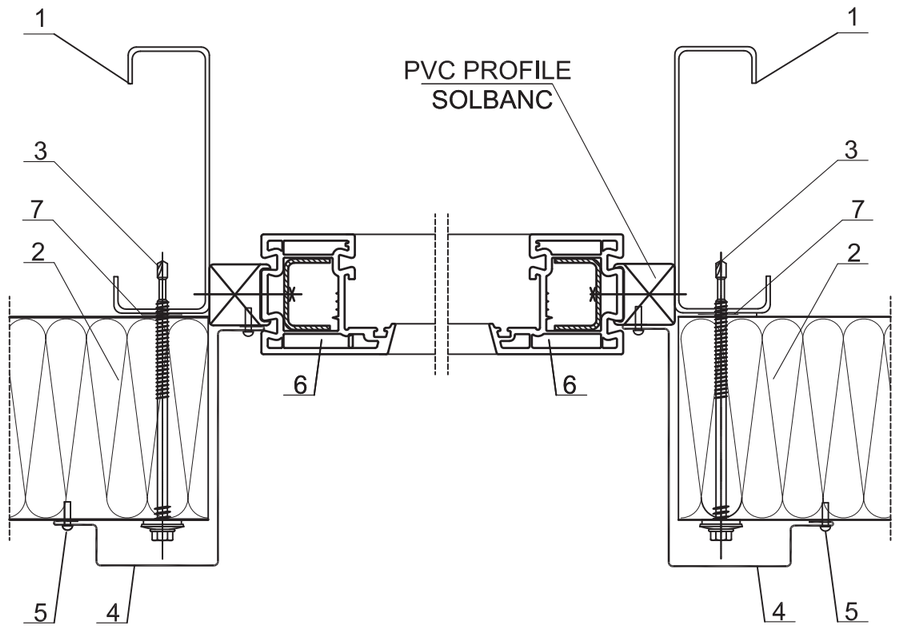
KEY

1. Support structure
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - dripper for windows moulding, 13pnv
5. Flashing - dripper for windows socle, 14pnv
6. Flashing - bordering the exterior moulding, 15pnv
7. Screw/rivet for fixing the concealing flashing
8. PVC window
9. Self-adhesive sealing tape PE 20x5

PNV5 Detail / Windows details

PNV5 - 2



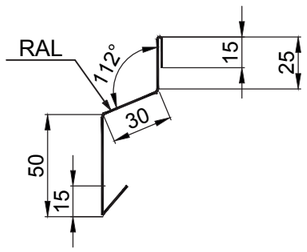


KEY

1. Support structure
2. ISOPER N - thermal insulating panel with normal joint (visible)
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing window jambs, 16pnh
5. Screw/rivet for fixing the concealing flashing
6. PVC window
7. Self-adhesive sealing tape PE 20x5

13pnv - flashing - dripper for windows moulding

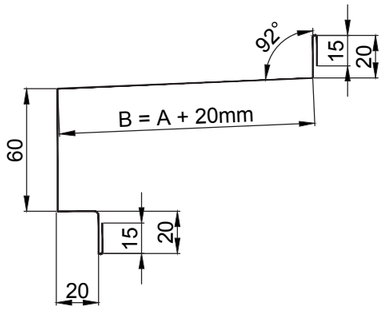
Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 135mm



14pnv - flashing - dripper for windows socle

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

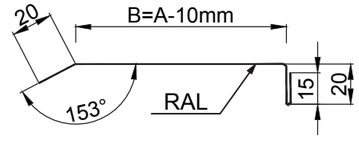
Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	50	200
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270
120	140	290



15pnv - flashing - bordering the exterior moulding

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 135mm

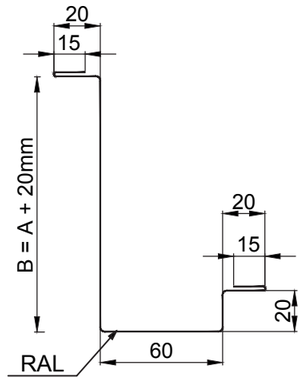
Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	20	75
40	30	85
50	40	95
60	50	105
80	70	125
100	90	145
120	110	165



16pnv - flashing - for concealing window jambs

Material: prepainted galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
30	50	200
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270
120	140	290



3. Technical details

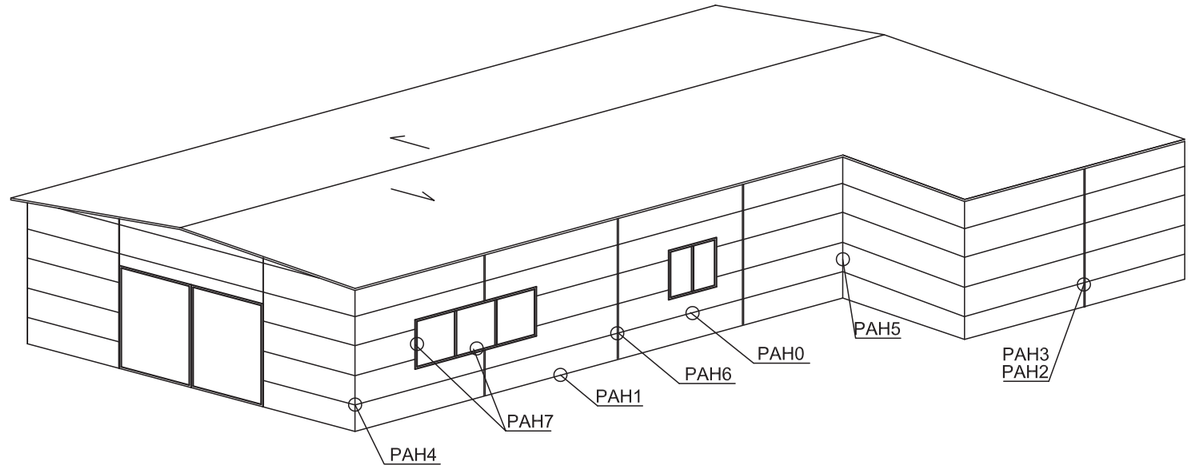
PART .03

Hidden joint wall panels - horizontal assembly

3D view

ISOPER A

Presentation of details

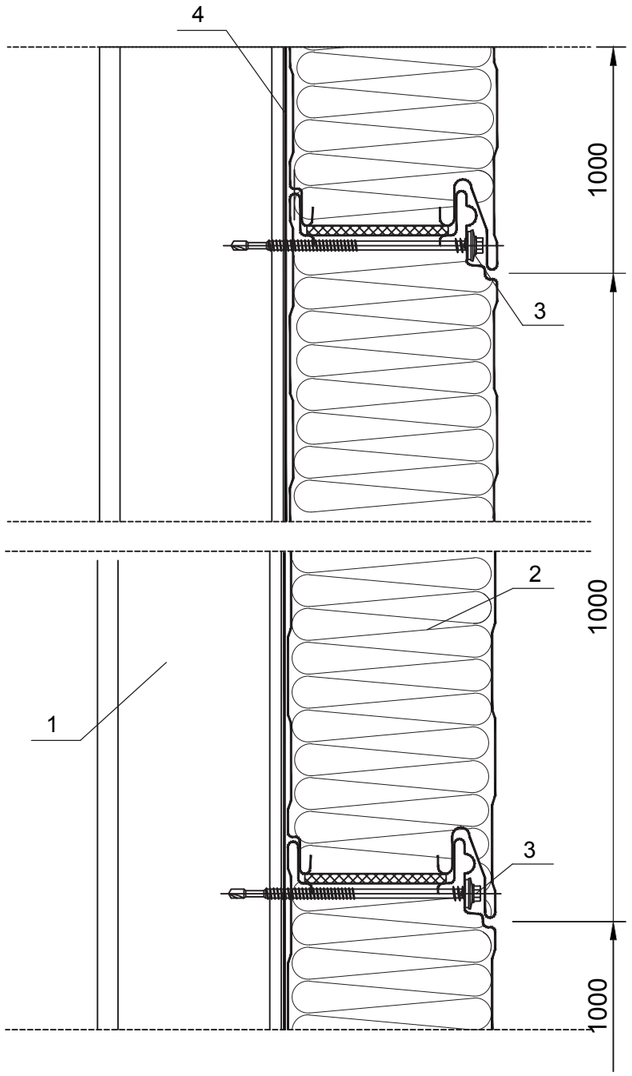


KEY

PAH0 Fixing details ISOPER A
PAH1 Socle detail - version 1 and 2
PAH2 Gap detail for fixing on the metal structure
PAH3 Gap detail for fixing on the reinforced concrete structure
PAH4 Exterior corner detail - type 1
PAH5 Exterior corner detail - type 2
PAH6 Gap detail for thermal expansion
PAH7 Windows details

PAH0 Detail

Fixing details ISOPER A

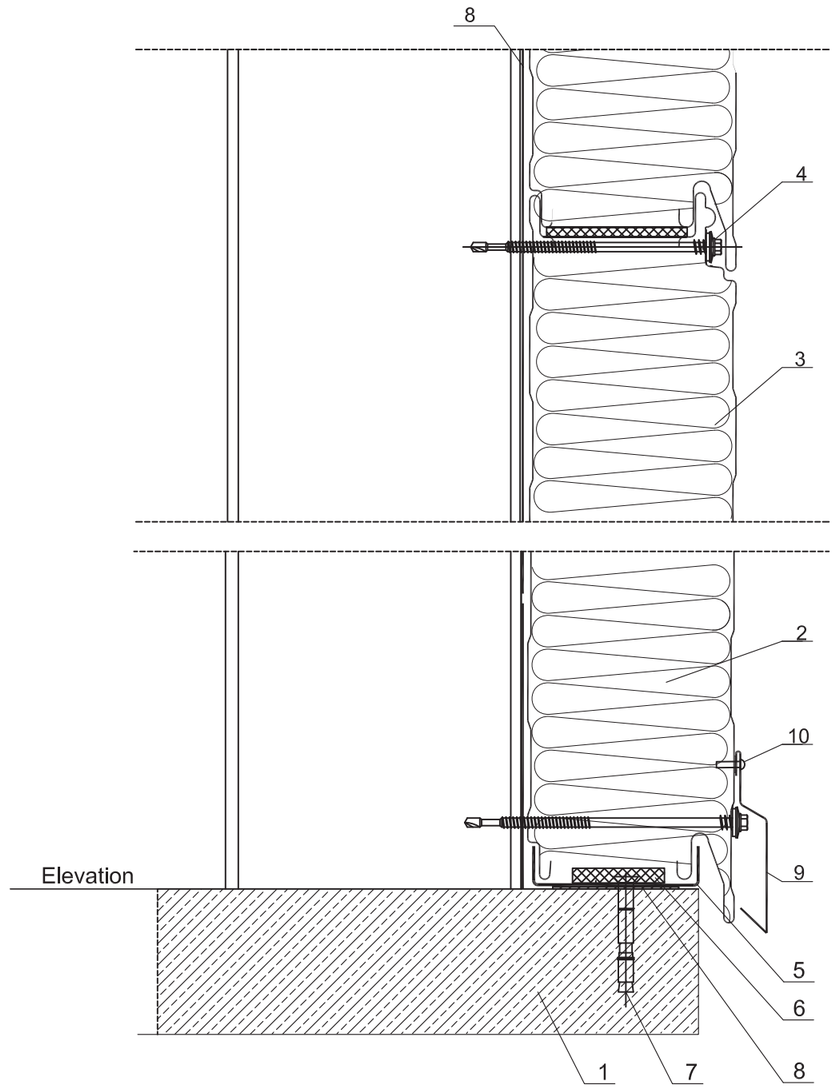


KEY

1. Support structure - thermal insulating panel (main/secondary pillars)
2. ISOPER A - thermal insulating wall panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Self-adhesive sealing tape PE 20x5

PAH1 Detail

Socle detail - VERSION 1

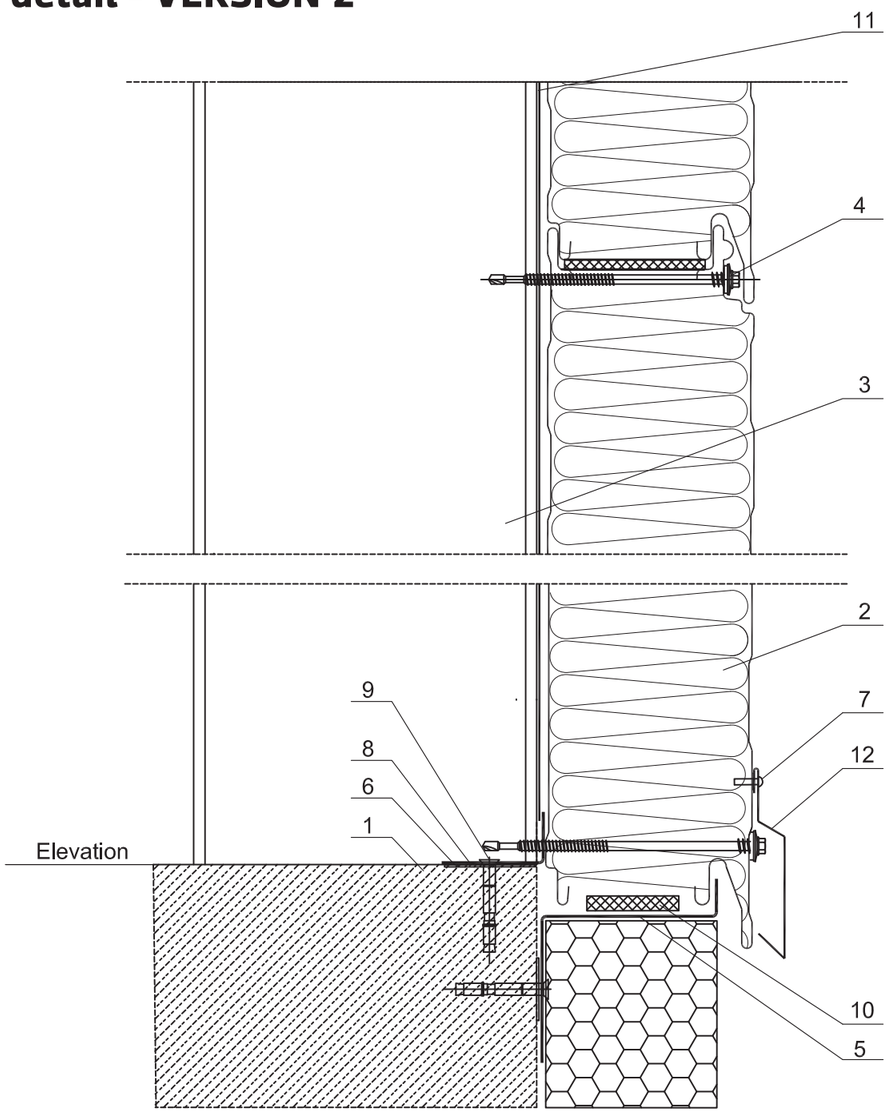


KEY

1. Support structure made of concrete
2. ISOPER A - thermal insulating panel with hidden joint
3. Support structure - thermal insulating panel
4. Screw for fixing the thermal insulating panel on the support structure
5. Flashing - for supporting the panel, 01pah
6. Self-adhesive sealing tape PE 50x5
7. Dowel for fixing the galvanized flashing onto the reinforced concrete beam
8. Self-adhesive sealing tape PE 20x5
9. Flashing - Socle dripper , 02pah
10. Rivet/screw for fixing the concealing flashing (~300mm)

PAH1 Detail

Socle detail - VERSION 2



KEY

1. Support structure made of concrete
2. ISOPER A - thermal insulating panel with hidden joint
3. Metal structure for supporting the thermal insulating panel
4. Screw for fixing the thermal insulating panel on the support structure
5. Flashing - for supporting the panel to the socle, 03pah
6. Self-adhesive sealing tape PU 20x4 (expandable)
7. Rivet/screw for fixing the concealing flashing (~300mm)
8. Flashing - for guiding the panel, 04pah
9. Dowel for fixing the galvanized flashing onto the concrete structure
10. Self-adhesive sealing tape PE 50x5
11. Self-adhesive sealing tape PE 20x5
12. Flashing - Socle dripper, 02pah

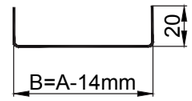
Note: The concrete socle of height > 20cm shall be insulated with polystyrene.

PAH1 Detail / Accessories

01pah - flashing - for supporting the panel

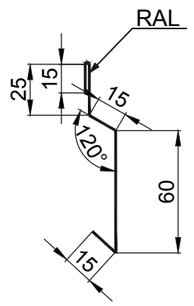
Material: galvanized steel sheet
Thickness: 2.50mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	26	66
50	36	76
60	46	86
80	66	106
100	86	126



02pah - flashing - Socle dripper

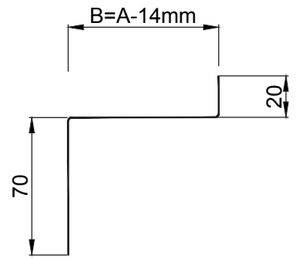
Material: galvanized steel sheet
Thickness: 0.50mm
Length: 2000-6000mm
Unfolded width: 130mm



PAH1 Detail / Accessories

03pah - flashing - for supporting the panel to the socle

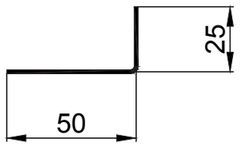
Material: galvanized steel sheet
Thickness: 2.50mm



Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	26	116
50	36	126
60	46	136
80	66	156
100	86	176

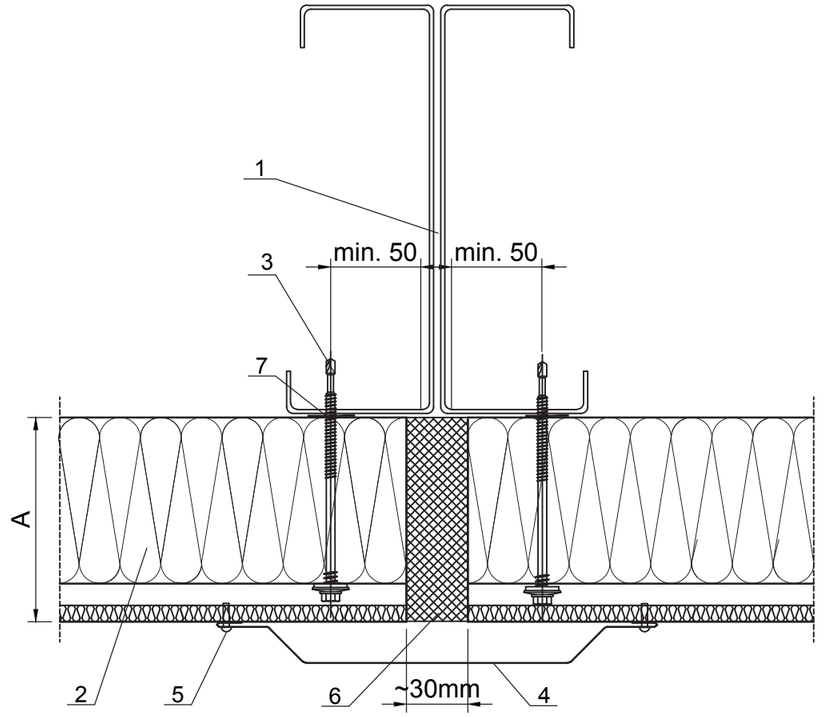
04pah - flashing - for guiding the panel

Material: galvanized steel sheet
Thickness: 2.0 mm
Unfolded width: 75 mm



PAH2 Detail

Gap detail for fixing on the metal structure



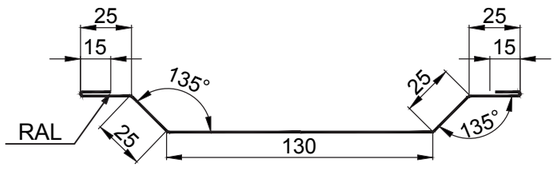
KEY

1. Support structure for thermal insulating panel (metal structure)
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing gaps between panels, 05pah
5. Rivet/screw for fixing the concealing flashing(~300mm)
6. Insulation to be applied on site
7. Self-adhesive sealing tape PE 20x5

PAH2 Detail / Accessories

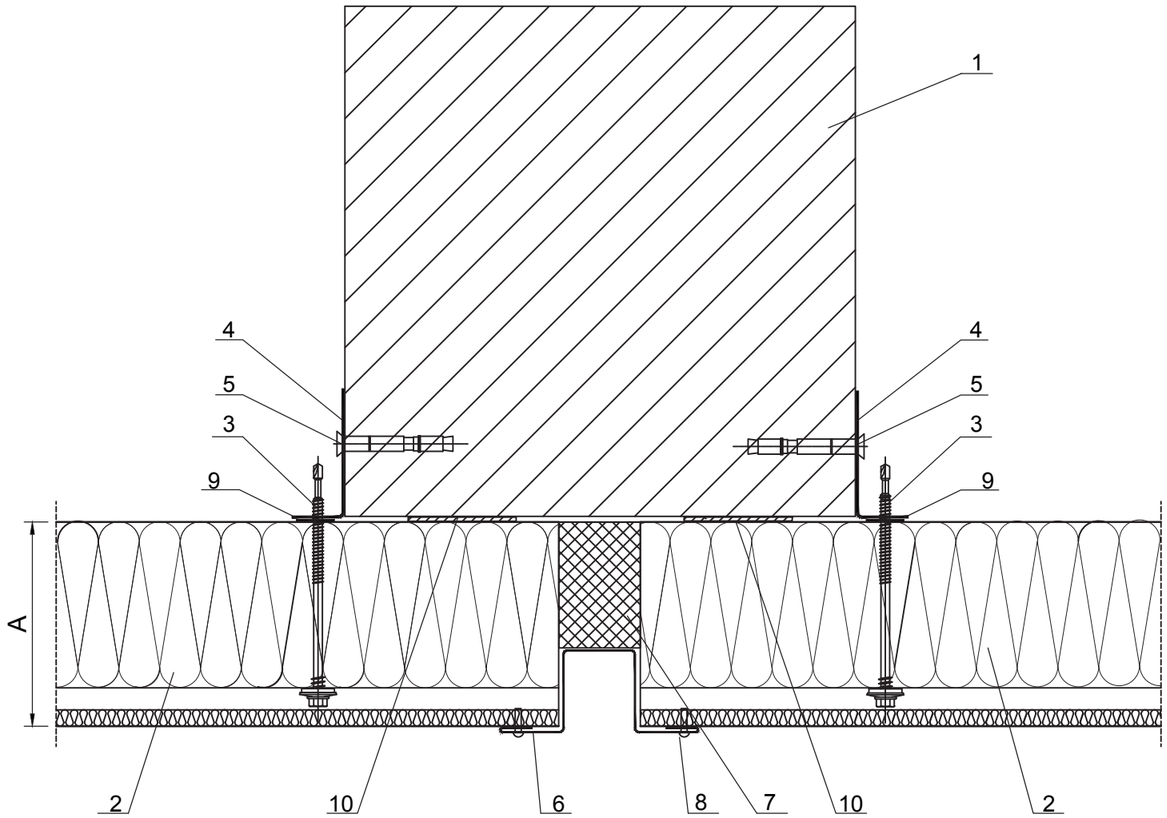
05pah - flashing - for concealing gaps between the panels and metal structure

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 260 mm



PAH3 Detail

Gap detail for fixing on reinforced concrete structure



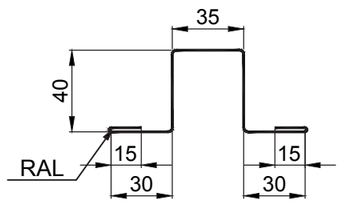
KEY

1. Support structure - thermal insulating panel (pillar made of reinforced concrete)
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Galvanized flashing for fixing thermal insulating panel, 07pah
5. Screw for fixing the support profile on the pillar made of reinforced concrete
6. Flashing, type omega, for concealing the gaps between thermal insulating panels, 06pah
7. Insulation that shall be applied on site
8. Screw/rivet for fixing the concealing flashing (~ 300mm)
9. Self-adhesive sealing tape PE 20x5
10. Self-adhesive sealing tape PU 20x4

PAH3 Detail / Accessories

06pah - flashing - type omega, for concealing the gaps between the panels and reinforced concrete structure

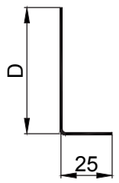
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 205 mm



07pah - galvanized flashing for fixing thermal insulating panel

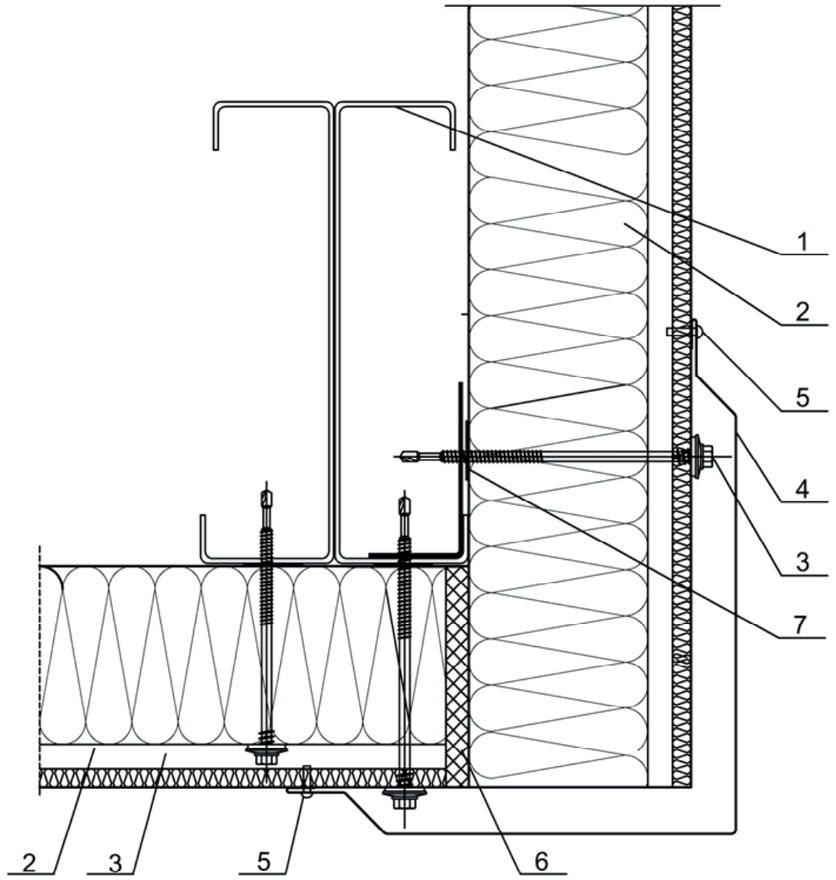
Material: galvanized steel sheet
Thickness: 2.0 mm
Unfolded width: 75 mm

Note:
1. The thickness of the profiles shall be determined by the project designer, who will consider the possibility to undertake the deviations of the concrete structure.
2. D shall be established by measurements on site, considering the deviations of the concrete



PAH4 Detail

Exterior corner detail type 1



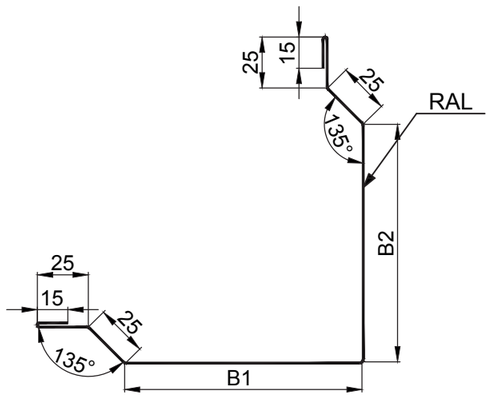
KEY

1. Support structure - thermal insulating panel (metal structure)
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior corner for concealing thermal insulating panels, 08 pah
5. Screw for fixing the concealing profile / rivet (~300mm)
6. Polyurethane foam
7. Self-adhesive sealing tape PE 20x5

PAH4 Detail / Accessories

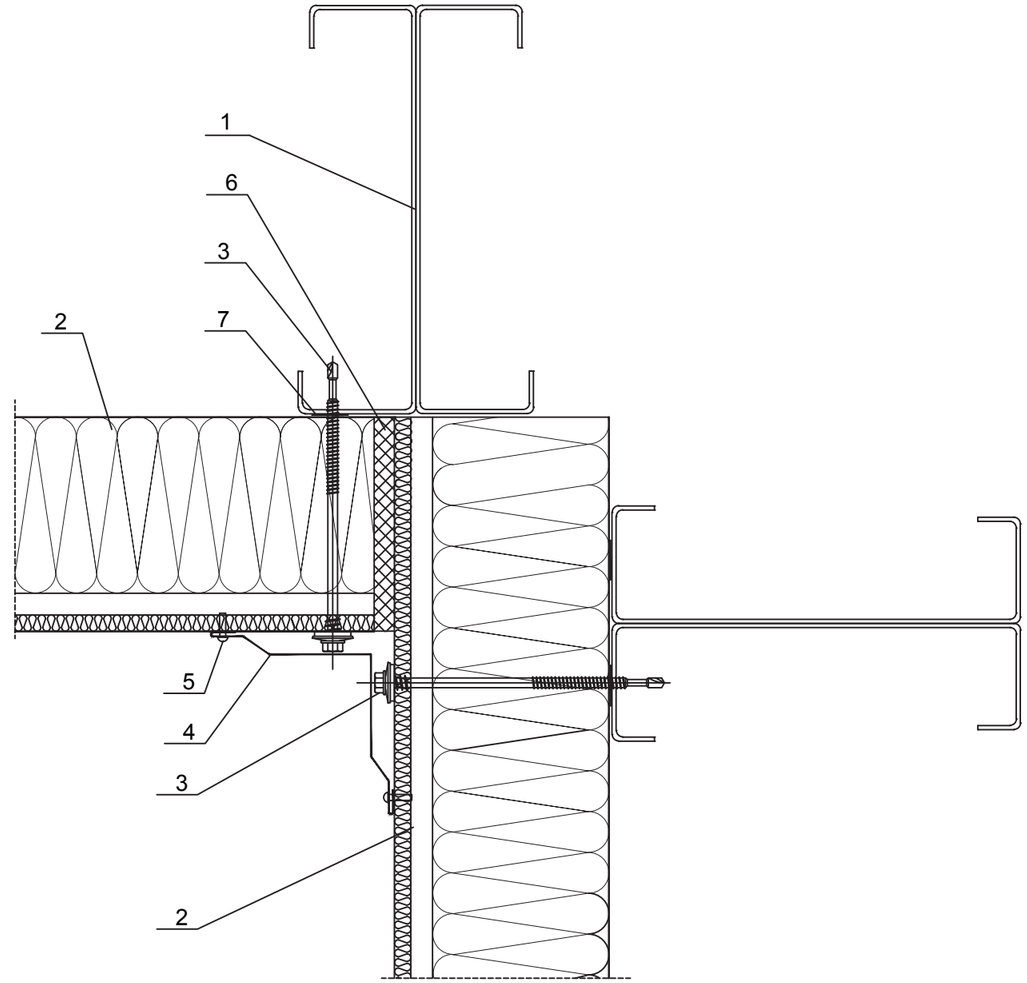
08pah - flashing - exterior corner type 1

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: B1+B2+130 mm
Note: B1,B2 shall be determined by measurements on site



PAH5 Detail

Exterior corner detail type 2



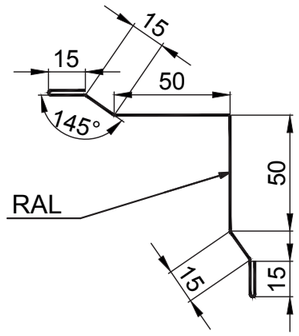
KEY

1. Support structure - thermal insulating panel (metal structure)
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior corner for concealing the panels, 09 pah
5. Screw/ rivet for fixing the concealing flashing (~300mm)
6. Polyurethane foam
7. Self-adhesive sealing tape PE 20x5

PAH5 Detail / Accessories

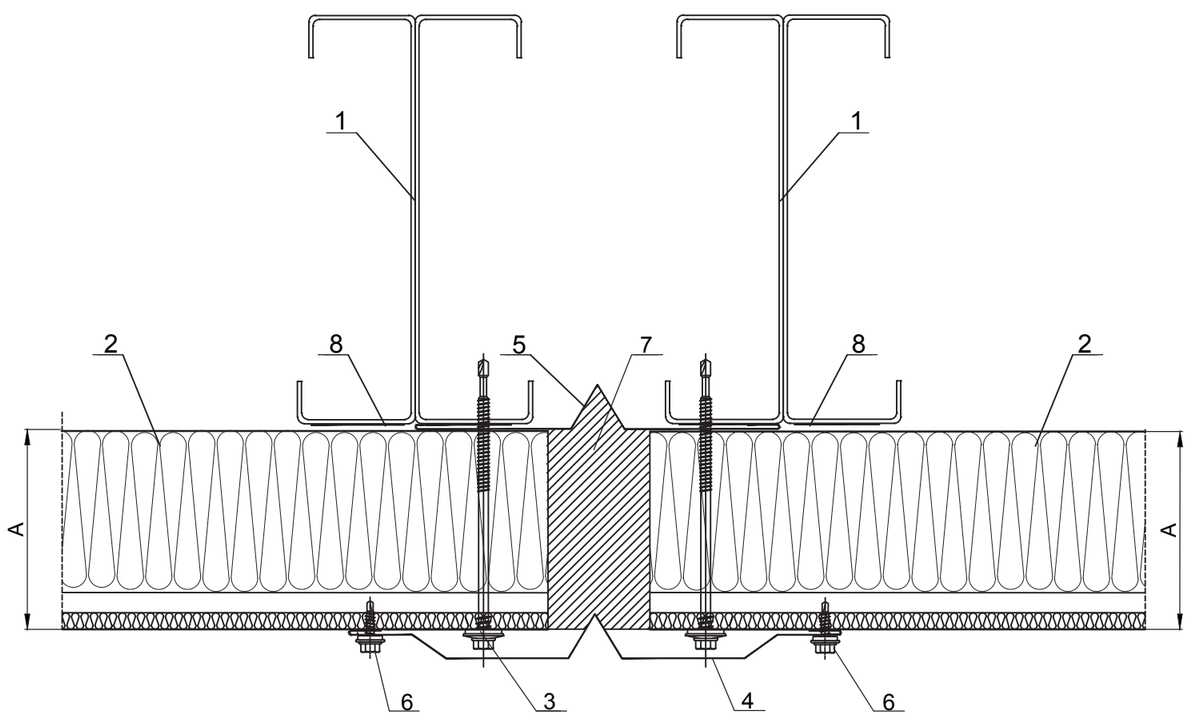
09pah - flashing - Exterior corner type 2

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 190 mm



PAH6 Detail

Gap detail thermal expansion



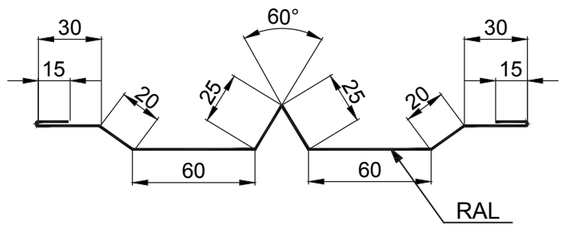
KEY

1. Support structure - thermal insulating panel
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior thermal expansion gap, 10pah
5. Flashing - Interior thermal expansion gap, 11pah
6. Screw for fixing the concealing profile / rivet
7. Insulation to be applied on site
8. Self-adhesive sealing tape PE 20x5

PAH6 Detail / Accessories

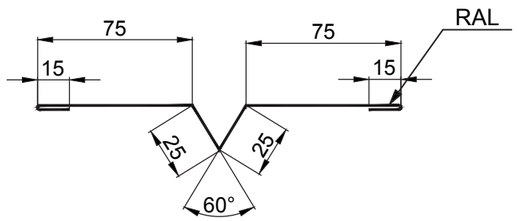
10pah - flashing - exterior thermal expansion gap

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 300 mm

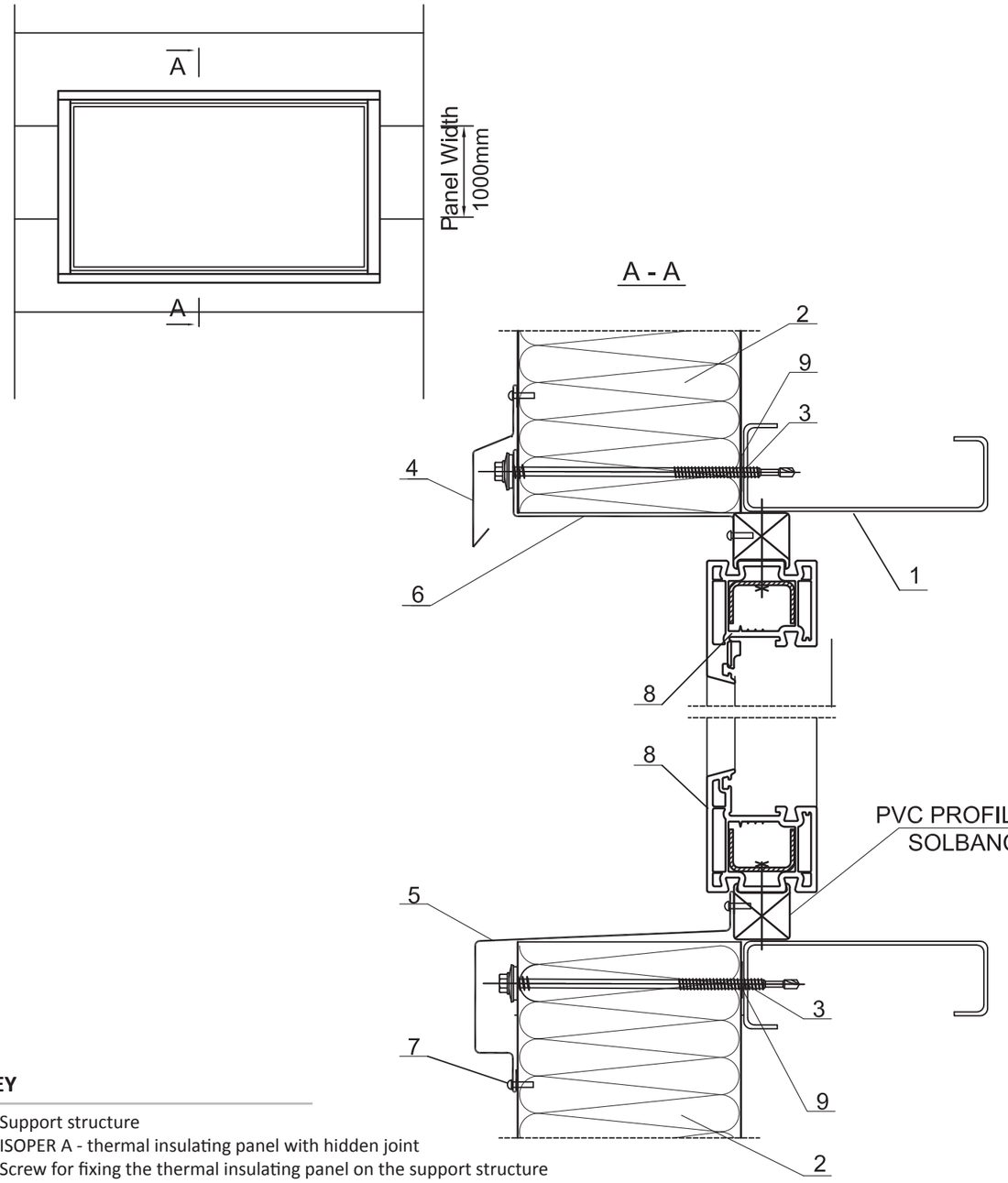


11pah - flashing - interior thermal expansion gap

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 230 mm



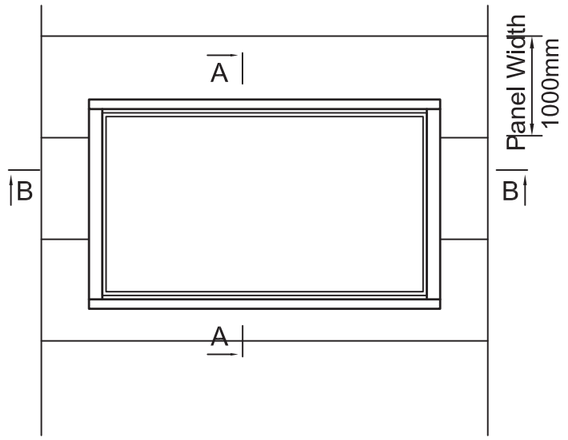
PAH7 Detail / Windows details

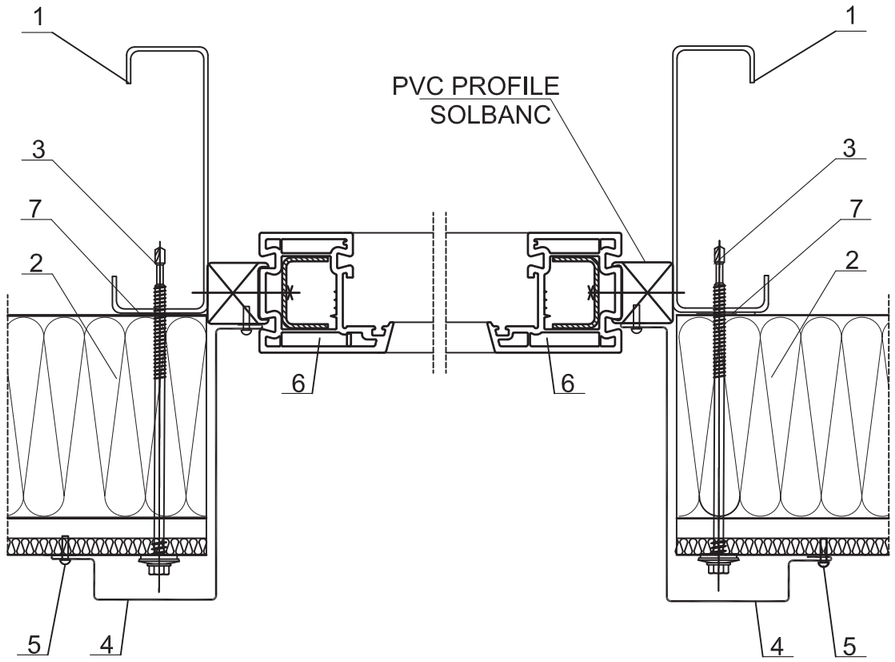


KEY

1. Support structure
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Dripper for windows moulding, 12pah
5. Flashing - Dripper for windows socle, 13pah
6. Flashing - Bordering the exterior moulding, 14pah
7. Screw/rivet for fixing the concealing flashing
8. PVC window
9. Self-adhesive sealing tape PE 20x5

PAH7 Detail / Windows details





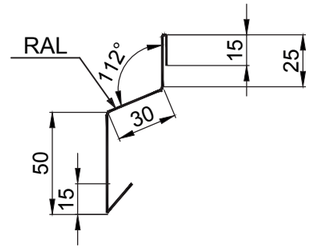
KEY

1. Support structure
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing window jambs, 15pah
5. Screw for fixing the concealing profile/rivet
6. PVC window
7. Self-adhesive sealing tape PE 20x5

PAH7 Detail / Accessories

12pah -flashing - dripper for windows moulding

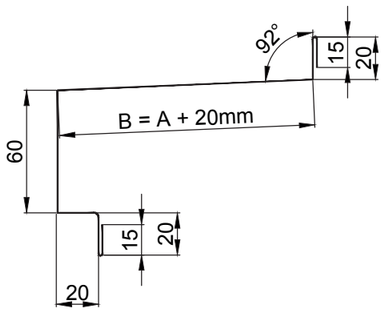
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 135 mm



13pah - flashing - dripper for windows socle

Material: galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

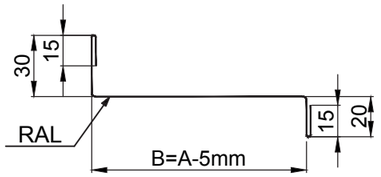
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270



14pah - flashing - bordering the exterior moulding

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

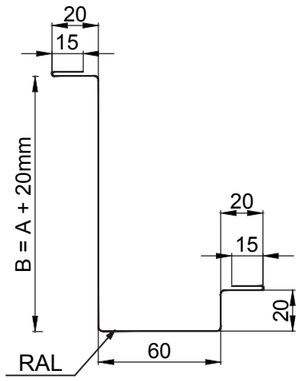
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	35	115
50	45	125
60	55	135
80	75	155
100	95	175



15pah - flashing - for concealing window jambs

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

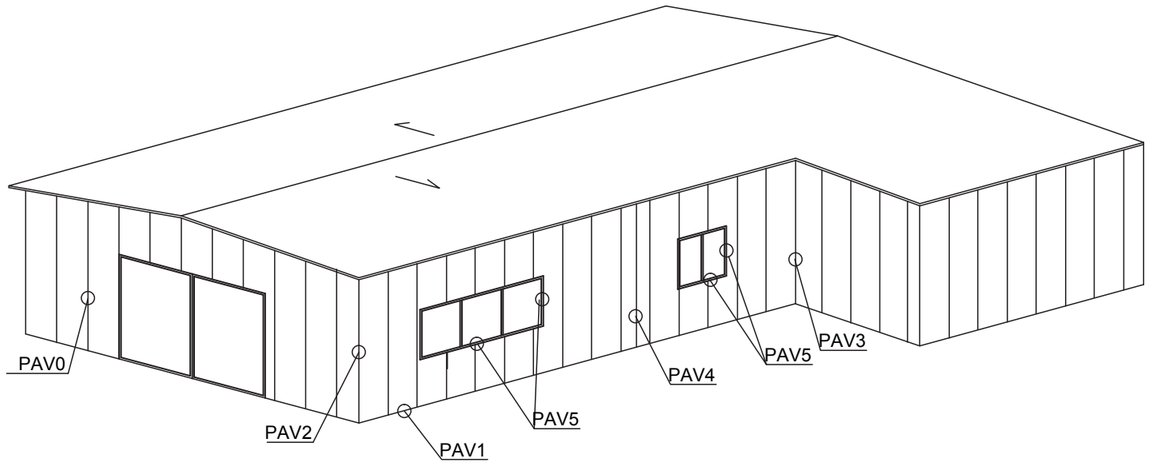
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	60	210
50	70	220
60	80	230
80	100	250
100	120	270



Wall panels vertical assembly - ISOPER A

3D view

Presentation of details

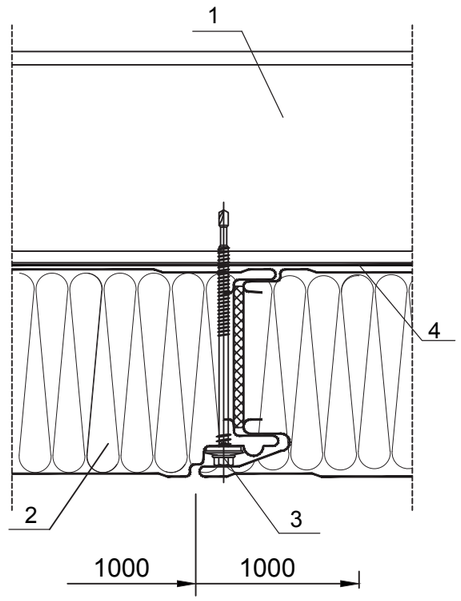


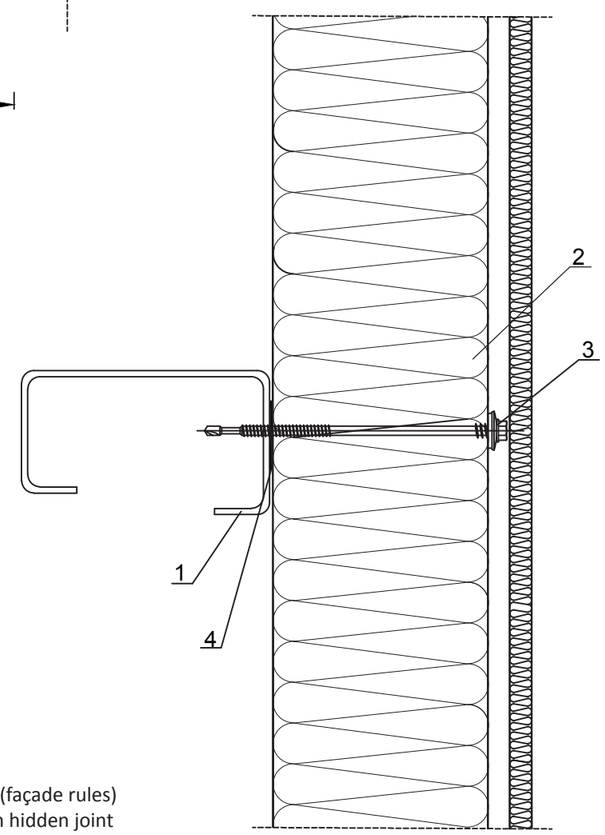
KEY

PAV0 Fixing details ISOPER A
PAV1 Socle detail - version 1 and 2
PAV2 Exterior corner detail - type 1
PAV3 Exterior corner detail - type 2
PAV4 Gap detail for thermal expansion
PAV5 Windows details

PAV0 Detail

Fixing details ISOPER A





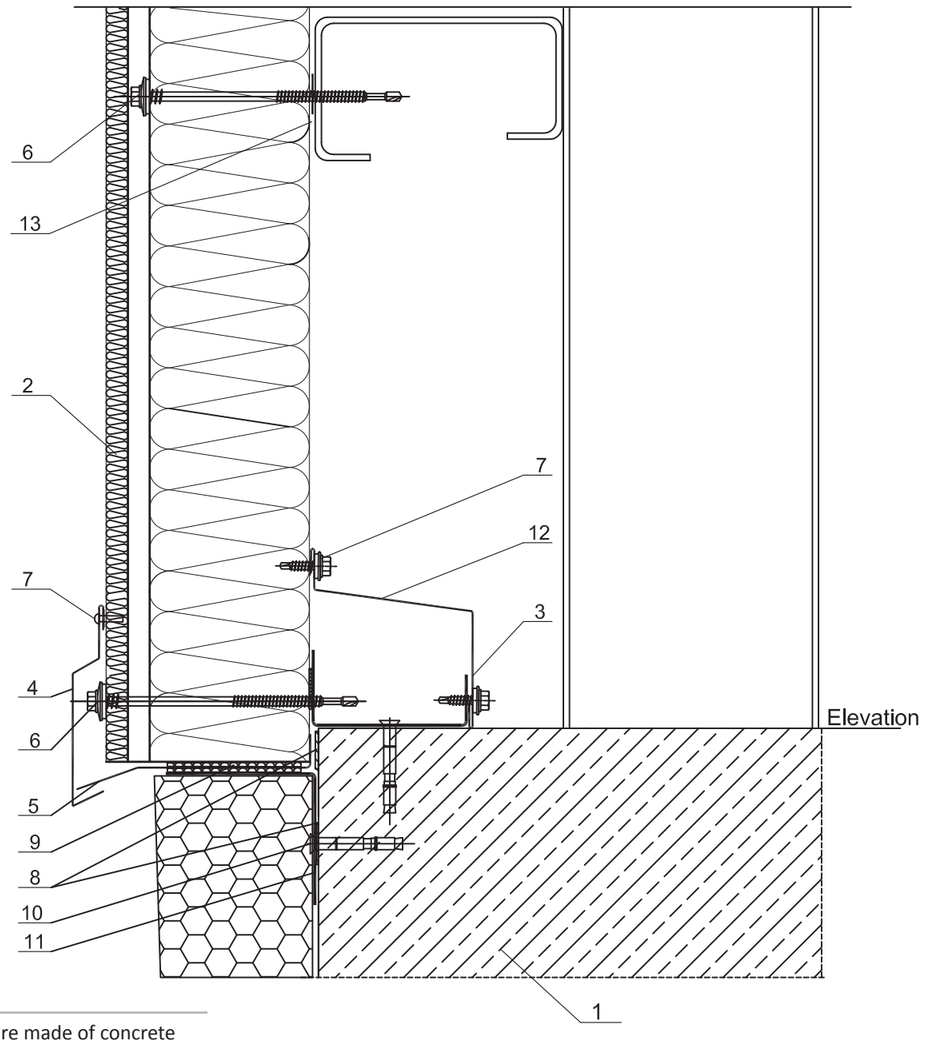
KEY

1. Support structure - thermal insulating panel (façade rules)
2. ISOPER A - thermal insulating wall panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Self-adhesive sealing tape PE 20x5

PAV1 Detail

PAV1 - 1

Socle detail ISOPER A - VERSION 1



KEY

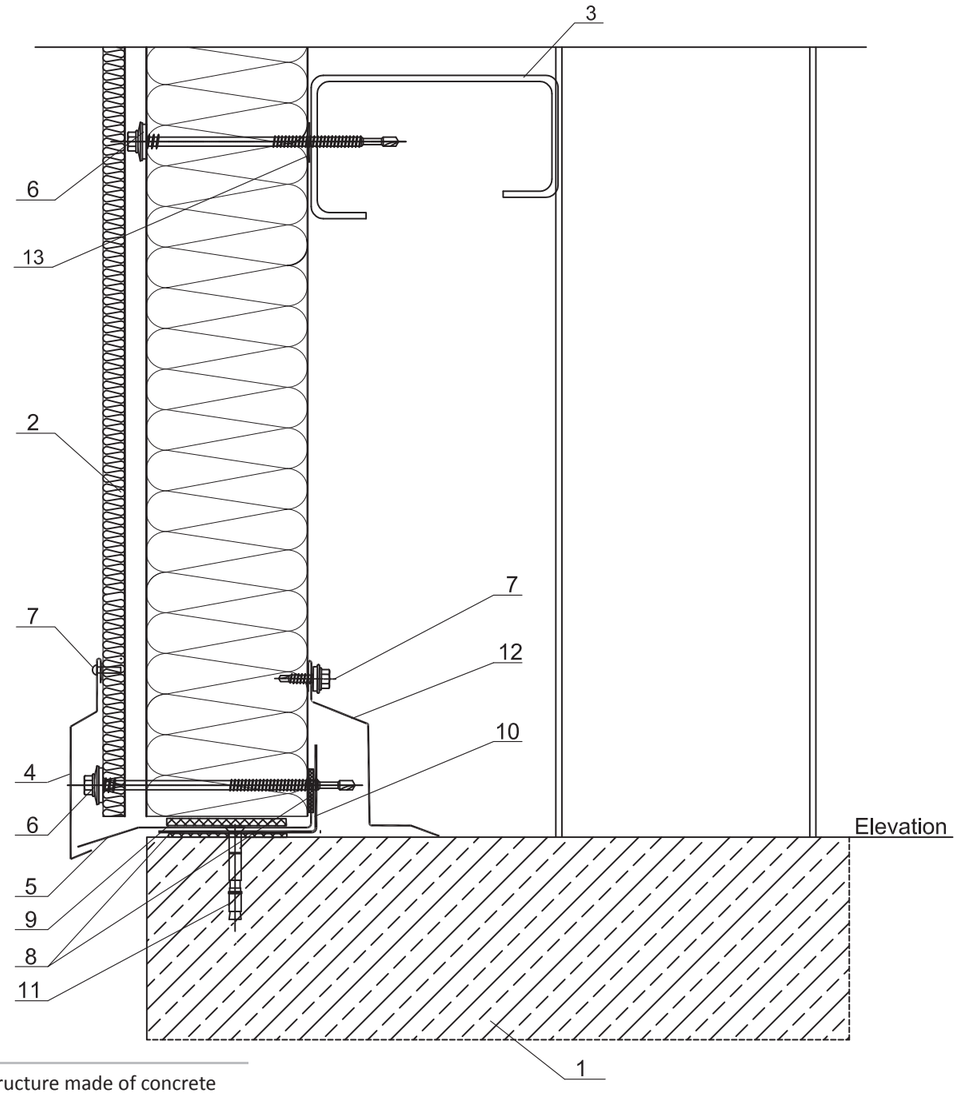
1. Support structure made of concrete
2. ISOPER A - thermal insulating panel with hidden joint
3. Support structure - thermal insulating panel (according the resistance project)
4. Flashing - Socle dripper , 01pav
5. Flashing - interior socle dripper, 02pav
6. Screw for fixing the thermal insulating panel on the support structure
7. Screw for fixing the concealing flashing
8. Self-adhesive sealing tape PU 20x4.0
9. Insulation to be applied on site
10. Galvanized flashing for supporting the thermal insulating panel, 03 pav
11. Dowel for fixing the galvanized flashing onto the reinforced concrete beam
12. Flashing - for interior concealing of the socle, 04pav
13. Self-adhesive sealing tape PE 20x5

Note: The concrete socle of height > 20cm shall be insulated with polystyrene.

PAV1 Detail

PAV1 - 2

SOCLE DETAIL ISOPER A - VERSION 2

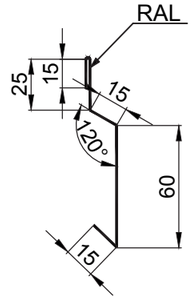


KEY

1. Support structure made of concrete
2. ISOPER A - thermal insulating panel with hidden joint
3. Support structure - thermal insulating panel (according the resistance project)
4. Flashing - Socle dripper, 01pav
5. Flashing - interior socle dripper, 02pav
6. Screw for fixing the thermal insulating panel on the support structure
7. Screw for fixing the concealing flashing
8. Self-adhesive sealing tape PU 20x4.0
9. Insulation to be applied on site
10. Galvanized flashing type L for supporting the thermal insulating panel, 05 pav
11. Dowel for fixing the galvanized flashing onto the reinforced concrete beam
12. Flashing - for interior concealing of the socle, 06pav
13. Self-adhesive sealing tape PE 20x5

01pav - flashing - socle dripper

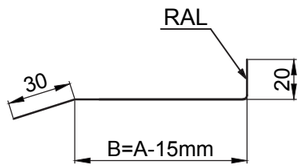
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 130 mm



02pav - flashing - interior socle dripper

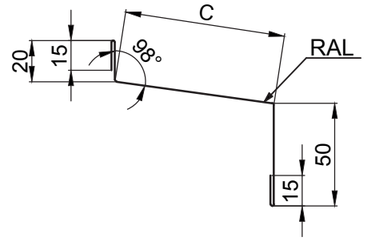
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	25	75
50	35	85
60	45	95
80	65	115
100	85	135



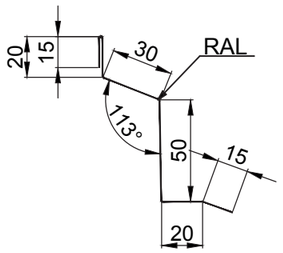
04pav - flashing - for interior concealing of the socle

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: C + 100 mm
Note: C shall be determined by measurements on site



06pav - flashing - for interior concealing of the socle

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 150 mm

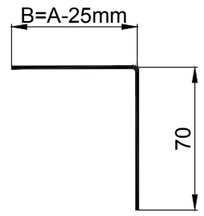


PAV1 Detail / Accessories

03pav - galvanized flashing for supporting the panel to the socle

Material: galvanized steel sheet
Thickness: 2.50 mm

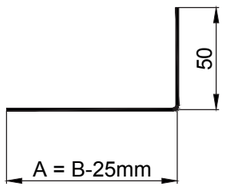
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	15	85
50	25	95
60	45	115
80	65	135
100	85	155



05pav - galvanized flashing type L for supporting the panel to the socle

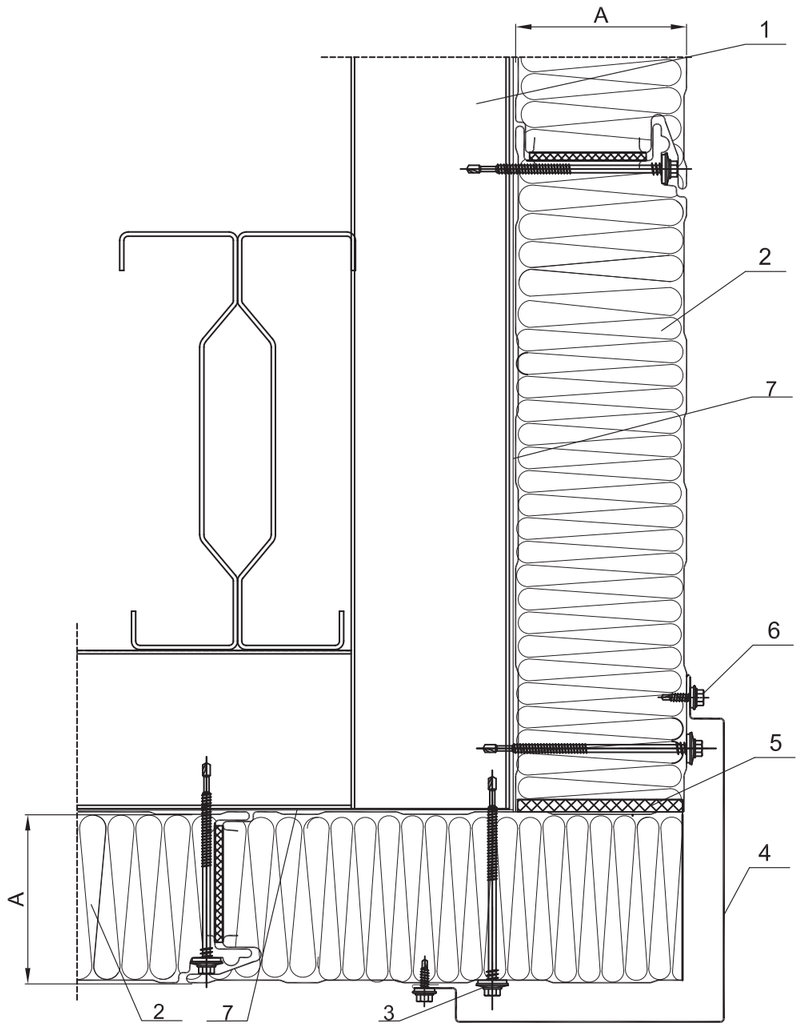
Material: galvanized steel sheet
Thickness: 2.50 mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	15	65
50	25	75
60	45	95
80	65	115
100	85	135



PAV2 Detail

Exterior corner detail - type 1



KEY

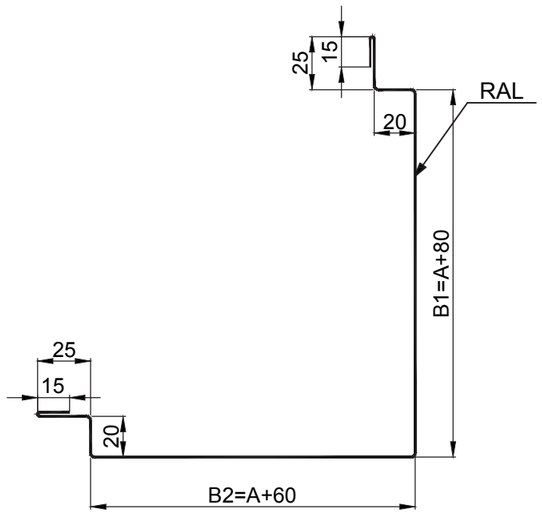
1. Support structure - thermal insulating panel
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior corner, 07pav
5. Polyurethane foam
6. Screw for fixing the concealing flashing
7. Self-adhesive sealing tape PE 20x5

PAV2 Detail / Accessories

07pav - flashing - Exterior corner type 1

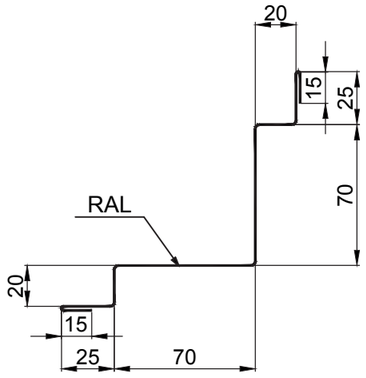
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: l= B1+B2 + 120 mm

Panel thickness A (mm)	B1=A+80 (mm)	B2=A+60 (mm)	Unfolded width (mm)
40	120	100	340
50	130	110	360
60	140	120	380
80	160	140	420
100	180	160	460



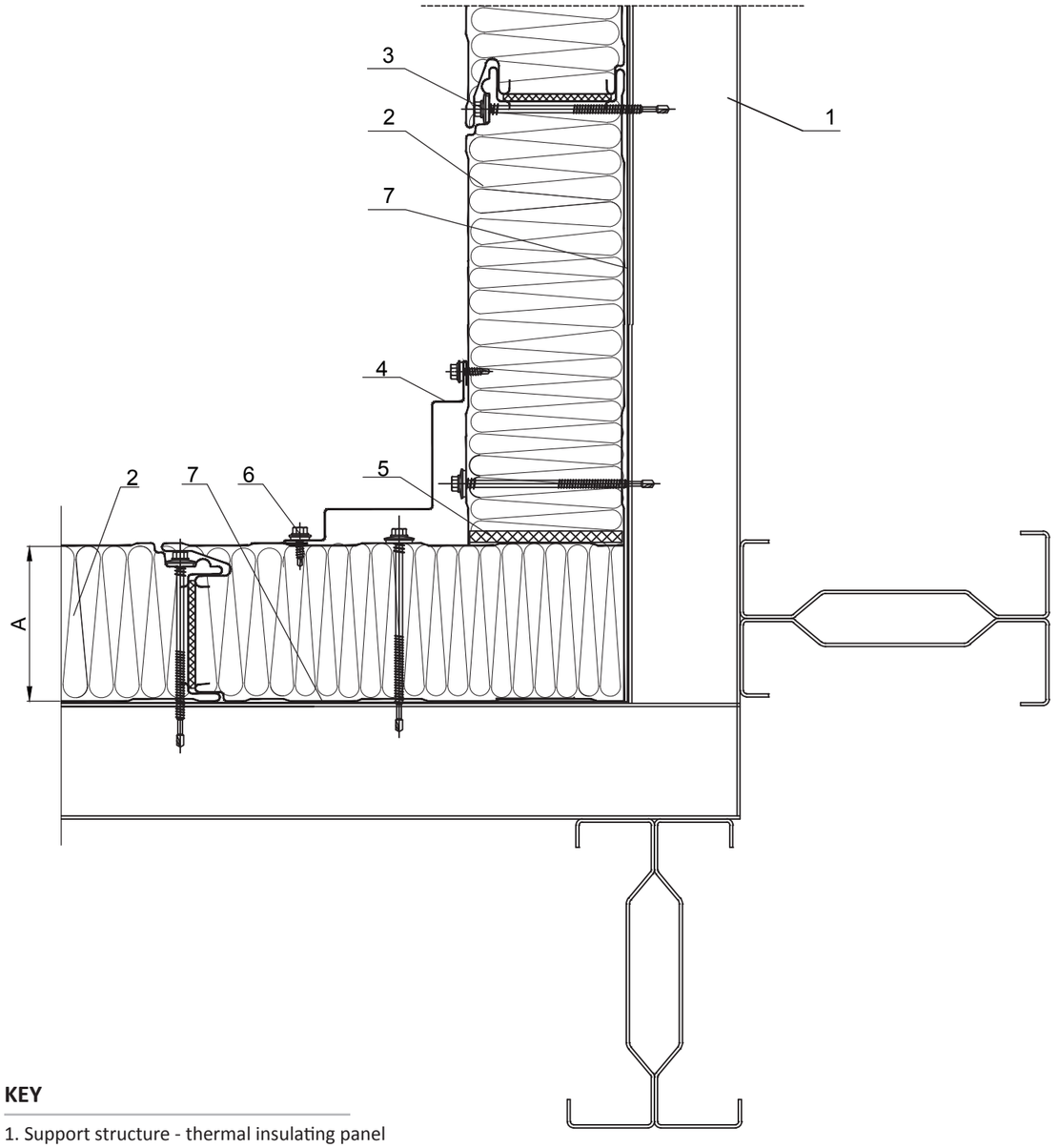
08pav - flashing - Interior corner type 2

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 260 mm



PAV3 Detail

Exterior corner detail - type 2



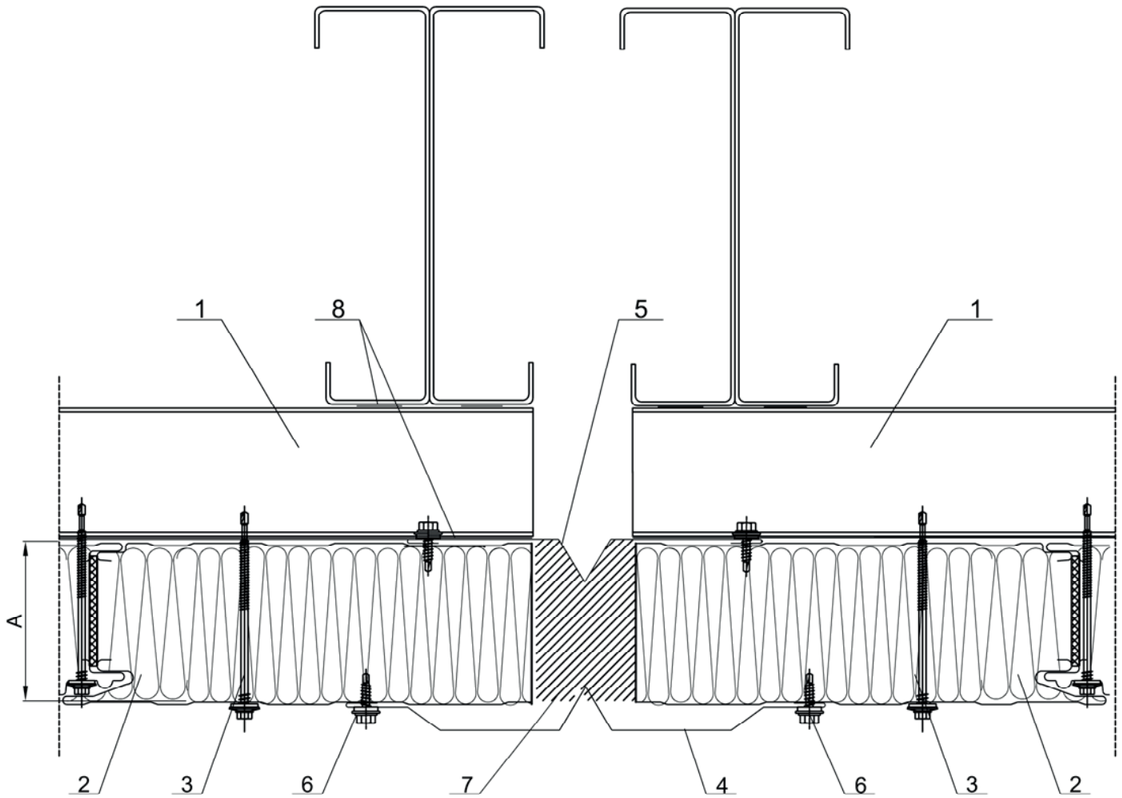
KEY

1. Support structure - thermal insulating panel
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior corner, 09pav
5. Polyurethane foam
6. Screw for fixing the concealing flashing
7. Self-adhesive sealing tape PE 20x5

PAV4 Detail

PAV4 - 1

Gap detail thermal expansion



KEY

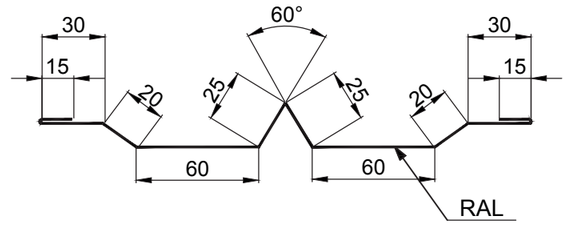
1. Support structure - thermal insulating panel
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - Exterior thermal expansion gap, 10pav
5. Flashing - Interior thermal expansion gap, 11pav
6. Screw for fixing the concealing profile
7. Insulation to be applied on site
8. Self-adhesive sealing tape PE 20x5

PAV4 Detail / Accessories

PAV4 - 2

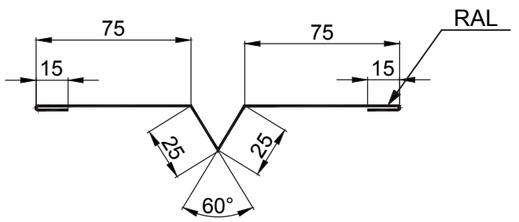
09pav - flashing - exterior thermal expansion gap

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 300 mm



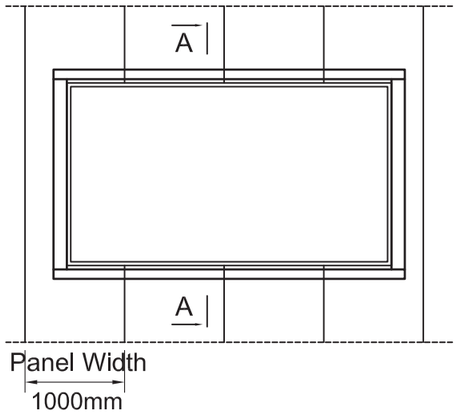
10pav - flashing - interior thermal expansion gap

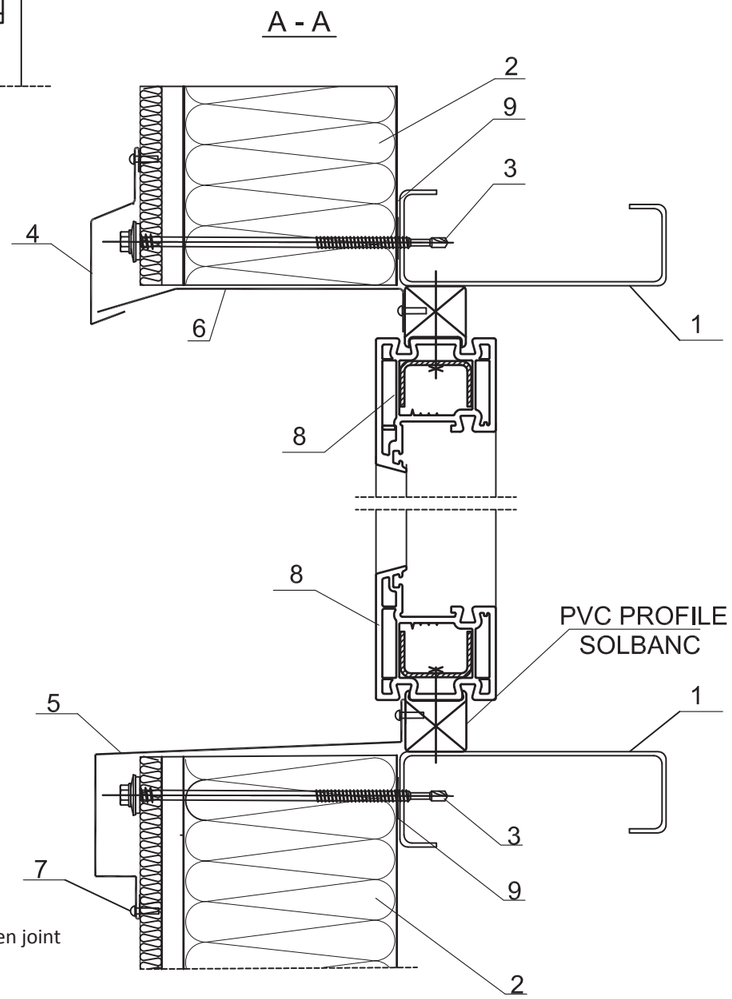
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 230 mm



PAV5 Detail / Windows details

PAV5 - 1



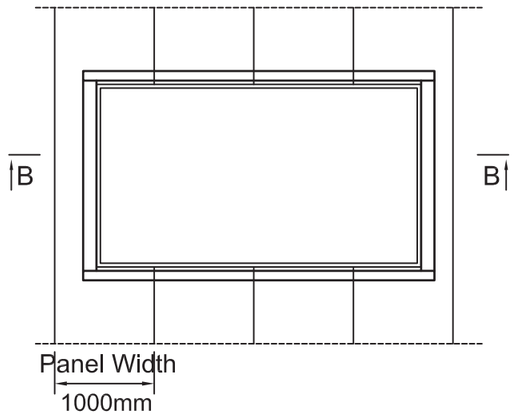


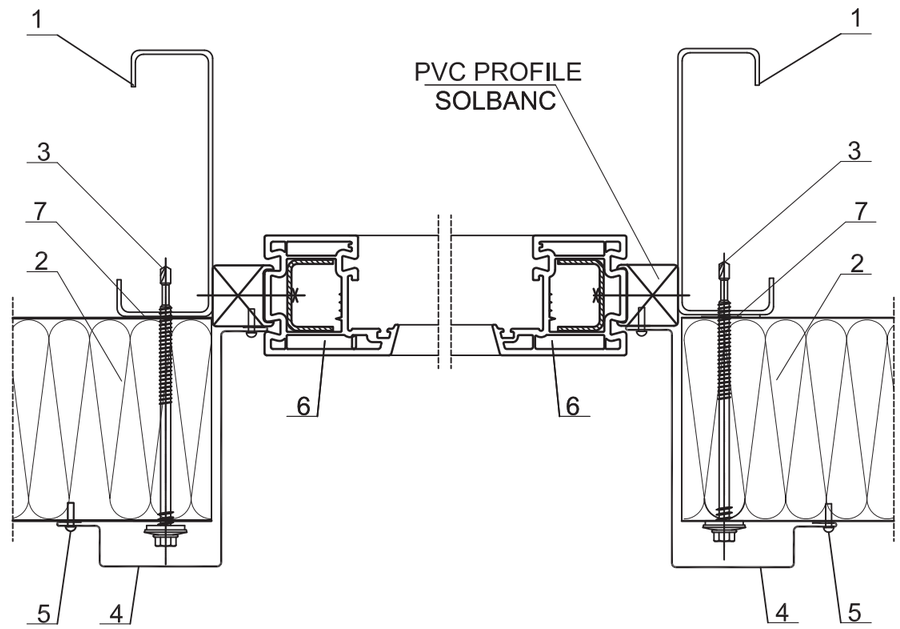
KEY

1. Support structure
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - dripper for windows moulding, 12pav
5. Flashing - dripper for windows socle, 13pav
6. Flashing - bordering the exterior moulding, 14pav
7. Screw /rivet for fixing the concealing flashing
8. PVC window
9. Self-adhesive sealing tape PE 20x5

PAV5 Detail / Windows details

PAV5 - 2



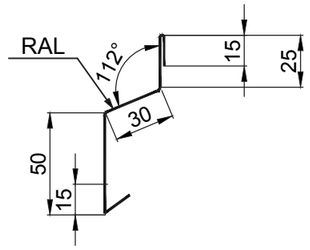


KEY

1. Support structure
2. ISOPER A - thermal insulating panel with hidden joint
3. Screw for fixing the thermal insulating panel on the support structure
4. Flashing - for concealing window jambs, 15pav
5. Screw/rivet for fixing the concealing flashing
6. PVC window
7. Self-adhesive sealing tape PE 20x5

11pav - flashing - dripper for windows moulding

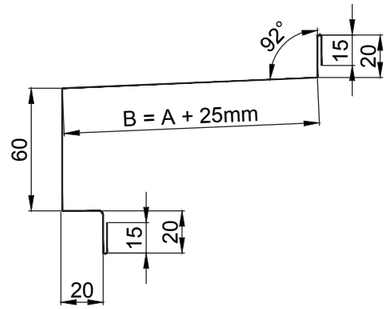
Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 135 mm



12pav - flashing - dripper for windows socle

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

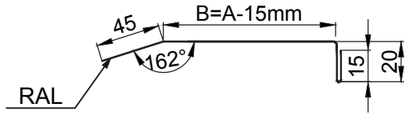
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	65	215
50	75	225
60	85	235
80	105	255
100	125	275



13pav - flashing - bordering the exterior moulding

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm
Unfolded width: 135 mm

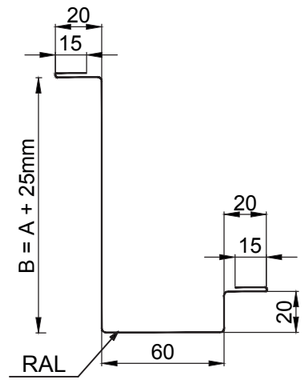
Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	25	105
50	35	115
60	45	125
80	65	145
100	85	165



14pav - flashing - for concealing window jambs

Material: prepainted galvanized steel sheet
Thickness: 0.50 mm
Length: 2000-6000mm

Panel thickness (mm)	B (mm)	Unfolded width (mm)
40	65	215
50	75	225
60	85	235
80	105	255
100	125	275



THERMAL INSULATING WALL PANELS

CERTIFICATION

Classification regarding fire characteristics (PIR core)

Classification : Fire resistance

ISOPERnRF	D = 50 și 60 mm	EI 20 E 90
ISOPERnRF	D = 80, 100, 120 mm	EI 30 E 30
ISOFRIGRF	D = 150, 200 mm	EI 30 E 30
ISOPERaRF	D = 80, 100 mm	EI 30 E 60
ISOAC3RF	D = 50 și 60 mm	REI 20 RE 30
ISOAC3RF	D = 80, 100, 120 mm	REI 30 RE 30
ISOAC5RF	D = 50 și 60 mm	REI 15 RE 30
ISOAC5RF	D = 80, 100, 120 mm	REI 30 RE 60

Classification : Fire reaction

ISOPERnRF	[30-200 mm]	B-S2, d0
ISOPERaRF	[40-100 mm]	B-S2, d0
ISOAC3RF	[30-120 mm]	B-S2, d0
ISOAC5RF	[30-120 mm]	B-S2, d0

Classification regarding fire characteristics (PUR core)

Classification : Fire reaction

ISOPERn	[30-200 mm]	D-S3, d0
ISOPERa	[40-100 mm]	D-S3, d0
ISOAC3	[30-120 mm]	D-S3, d0
ISOAC5	[30-120 mm]	D-S3, d0

Density 35-40 kg/m³

Other tests performed

Airborn sound insulation

ISOPERn 40 - RW (C;Ctr) = 28 (-3;-4) dB

ISOAC5 80 - RW (C;Ctr) = 27 (-2;-5) dB

E - Integrity (fire tightness)

I - Insulation (thermal insulation to fire)

R - load bearing capacity

* For double sided metal faced panels and galvanized profiles types Z, C, U and Σ, CE label is applied.

CE

The company's activity is carried out according the Integrated Management System, Quality - Environment, Health and Operational Safety in accordance with European standards. The system is certified by SGS

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