PRELAQ®

Long strip roofing with Prelaq PLX for insulated roofs

LONG STRIP ROOFING ON THERMAL INSULATION
AND PROFILED SHEET STEEL

SSAB
SWEDISH STEEL

This handbook is the second of two parts. This part, part II, deals with folded long strip roofing with Prelaq PLX on supporting trapezoidal sheet steel and insulation, whereas part I deals with Prelaq PLX on a boarded roof.

The instructions in this handbook are basically generally valid. However, the design drawings are intended to show only typical solutions, and they should be modified from case to case and adapted to the prevailing conditions.

CONTENTS

Sheet steel as roofing material

There are many factors that favour the use of sheet steel as roofing material. Be it industrial, commercial or residential roofing, the reasons include appearance, fire resistance, ability to withstand mechanical loading, and useful life. Long strip roofing with Prelaq PLX can be used for all types of buildings, provided that the roof pitch is not less than 3.6°–6°, depending on conditions.

Unlike any other roofing material, long strip roofing offers scope for exciting roof designs and durable, attractive roofs.

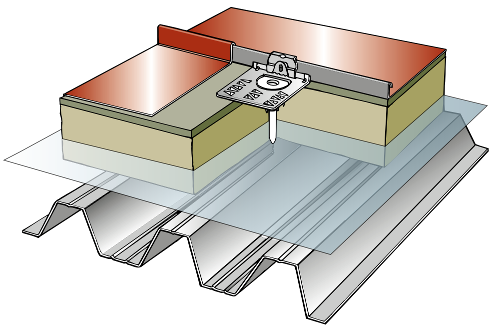
Long strip roofing is also suitable for re-roofing and can be combined with extra thermal insulation.

Insulated roofs with long strip roofing

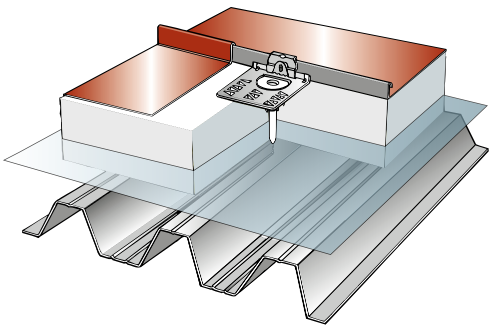
This publication also shows how insulated roof structures can be produced by long strip roofing on mineral wool insulation. Experience of this type of structure has been accumulated since the early 1970s and this roofing has proved to perform well. However, better knowledge is available today of the airtight barrier and the importance of plastic film for the performance of the roof from the vapour aspect. As an alternative, EPS (extruded polystyrene) can be used for thermal insulation.

This type of roof is suitable for commercial and industrial buildings and for sports premises.

Roofs produced in accordance with the descriptions below are attractive, energy saving, incombustible and have low maintenance costs.



Folded long-strip roofing with Prelaq PLX
Rigid, board-type mineral wool
Mineral wool of at least 80 kg/m³
Plastic film as air and vapour barrier
Lower mineral wool, 80 kg/m3
Load-bearing trapezoidal sheet steel
Clip with screw fixing



Folded long-strip roofing with Prelaq PLX
Cellular EPS plastic
Plastic film as air and vapour barrier
Cellular EPS plastic and 80 kg/m³ mineral wool
Load-bearing trapezoidal sheet steel
Clip with screw fixing

Roof pitches

The roof pitch should not normally be less than 1:10 (5.7°), but 1:16 (3.6°) may be acceptable in favourable cases. The latter are roofs with continuous strip lengths, i.e. no obstacles along the roof pitch length.
Upstands in conjunction with high points may be acceptable.

European standards

Long strip roofing with Prelaq PLX conforms to European Standards EN 505 "Roofing Products from Metal Sheet – Specification for fully supported roofing products of sheet steel" and EN 14783:2006 "Fully supported metal sheet and strip for roofing – Product specification and requirements".

Description of material for Prelaq PLX

STEEL MATERIAL

Prelaq PLX has a core of mild steel that is easy to work and is therefore suitable for craftsman working and machine folding.
Since the core is of mild steel, there is practically no springback, and this is of great importance in enabling tight folds to be produced. The yield strength of the material is around 180 N/mm².
The sheet thickness is 0.6 mm.
The normal distance between the strip seams is 600 mm, and the strip width is therefore 670 mm.

ZINC COATING

The steel material in Prelaq PLX has a hot-dip galvanized Z350 surface, i.e. the zinc coating is 350 g/m² on both sides.

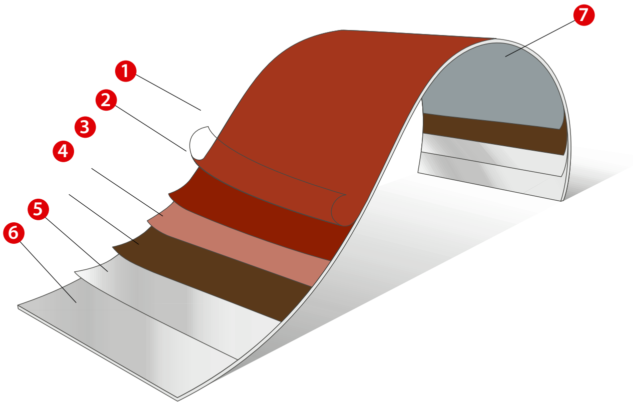
PREPAINTING

The paint coat is 50µm thick.
A thin, epoxy-type reverse side paint is used for the underside of the sheet. The colour of this paint is blue. The reverse side is marked with the name Prelaq PLX, and the production year and week.

WORKING TEMPERATURE

The lowest recommended working temperature on folding is -10°C. This value is for the sheet steel temperature. Since the coils of strip are stored outdoors at night, the sheet temperature in the cold season of the year may be lower than the ambient temperature when work is being done. It is advisable not to start the work early in the day when using difficult, manual working, and such work should be left until the sheet steel temperature has risen. Another possibility is to warm the material to be worked.

1. Possibly plastic film
2. Top coat of paint
3. Primer
4. Pretreatment
5. Z350 zinc coat
6. Mild steel sheet



Core material		
	Standard	**Data**
PLX (DX54D)	EN 10327	Mild steel grade, Rel approx. 180 N/mm²
Nominal thickness	EN 10143	0.6 mm
Zinc coat	EN 10143	Z350
Paint coat	**Test method**	**Data**
Paint thickness	ISO 2808	50µm
Gloss	EN 13523-2	7,40
Minimum bending radius	EN 13523-7	1T – 2T is suitable for folding
Adhesion	EN 13523-6	Satisfactory
Scratch resistance	EN 13523-12	35 N min
Maximum service temperature		100°C
Reaction to fire	EN 13501-1	Class A1
External fire performance	EN 14783:2006	$B_{ROOF(t1)}$, $B_{ROOF(t2)}$, $B_{ROOF(t3)}$, $B_{ROOF(t1)}$,
Change in length		0,000012 m/m °C
Utomhusegenskaper		
Resistance to corrosion	EN 10169-2	RC4 1)
Outdoor UV exposure	EN 10169-2	R_{uv3} 2)

1) Prelaq PLX conforms to the requirements for corrosivity class RC4, which means that the material can be used in basically any outdoor environment.

2) Prelaq PLX conforms to the requirements for UV resistance class R_{UV3}, which means the material can be used north of 45° N and between latitudes 37° N and 45° N at an altitude not exceeding 900 m above sea level.

Functional requirements on component materials

THERMAL INSULATION OF MINERAL WOOL OR EPS CELLULAR PLASTIC

Long strip roofing for this design should rest on an insulating layer of rigid mineral wool. Extruded polystyrene (EPS) cellular plastic of adequate strength can be used as an alternative to mineral wool insulation. EPS cellular plastic may attract higher insurance premiums for the building. A combination may be used in which the lower layer consists of mineral wool and the upper layer of EPS cellular plastic.

The insulation transmits snow loads and other downward forces onto the load-bearing trapezoidal profiled sheet steel. The long strip roofing is secured to the load-bearing profiled sheet steel. Other load-bearing support surfaces that provide good securing can be used, although these are not discussed in this publication.

Insulation as support for long strip roofing should have a density and rigidity that are adequate for machine folding. Airtightness of the roof is provided by a vapour barrier of polyethylene film placed on the lower panel that should be 50 – 70 mm thick.

Mineral wool

Thermal insulation of mineral wool is laid in three layers with different hardnesses. The lower two panels should have a density of at least 80 kg/m3, whereas the upper panel should be 20 mm thick and should be of board grade. The mineral wool may be compressed by a maximum of 10 mm at a load of 15 kPa.

EPS cellular plastic

Thermal insulation of EPS cellular plastic should be laid in at least two layers. EPS cellular plastic is a combustible material. This means that sectionalizing by means of incombustible material such as mineral wool should be used for large roof surfaces. Adjacent to fire ventilators, EPS cellular plastic must not be located closer than 600 mm from the inside of the ventilator.

PLASTIC FILM FOR AIR AND VAPOUR BARRIERS

The roof must always have a durable, type-approved plastic film that prevents humid air for penetrating up to the outer sheet steel. This is intended to prevent harmful condensation on the long strip roofing sheet. Careful joining of the plastic film should be done by placing a strip of unvulcanized butyl rubber in the overlapping joints of the film. If the film joints cross the profiling of the sheet steel, a board or sheet steel strip should be placed under the joint to enable the joint to be clamped. The film should be joined in a similar way to the sealing layer of the wall.

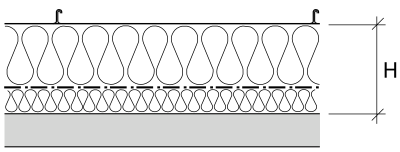
LOAD-BEARING TRAPEZOIDAL SHEET STEEL

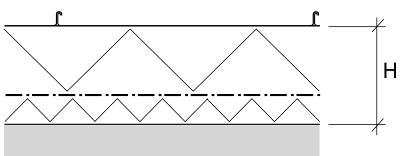
The load-bearing trapezoidal sheet steel must be designed to support the deadweight and snow load. The stiffness in bending should be specified so that bending does not exceed L/150 at the design load. The load-bearing sheet steel should be laid in the longitudinal direction of the building and is therefore oriented at right angles to the steel strip.

Values of U_p are given in the table below.

Insulation thickness, H mm	U_p w/ m² °C	Deadweight *) of mineral wool, kN/m²	Deadweight *) of EPS cellular plastic, kN/m²
150	0.25	0.19	0.08
180	0.21	0.22	0.09
220	0.17	0.24	0.10
250	0.16	0.26	0.11

*) The specified deadweight does not include the weight of the supporting sheet steel





WATER DRAINAGE

Water can be drained from the roof by means of external gutters or by internal gutters and sunken valleys. Two alternatives can be used for water drainage by means of internal gutter, i.e. either 2 mm thick anti-corrosion treated sheet steel or 1.0 - 1.5 mm stainless steel sheet. The gutter is made in sections. Every section of the gutter must be provided with an overflow. The overflow can also be made with a connection to the nearest drain. The gutter is heated from below by locally thin insulation, which prevents freezing.

SECURING CLIPS

The function of the clip is to secure the sheet against wind suction. Securing can be done by either sliding or fixed clips, where the sliding clip enables the sheet steel strip to move longitudinally in relation to the clip. The fixed clip has the opposite task, i.e. to lock the sheet steel strip at the selected point.

The clip is hooked onto the edge that forms the inner sheet in the finished seam. Clips should be made of galvanized or stainless steel sheet and have an ultimate pull-out strength of at least 1 kN. The clip should have the right height in relation to the seam design.
The steel strip is secured to the lower sheet through the insulation by the clip being secured through a plastic sleeve of a length suitable for the thickness of the insulation. The sleeve is secured to the lower sheet by means of self-drilling screws. The sleeve should be about 20 mm shorter than the thickness of the insulation, which produces a telescopic effect and allows the insulation material to be compressed.

Pull-out tests have shown that the securing is very well able to withstand the design wind loads, and the securing of the screw to the lower sheet will be the design parameter. Fixed clips are used in the fixed zone and sliding clips are used in the sliding zone. See the section on Securing the sheet steel in the direction of the roof pitch.
A securing system designed in accordance with this principle has been developed by the Bjarnes system AB in Södertälje, Sweden. The system consists of clips, plastic sleeves and self-drilling screws that are matched to one another. The system has been used for more than 10 years and has proved to perform well.

Fixed clip

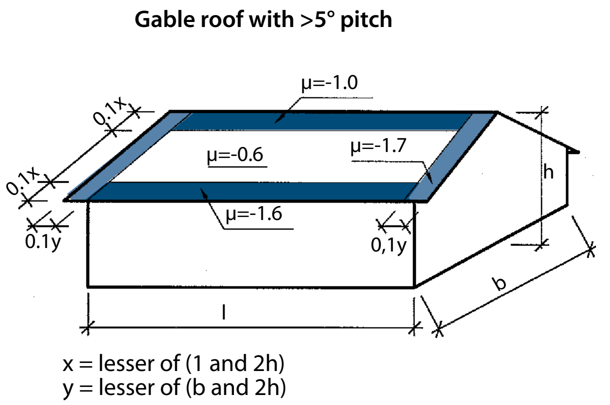
Sliding clip

Wind loading

The roof of a building is subjected to suction forces caused by the wind. In the boundary zones along the outer edges of the roof, the wind suction may be 2 – 3 times higher than that on the remainder of the roof.

The design wind load Qk for a particular building is determined on the basis of the height, design and geographical location of the building. The design load must be determined as specified in national regulations.

The figures below give the form factors for gable roofs and pitched roofs according to Swedish regulations. National regulations in other countries may specify other values.



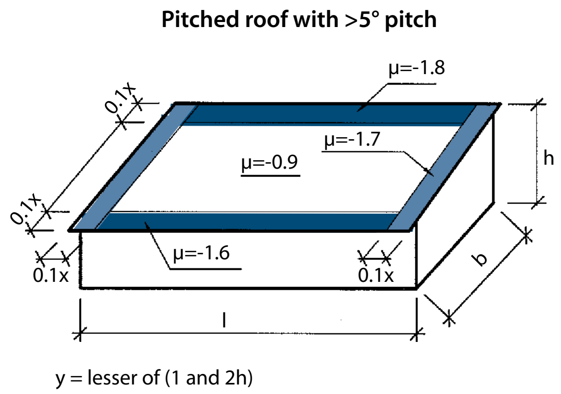


Figure 1. Form factors for wind load

The design suction load in each roof zone can be calculated from:

$$Qd = \mu\ 1.5\ Q_k\ (kN/m^2)$$

where Q_k is the characteristic velocity pressure in accordance with national regulations μ is the form factor is accordance with the figure below or the "Snow and wind load".
1.5 is the partial coefficient for variable load.

Clip spacing

If the load-bearing surface consists of profiled sheet steel, the load-bearing sheet steel is normally oriented across the longitudinal direction of the roofing strip. The spacing of the clips is normally adjusted to the distance between the tops of the profiled sheet and is a multiple of this distance. The clip spacing is normally set at a maximum of 600 mm, but may sometimes have to be reduced in the boundary zones in locations exposed to the wind. If the wind loads are very high, it may be justified to have narrower strip in the gable boundary zones.
The project design documents should contain information on the clip spacing on the various surfaces of the roof.
It is always economically and technically justified to adjust the clip spacing to the relevant wind loads, fasteners and support surface.

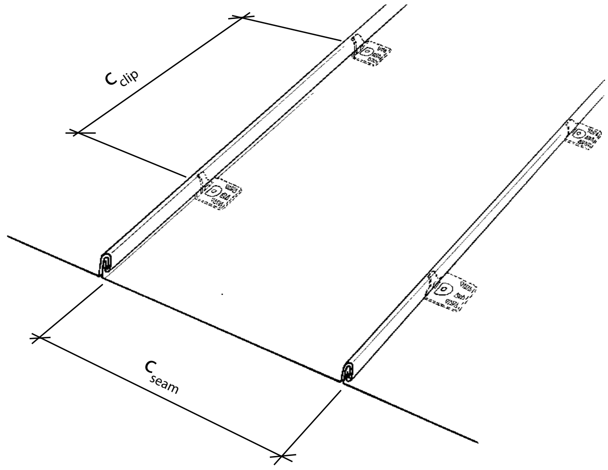


Figure 2.

On the basis of the design suction load, the pull-out force F_t on the clip mounting is calculated from:

$$F_t = q_d \; c_{clip} \; c_{seam} \text{ (kN)}$$

where c_{clip} is the clip spacing along the seam (see Figure 2)

c_{seam} is the spacing between seams (see Figure 2)

DESIGN CONDITIONS

The pull-out force F_t should be lower than or equal to the design pull-out value R_d for the clip mounting ($F_t < R_d$).

Table 3 shows the maximum clip spacing when secured to profiled sheet steel with a thickness of 0.65 mm. If the sheet is thicker than 0.65 mm, the clip spacing can be increased in proportion to the increasing pull-out load in Table 2, although to no more than 600 mm.

The table below shows the pull-out values R_d for 4.8 mm dia. screws in profiled sheet steel.

Table 2. Design pull-out load R_d for 4.8 mm screw

Sheet thickness mm	Design value of pull-out load R_d kN
0.65	0.51
0.70	0.58
0.80	0.70
0.90	0.84
1.00	0.98

The lower yield strength of the profiled sheet has been assumed to be 350 N/mm².

Table 3. Maximum clip spacing C_{clip} for gable roof and pitched roof

Wind load q_k kN/m²	Max. clip spacing C_{clip}, mm		
	Inner surface	Boundary zone	Corner [1] $\mu = -2.6$
0.4	600	600	600
0.5	600	600	500
0.6	600	600	420
0.7	600	520	360
0.8	600	450	310
0.9	600	400	280
1.0	600	360	250
1.1	600	330	230
1.2	600	300	210

[1] Applies to roof corners only if the roof pitch is <5° over a distance of 0.25x times 0.25y (0.25x) in the corners as shown in Figure 1.

Thermal movements

For long strip roofing, it is important to take into account the movements of the strip occurring as a result of temperature changes. The sheet steel may sustain damage if insufficient expansion allowance is provided at verges or eaves, roof upstands or at walls.
All materials expand and contract when the temperature changes. The change in length of aluminium sheet and zinc sheet is about twice that of sheet steel. The sheet length increases in the summer and decreases in the winter. The temperature of the roof material in the summer may be up to 80°C, whereas in the winter it may conceivably be as low as -35°C. The length of the roof covering also changes, and the calculations below are therefore done to be on the safe side.
The temperature of the sheet steel at the time of installation determines how the length will change in the summer and winter from the original length. The table below gives particulars of the change in length per metre of length of the sheet that can be expected for different installation temperatures.
In the table, L is the distance in metres from the fixed point to the end of the sheet.

Table 4. Change in length for different installation temperatures.

Temperature on installation	Thermal movement, mm	
°C	Summer (+75° C)	Winter (–35° C)
–10°	+1.0 · L	– 0.3 · L
0°	+0.9 · L	– 0.4 · L
+10°	+0.8 · L	– 0.5 · L
+20°	+0.7 · L	– 0.7 · L
+30°	+0.5 · L	– 0.8 · L

Example:
Temperature during installation: 10°C
Distance L from fixed point to eaves: 15 metres

Change in length at eaves:
Expansion in the summer: +0.9 · 15 = approx. +14 mm
Contraction in the winter: -0.5 · 15 = approx. -7 mm

It is important to allow for thermal movements so that the sheet or its securing devices will not be damaged. Longer strips should be secured by means of both fixed and sliding clips. Space for expansion and contraction must be allowed at the joints and connections.

Securing the sheet steel in the direction of the roof pitch

On a pitched roof, the snow load and the deadweight of the sheet give rise to a load component in the direction of the roof pitch, which must be taken into account so that the position of the sheet steel and insulation will not change.
Sliding of the sheet steel strip is prevented by friction between the materials and by the special fixed clips that are fitted and produce a fixed zone.

Roof pitch ≤15 metres and roof pitch <7°
A fixed zone should be located in the middle of the roof pitch. Five fixed clips should be provided there at every fold within a distance of 3 metres (see Figure 3).

Roof pitch length >15 metres or roof pitch >7°
If the roof pitch is greater than 10°, the fixed zone should be located as shown in the figure below. The calculation should be made to determine the number of fixed clips. More than the minimum number of 5 may possibly be required.

Strip lengths
The permissible strip lengths are determined by the thermal movements and the scope available for taking them up.
A roof with long strip roofing on insulation and profiled sheet steel should not consist of continuous strip lengths of more than 30 metres at a maximum pitch of around 7°.

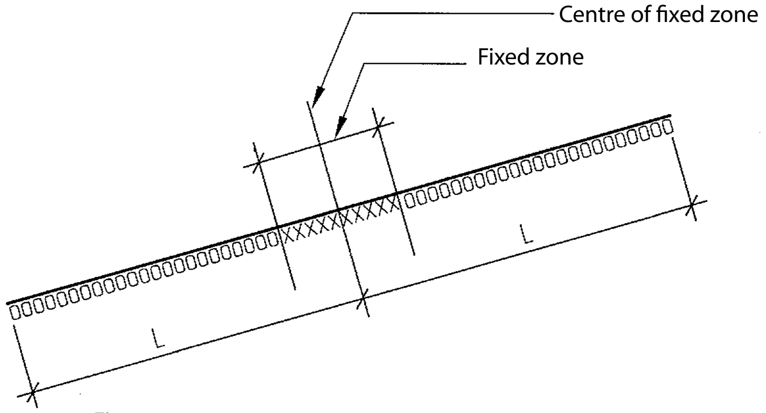
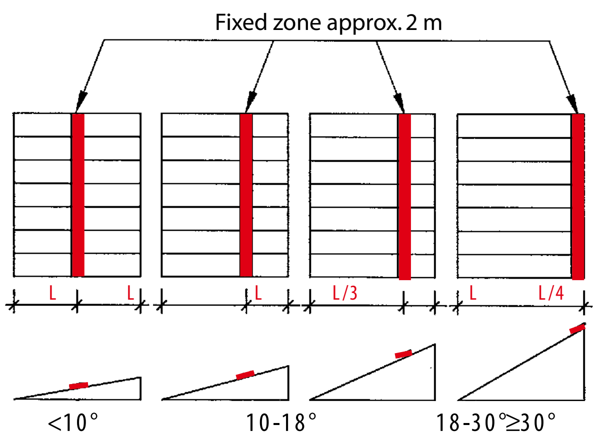


Figure 3



The shear force S for which the mountings should be designed can be calculated from:

$$S = 0.6\,L\,q\,\sin\alpha\,\cos\alpha\ \text{(kN)}$$

where L = length of roof pitch, metres
q = snow load and deadweight of the sheet (kN/m²)
α = roof pitch

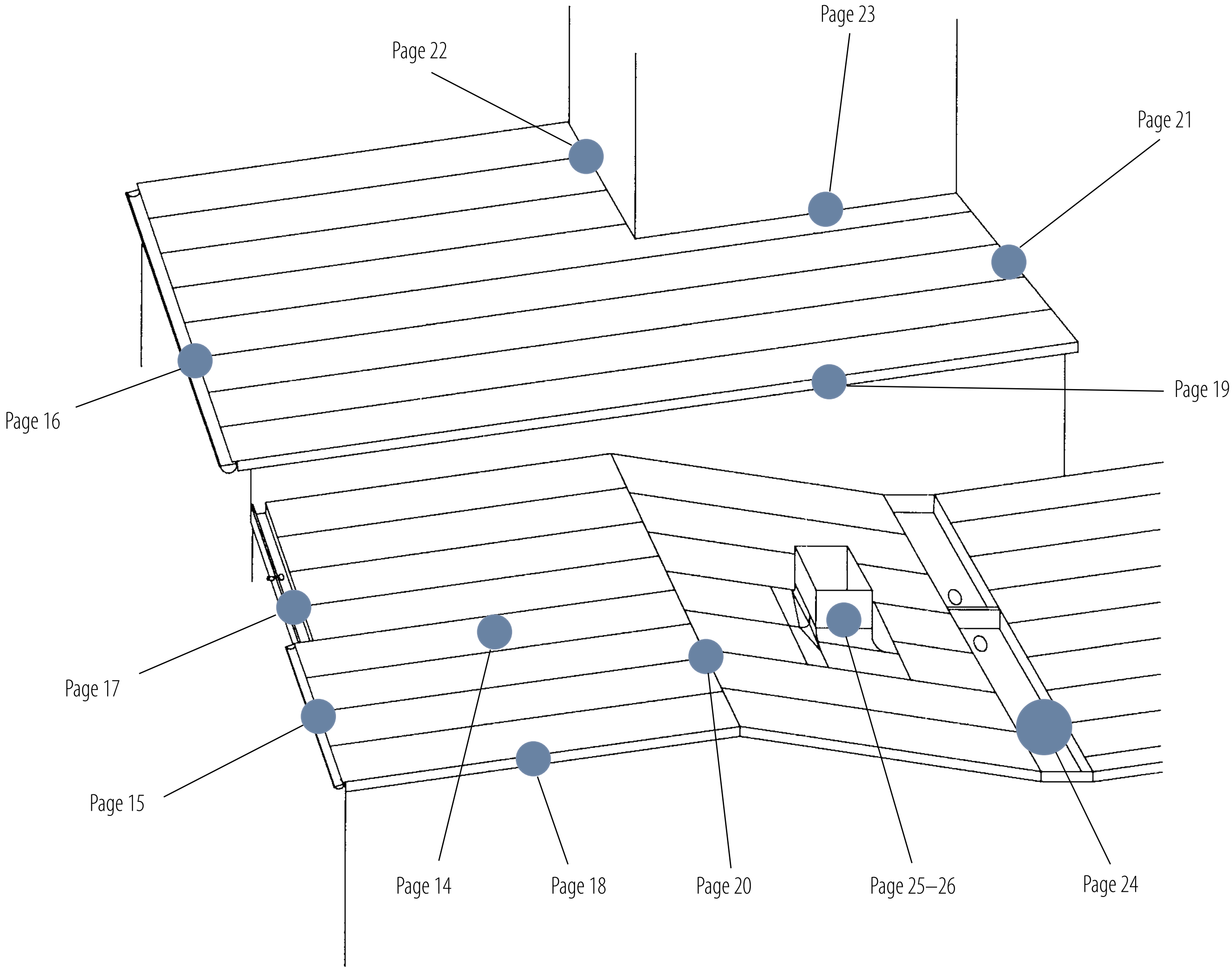
Tests have shown that a fixed clip is subjected to a retaining force of 0.6 kN. The number of necessary fixed clips per seam will then be:

$$n = S / 0.6\ \text{(number of clips)}$$

Long strip roofing on insulation and profiled sheet steel – detailed design

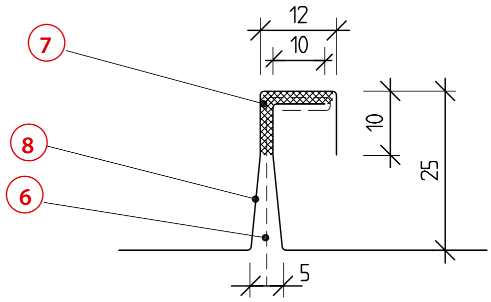
The numbering of the components on the following typical drawings is in the order that they are normally installed.

The notes on the general arrangement below refer to the relevant pages in the handbook.

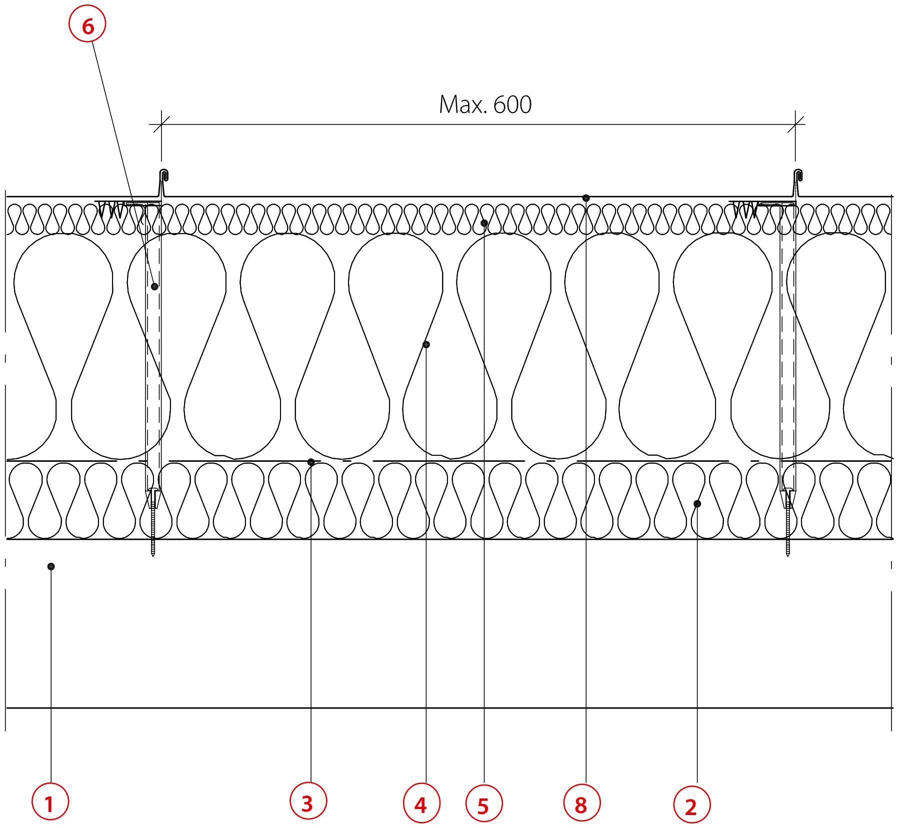


Cross-section

Seam sealant must be applied to all surfaces of the sheet steel that are in contact with one another. Remove any excess seam sealant on the outside of the sheet steel surface. The seam sealant must give the seam the necessary water tightness, must have good durability and must be formulated so that it does not attack the paint coat.



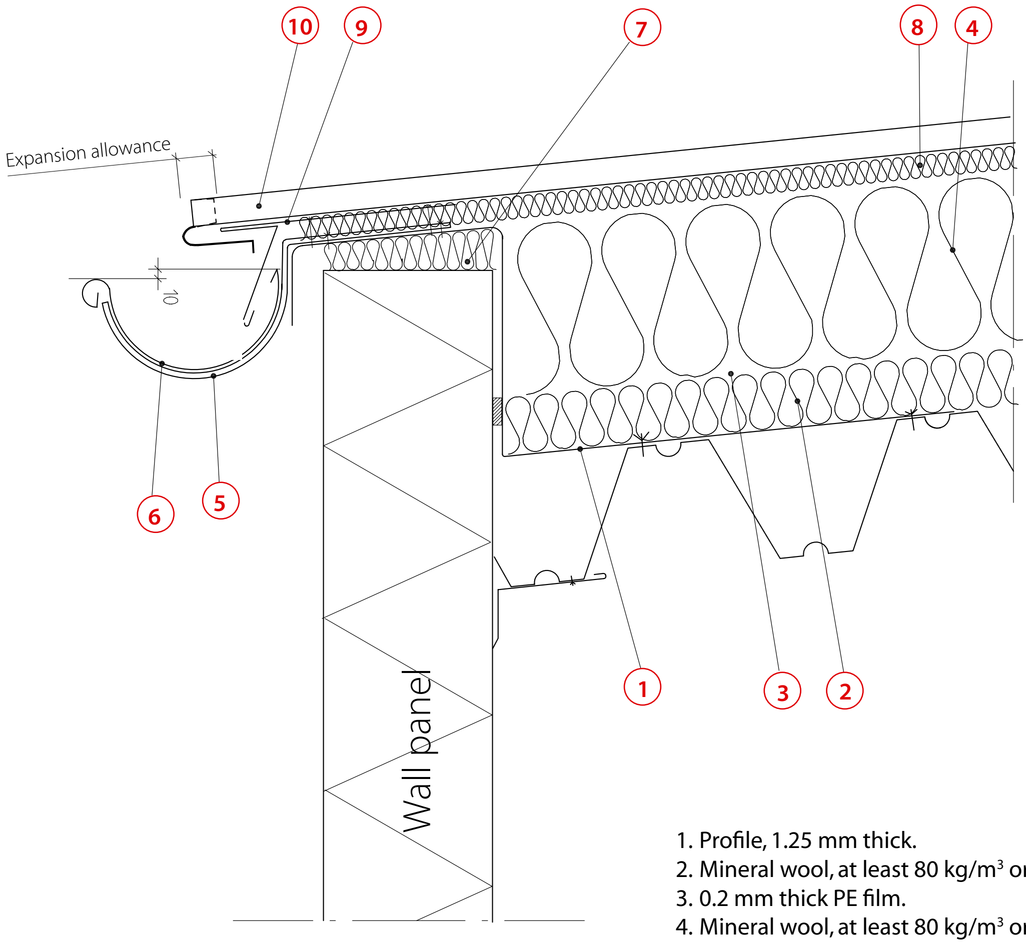
Before final folding



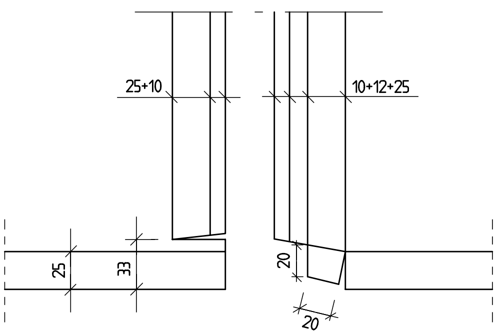
1. Profiled sheet steel, at least 0.65 mm thick
2. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
3. 0.2 mm PE film
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
6. Plastic sleeve with screw and clip.
7. Seam sealant.
8. Prelaq PLX, 0.6 mm thick.

Eaves
– external gutter

In long strip roofing, the strips should be connected to sliding joints and eaves by means of a single eaves fold. The expansion allowance should be sufficient to ensure that the roofing strip will overlap the roof projection even at maximum expansion of the strip, and it must not be so small that the strip will be damaged when it contracts. See the section entitled Temperature movements and strip lengths. The roof projection should not be bent down so that the freedom of movement is restricted.



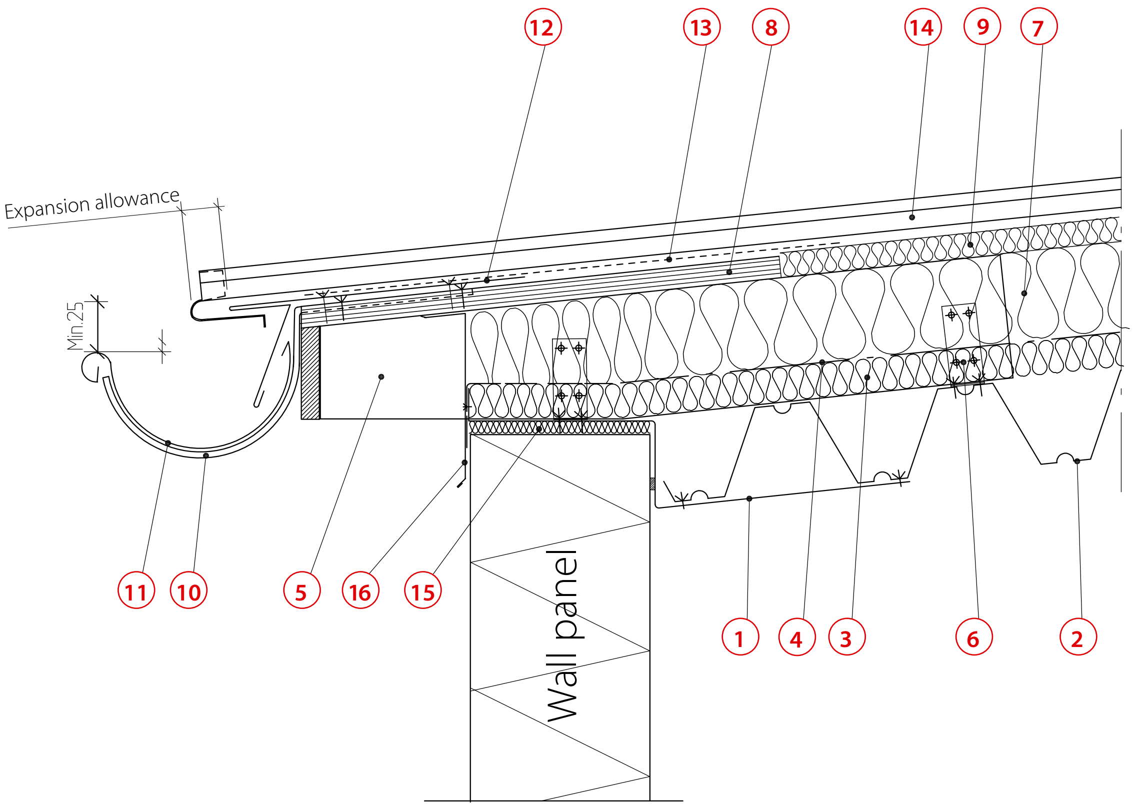
1. Profile, 1.25 mm thick.
2. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
3. 0.2 mm thick PE film.
4. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
5. Gutter brackets at 600 mm centres
6. Gutter made of Prelaq Nova DS
7. Loose mineral wool or PU foam
8. Mineral wool, at least 200 kg/m^3 (not if EPS cellular plastic is used)
9. Eaves sheet made of Prelaq Nova, 0.6 mm thick
10. Prelaq PLX, 0.6 mm thick



Seam termination can be done in different ways. The most common design without bent-down roof projection is shown here.

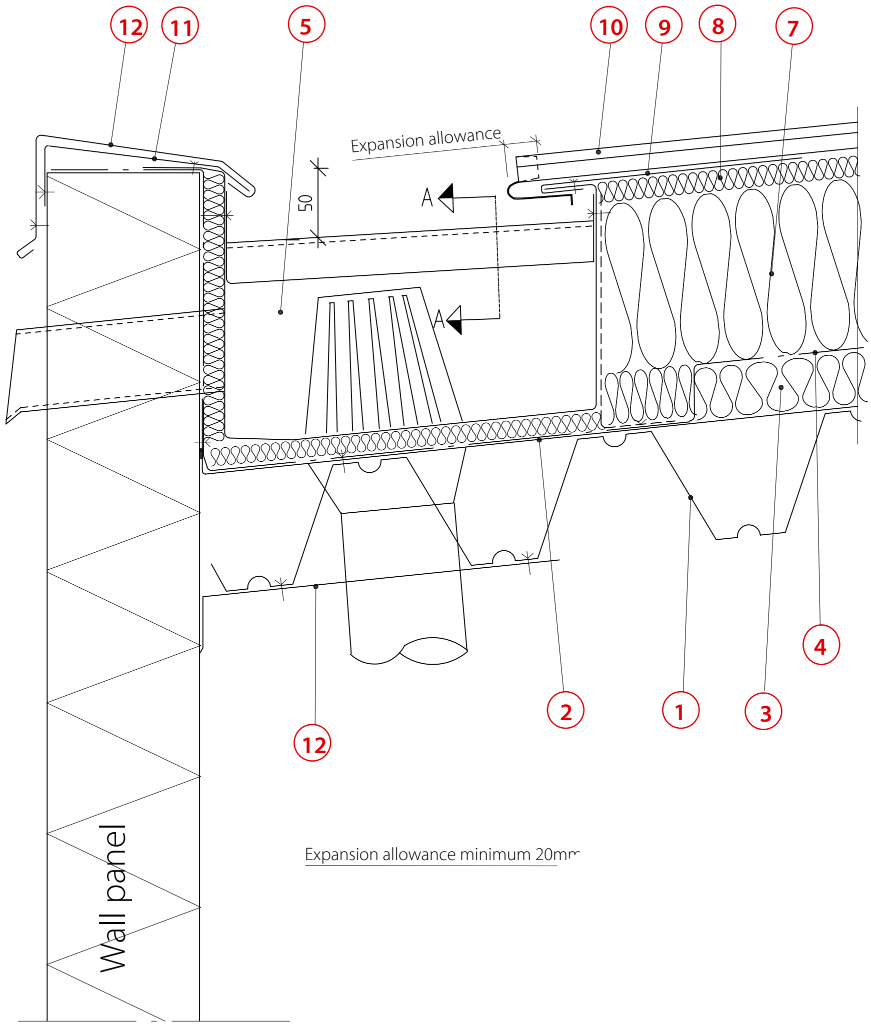
Eaves with roof projection

In long strip roofing, the strip should be connected to the sliding joint and roof projection by means of a single eaves fold. The expansion allowance should be sufficient to ensure that the roofing strip will overlap the eaves even at maximum expansion of the strip, and must not be so small that the strip may be damaged when it contracts. See the section entitled Temperature movements and strip lengths. The roof projection should not be bent down so that the freedom of movement is restricted.

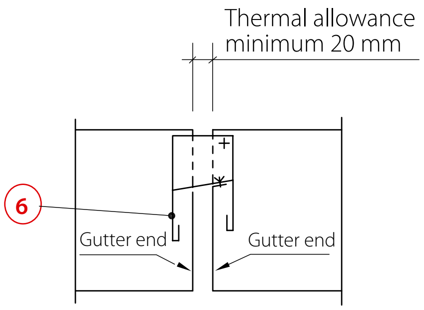


1. Hot-dip galvanized profile, 1.25 mm thick from support to support
2. Profiled sheet steel.
3. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
4. 0.2 mm thick PE film
5. Timber stud, 45 mm x h, 600 mm between centres.
6. Securing brackets, 1 + 1
7. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
8. 19 mm thick plywood. Relieved at gutter brackets
9. Mineral wool, 200 kg/m³ (not if EPS cellular plastic is used)
10. Gutter brackets at 600 mm centres
11. Prelaq Nova gutter
12. Prelaq Nova eaves sheet, 0.6 mm thick
13. Layer of roofing felt
14. Prelaq PLX, 0.6 mm thick.
15. Loose mineral wool
16. Facing

Eaves – internal gutter

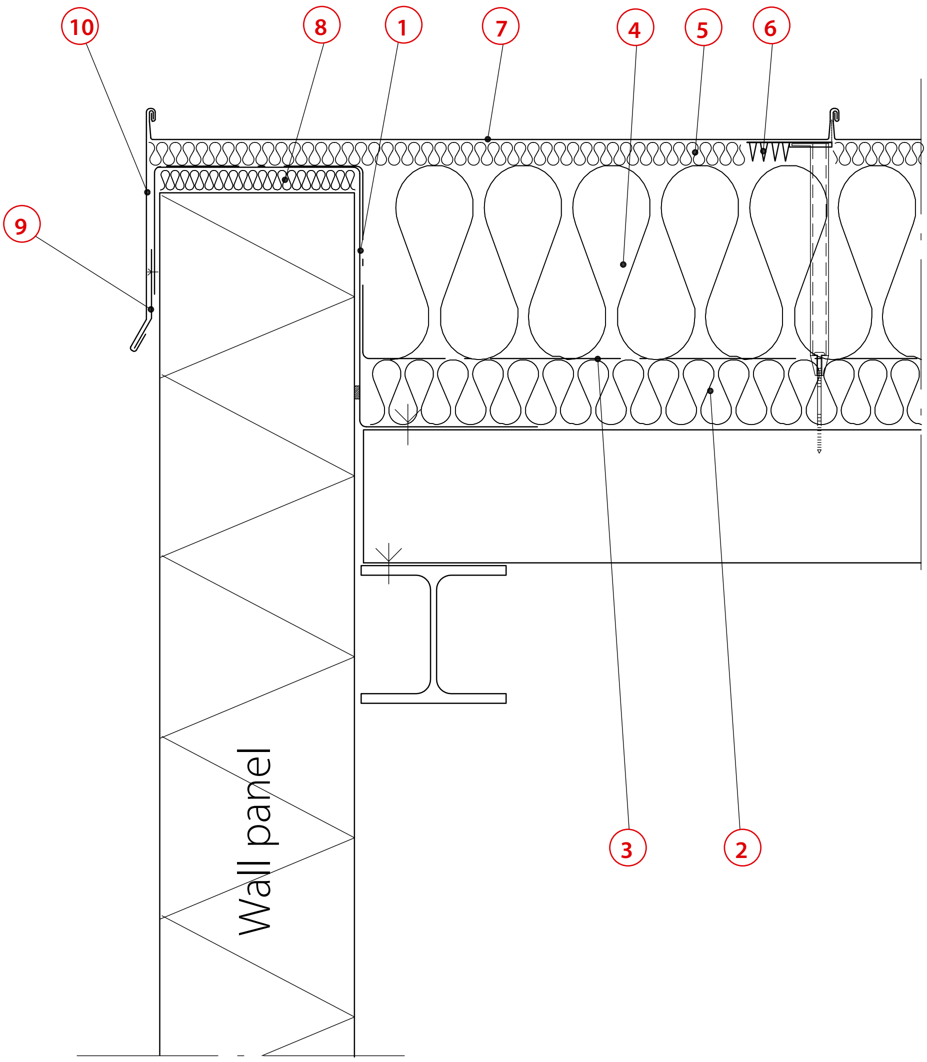


Section A - A



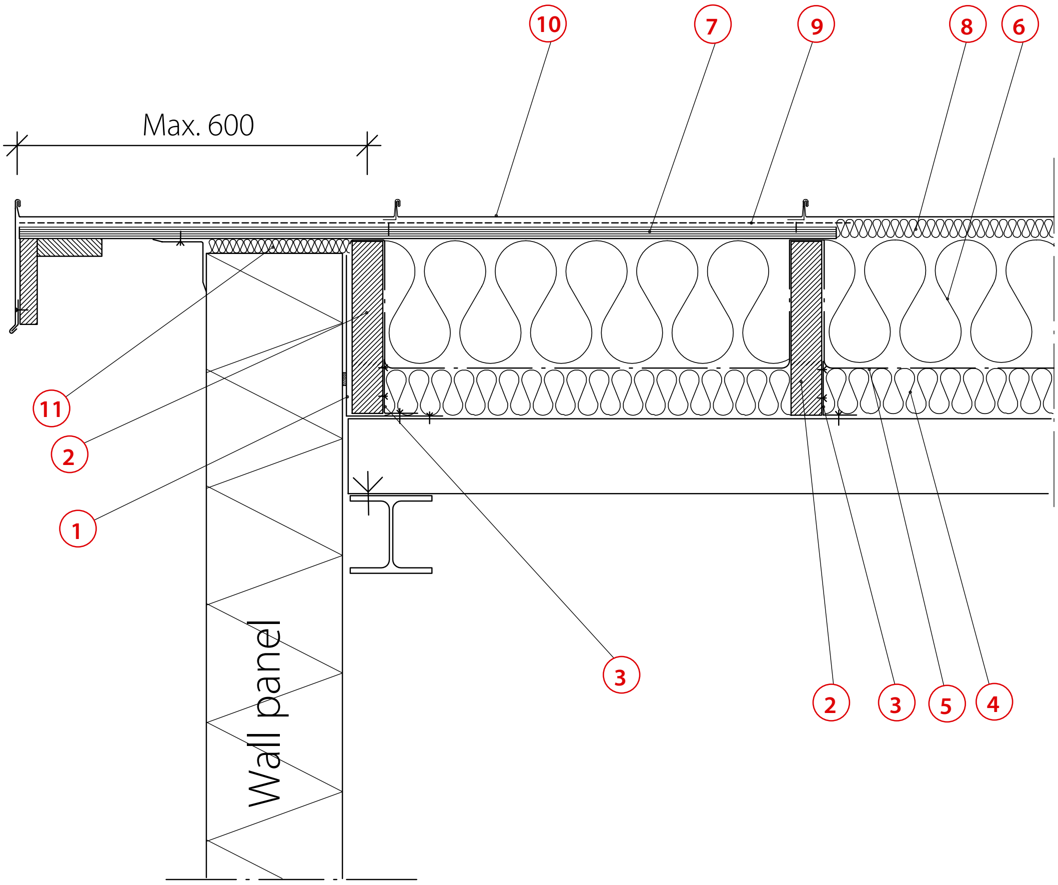
1. Profiled sheet steel.
2. Hot-dip galvanized sheet, 1.00 mm thick
3. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
4. 0.2 mm thick PE film
5. Stainless steel gutter, 1.0 – 1.5 mm thick.
6. Cover sheet over gutter joint
7. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
8. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
9. Eaves strip, galvanized, 1.0 mm thick
10. Prelaq PLX, 0.6 mm thick
11. Profile, 1.25 mm thick
12. Cover strip, Prelaq Nova 0.6 mm thick

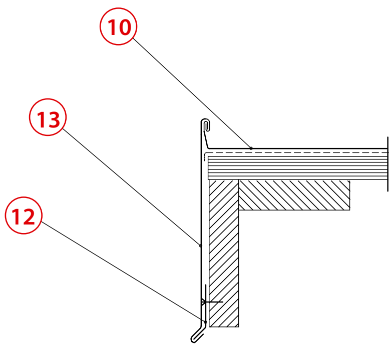
Gable



1. Hot-dip galvanized profile, 2.0 mm thick
2. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
3. 0.2 mm thick PE film
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
6. Clip with sleeve
7. Prelaq PLX, 0.6 mm thick
8. Mineral wool or PU foam.
9. Galvanized cover strip, 1.0 mm thick
10. Prelaq Nova cover strip, 0.6 mm thick

Gable with roof projection





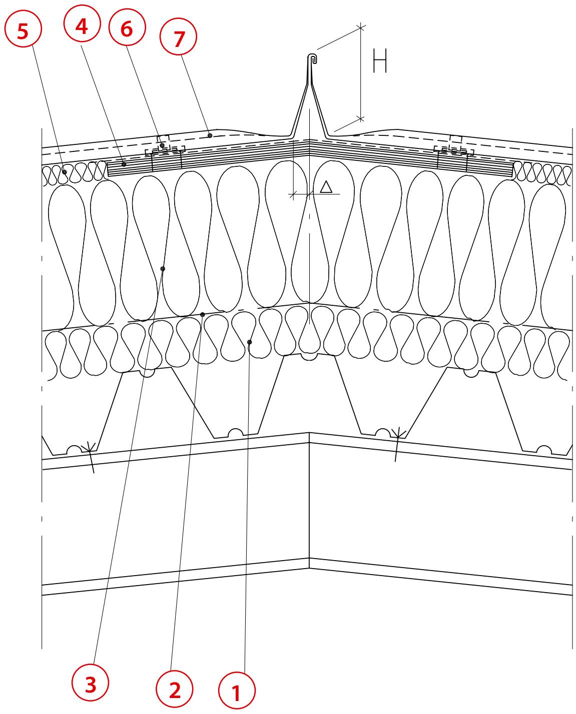
1. Hot-dip galvanized profile, 1.5 mm thick.
2. Timber joist, 45 mm x h
3. Securing brackets at max. 500 mm centres
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. 0.2 mm thick PE film.
6. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
7. Outdoor grade plywood, 19 mm thick
8. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
9. Layer of roofing felt
10. Prelaq PLX, 0.6 mm thick
11. Loose mineral wool or PU foam
12. Continuous securing strip.
13. Prelaq Nova cover strip, 0.6 mm thick

Ridge – alternative 1

1. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
2. 0.2 mm thick PE film
3. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
4. Plywood
5. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
6. Clip mounting, sliding
7. Prelaq PLX, 0.6 mm thick

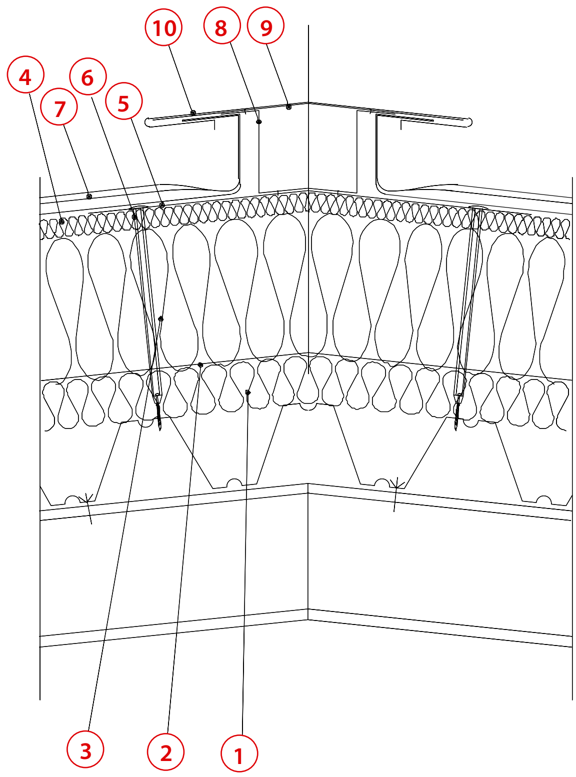
Auxiliary table for height H

Expansion allowance Δ	Height H mm
5	89
8	113
11	132
14	150

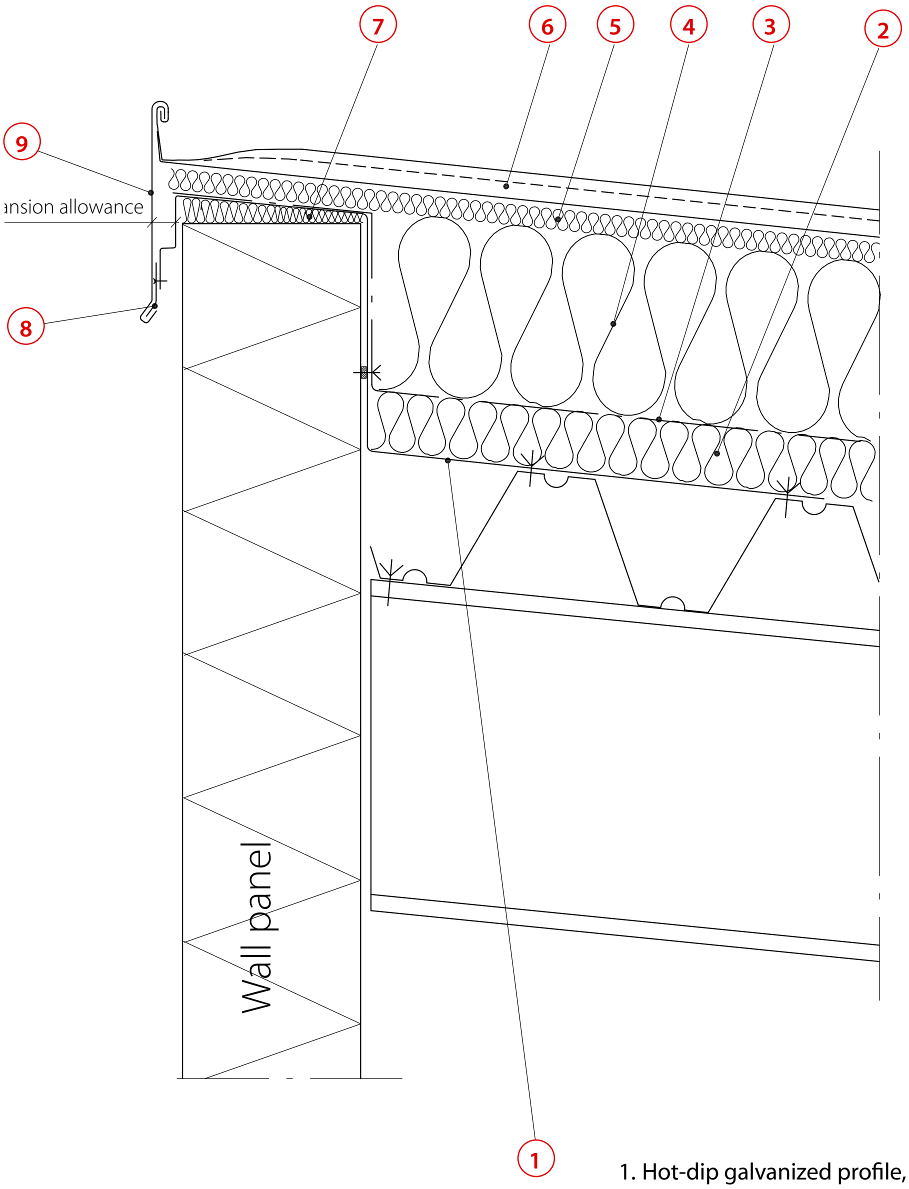


Ridge – alternative 2

1. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
2. 0.2 mm thick PE film
3. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
4. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
5. Hot-dip galvanized sheet, 2.0 mm thick
6. Clip mounting
7. Prelaq PLX, 0.6 mm thick
8. Hot-dip galvanized sheet steel, 1.0 mm thick
9. Hot-dip galvanized sheet steel, 1.0 mm thick
10. Prelaq Nova ridge cover strip



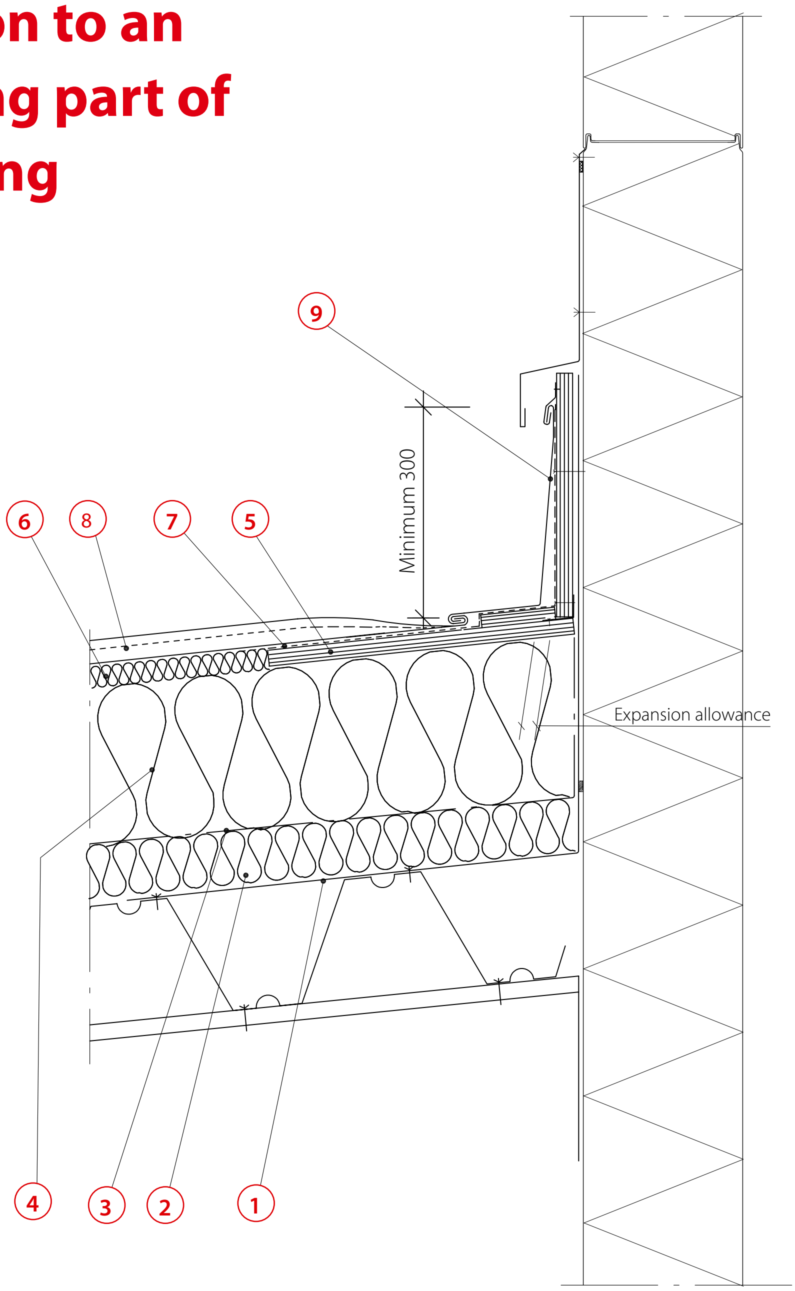
High point of frontage



1. Hot-dip galvanized profile, 2.0 mm thick
2. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
3. 0.2 mm thick PE film
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
6. Prelaq PLX, 0.6 mm thick
7. Loose mineral wool or PU foam
8. Hot-dip galvanized securing strip
9. Prelaq Nova barge board, 0.6 mm thick

Connection to an upstanding part of the building

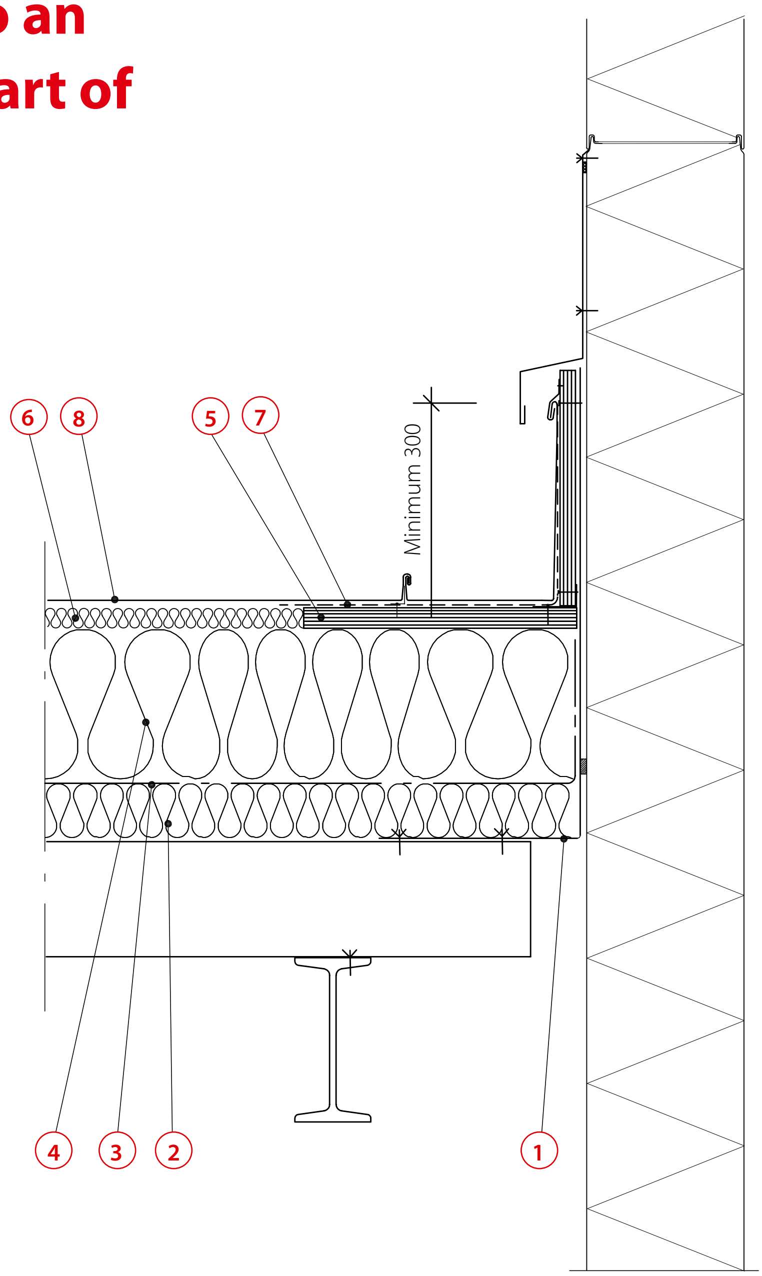
HIGH POINT OF CONNECTION



1. Hot-dip galvanized profile, 2.0 mm thick
2. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
3. 0.2 mm thick PE film
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
6. Prelaq PLX, 0.6 mm thick
7. Loose mineral wool or PU foam
8. Hot-dip galvanized securing strip
9. Prelaq Nova barge board, 0.6 mm thick

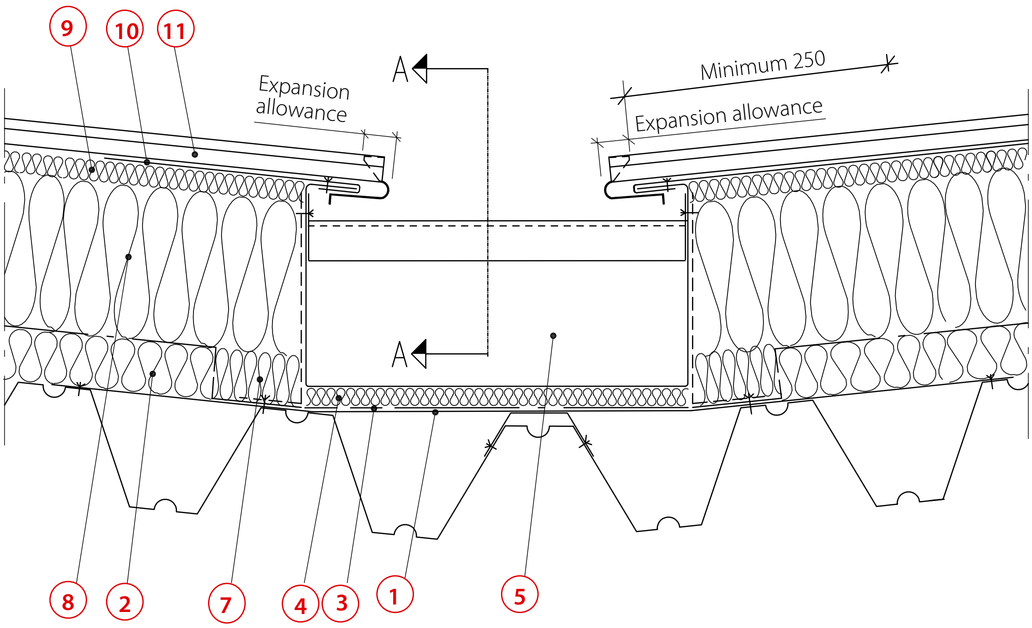
Connection to an upstanding part of the building

SIDE OF CONNECTION



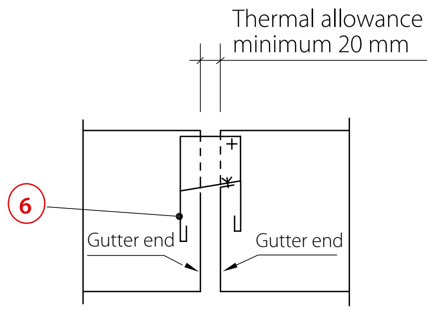
1. Hot-dip galvanized sheet steel, 1.5 mm thick
2. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
3. 0.2 mm thick PE film.
4. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
5. Plywood, 19 mm thick
6. Mineral wool, at least 200 kg/m^3 (not if EPS cellular plastic is used)
7. Layer of roofing felt
8. Prelaq PLX, 0.6 mm thick

Sunken valley

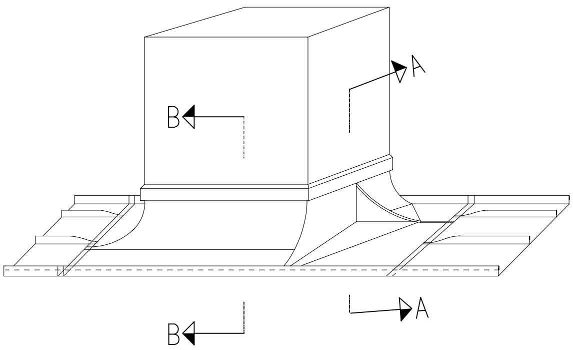


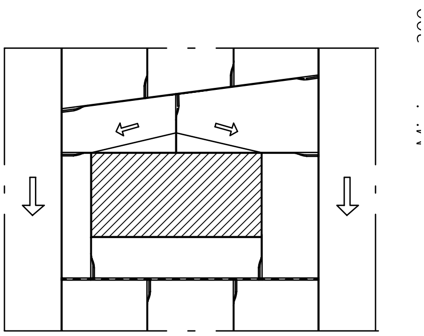
1. Hot-dip galvanized sheet steel, 1.0 mm thick.
2. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
3. 0.2 mm thick PE film.
4. Mineral wool, at least 200 kg/m^3
5. Stainless steel valley, 1.0 – 1.5 mm thick
6. Closing strip over valley joint
7. Loose mineral wool
8. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic
9. Mineral wool, at least 200 kg/m^3 (not if EPS cellular plastic is used)
10. Hot-dip galvanized cover strip, 0.6 mm thick
11. Prelaq PLX, 0.6 mm thick

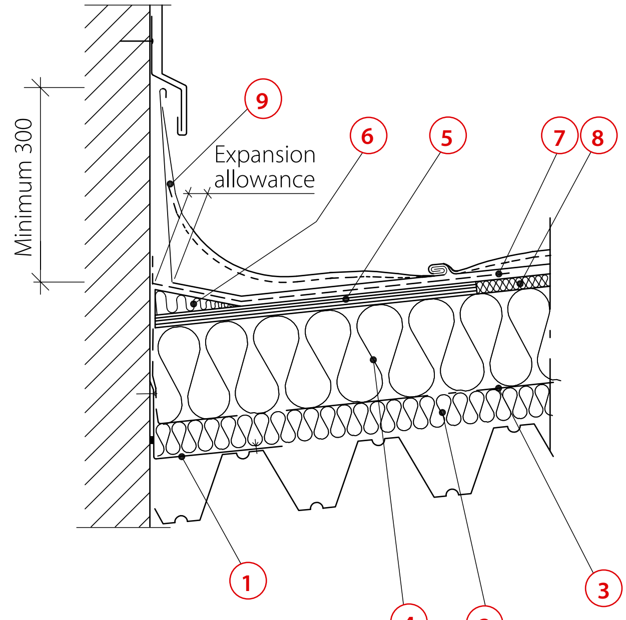
Section A–A



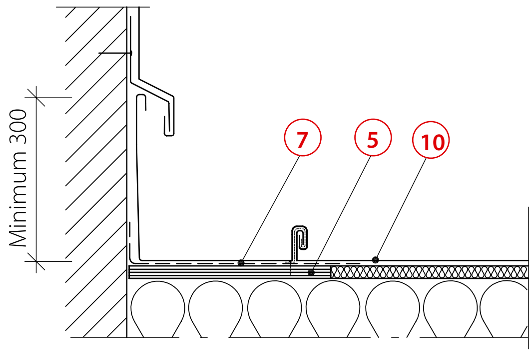
Flashing at roof upstand







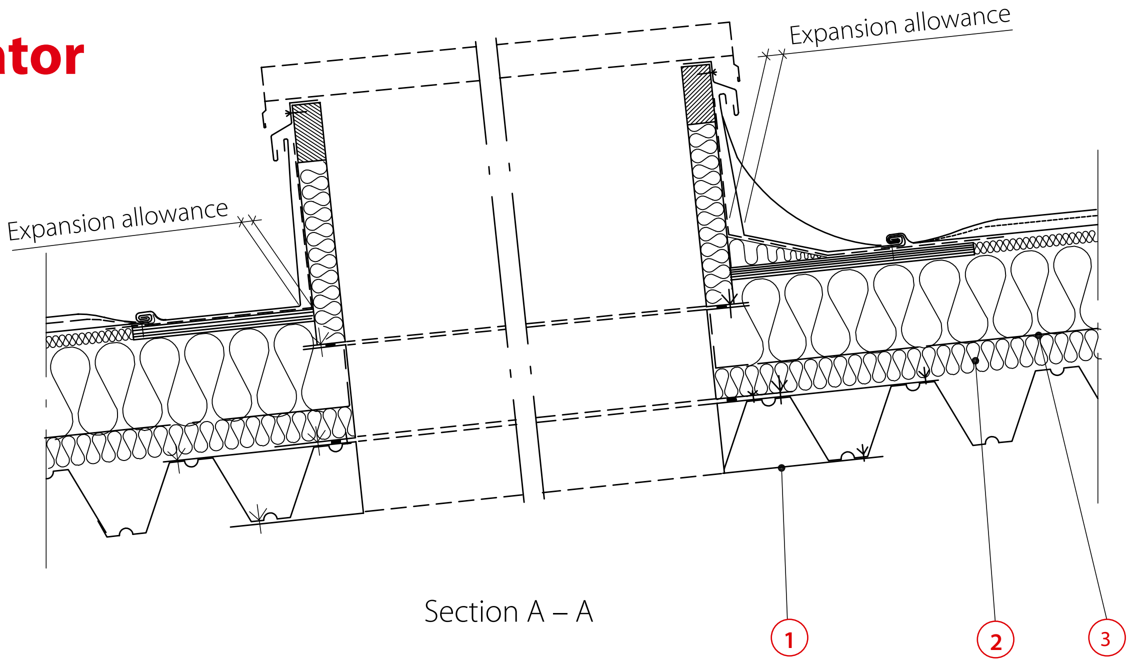
Section A – A



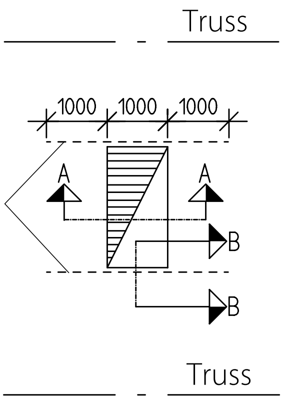
Section B – B

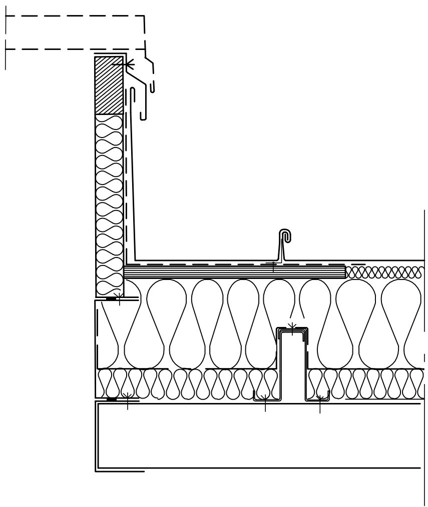
1. Hot-dip galvanized sheet steel, 1.0 mm thick
2. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
3. 0.2 mm thick PE film
4. Mineral wool, at least 80 kg/m³ or EPS cellular plastic
5. Outdoor grade plywood, 19 mm thick
6. Wedge of rigid mineral wool or wood.
7. Layer of roofing felt
8. Mineral wool, at least 200 kg/m³ (not if EPS cellular plastic is used)
9. Fillet of Prelaq PLX
10. Prelaq PLX, 0.6 mm thick

Fire ventilator



Section A – A





Section B – B

1. Hot-dip galvanized cover strip, 0.6 mm thick
2. Mineral wool, at least 80 kg/m^3 or EPS cellular plastic (no closer than 600 mm to inside of ventilator)
3. 0.2 mm thick PE film

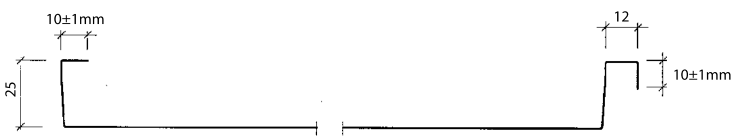
For other particulars, see the previous page.

Work procedure

PRE-FOLDING

In long strip roofing, the sheet steel strip is worked in two stages, i.e. pre-folding which is carried out in a stationary pre-folding machine, and seam folding carried out on the roof by means of a special folding machine. It is important that the machines used are correctly preset, and that they are correctly serviced and maintained. It is important that the feed tables and settings of the pre-folding machine are checked and that the forming rollers are kept clean, so that the paint coat on the fold will not be damaged. Carefully check the dimensions of the fold before the subsequent seam folding on the roof.

In order to achieve a good seam, it is important to check the dimensions for which tolerances are specified after pre-folding as described below.



Sheet after prefolding

If any of these dimensions are incorrect, the risk is that, in the worst case, a single fold will be obtained instead of a double fold. The strip width tolerance of Prelaq PLX for long strip roofing is 0/+2 mm.

SEAM FOLDING

When the strips are laid, they should be locked so that they do not move out of position when the seam folding machine is run. If the roofing is laid on a hard surface, such as a boarded roof, the strips can be locked at intervals of 1 metre, for instance. On a softer surface, such as insulation, the locking arrangements should be more closely spaced. This locking is often carried out by means of folding tongs, although simple tools are available for this operation, so that the work can be done with the operator standing.

Before the seam folding machine is placed in position, the first fold should first be clamped with folding tongs, for example, along a distance of about 300 mm. Then re-fold to a double seam along about 200 mm before placing the machine in position. Make sure that the lever that moves the rollers onto the seam moves down freely. This will ensure a much longer useful life of the rollers. Follow the machine along the seam to make sure that re-folding is correctly done. This is particularly important if the long strip roofing is done on insulation.

Many operators prefer to run the seam folding machine from the top downwards. However, remember to turn the fold to suit the direction of flow of rainwater.

The procedure sometimes adopted is that several strips are laid and they are only locked in position for producing the seams with the seam folding machine at a later date. In such cases, the seams should not be made on successive strips from one side to the other since, by working on the entire seam, the seam folding machine may exert a transverse pull on the strips, which may result in sloping seams. Such stretching can be avoided by skipping a number of folds when making the seams and then going back to complete the seam folding.

FITTING OF AIR BARRIER AND INSULATION

The quality recommended in insulated long strip roofing is limited ability to allow people to walk on the roof. This means that repeated walking on the roof makes the mineral wool soft and impairs its ability to withstand the external snow load. This can be avoided by fitting the insulating panels in pace with the sheet steel strips. The sheet steel strip and insulation must not be fitted if the insulating material is damp or if there is water in the bottom of the trapezoidal profiles.

It is vitally important that the plastic film should be tight and joined in accordance with the instructions on page 7. The film must not be damaged, e.g. by holes being made due to careless fitting of clips or in some other way.

FITTING

The locations of the clips should be determined by finding out the positions of the profile tops of the supporting sheet steel by measuring or chalk lining. Secure the clips by driving the plastic sleeve down with a hammer. Drive the self-drilling screws by means of a power screwdriver with extended spindle.

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