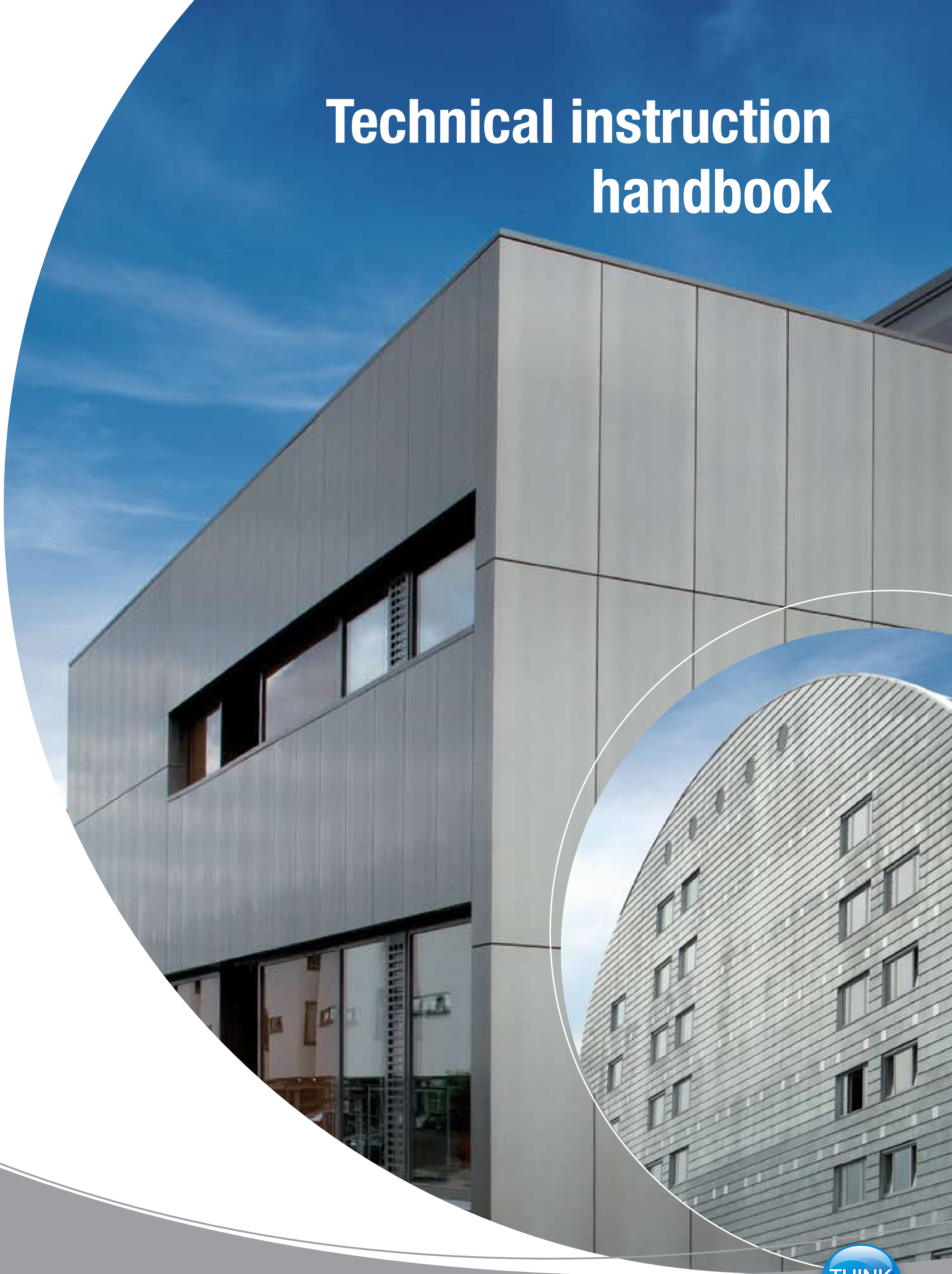
Technical instruction handbook



NedZink

THINK ZINK

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Chapter 1 - NedZink

BUILD ON NEDZINK

Since 1995, NedZink has been part of the leading international holding company Koramic Investment Group. Production takes place in Budel-Dorplein in the Netherlands. There are sales offices in the Netherlands, Belgium and Germany.

As the first producer of rolled construction zinc with quality assurance under NEN-EN-ISO 9001:2000, NedZink is a stimulator of durable and technically high quality zinc applications. As a trading partner, NedZink is an inspirer with its reliable provision of knowledge, quality and service. As the market leader in the Netherlands, NedZink is a promotor of creative possibilities in zinc.

The strength of NedZink lies in the A-quality and durability of the zinc produced and in the long-standing tradition of deliberate entrepeneurship, while accepting responsibility for people and the environment. Future-oriented business management and investments in up to date production techniques further strengthen the market position and create room for new developments.

LOOK FOR NEW OPENINGS

Innovation remains fascinating and inspiring

Besides thinking and acting on quality, NedZink constantly concentrates on the future. It seeks new openings in the application of construction zinc. Innovation is the guiding motive. As a material zinc has a centuries-old tradition.
By constantly applying the existing product in new forms, it remains as fascinating and inspiring as a new discovery. A striking example of such a new opening in the market is NedZink NOVA, the prepatinated Titanium Zinc from NedZink. Made for modern, aesthetic building pratice.

Investing efficient, modern techniques

Being in tune and changing with construction practices would not be possible for NedZink without structural investments in efficient, modern techniques. Each of NedZink products can make use of this expertise as support in practice. All technical documentation is also always available online.

The development of new processes

Product innovation also means finding new openings in production processes. This is the search for unprecedented technologies for the creation of new, mechanical and physical properties. To keep these developments in tune with NedZink certified quality standard, the necessary innovations in process management are also needed each time.

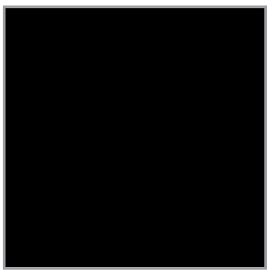
Chapter 2 - Products

NedZink has already been producing high quality zinc products for applications in the construction sector for more than a hundred years. Semi-finished products of titanium zinc and the associated construction elements are sold under the brand names NedZink NATUREL and NedZink NOVA, and have an excellent reputation on the European market.

The basic material NedZink NATUREL is titanium zinc with a smooth rolled surface for applications in roof and facade cladding, roof gutters and rainwater drainage systems.

NedZink NATUREL

NedZink NOVA



NedZink NOIR

NEDZINK NATUREL

NedZink NATUREL is a durable, aesthetic and maintenance-free building material that becomes increasingly attractive over the years under the influence of the weather conditions. This is due to the formation of a natural zinc patina layer on the surface.

This property means NedZink NATUREL is mainly used where a natural and lively appearance, high cost-effectiveness and a long life are required.

NEDZINK NOVA

In order to achieve the natural grey tint from the start, NedZink has developed a highly advanced prepatination process.

The uniform medium-grey of NedZink NOVA originates after a chemical surface treatment following the rolling process. Colourfast approaching the most natural patina tint. Roofing, facade cladding and rainwater drainage systems are the right colour from day one.

NEDZINK NOIR

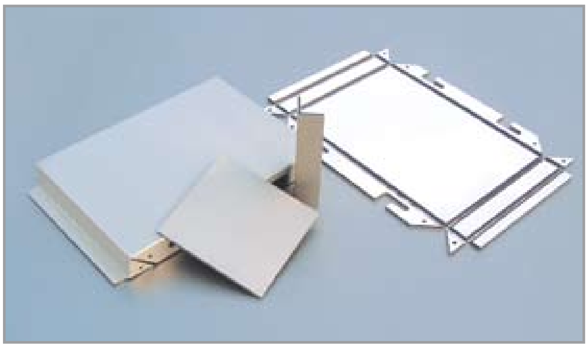
In addition to the patina grey NedZink NOVA, NedZink has a second variant of prepatinated titanium zinc called NedZink NOIR. This variant has a virtually black surface. You can use this to give your projects a distinct and unique look.

NEDZINK NOVA COMPOSITE

Product description

NedZink NOVA COMPOSITE is a panel that consists of 2 layers of prepatinated 'NedZink NOVA' zinc and a polymer core (LDPE). This combination creates a flat, stiff panel that is exceptionally well suited for facade cladding applications. Whether using glue, internal brackets, clamps or screws, there is a solution for every application.

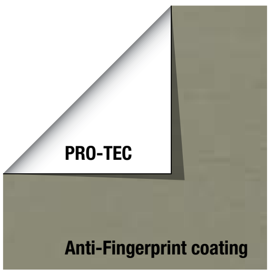
Aside from the strength and stiffness of the panel, a very flat surface is also achieved by the combination of materials. An advantage of prepatinated zinc is its durable, aesthetic character combined with its unique self-repairing properties.



NedZink NOVA COMPOSITE

NEDZINK NOVA PRO-TEC

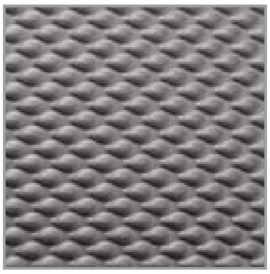
NedZink NOVA Pro-Tec is process-produced patinated Titanium zinc (NEN-EN 988) with a protective coating on the back side for application on either cold or hot roof constructions. This protective layer consisting of a 2-ply polymer coating system, protects the zinc against the effects of water vapour and other substances. The good processing properties of zinc are retained. NedZink NOVA Pro-Tec can be used in all standard systems, but is mainly recommended for unventilated, dampproof hot roof constructions, outer wall cladding and with backing materials that are incompatible with zinc.



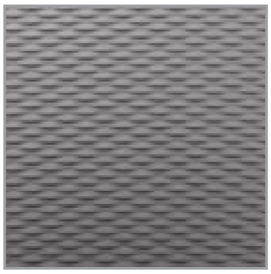
NedZink NOVA

NEDZINK NOVA STRUCTURE

A new addition to the product range is 'NedZink NOVA STRUCTURE', prepatinated 'NedZink NOVA' zinc with a surface structure, available in various motifs. The unique look of this surface opens totally new horizons for planners and architects when designing high quality metal cladding, either exterior for roofs and facades, or interior for various design applications.

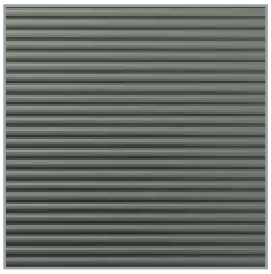


Amsterdam



Paris

Brasilia



New York

Chapter 3 - Installation of roof gutters and rainwater downpipes

A distinction is made in the installation of roof gutters supported by brackets and roof gutters in a wooden box.

ROOF GUTTERS SUPPORTED BY BRACKETS

GUTTER BRACKETS

Specifications
The hot dip galvanized gutter brackets to be used meet NEN-EN 1462 standards and must, according to the specifications of the manufacturer, be suitable for the type of gutter to be installed. The form of the gutter brackets is determined by the roof gutter, just as the manner of attachment.

Adjustment
The form of standard and non-standard gutter brackets must be adjusted to the form of the wall plate, the required slope, the pitch of the roof and the position of the gutter to be installed (back height higher than front height).

Slope of the gutter
The slope in the direction of the outlet piece must amount to at least 2 mm per metre of gutter length.

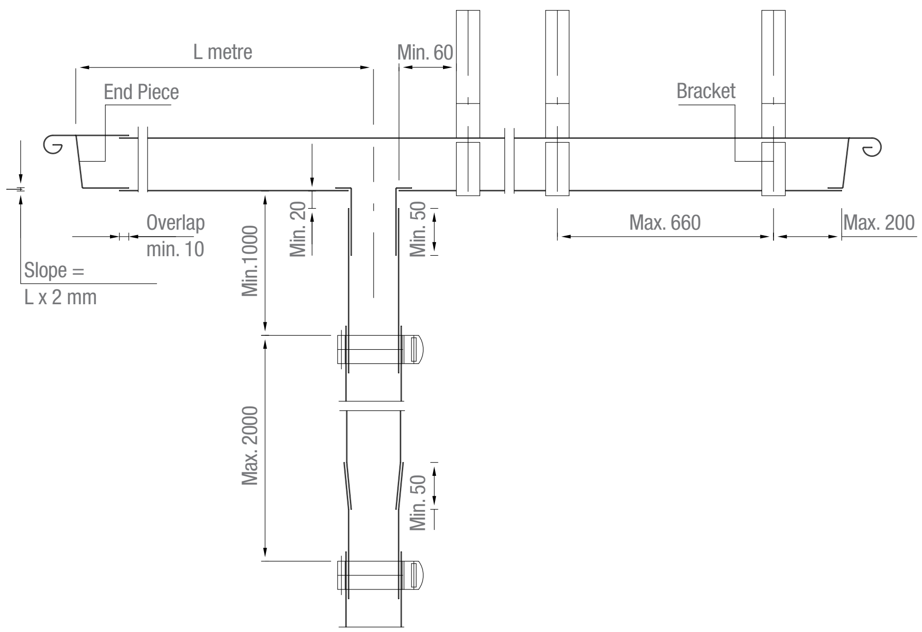
Attachment
A gutter bracket must be attached to the wall plate with at least 2 galvanized or stainless steel screws.
The distance between the gutter brackets amounts to max. 660 mm centre to centre.(bead 20 mm and zinc thickness in accordance with EN 612). The brackets are placed under the thread to secure the slope in the direction of the outlet piece.

The brackets has been provided with a lip for the attachment of the bead, fig. 3, that fits in the bead or a bracket without lip but with a hot dip galvanized steel angle profile, fig 4, that fits in the bead. Several other attachment techniques are to be found in Europe. The back height is attached with a clip of hot dip galvanized steel or stainless steel. The galvanized steel angle profile must meet the same standards as the gutter brackets.

ROOF GUTTERS AND ACCESSORIES

Specifications
Roof gutters made of NedZink NTZ must meet the NEN-EN 612. The minimum material thickness is 0.65 mm, 0.70 mm or 0.80 mm depending on the type of gutter and developed width of the gutter. The standard length varies from 2, 3, 4 to

Figure 3.1



Measure in mm

Longitudinal-section of the roof gutter in the bracket.

6 metres depending on the type of gutter and customs per country.

Two important types of gutter can be distinguished, namely: the suspended gutters, fig. 2, and the box gutter, fig 1. Non-standard prefab gutters can be ordered according to a drawing or made by the metal worker from NedZink NTZ sheet material. Non-standard prefab gutters must also meet NEN-EN 612.

Accessories

The accessories, namely: end-pieces left and right, expansion sleeves left and right, separation slides and outlet pieces can be supplied by the wholesale trade or be made by the metal worker from NedZink NTZ.

Pre-treatment of roof gutters

The gutter parts are preferably pre-treated in the workshop, i.e.:

- Making gutter parts to length.
- Making (and if possible soldering) mitres.
- Soldering end pieces, expansion sleeves and outlet pieces. See for examples figs 3.4, 3.5 and 3.6.

INSTALLATION OF ROOF GUTTERS SUPPORTED BY BRACKETS

The gutter parts should preferably be installed from left to right and against the slope (from low to high). The structural conditions do not always allow this. When choosing another installation direction, the installation from low to high is more important than from left to right (draining overlap!).

At one side of the bead a locating edge or fitted edge may have been left open to facilitate the joining together of the gutters. The gutter parts, starting at the bead, are joined together with a minimum overlap of 10 mm. With the same rotating movement the gutter parts with the bead are placed in the correct position over the lip or steel angle profile of the brackets.

The clip at the back height of the bracket is now bent downwards over the water check of the back height, in such a way that the gutter can continue to move in the circumstances of contraction and expansion. (The use of nails for the same purpose is not permitted as this is disastrous for the service life of the gutter!)

The overlap of the gutter can now be soldered. Note the minimum overlap of 10 mm and flow through of the soldering of at least 10 mm. For soldering see Chapter Soldering.

The distance between the side of an outlet piece and a bracket must be at least 60 mm, see figure 3.1.

An expansion device must always be supported by a bracket, see figures 3.5, 3.6 and 3.7.

Expansion

Expansion devices are necessary in order to absorb the expansion and contraction of the roof gutter. Where and when an expansion device must be used is shown in table 1.

ROOF GUTTERS IN A WOODEN BOX

CONSTRUCTION

Support

The support forms part of the structural and is usually made of wood. NedZink NTZ® can be excellently applied directly to unplanned wood. It is advisable not to use water-resistant wood glued together. It is undesirable for water to remain in the enclosing box in the event of a calamity. The fitting first of rough unplanned wooden parts in the bottom is recommended for a concrete substructure. If this is impossible then a layer of natural glass fibre 3 – 5 mm can be fitted under the zinc bottom.
This prevents corrosion due to water on the underside of the zinc.

Table 1. Expansion device in roof gutter

Gutter construction	Max. gutter length in metres without expansion sleeve	Max. distance in metres between 2 expansion devices			
		Developed width of the gutter $\leq$ 550 mm		Developed width of the gutter > 550 mm	
		Mechanical exp.	Rubber expansion	Mechanical exp.	Rubber expansion
Gutter in the box					
2 free end pieces	**12**	12	9	9	6
1 free end piece	**6**	6	4,5	4,5	3
Gutter in bracket					
2 free end pieces	**18**	18	12	12	9
1 free end piece	**9**	9	6	6	4,5

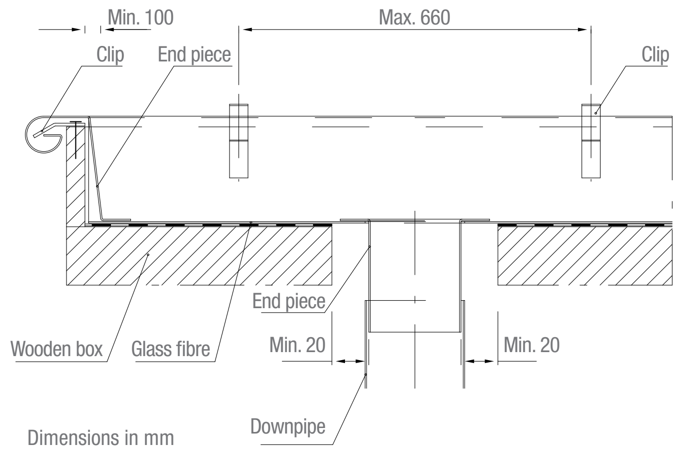


Figure 3.2 Longitudinal-section of a gutter in a wooden box

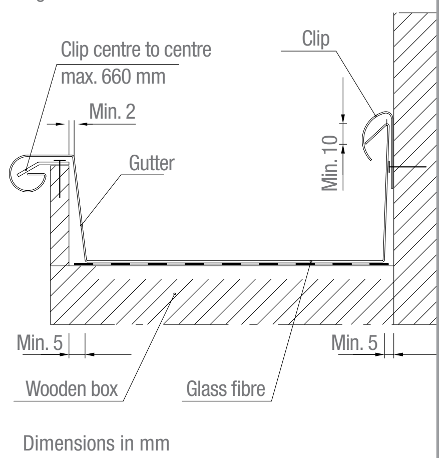


Figure 3.3 Cross-section

Before applying the zinc, check wether the supporting wooden box is clean and does not contain projecting nailhead or screws. Then the box is measured at various places and following measurements should be taken:

- Upper opening width
- Bottom width
- Height and slope of front height and rear height of the wooden box
- Thickness of the edge of the front height of the wooden box
- Length of the various gutter surfaces

Opening of the outlet piece

The outlet piece in the supporting box construction must be spacious enough to allow the gutter to contract and expand. This means that the outlet piece, with the rainpipe slipped around it must have an oval cavity with at least 20 mm of space to the left and to the right and in other two directions at least 5 mm. See figs. 3.2 and 3.3.

Construction of the roof gutter

Make a drawing of the measured supportive box and draw in the zinc-titanium gutter, see figures 3.2 and 3.3. The following basic rules should be observed:

- The upper opening width of the gutter must be at least 4 mm smaller than that of the box.
- The bottom width of the gutter must be at least 10 mm smaller than that of the box.
- The front height of the gutter must be 1 to 2 mm larger than that of the box.
- The bead falls before the edge of the box and not on it.
- The back height min. 10 mm higher than the front height, in case of gutter with water check.
- The slope of the gutter equal to that of the box including any bent forms.
- The further dimensional proportions in accordance with NEN-EN 612.
- The ends of the gutter must have at least 10 mm space in relation to the ends of the supporting box (see also: 'Expansion').

Specification

The roof gutters, made of NedZink NTZ®, must meet EN 612. If the dimensions of the box permit use Standard Prefab gutters or otherwise non-standard gutters (tailor- made) of NedZink NTZ®.

Pre-treatment of roof gutters

The roof gutters are preferably pre-treated as far as possible, i.e.:

- Making gutter parts to length.
- Making (and if possible soldering) mitres.
- Soldering end pieces, expansion sleeves and outlet pieces. See also figures 3.5, 3.6 and 3.7.

INSTALLATION OF ROOF GUTTER IN A WOODEN BOX

Clips

Clips are attached at the edge of the front height of the box with a minimum width of 70 mm and a thickness of 0.80 mm. Attach the clips with 3 galvanized or stainless steel flat-headed nails min. 22 mm in length.

The distance between the clips is max. 660 mm centre to centre. At a developed width of 600 mm, a max. clip distance of 500 mm is advised. The clip must have a such a form and overhang that the clip fits at least up to $^{3}/_{4}$ in the bead cavity and fixes the gutter in its correct position (see fig. 10). Clips of min. 30 mm width are further attached to the wooden back height at the same distances, which are bent over the water check of the gutter, see fig. 10b.

For the gutter with a large devolped width e.g 700 mm and a gutter bottom width 300 mm the fitting of a sliding clip in the bottom is advised. This bottom clip may in no circumstances be soldered to the gutter.

Installation direction

The gutter parts must be preferably installed from left to right and against the slope (from low to high). The construction conditions may not always allow for this. When choosing another installation direction the installation from low to high is more important than from left to right (drainage overlap!).

Installation

The gutter parts with the bead are now hooked over the fastening clips and tilted in the box with a minimum overlap of 10 mm. The gutter is pressed on the bottom of the box and secured in this position by bending the clips of the back height over the water check in such a way that the gutter can continue to move in the event of contraction and expansion.

After fitting any mitres, the overlapping seams can be soldered. Make sure that there is an overlap of at least 10 mm and a flow through of the solder of at least 10 mm. See for soldering: Chapter Soldering.

Expansion

Expansion sleeves are necessary to absorb the expansion and contraction of the roof gutter.
Where and when an expansion device must be used is shown in table 1.

RAINWATER DOWNPIPES AND ACCESSORIES

Specifications

Rainwater pipes are made of NedZink NTZ® and must meet EN 612. Current dimensions are 80 and 100 mm. The Ø 80 mm pipe is often used.
The material thickness is 0.65 mm for circular pipes ≤ 100 mm. For pipes ≥100 mm the min. thickness is 0.70 mm. Rectangular pipes are also often used. Thickness is 0.65 mmif one-right-angle is ≤ 100 mm. Thickness is 0.70 mm if this side ≥ 100 and ≤ 120 mm. In the case of a right-angled side ≥ 120 mm the minimum thickness is 0.80 mm. Standard lenths 2 and 3 metres.
Non-standard downpipes can be ordered according to drawings via the wholesale (length max. 3 metres) or made by the metal worker from NedZink NTZ®. Non-standard prefab downpipes must also meet EN 612.
The accessories, namely: bends, wreathers, clamps etc. can be ordered standard or according to drawing from the wholesale trade or be made by the metal worker from NedZink NTZ®.

Brackets

The brackets must be adjusted to the rainwater downpipe and are usually made of hot dip galvanized steel.

Attachment of brackets

The brackets must be attached at a maximum of 2 metres distance, and the upper bracket must be installed at least 1 metre under the gutter bottom, see figure 6. When the movement (expansion) of the gutter is absorbed by bends, the

Figure 1 Box gutter

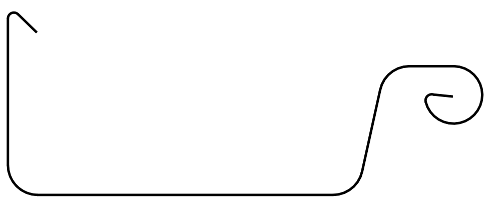


Figure 2 Suspended gutter

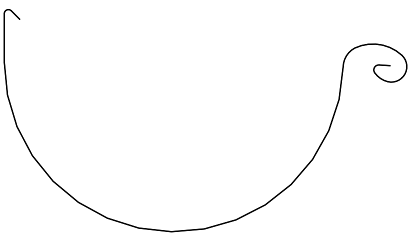


Figure 3 Bracket with lip

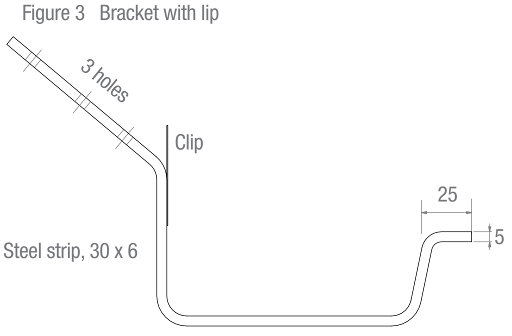
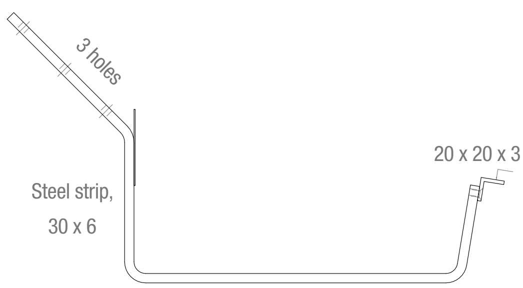


Figure 4 Bracket with steel angle profile



bracket distance to the gutter bottom may be less than 1 metre. The attachment of the bracket must be taken from the instructions of the bracket manufacturer and/or the specifications.

Installation of rainwater downpipes

The rain pipes are hung from above to below. The rainwater downpipe are slipped in to one another with a min. overlap of 50 mm. Each length of piping must be bracketed at least once. The brackets must allow for the expansion of the pipe, and a soldered wreath prevents sagging. The upper short length of piping may not be able to press against the bottomside of the gutter and must therefore have at least 20 mm space. The outlet piece must be slipped at least 50 mm into the downpipe, so that the projecting outlet piece imust be 70 mm in length. See figures 3.1, 3.2 and 3.3.

Special constructions

If rainwater downpipes do not lead in a vertical line to the sewer, short lengths of piping in staggered line must be led to the lowest point. Use can be made of bends and jumps, or as custom-made work of lengths of piping. The corner between an inclined short length of piping and the predecing length of piping may not be smaller than 120°.

The slope of a rainwater downpipe must be minimum 5 mm per metre, if the specifications do not require otherwise.

Figure 3.4 The end of a gutter with end piece

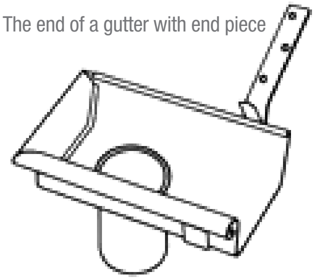


Figure 3.5 Installation of zinc expansion device

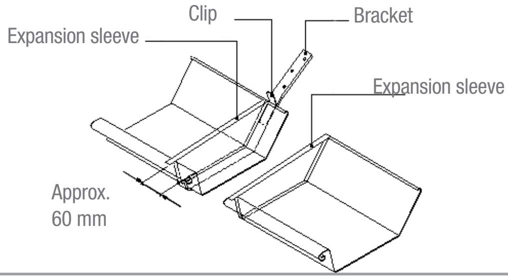


Figure 3.6 Zinc expansion device installed

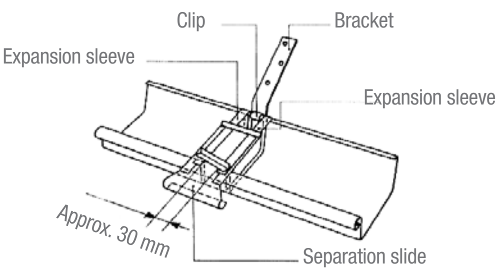


Figure 3.7 Rubber expansion sleeve

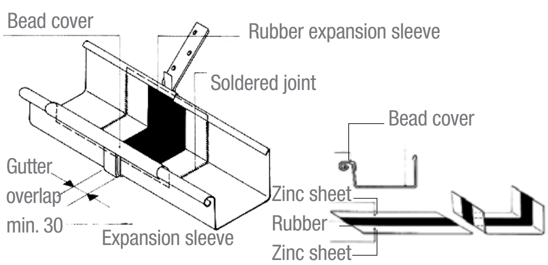


Figure 5 Rainwater downpipes

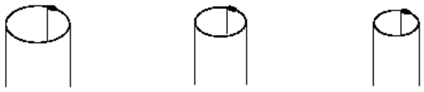
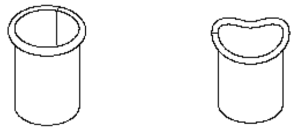


Figure 6 Outlet pieces



ACCESSORIES

Figure 7 Accessories

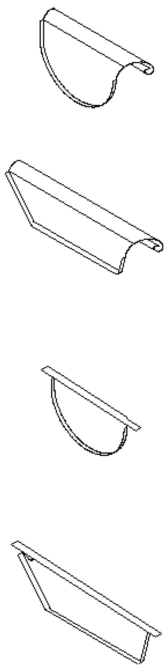
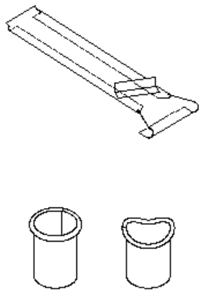


Figure 8 Accessories

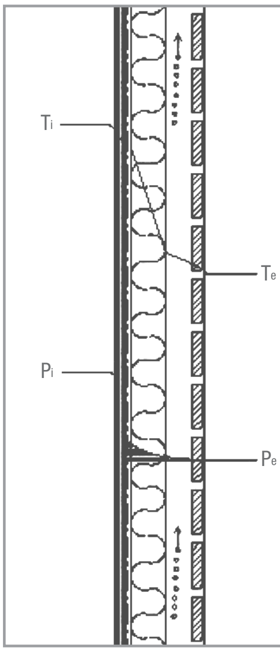


Chapter 4 - Building physics

GENERAL

The quality and service life of a roof or facade covering made of zinc-titanium depends firstly on the design and execution of the roof structure as a whole and secondly on the zinc-titanium system itself. For insulated roofs, a ventilated construction is very well suited for the application of virtually vapour proof zinc roofing.
If the roof is properly constructed incorporating rear ventilation, any corrosion of the zinc cladding materials caused by condensation water from the inside is virtually eliminated

Temperature curve and water vapour pressure in a ventilated structure



Meaning of abbreviations:

T_i = Internal temperature
P_i = vapour pressure - internal
T_e = External temperature
P_e = vapour pressure - external

NOTES

Flat or almost flat roofs with a pitch of less than 3° should, if possible, not be covered with zinc-titanium unless the surface area is smaller than 15 m^2, for example over dormer windows and canopy roofs. Fully soldered zinc roof cladding may not be larger than 15 m^2 due to expansion.
On surfaces larger than 15 m^2 an expansion construction must be installed.

The structure used (usually consisting of elements, segments or a complete roof system) must meet the requirements of the Building Code. These requirements must be met both for new construction and for renovations.

DESIGN ASPECTS

Roofs and facades are stressed not only by mechanical forces but also by the physical aspects of a building. These include fluctuating temperatures, which may vary between -20°C and + 80 °C, and differences in air humidity on the inside and outside.

In the commonest situation, where the internal temperature (Ti) is higher than the external temperature (Te), it is generally also found that the air humidity is greater on the inside than the outside (see fig. 2). The difference in vapour pressure (Pi -Pe) causes vapour transport to be transported through the roof structure from the inside to the outside.

If the roof is not constructed properly, condensation or frost will be formed on the inside of the relatively cold zinc-titanium.

VENTILATED AND UNINSULATED CONSTRUCTION

Uninsulated roofs (and facades) can still be found in storage areas, sheds etc., in old buildings such as churches, and in buildings with an insulated attic floor.

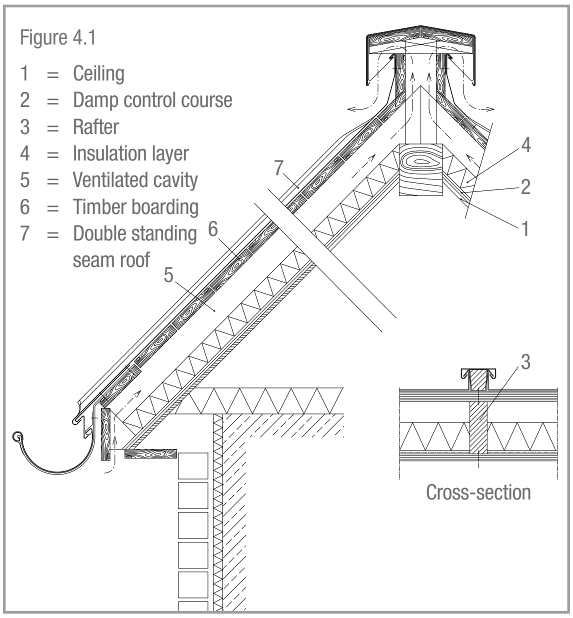
The construction of an uninsulated roof is generally structured as follows: From inside to outside: supporting rafters, roof/facade boarding (unplaned wooden boards at least 23 mm thick, without tongue and groove, with gaps of at least 5 mm. The gaps between the boards can be larger depending on the pitch of the roof. Zinc roofing or facade cladding.

VENTILATED AND INSULATED CONSTRUCTION

The construction of an insulated roof or insulated facade is generally built up as follows (see diagrams) beginning on the inside:

1 Ceiling – any type, although it must be able to support the insulating material, or have the insulation attached to it..
2 Damp control course made of metal or plastic film.
3 The supporting rafters always run vertically, i.e. from base to ridge, generally made of wood.
4 Insulation slabs, matting or foam between the rafters, or even better, to be made to run across under the rafters. Although a different construction is required for this.
The thickness of the insulating layer depends on the material used and the degree of insulation required.
5 Ventilated cavity: thickness depends on the pitch of the roof.
6 Timber boarding: If Zinc-Titanium is to be used, the preferred type of timber is planed boards no less than 22 mm, not tongue-and-grooved, installed horizontally with gaps between the boards of at least 5 mm.
The gaps between the boards depend on the pitch of the roof, i.e.

-roof pitch up to 45º	5 – 10 mm
-roof pitch from 45º - 70 º	5 – 50 mm
-roof pitch from 70º - 90 º	5 – 100 mm



Install the wooden sections such that the clips can be fitted in the desired place. The nail heads must be countersunk to prevent contact with the zinc. Use galvanized nails with a zinc-layer thickness of at least 20 microns or AISI 304 stainless steel.
7 Zinc roofing or facade cladding in the form of the chosen roof/facade cladding type.

UNVENTILATED CONSTRUCTION

In a non-ventilated subconstruction, no ventilating cavity is present under the zinc. The zinc is applied to a subconstruction, which preferably consists of a metal roof element for the vapour tight construction.

The metal roof element has a 50 µm aluminium top layer. In order to prevent cold bridges this metal roof element is surrounded by a groove.
The construction of this panel is for example:
- A damp control course (self-adhesive bituminous strip with aluminium top layer of 50 µm.)
- A PUR/PIR metal roof element with watertight integrated wooden frame or full boarding.
- A forward cover strip or structure mat as required by the zinc cladding.
- Fasteners as required by the subconstruction.

DAMAGE AND MEASURES

Excessive condensation can be harmful in a number of ways. For example, it can the zinc-titanium on the inside as the result of corrosion, or lead to moisture damage on parts of the supporting structure (corrosion, wood rot or mould).

Measures for a ventilated construction:
In order to achieve the desired movement of vapour and to avoid the risk of damage, two main steps must be taken:
A Fit a damp control course on the inside of the thermal insulation
B Include a gap on the external side of the thermal insulation to permit ventilation by external air.

A. Diffusion layer
This layer is necessary:
1 To let through just enough vapour, but not too much, to remove excess vapour from the building (e.g. 'vapour produced by the occupants). We recommend the selection of a material which prevents the transmission of vapour, having a minimum value of µ.d=10.

2 To make the structure draught-proof and prevent air from the interior from flowing directly into the ventilation cavity. The cavity is in direct contact with the external air, meaning that an unpleasant current of air could flow into or out the structure through any cracks or gaps.

The diffusion layer is not needed in all cases, e.g. where the structure beneath the ventilation cavity already has a vapourcontrol value greater than 10 µ.d (thickness in m). In such cases, however, the ventilation gap and the air apertures must correspond to the values given in the table and protection must be provided to seal any cracks between the ventilation gap and the interior air space.

B. Ventilation cavity

The ventilation cavity must be to the external air via ventilation apertures at the lowest and highest points of the facade or roof. The air must be able to flow between apertures without major obstacles. The required dimensions for the gap and apertures are detailed in the following table:

Pitch	minimum width of ventilation	min. cross-section of ventilation apertures top and bottom per m^2 of roof surface area
Less than 3°	200 mm	25 cm^2
3° to 20° *	100 mm	20 cm^2
20° to 90° *	50 mm	10 cm^2
90°	35 mm	10 cm^2

*) intermediate values can be obtained by interpolation.

Where a higher moisture level is present, as is the case with a temperature of 20°C and a relative humidity level of 60% (vapour pressure > Ps = 1400 Pa), the minimum pitch recommended is 7°.

EXECUTION

The advice given above is followed in most building plans. Roof and facade details illustrate clearly how these areas should be built. However, experience has shown that a number of details in a construction project may not be fully thought out, being left largely to the operatives on site.

In such cases it often happens that, at certain points, ventilation apertures are made too small – or sealed up completely – during the construction of joints between roof and on dormer windows, porches etc. We strongly advise therefore that the principles of the roof and facade cladding details should be strictly followed throughout the whole project.. This is the only way that the rear ventilation required can be incorporated into the structure.

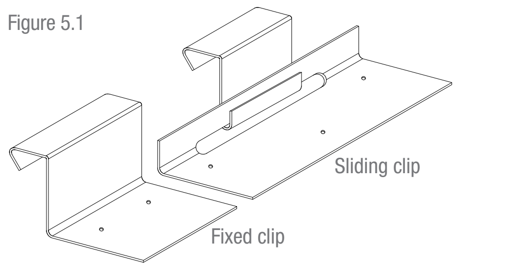
Chapter 5 - Standing seam system

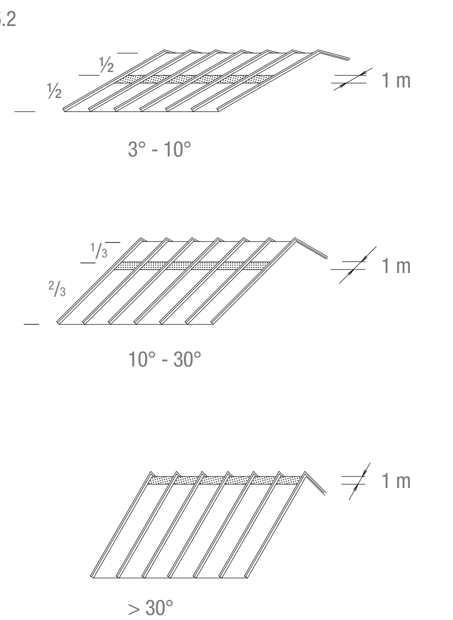
hooked standing seam before closure

angled standing seam

double lock standing seam

standard pre-profiled standing seam bay





APPLICATIONS

The double standing seam system provides a rain-tight roof and facade covering where the pitch is in excess of 3°, preferably 7°. The single standing seam is used for roofs with a pitch steeper than 25° and for facades. For roofs with a pitch angle lower than 25° the double standing folded seam is used.

The standing seam system makes it possible for a roof or facade to be covered with Zinc-Titanium. quickly and at reasonable cost. This is because preformed metal bays are used, and the seams are folded mechanically, reducing manual folding to a minimum.

The preformed bays are supplied in standard sizes and are locked together on site with a single or double fold, by machine or by hand. Aside from straight bays, curved (convex and concave) and tapering bays can be made without problems. The bays are secured to the substructure by means of fixed and sliding clips (see figure 5.1).

THE STANDING SEAM SYSTEM FOR ROOFS

With a standing seam roof the zinc bays are connected in the longitudinal direction with so-called (double) standing seam. The material thickness is 0.80 mm. The allowable bay width is determined by the wind load and the height of the roof. The standard bay width varies from 330 mm to 530 mm. The maximum bay length is 10 metres (thermal movement: 20 mm). Think about handling the bays when making a selection

The standing seam can consist of a single or double connection. A single connection forms a less effective water seal and may therefore only be used on roofs with a pitch angle larger than 25°. With fixed clips the cladding is fixed over a one metre length. Sliding clips are used for the remaining length of the roof bay.

The location of the fixed clips depends on the pitch angle of the roof. The relationship between the location of the fixed clip and the pitch angle is shown in figure 5.2. Fixed clips ensure that the standing seam bays don't slip. Bays up to 3 metres long can be fully secured with fixed clips. For lengths greater than 3 metres the bay is secured with fixed clips over a length of one metre, and the rest with sliding clips.

THE STANDING SEAM SYSTEM FOR FACADES

With a standing seam facade the zinc bays are connected in the longitudinal direction with so-called standing seams. The material thickness is 0.80 mm. The allowable bay width is determined by the wind load and the height of the facade.

Horizontal and vertical standing seam facade

If the standing seam bays are installed horizontally, then it is recommended to limit the bay width to 300 to 430 mm for optimal work, and to limit the strip length to about 5 metres for handling reasons.
If the standing seam bays are installed vertically, then limiting the bay width to 500 mm or less is recommended and limiting the bay length to about 6 metres for handling reasons.
The standing seam system used as facade cladding likewise requires a ventilation gap behind the zinc-titanium. The methodology for a facade is the same as for roof cladding.

SUPPORT

The standing seam system must be fully supported by unplaned, untreated wooden boards at least 23 mm thick, not tongue and grooved, with gaps of at least 5 mm. The space between the boards can be larger depending on the pitch of the roof, i.e.

Roof pitch up to 45º	5 – 10 mm
Roof pitch from 45º - 70 º	5 – 50 mm
Roof pitch from 70º - 90 º	5 – 100 mm

The construction requirements are also important in this.

For facades, the positioning of the wooden parts must be coordinated with the positioning of the clips. Use galvanized nails with a zinc-layer thickness of at least 20 microns or AISI 304 stainless steel for fastening.

Fastening the clips

Fastening the standing seam bays to the subconstruction is done using clips. The fixed clips secure the standing seam bay and the sliding clips make longitudinal expansion possible. The clip is secured over the lowest standing seam bay and on the subconstruction. Then the top standing seam bay is placed over this and folded shut.

For the correct positioning of the fixed clips see figure 5.2. The clips are secured to the supporting substructure. The number of clips to be used must meet the specifications in the table below.

ASSEMBLY

Marking out

The marking work should be commenced in the centre of the roof or facade area, bay widths being to the left and right of this point. Coordination with the client with regard to the line pattern is recommended.

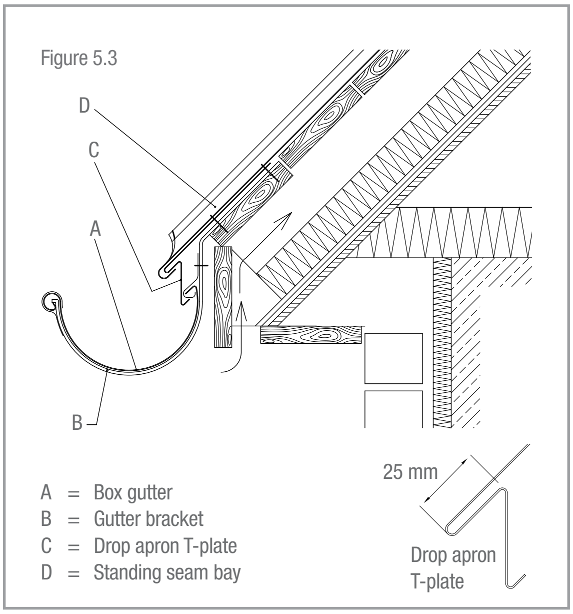
Thermal movement

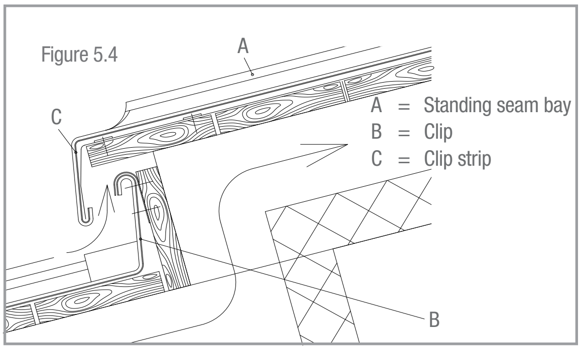
The bays expand and contract with temperature. this means that the bay length should not exceed 10 m. If the length exceeds 10 m, a transver jointis needed to allow for thermal movement: the actual type depends on the pitch of the roof (see figure 5.6). At this joint, part of the profile is removed, to prevent the welt becoming too thick (see figure 5.7).

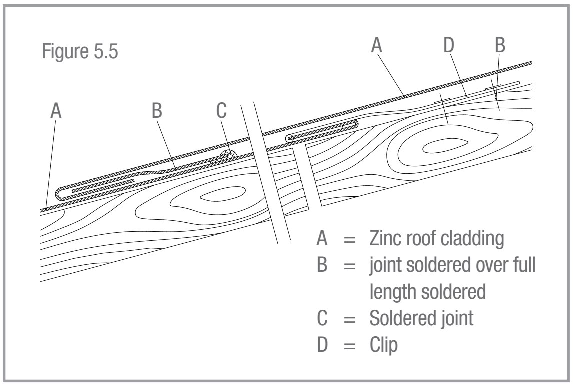
Table 5.1 Number of clips per m² and the distance apart as a function of bay width and roof height.

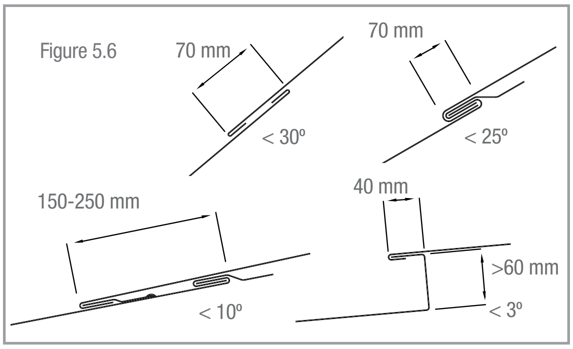
Roof height	Area of roof	Bay width* 500 mm	Bay width* 530 mm
		Number of clips per m² and centre-to-centre distances (in mm)	
		Number - distance	Number - distance
20 - 100 m	normal area verge area	8 – 250 8 – 250	8 - 210 8 - 210
8 - 20 m	normal area verge area	5 – 400 6 – 330	5 - 330 6 - 280
0 - 8 m	normal area verge area	5 – 400 5 – 400	5 - 330 5 - 330

*) the material thickness of zinc-titanium is at least 0.80 mm.
The table applies to wind area I (coastal area), II and III (see NEN 6702).









Assembling the bays

The bays are laid from left to right or vice versa, as indicated on the substructure. Before the first bay is laid, however, the eaves abutment should be fitted. An example of this is illustrated in figure 5.3. The first bay has to serve as a verge flashing. The first bay is laid with an overlap of at least 25 mm over the drop apron T-plate.

The first bay has to serve as a verge flashing, it generally does not retain its full width. Once the bay has been hooked into place, the fixed and sliding clips are attached. The siting at which the fixed clips are attached depends on the pitch of the roof (see figure 5.2). Consult the tabel 5.1 to calculate the distance between the clips for different bay widths and roof heights.

Once the first bay has been laid and the clips have been attached, the next bay is laid alongside without the use of lateral force with sufficient overhang at the eaves. However, if more than one strip is needed between the eaves and the ridge, the whole length from eaves to ridge is laid first, and then a cross welt is produced (see figure 5.6.) The second bay is laid when this has been completed, beginning at the eaves again. When this bay is in the correct position, the fixed and sliding clips must be attached, as already described. The seams are then folded closed, manually or with a folding machine.

The eaves abutment is produced by the bottom edge of the bay being cut and folded. A straight chalkline is marked out on the bottom edge of the bay to enable a straight eaves border to be produced. The bay can then be cut as illustrated in figure 5.11.

The eaves edger is used to produce the first fold along the chalk line: this is then closed with the eaves welter.

ASSEMBLING FACADE CLADDING

The standing seam system used as facade cladding can be assembled horizontally and vertically. In the case of application as facade cladding, the single standing seam is often used.

The assembly of the vertical standing seam bays against the facade is done in the same way as the roof, with the difference that in the top metre of the standing seam bay the fixed clips are done in accordance with figure 5.2. The number of clips to be used against the facade must meet the specifications from table 5.1. Horizontally assembled standing seam bays with a length up to 3 metres are fully secured with fixed clips. Bays longer than 3 metres over a zone of one metre, in the middle of the standing seam strips. The rest is done with sliding clips.

Figure 5.7

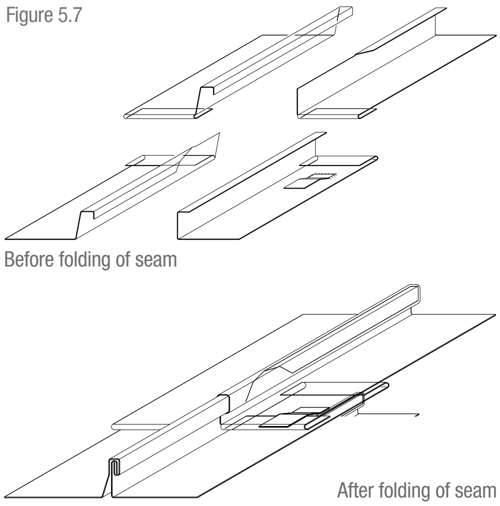
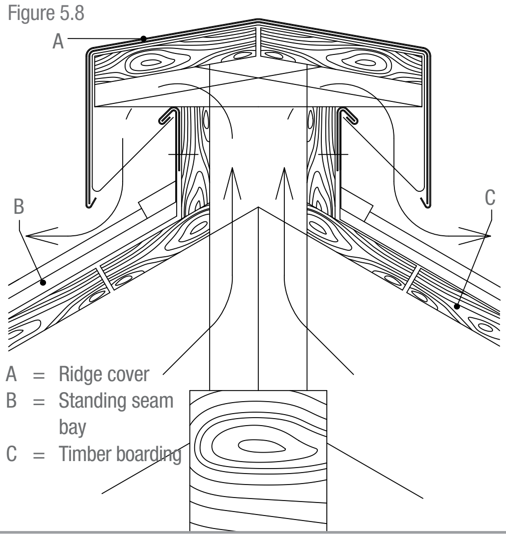
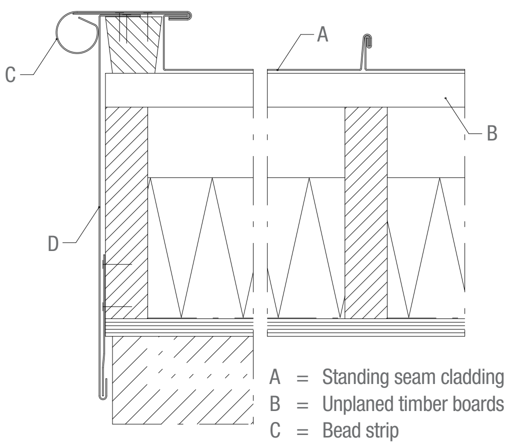


Figure 5.8



A = Ridge cover
B = Standing seam bay
C = Timber boarding

Figure 5.9



A = Standing seam cladding
B = Unplaned timber boards
C = Bead strip
D = Covering strip

Tools

Aside from the usual zinc working tools, double-single seamfolders, eaves edger and eaves closing pliers are needed.

CONNECTIONS

Ridge abutment

The ridge abutment is produced by means of a crimped seam as shown in detail 5.8. In this the pre-profiled side upstand profile is bent back on site to form a straight upstand.

Verge flashing profile

The verge flashing is formed by turning up the projecting part of the first and last zinc-titanium bays against a verge roll. These bays can be cut to the correct width and the side upstands formed against the roll either on the roof or beforehand. The upstand is at least 55 mm high. The construction is shown in figure 5.9.

The verge roll can be covered with any kind of profile. Both this capping and the bay upstand are secured with at least three clips per metre.

Wall abutment

One example of a wall abutment is given in figure 5.10. A gap must be allowed for ventilation.

Roof penetration

The methods used for ridge abutment, verge flashing attachment and eaves abutment are used here. The zinc-titanium should not be fitted too close to the roof penetration. It must be able to expand and contract freely. Figures 5.14 and 5.15 show examples of a chimney in a roof.

Hip construction

The two roof surfaces are separated by a hip roll. The hip roll must be adequately secured to the hipp construction with the appropriate fasteners. The double standing seam bays are attached to this roll in the same way as for the ridge abutment, but splayed as in figure 5.9. Capping is fitted over the wooden hip roll. The upstand against this hip roll must be no less than 55 mm at right angles to the edge of the hip roll (see figure 5.16).

Figure 5.10

A = Standing seam cladding
B = Timber boarding
C = Ventilated air cavity
D = Covering strip
E = Lead flashing
F = Clip

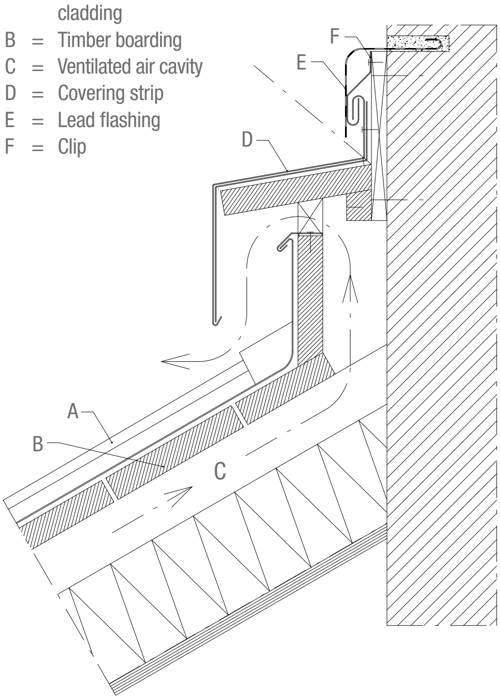


Figure 5.11

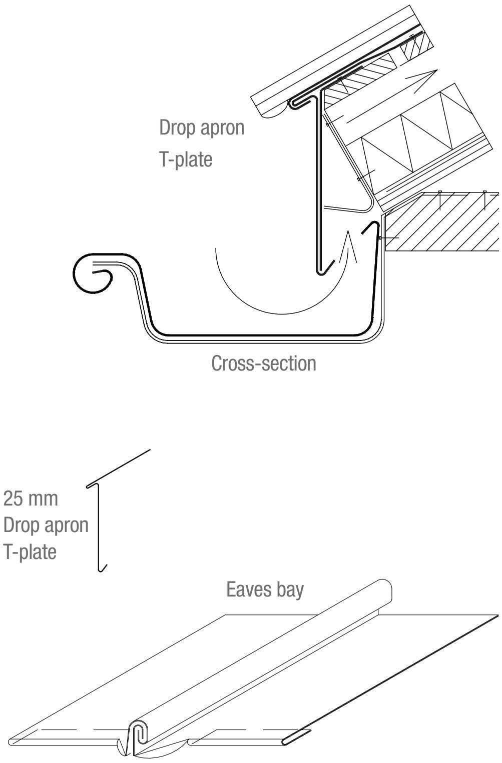
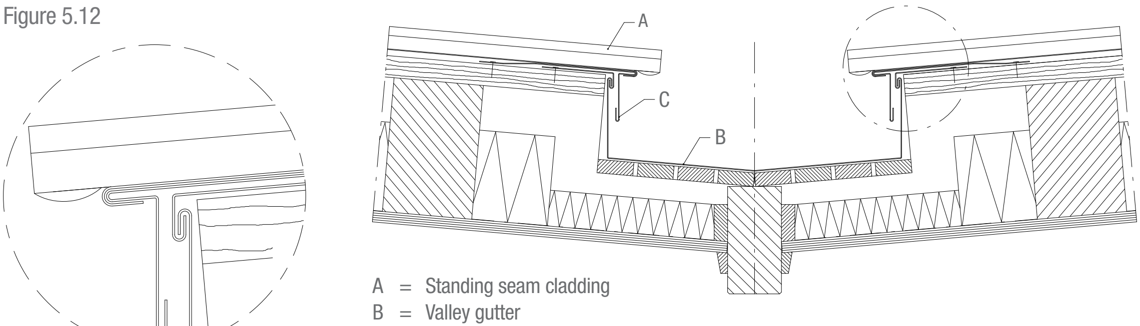
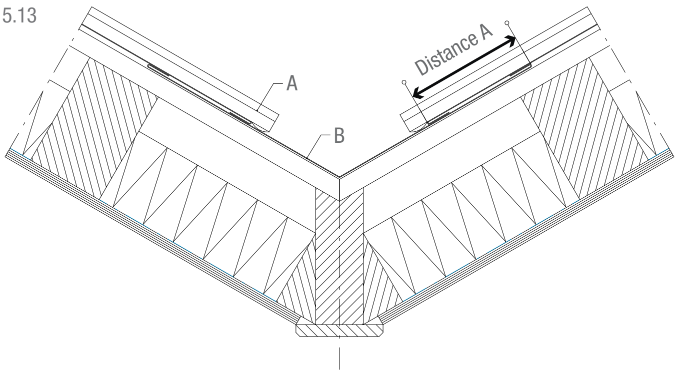


Figure 5.12



A = Standing seam cladding
B = Valley gutter
C = Drop apron T-plate

Figure 5.13



A = Standing seam cladding
B = Valley gutter

Ventilation at the valley must not be blocked!

Valley gutter

The valley is the angle between two pitched roofs. The bottom end of the bay is cut splayed, and bent over as shown in the eaves abutment, figure 5.11. This bend hooks into the additional clip which is soldered in lengths of e.g. 1 metre on the valley gutter.

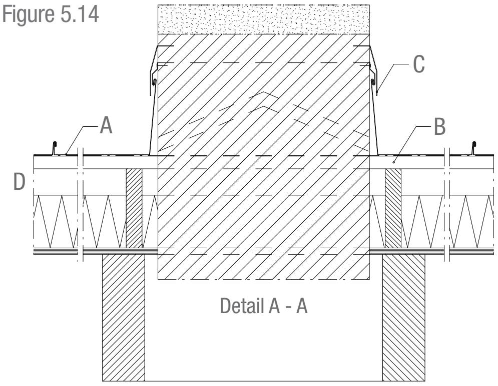
The valley gutter is secured onto the underlying timber by means of clips (see figure 5.13.) The distance 'a' depends on the pitch and may be calculated as follows:

$$\alpha = \frac{55}{\sin \alpha}$$

15° ----- a = 200 mm
20° ----- a = 160 mm
25° ----- a = 130 mm
30° ----- a = 110 mm
35° ----- a = 100 mm
40° ----- a = 90 mm
45° ----- a = 80 mm

When the pitch is less than 15°, a box gutter must be in the valley, see figure 5.12. The minimum depth of this box gutter is 120 mm.

Figure 5.14



A = Standing seam bay
B = Timber boarding
C = Lead flashing
D = Ventilated air cavity

Figure 5.15

A = Standing seam bay
B = Timber boarding
C = Lead flashing
D = Ventilated air cavity

Detail A - A see figure 5.14

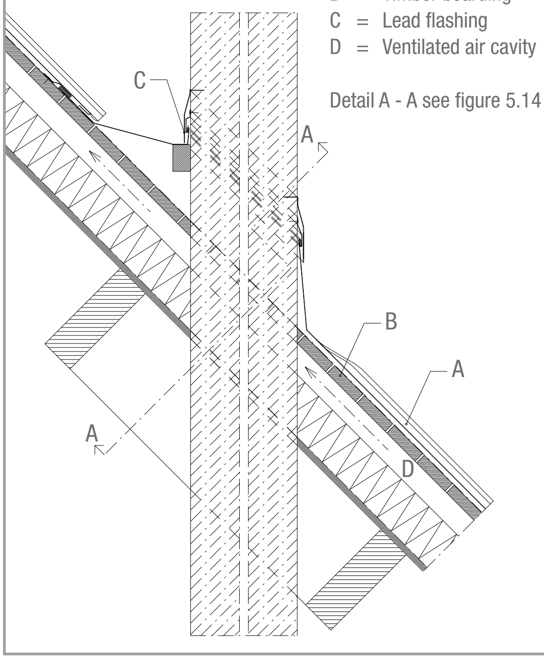
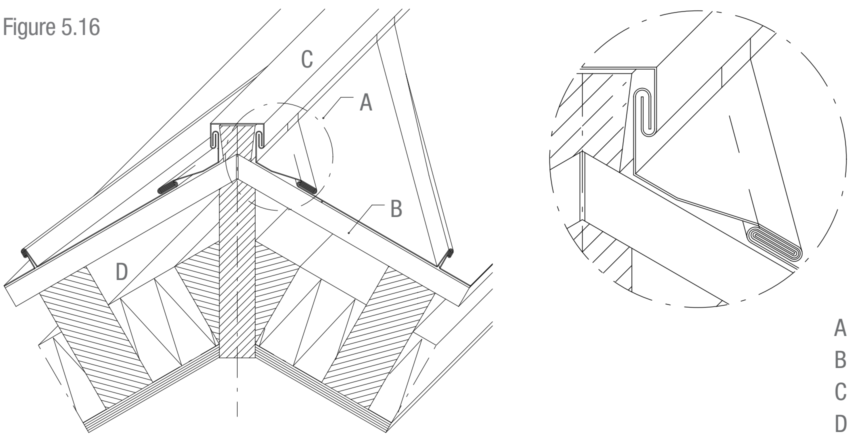


Figure 5.16



A = Standing seam cladding
B = Timber boarding
C = Hip construction
D = Ventilated air cavity

Chapter 6 - Roll Cap system

APPLICATIONS FOR ROOF AND FACADE

The wood roll cap system is suitable for large and small roofs with a pitch of the roof of at least 3°, preferably > 7°, and as facade cladding. The standard NedZink roll cap roof consists of zinc bays with
upstands on both sides and separated by trapezoidal wood rolls. Zinc caps are used to cover these wood rolls. This gives the roll cap its characteristic and robust appearance The material thickness of the zinc-titanium depends on the width of the bay and the height of the roof, see table 6.1.

The Roll Cap Roof

A Roll Cap roof is a cladding that consists of zinc sheets provided with upstands in the longitudinal direction. Between the bays, so-called wood rolls are installed on the timber boarding. These rolls have a trapezoidal cross section with a width of 40-50 mm and a height of 60-70 mm. The water tight finishing between roof bays and wood rolls is obtained by a covering profile (roll capping).

Roll Cap roofs are installed with clips on the timber boarding. The minimum width of a clip is 50 mm with a minimum sheet thickness of 0.65 mm. Depending on the assembly system the clip is installed on or under the wood roll. Fixed and sliding clips must also be used with Roll Cap roofs. For the positioning of the fixed clips, the same rule applies as with a standing seam roof.

Thermal movement

The bays expand and contract with temperature. This means that the bay length should not exceed 10 m. If the length exceeds 10 m a transver joint is needed to allow thermal movement. The actual type depends on the pitch of the roof (see figure 6.7). Overlapping is necessary to obtain a water-tight construction.

Specifications of Roll Cap standard components

Standard roll cap bay (fig. 6.1)
Bay width: maximum 890 mm, with 2 upstands each 55 mm, Girth maximum 1000 mm.
Material thickness: 0.80 mm or 1.00 mm.

Standard Roll capping (fig. 6.2)
Cross-section: 65 mm x 25 mm
Material thickness : as for roll cap bay

Eaves apron
Width: 330 mm.
Material thickness: as for roll cap

Clips (fixed and sliding) (see fig.6.3 and 6.4)
Width: 50 mm. Length: > 220 mm.
Material thickness: as for roll cap bay
These clips are produced by the sheetmetal worker. The length must have a little excess, so that it can be cut to the exact size during fitting The fixed clips secure the roll cap bay and the sliding clips make longitudinal thermal movement possible.

Wood roll (fig. 6.4)
Wood, good quality, minimum quality class C according to NEN 5466 (KVH 2000). The wood roll must be straight and accurately dimensioned.

Figure 6.1

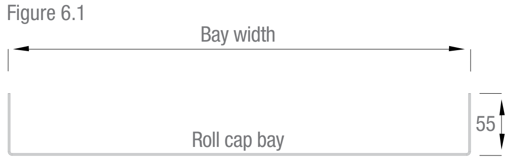
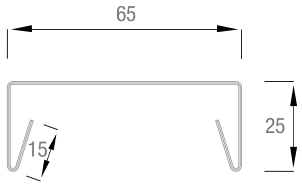


Figure 6.2



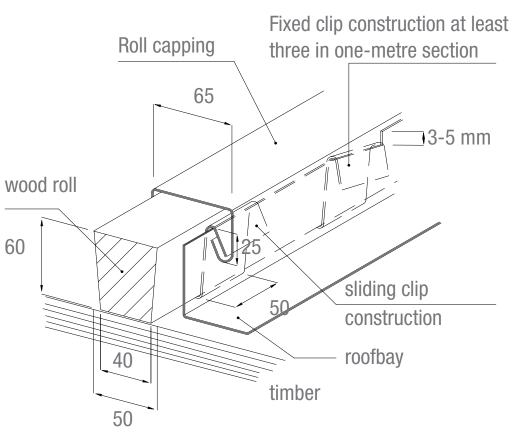
The Roll Cap system for facades

In order to maintain a rain-tight facade, special profiles are used with the horizontal roll caps (see fig. 6.5). Applying roll caps with a vertical facade cladding, the two upstands of the roll cap must have a special weather check (see fig. 6.6)

The Click Roll Cap system

The click roll cap system is a variant consisting of pre-profiled click roll cap bays, click roll caps and associated galvanized steel clips. These clips are put over the upstands of the roll cap and screwed in place. The click roll cap is then snapped on.
The height of the upstand is 47 mm and the maximum practical width is about 600 mm.
The galvanized steel clips of 500 mm have a thickness of 1 mm and must be fastened at 1 metre intervals centre to centre. The wood roll is now no longer needed.

Figure 6.3



Dimensions in mm

Figure 6.4

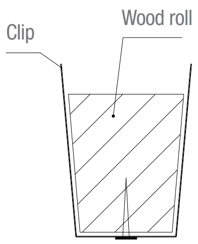
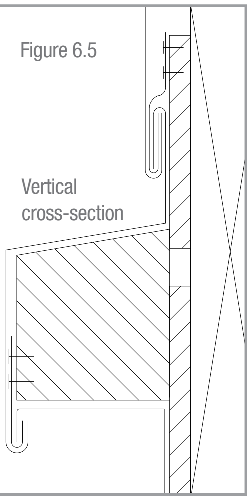


Figure 6.5



SUPPORT

The roll cap system must be fully supported by unplaned, untreated wooden boards at least 23 mm thick, not tongue and grooved, with gaps of at least 5 mm. The space between the boards can be larger depending on the pitch of the roof, i.e.

Pitch of the up to 45º	5 – 10 mm
Roof pitch from 45º - 70 º	5 – 50 mm
Roof pitch from 70º - 90 º	5 – 100 mm

For facades, the positioning of the wooden parts must be coordinated with the positioning of the clips. Use galvanized nails with a zinc-layer thickness of at least 20 microns or AISI 304 stainless steel for fastening.

Ventilation: With insulated roofs, an air cavity that is ventilated with outside air must be put in place (see chapter on Building Physics).

Fastening the clips

The fastening of the roll cap strips on the subconstruction is done using clips. The fixed clips secure the lock seam strip and the sliding clips make longitudinal expansion possible. For the correct positioning of the fixed clips see figure 6.7. The clips are secured to the underlying roof panelling. The number of clips to be used must meet the specifications in table 6.1.

Figure 6.6

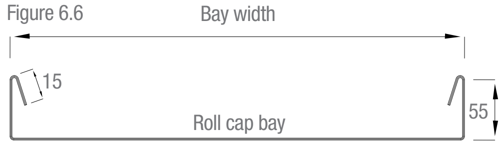


Figure 6.7

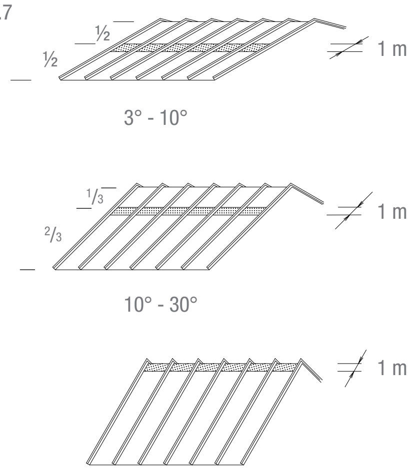


Table 6.1 Number of clips per m² and distance apart, depending on the bay width and roof height.

		Bay widths between the wooden rolls						
		500-(600) mm	600-(700) mm		700-(800) mm		800-(890)** mm	
			Wind area I	Wind area II/III	Wind area I	Wind area II/III	Wind area I	Wind area II/III
		Number of clips per m2 and distances apart in mm						
Roof height	Roof area	Number-distance	Number - distance		Number - distance		Number - distance	
50 - 100 m	normal area edge area	6 - 330 8 - 250	6 - 280* 8 - 210*	6 - 280* 8 - 210*	6 - 240* 8 - 180*	6 - 240* 8 - 180*	n/a	n/a
20 - 50 m	normal area edge area	6 - 330 8 - 250	6 - 280 8 - 210	6 - 280 8 - 210	6 - 240* 8 - 180*	6 - 240* 8 - 180*	n/a	n/a
8 - 20 m	normal area edge area	5 - 400 6 - 330	5 - 330 6 - 280	5 - 330 6 - 280	5 - 280* 6 - 240*	5 - 280 6 - 240	5 - 250* 6 - 210*	5 - 250* 6 - 210*
0 - 8 m	normal area edge area	4 - 500 4 - 500	4 - 220 4 - 220	4 - 420 4 - 420	4 - 360 4 - 360	4 - 360 4 - 360	4 - 320* 4 - 320*	4 - 320 4 - 320

*) Sheet thickness at least 1.00 mm, elsewhere minimum 0.80 mm.
**) maximum 890 mm

Wind area I = coastal area (see NEN 6702)

Figure 6.8

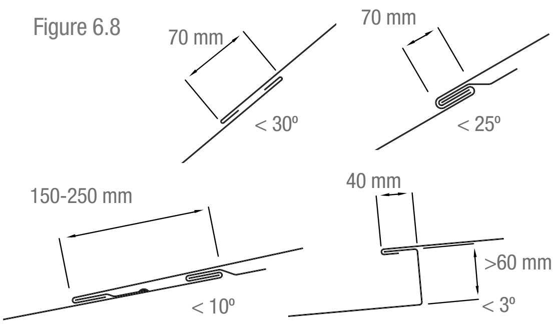
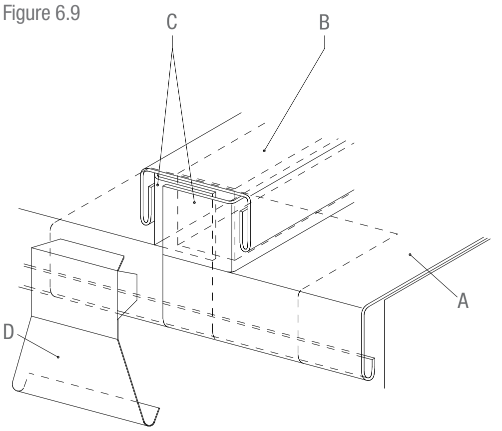


Figure 6.9



A = Roll cap bay
B = Roll capping
C = sheet insert
D = Cover sheet

ASSEMBLY

Marking out

The marking work should be commenced in te centre of the roof or façade area, bay widths being to the left and right of this point. Coordination with the client with regard to the line pattern is recommended.

Assembly

The clips must be attached to the wood roll as shown in figure 6.4. The number of clips and their maximum distance apart are given in table 6.1. The wood rolls are then carefully fitted to the timber at the marked points, with the narrow end downwards, preferably with galvanized steel screws. The distance between the wood rolls must be checked using a roof bay or a template.

Eaves abutment

The eaves apron for engaging with the first roof bay owest roll cap strip, is slid between the wood roll and roof board and secured with nails or screws (see fig. 6.9) The eaves apron must be correctly aligned.

The first roof bay is hooked into the eaves apron. The lower edge of this bay is bent to the correct angle for the roof pitch. The selected length of the first bay is frequently 1 -1.5 metres. This bay, together with the soldered sheet insert can be produced in the work shop in advance. Figure 6.9 illustrates how the bays are finished and assembled at the eaves.

The next bay is then fitted, if more than one bay is required between the eaves and the ridge The bays must be joint with a transverse welt as shown in figure 6.8 or soldered to a maximum of 10 m length to allow thermal movement. Fixed clips are required, so that the bays do not slip. The section at which these are fitted depends on the pitch of the roof (fig 6.7). There should be at least three of these fixed clip constructions in this 1 metre section of the bays as shown in fig. 6.3. An incision of approx. 3 mm is made in the upstand and the zinc is cut away at an angle (see fig. 6.3). The clip can then be turned over into this gap, thus preventing the zinc bay from slipping downwards. The remaining clips used are then sliding clips.

Figure 6.10

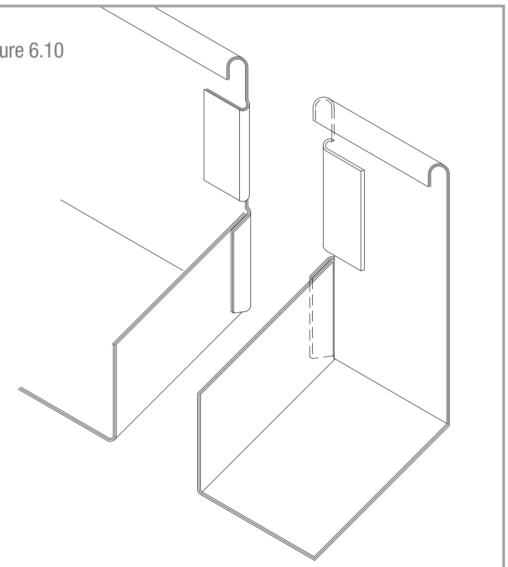
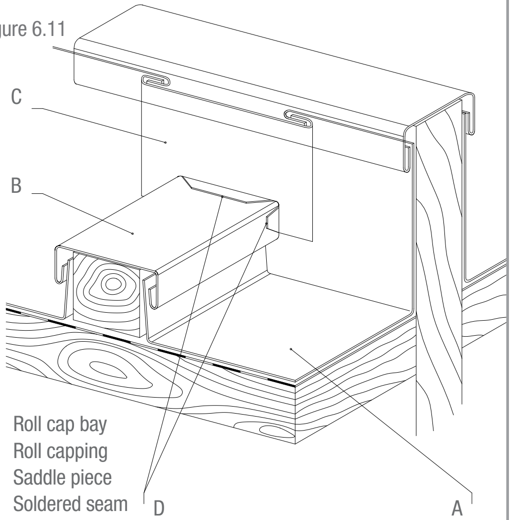


Figure 6.11



A = Roll cap bay
B = Roll capping
C = Saddle piece
D = Soldered seam

Ridge attachment

To begin with, the upper end of the bay must be formed as shown in figures 6.10 and 6.11, after which this bay is layed in position.

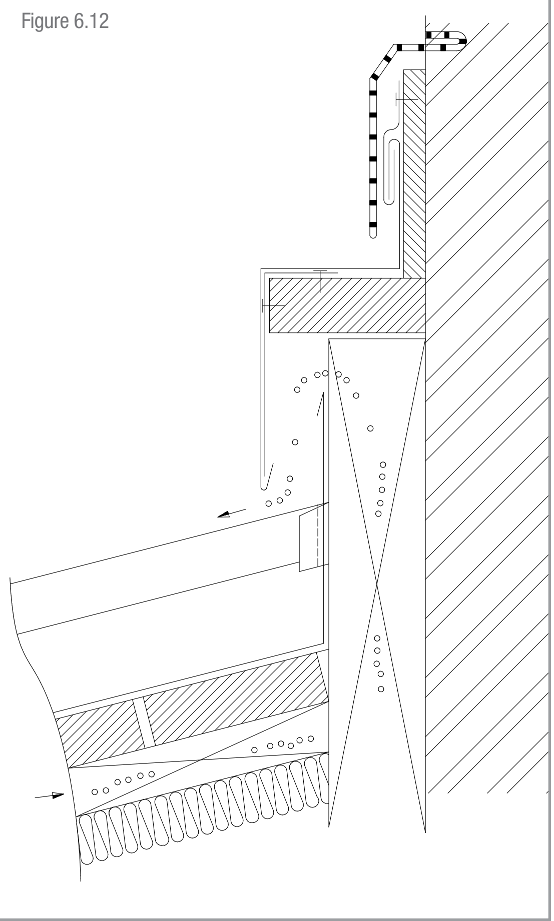
The top bay which meets attached to the ridge can also act as an adjustment bay with a length of 1-1.5 metres in length and this can be prepared in the workshop. Connection to a hip roll is carried out exactly as for the ridge attachment, although in this case the connection is splayed.

Fitting the roll capping

Firstly all the clips should be turned down over the bay and cut to a length of 22 mm from the upper edge of the roll. This is done to allow the roll cap to be pushed upwards. The roll cappings are soldered together up to a maximum length of 10 m. The location of the fixed clips of the roll cap to the wood roll depends on the pitch of the roof (fig. 6.7). The saddle piece is then soldered to the capping at the ridge (fig 6.11).

At the eaves the capping is finished as shown in figure 6.9. A stop end is soldered to the roll capping and engaged with the eaves apron. This stop end should never be soldered to the

Figure 6.12



neighbouring bays. The same applies to bays laid alongside one another.

Verge flashing profile

The verge flashing is formed by turning up the projecting part of the first and the last bays against a verge roll. These bays can be cut to the correct width and the side upstands formed against the roll either on the roof or beforehand. The upstand is at least 55 mm high. The verge roll can be covered with any kind of profile. Both this capping and the bay upstand are secured with at least three clips per metre.

Wall abutment

One example of a wall abutment is given in figure 6.12. A gap must be allowed for ventilation.

Chapter 7 - Lozenge system

APPLICATION ON ROOF AND FACADE

The lozenge system is used for covering large and small sloping and vertical surfaces. The minimum pitch of the roof is 25° or 18° when the vertex of the lozenge is soldered. The standard lozenge system consists of small, uniform bent plates which hook onto each other. The most common form of a lozenge is the square, although the rhombus is also frequently used.

The square lozenge is discussed in this chapter. In addition to lozenge, the names zinc tiles or zinc slates are also employed. Lozenges provide a good solution for cladding of moderately curved surfaces. When hooked together, the lozenges form a mosaic of uniform surfaces with the vertical and horizontal diagonals. Figure 7.1 is a schematic representation of the lozenge system. Aside from the standard lozenges, other dimensions are also possible.

Figure 7.4a shows the half-lozenge for eaves abutment.and Fig. 4b shows the half-lozenge for ridge abutment. Seizes and material thicknesses are the same as whith whole lozenges. With a "top" half-lozenge, both a sliding clip and a soldered clip can be used.

Sliding clip, 70 mm x 50 mm

Material thickness as for the lozenge. The sliding clip functions as a support clip. These support clips can be made by the sheet metal worker himself.

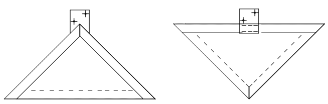
Soldered clips

50 mm wide. Length approx. 100 mm, depending on the location and space for fitting on the base. The clip can be made by the sheet metal worker himself and soldered to the lozenge.

Profiles

The dimensions of the eaves profiles, attachement profiles, etc. will depend on the on-site dimensions and can either be made by the sheet metal worker or supplied custom-made in lengths as custom items.

Figure 7.4 Standard half-lozenge



Specifications of the components

Figure 7.1

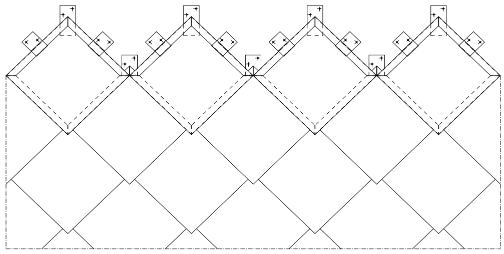


Table 7.1. Dimensions of lozenge, square model without clip.

Lozenge size	Cutting size	Number/m²
450x450 mm	500x500 mm	approx. 5,6
280x280 mm	330x330 mm	approx. 15,3
200x200 mm	250x250 mm	approx. 32

Figure 7.2a en 7.2b

Standard lozenge, square

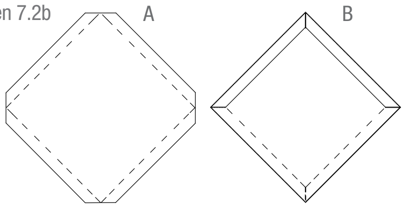
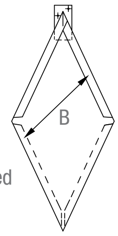


Table 7.2. Dimensions of standard lozenge, rhombus, vertex 50

Afmeting losange breedte 'b'	Knipmaat	Aantal/m²
200 mm	250 mm	ca. 25,6
250 mm	300 mm	ca. 15,3
280 mm	3300 mm	ca. 11,9

Figure 7.3
Standard Lozenge, rhombus vertex 50°



Material thickness 0.80* - 1.00* mm *standard thickness

SUPPORT

The lozenge roof must be fully supported by timber, preferably of rough, unplanned boards, 23-25 mm thick and not tongue-and-grooved, with gaps of at least 5 mm.

Use galvanized nails with a zinc-layer thickness of at least 20 microns or AISI 304 stainless steel for fastening.

VENTILATION

For insulated roofs an air cavity that is open to the outside air is needed between the insulation and the supporting roof boarding. See chapter on Building Physics.

Assembly

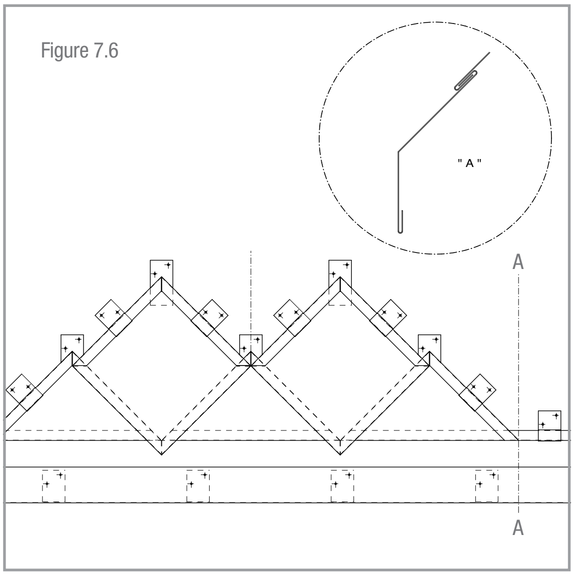
The following description concerns the assembling of lozenges with soldered clips on the vertex and two support clips on the upper sides. The clips are to be fixed to the timber boarding with stainless steel or galvanized steel nails or screws. The lozenges are mounted from eaves to the ridge.

Eaves abutment

An eaves profile is first mounted (use a wire to place the clips for this). Hook the bottom half-lozenge into this and then continue with whole lozenge, see figure 7.6.

Marking: Lozenges are mounted with a small degree of play and marking is necessary to achieve a straight-line pattern. Begin marking from the centre of the roof by applying chalk lines on every third lozenge.

Figure 7.6



Ridge abutment

It is preferable to ensure that half- lozenges can be used for making a ridge connection. When this is impossible, the lozenge must be cut to the desired size and the top size must be bent over. These partial or half-lozenges are to be provided with sliding clips or soldered clips for mounting on the timber boarding. Subsequently with the top profile. An example of ridge abutment is shown in figure 7.7.

Verge abutment

A common method of verge abutment is to end with a verge roll, see figure 7.9.

Table 7.3. Material thickness of lozenge and number of clips dependent on roof height, wind area and lozenge size.

		Lozenge dimensions (cutting size)					
		to 330 x 330 mm		330 x 330 to 400 x 400 mm		400 x 400 to 500 x 500 mm	
		Material thickness* and number of clips per lozenge					
Roofheight	Number of clips per m²	Material thickness	Number of clips	Material thickness	Number of clips	Material thickness	Number of clips
0 - 8 m -inland -coast	 6 6	 0,80 0,80	 1 1	 0,80 0,80	 1 1	 0,80 0,80	 3 3
8 - 20 m -inland -coast	 6 8	 0,80 0,80	 1 1	 0,80 1,00	 3 3	 1,00 1,00	 3 3
20 - 100 m -inland -coast	 8 8	 0,80 1,00	 1 1	 1,00 1,00	 3 3	 1,00 1,00	 3 3

* Advice relative to lifetime and load.
Inland = Area III NEN 6702
Coast = Area I and II NEN 6702

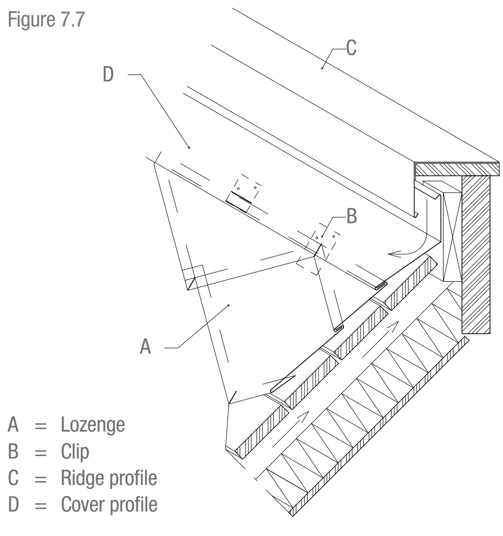


Figure 7.7

Side attachment of the roof to wall

Figure 7.10 shows the side attachment by means of a zinc profile with additional clip. The straight upstand of the zinc against the wall must be at least 100 mm high.

Hip construction

In figures 7.11 and 7.12 a wood roll is placed on the rafter and the lozenge is bent against the wood roll. Ideally, this should be done before placing the roll on the hip rafter. Figure 7.12 shows the method using a zinc strip with additional clip. In the case of a hip construction the hip rafter can be covered in a number of ways. Using a flat profile which is attached to the folded hooks of the lozenge. The lozenge can also be bent against the wood roll or the method using a zinc strip with additional clip.

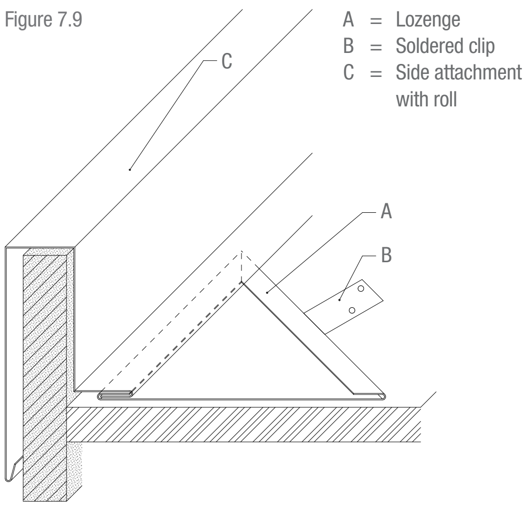
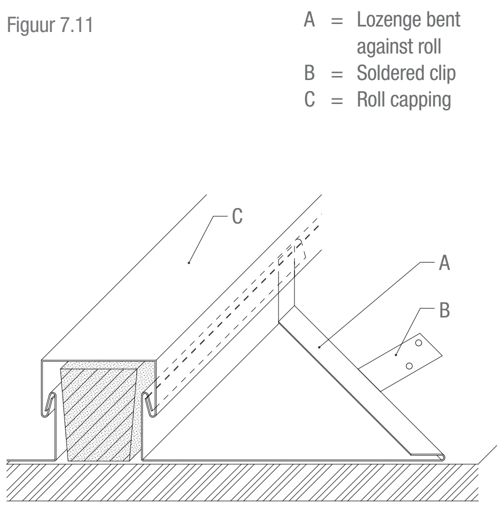


Figure 7.9



Figuur 7.11

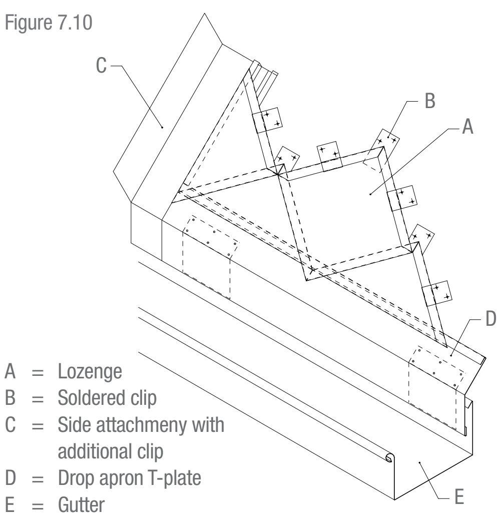


Figure 7.10

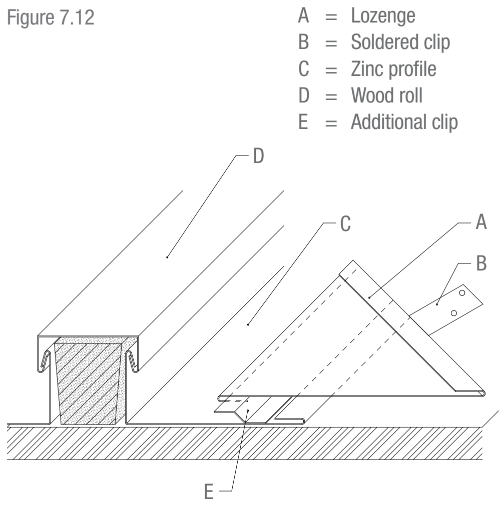
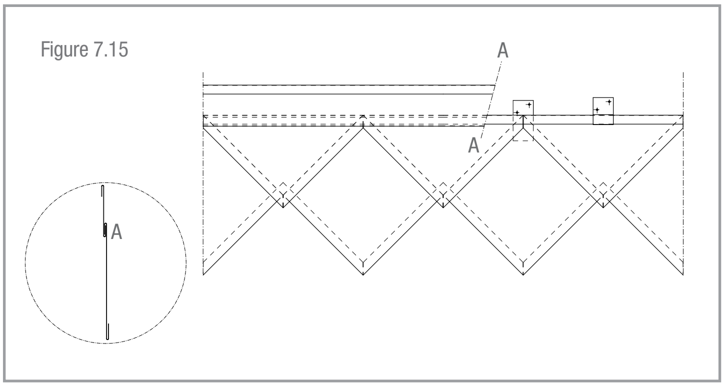
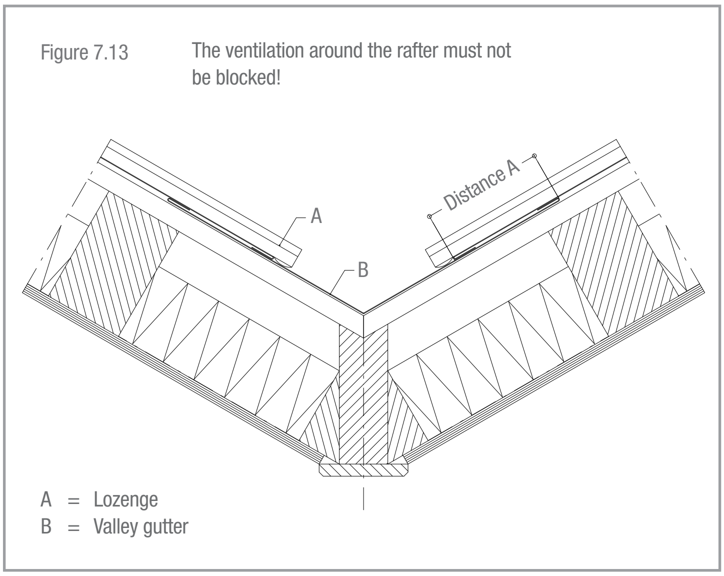
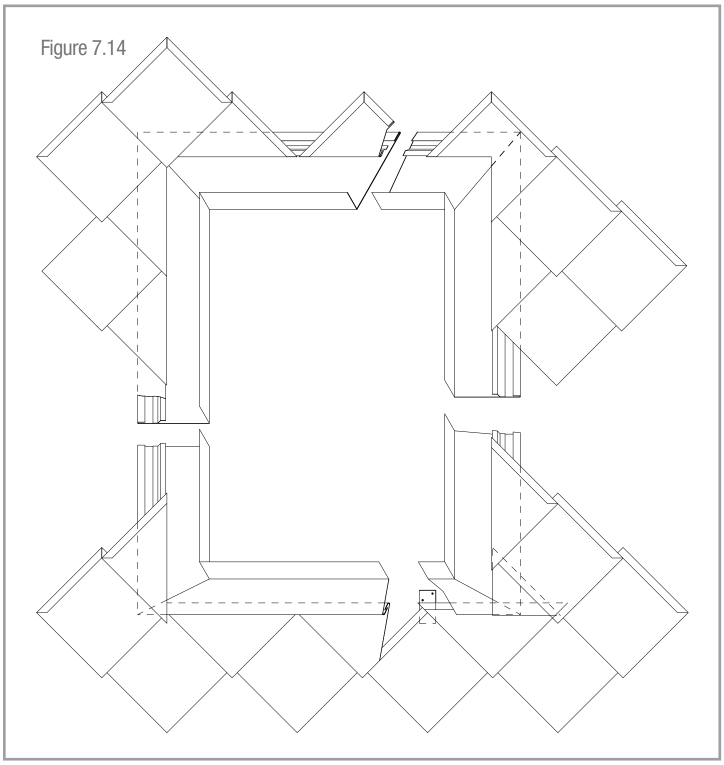


Figure 7.12







Valley gutter
The valley gutter is provided with a continuous additional clip for hooking the lozenges, see figure 7.13.

Roof penetration
A roof penetration requires the techniques used for ridge abutment, verge abutment and eaves abutment, see figure 7.14.

Facade cladding
The lozenge system works extremely well for façade/wall cladding. Assembling and connections are as with the lozenge roof. The base connection is as shown in figure 7.6, in which the base profile does not need to be bent in accordance with the pitch of the roof. The top finish is shown in figure 7.15. Connections with windows are as in figure 7.14. Although lozenges can also be used to cover large surfaces, they are especially suitable for small roof surfaces with a high pitch and for walls and sides of dormer windows. Small surfaces require a modified size of the shingles.

Chapter 8 - NedZink system

ROOF APPLICATION

The NedZink system provides watertight cladding for straight roofs and facades with a pitch of between 7 and 90°.

The standard length for NedZink bays is 3 metres with a nominal width of 300 mm. Preformed clips are used to secure the NedZink bays. Each clip is fastened with stainless steel screws (4 x 20 mm) crosshead on the base construction. The clips are made as sliding clips. To prevent the facade bays slipping down, they must be secured by making a 5 to 10 mm incision in the 30 mm upstand and bending it over to form a lock.

The NedZink system which was developed by NedZink B.V. offers the following benefits:

a. Assembly is straightforward, requiring less time than conventional zinc roof systems.
b. The use of prefformed and standardised components prevents mistakes during assembly.
c. The supporting substructure is less complex and less expensive because the System can be attached to a lattice of battens instead of timbers.
d. The hollow cap construction provides additional (important in case of insulated roofs.

The system also has the advantage that it can be adjusted to accommodate any type of joint, attachment or penetration found in conventional zinc roof systems. The most common types of joints are standardised.

SYSTEM RIDGE CONSTRUCTION

This System ridge profile is supplied in 600 mm lengths and must be worked as follows by the sheet metal worker: make incision in the upstand and the cap, bend to correct angle and solder the ridge capping and the ridge sheet. The verge flashing profiles must be adjusted on site by the sheet metal worker. The ridge sheet and ridge capping are also produced on site.

Other profiles, such as water sills, frame cladding, capping etc. can be supplied on request and by agreement. The total weight of the NedZink system cladding, including clips, is approximately 8.5 kg/m² of surface area covered.

SPECIFICATIONS OF THE STANDARD COMPONENTS

NedZink NTZ® 0,80 mm

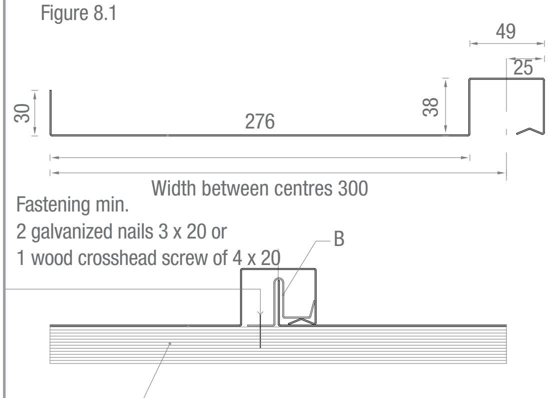
System bay	effective width	300 mm
(fig. 8.1)	length	3000 mm
	(other lengths by agreement)	
	weight	2.53 kg/m
Verge flashing	cover width	25 mm
profile A	length	3000 mm
(fig. 8.2)	weight	0.62 kg/m
Verge flashing	cover width	25 mm
profile B	length	3000 mm
(fig. 8.3)	weight	1.11 kg/m
Flat ridge profile	length	3000 mm
(fig. 8.4)	weight	2.53 kg/m
Alternative:		
System ridge profile	length	600 mm
(fig. 8.5)	weight	2.37 kg/m
		(1.42 kg/piece)
	effective width	300 mm
Wall attachment profile		
(fig. 8.6-8.7)	length	3000 mm
	weight	1.75 kg/m
Stainless steel	width	35 mm
System clips (fig. 8.1)	screw hole	ø 5 mm
Required quantity		approx. 10 pieces/m²
roof distance from centre to centre		300 mm

Stainless steel screws. Minimum 4 x 20 mm crosshead, flat

Additional standard profiles for NedZink facades:

Corner profile A	length	3000 mm
(fig. 8.8)	weight	1.25 kg/m
Corner profile B	length	3000 mm
(fig. 8.8)	weight	0.69 kg/m
Eave-flashing	length	3000 mm
(fig. 8.9)	weight	0.83 kg/m

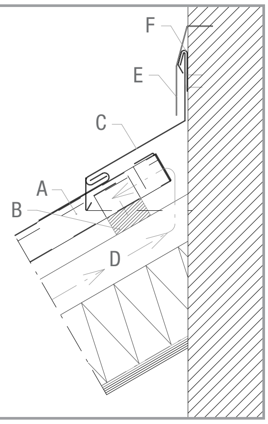
Figure 8.1



Fastening min.
2 galvanized nails 3 x 20 or
1 wood crosshead screw of 4 x 20

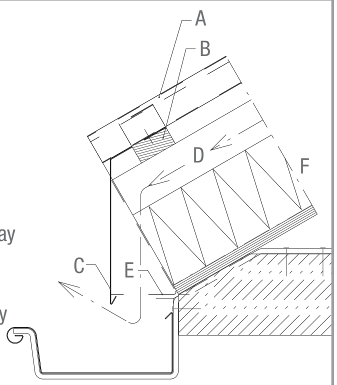
A = Batten or timber
B = System clip distance between centres 300 mm

Figure 8.6



A = NedZink System bay
B = Batten
C = Wall abutment profile
D = Ventilated air cavity
E = Lead flashing
F = Clip

Figure 8.7



A = NedZink System bay
B = Batten
C = Eaves profile
D = Ventilated air cavity
E = Bird netting
F = Insulation

Figure 8.2
Verge flashing profile A
NdZink System

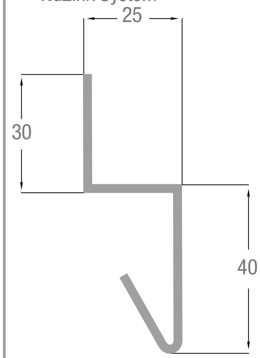


Figure 8.3
Verge flashing profile B
NedZink System

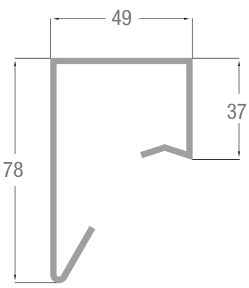


Figure 8.4
Flat ridge profile

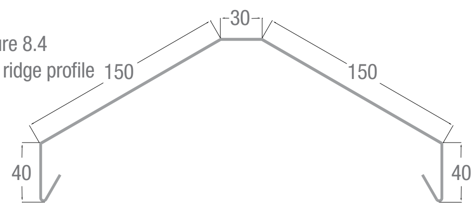


Figure 8.8
Internal and external corner on System facade

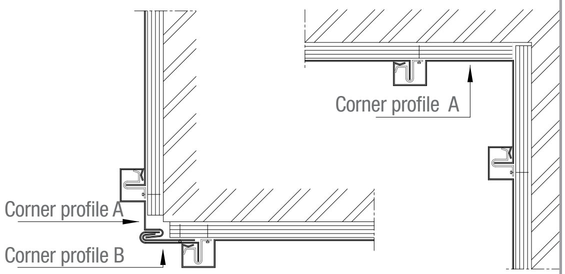
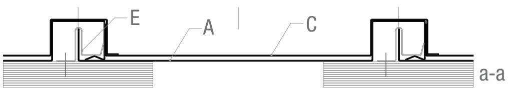
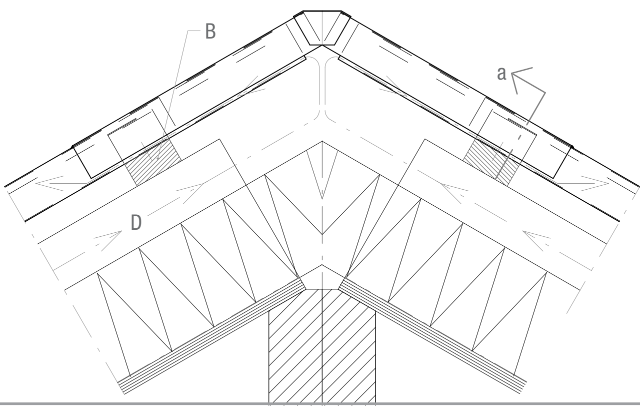


Figure 8.5
System ridge construction





A = NedZink System bay
B = Batten
C = System ridge profile
D = Ventilated air cavity
E = System clip

Figure 8.9

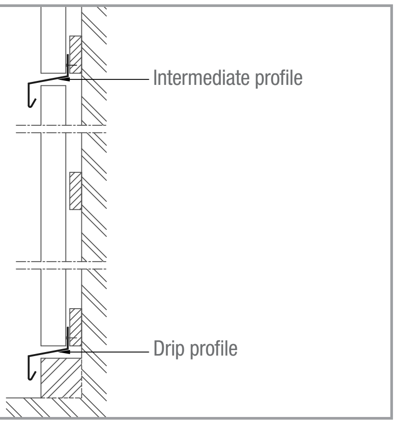
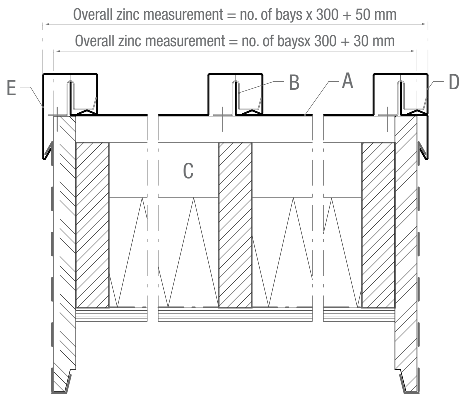


Figure 8.10



A = NedZink System bay
B = System clip
C = Ventilated air cavity
D = Verge flashing profile A
E = Verge flashing profile B

Figure 8.11

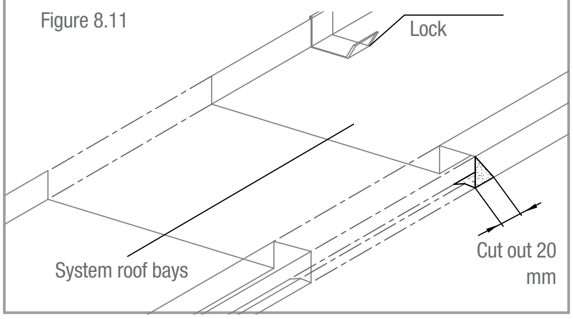
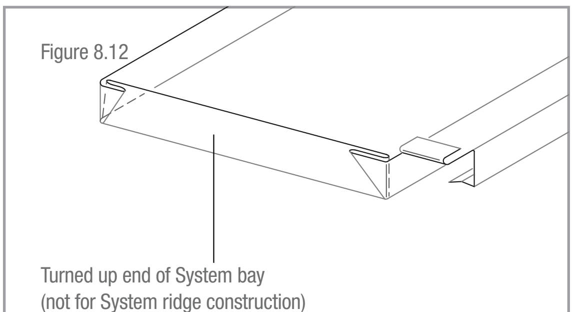


Figure 8.12



SUBSTRUCTURE

The bays of the NedZink System may be laid on a horizontal wooden lattices (e.g. tile laths) provided that their cross-section is no less than 25 mm x 35 mm, or on a lattice made of galvanized steel or aluminium . Minimum dimensions are 1 mm (25x25x25) for steel, and 2 mm for aluminium. The distance between centres should be 300 mm.

The construction of the roof determines wether the lattice substructure is supported by wooden rafters or metal beams. Although not actually necessary, a NedZink System roof can also be fitted to enclosed roof boarding, provided this is adequately ventilated in the case of an insulated roof (consult chapter on Building Physics).

SYSTEM BAY MEASURING AND QUANTITY CALCULATION.

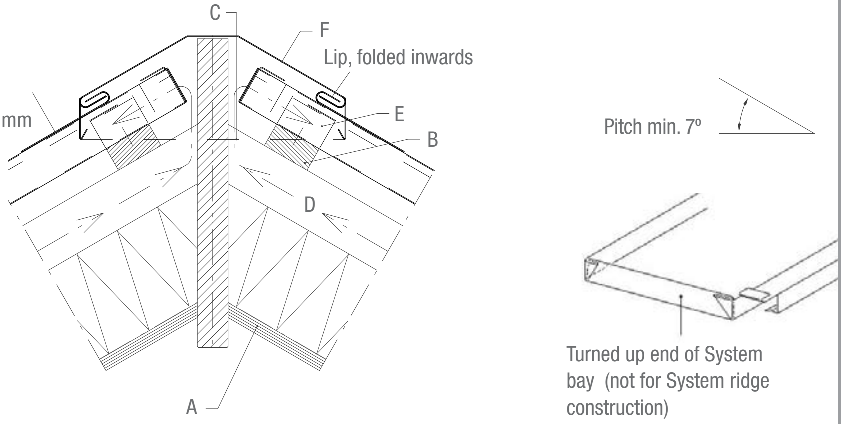
Figure 8.10 shows a cross-section through the NedZink system roof construction. Check the dimensions of the roof and mark the arragement of the bays, bearing in mind that the width per bay may vary by + 4 mm or - 2 mm. The overal width to be covered is: number of strips x 300 mm (+4 mm or -2 mm) + 30 mm.

Example:
The overall measured roof width is 14.47 metres.
The overall width of the bays is
14470 mm - 30 mm = 14440 mm.
The number of bays is 14440 mm: 300 mm = 48.13.

The cover width required for each bays is then
14440 mm: 48 = 300.83 mm = rounded to 301 mm.
In this example the bays therefore have to be laid slightly further apart.

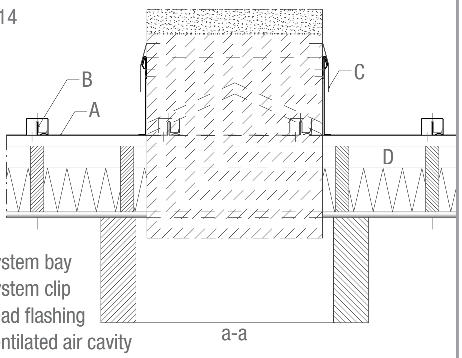
If the calculated cover width is not between 298 mm and 304 mm, a special roofing bay must be either ordered or produced from a standard bay. It is advisible to mark the position of the bays at the eaves as well as at the ridge after every three bays: in this case at 0 - 903 - 1806 - 2709 mm, etc.

Figure 8.13
Construction with flat ridge profile



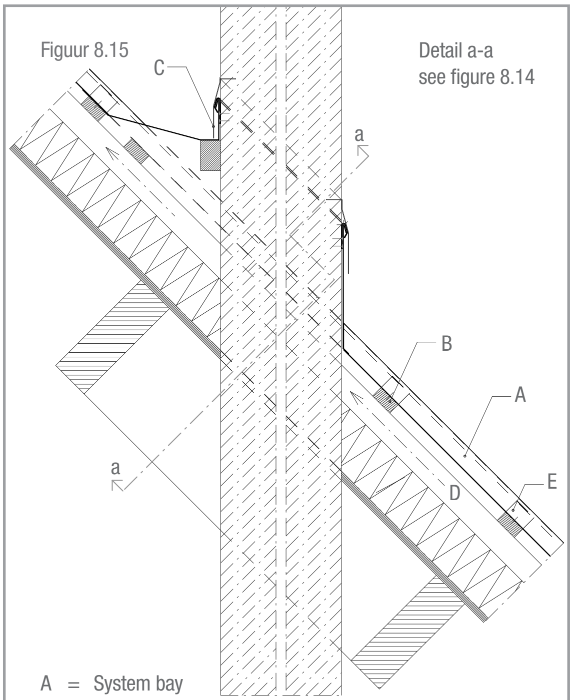
A = Internal ceiling
B = Batten
C = Stop end
D = Ventilated air cavity
E = System clip
F = Flat ridge profile

Figure 8.14



A = System bay
B = System clip
C = Lead flashing
D = Ventilated air cavity

Figuur 8.15



A = System bay
B = Batten
C = Lead flashing
D = Ventilated air cavity
E = System clip

PREPARATION OF THE COMPONENTS

After receiving the materials the following preparations can be made:

- Cutting the bays pieces to length.
  Joining the bay pieces (see fig. 8.11)
  (Lengths up to a maximum of 12 metres may only be produced on the roof. Form an upstand against rainat the ridge end of the upper bay (see fig. 8.12); when using the flat ridge construction or connections to vertical construction elements (see fig. 8.6 and 8.13).

- Forming stop ends in the flat ridge profiles.
  Alternative: produce System ridge pieces from the standard System ridge profiles (fig. 8.5)

- Preparing zinc clips for the ridge and verge flashing profiles as shown in figures 8.6, 8.10 and 8.13 and working drawings.

ASSEMBLY

Before starting on the roof cladding, first install any gutter brackets and eave profiles and bird netting (fig. 8.7). The work should proceed as follows:

- Begin by fitting verge flashing profile A to the left or right gable end(fig. 8.2). This profile is attached using the System clips, which are pushed over the 30 mm high upstand. The Sytem clips must be attached to the substructure with stainless steel cross-head wood screws (4 x 20 mm). Centre to centre distance is 300 mm.

  Then insert the first bay into the stainless steel clips and secure the upstand on the other side of the bay with the clips. Then attach the next bay, and so on. To prevent the bays sliding down, they must be secured at no less than 3 points, by making a 5 to 10 mm incision in the 30 mm high upstand above a clip and bending it over to form a lock (see fig. 8.11).

- After the last standard bay, verge flashing profile B (fig. 8.3) is fitted by pushing it over the clips. If there is insufficient space to do this, the hooked part of the profile which fits underneath the clips can be removed so that the profile only has to be pushed along 50 mm. It may be important to have a slightly longer verge profileso that it can be properly joined with the stop end of the gutter.

- The opposite side of the roof should be a mirror image of the first side this means starting at the same gable end. This ensures the bays are correctly aligned at the ridge.

- Assembling the flat ridge profile: The flat ridge profile is laid loosely on top of the ridge and the positions of the caps are marked. These marked places are then cut out of the ridge profile, allowing a few mm of play, and a lip of approx. 25 mm is folded inwards. Then the flat ridge profile can be laid in the correct position and secured with clips as shown in figure 8.13.

- Assembling System ridge: System ridge components are prepared as shown in fig. 8.16. They are bent to the correct angle, and the ridge capping and ridge pieces are soldered on. System ridge components are then fitted in the same order as for the roofing bays assembled previously. Fixing is by means of solder joints on each profil cap. The verge ridge components are completed with suitable stop ends.

SUPPLEMENTARY CONSTRUCTIONS

Wall abutment is illustrated in fig. 8.6.
Fig. 8.14-8.15 shows how a roof penetration is constructed.

APPLICATION ON FACADES

System bays for the facade are attached to a horziontal lattice made of wood or metal .The lattice spacing is 300 mm. This lattice can be attached to any type of wall construction (brick, concrete, wood, metal, etc.) The ventilation aspect of facades is described in Building Physics.

Measuring and assembly

This is essentially the same as described in the section NedZInk System. Any differences lie in the use of different connection profiles at the beginning and the , and in the use of a drip profile. In addition, the locking device to prevent bays slipping down must be fitted on no less thanl5 clips. Facade openings can be constructed using specially-ordered profiles. Corner profiles A and B can be used to take the System facade around external corners, as shown in figure 8.8 - 8.9.

Internal corners are fitted with a normal System bay, bent at right angles in the middle as in figure 8.8. If the length of the facade is not a multiple of 298 - 304 mm plus standard corner treatment adjustment bays should be made.

The standard bay length is 3 metres (up to 6 metres on agreement). When higher facades are to be covered, the bays can be linked in the same way as for roofs, namely with the soldered overlap as in figure 8.11. A better method of joining facade bays is to use an intermediate profile as illiustrated in figure 8.9. Assembly in such cases is from the bottom up, beginning with the drip profile.

Chapter 9 - U-click cassette system

CASSETTE SYSTEM

The cassette system is extremely suitable for cladding facades with NedZink NOVA NTZ®. With the modular cassette system, aside from the standard pattern size in multiples of 300 mm, custom work on a project basis is also possible. The system is a modular cassette system made up of a hanging system profile and a cassette, which is installed according to the "internal bracket system" and is secured with a fixed fastener.

The pattern size is free to a maximum of 4500 mm. The seams between the cassettes is 15 mm. The panels have a thickness of 50 mm.

AREA OF APPLICATION

The modular cassette system can serve as facade cladding with the following technical specifications:

- Pattern size is free to a maximum of 4500 mm
- The seams between the cassettes are 15 mm
- The corner pieces are available in various dimensions. A whole panel is used to start at the base and a variable edge piece is used to finish on the top side.
- The panel thickness is 50 mm.

SUPPORT

The system is a modular cassette system made up of a hanging profile system that can be mounted against a stable, flat substructure. And from a cassette, which is mounted according to the 'internal bracket system' and is secured with a fixed fastener.

ASSEMBLY

Assembly with the 'internal bracket system' offers the possibility of fast, easy, and cost-reducing assembly. The system is bi-modular, meaning that it can be connected on 4 sides. There are no fixed pattern sizes, giving freedom in the design.

THE ADVANTAGES OF U-CLICK FOR SYSTEM CONSTRUCTION

- Fast, easy and cost-reducing assembly
- Complete system with edging and corners.
- Bi-modular: Connectable on 4 sides. No fixed pattern sixes, giving freedom in the design
- Maintenance friendly, no periodic cleaning needed
- Adds aesthetic value
- Long service life
- High economic residual value and recyclable

Figure 9.1

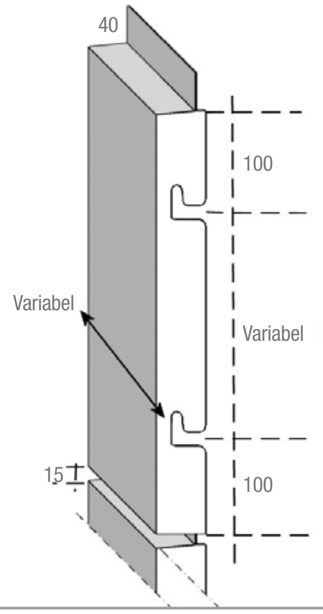


Figure 9.4

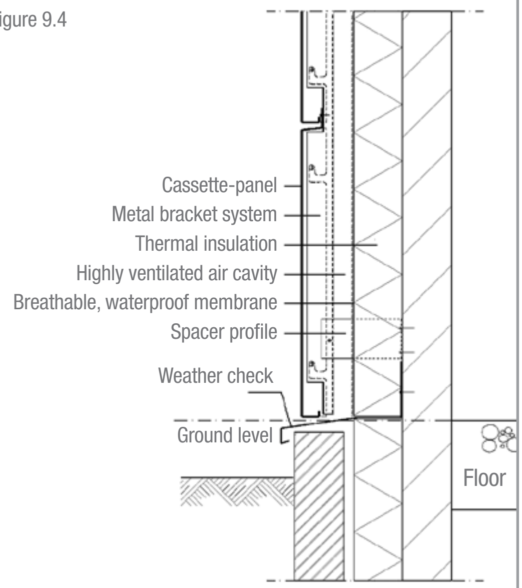


Figure 9.2

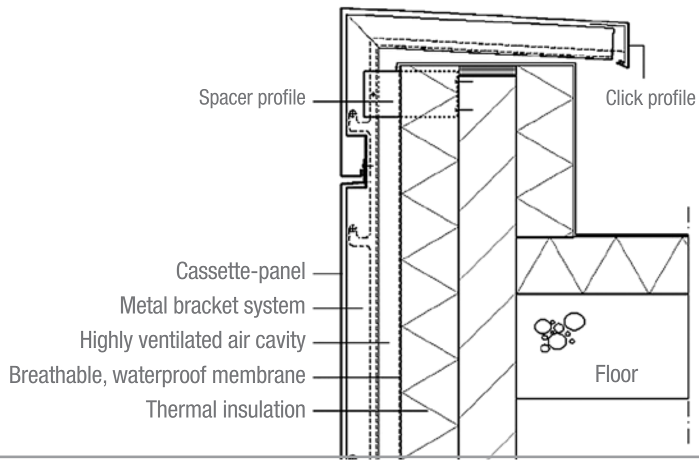


Figure 9.3

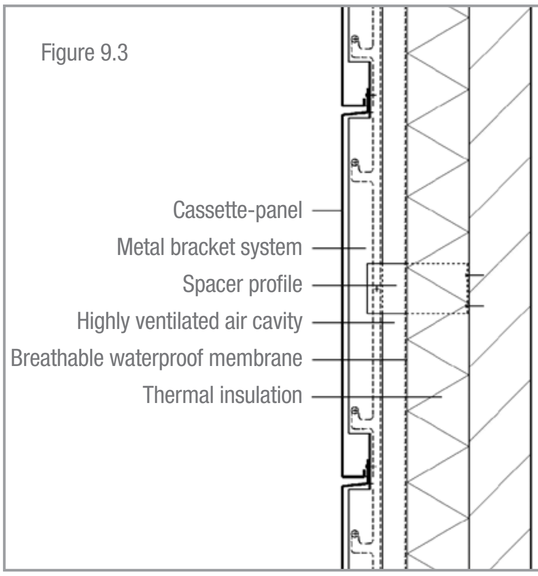
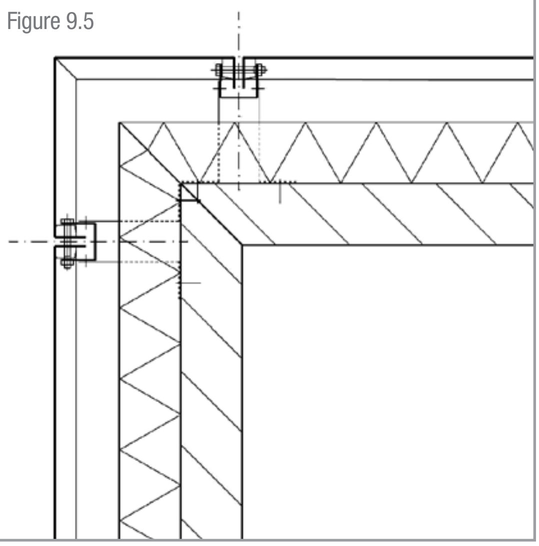
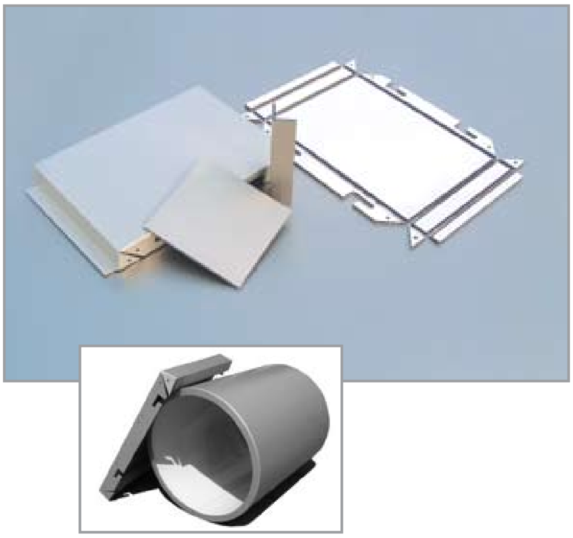


Figure 9.5



Chapter 10 - NOVA COMPOSITE



GENERAL

NedZink NOVA COMPOSITE is a prefrabricated sandwich panel, with an LPDE core (polymere) and covered on the outside with pre-weathered‘NedZink NOVA’zinc.
This combination creates a flat, stiff panel that is exceptionally suitable for use as facade cladding. Whether using glue, internal bracket cassettes (U-Click), clamps or screws, there is a solution for every application.

With the development of NedZink NOVA COMPOSITE, the various loads were taken into account, such as wind pressure and suction, to which a building facade can be exposed. The panel is available in a standard thicknesses of 4 mm, for which the thickness of the ’NedZink NOVA’ top and bottom layer is 0.5 mm.
An advantage of the prepatinated zinc is its durable, aesthetic character combined with the unique self-repairing properties of titanium zinc.

AREA OF APPLICATION

With NedZink NOVA COMPOSITE a facade can be created in zinc with large panel dimensions and exceptional flatness. Rounded elements and curved facades are possible. The assembly of the panel can be adjusted to the design.

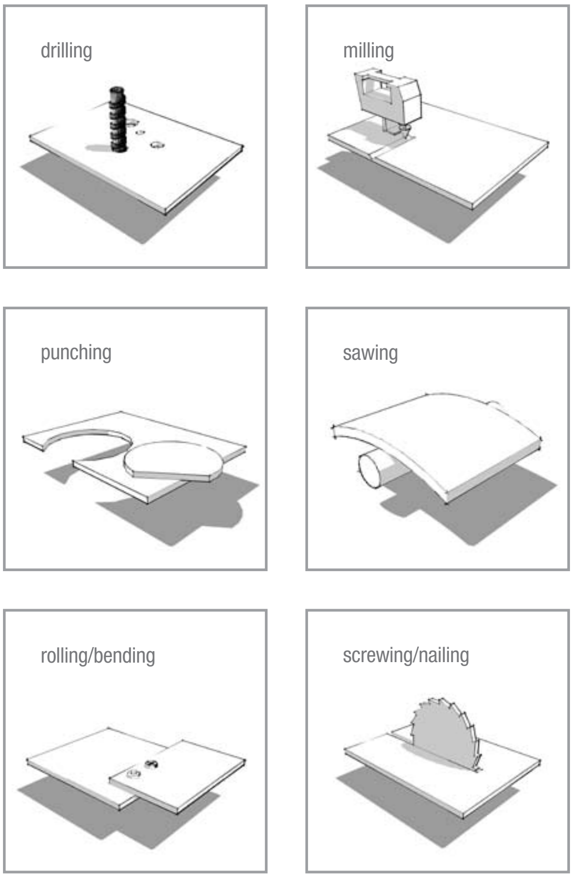
POINTS OF ATTENTION IN HANDLING

NOVA COMPOSITE is delivered as sheets on pallets. The material comes with a protective foil on the visible side as standard. The factory-applied anti-fingerprint coating protects the zinc against fingerprints during handling and assembly.

Product properties NOVA COMPOSITE		
Standard dimensions*	3200 x 1000 mm	
Standard panel thickness*	4 mm	
Panel composition	top and bottom layer:	2 x 0,5 mm NedZink NOVA
	core:	3 mm low density polyethylene (LDPE)
Tolerances	thickness:	-0 / +0,4 mm
	width:	+ / -2,0 mm
	length:	-0 / +4,0 mm
	diagonal:	max. 3,0 mm

* Other dimensions and thicknesses are available on request

When processing it is always advisable to do a test to determine whether the requirements have been satisfied. The following techniques can be used on NOVA COMPOSITE:



When using the milling and folding technique the panel is provided with a special V groove which enables it possible to bend the panel without special tools. Because of the remaining thin layer after milling it is possible to fold the panel to the desired angle by hand or with hand tools.
The groove shape determines the radius of the bend on the outside. When doing this it is important that at least 0.2 mm of the LDPE core remains intact.

ATTACHMENT METHODS

The installation of the panel can be adjusted according to the design.

The following attachment methods are possible with NOVA Composite:

- gluing
- clamping
- visible screws
- internal bracket system

PROCESSING TECHNIQUES

Sawing: The panels can be sawn with standard machines fitted with hardened bits. With standard bits, zinc causes accelerated wear of the cutting edges.

Shearing and perforating: The panels can be cut and punched with standard guillotine cutters and punch machines. Because NOVA COMPOSITE is built up of two metal layers and a LDPE core, a slight drawing of the zinc cover sheet caused by the impact side should be noted. This can be an aesthetic choice. If a sharp cut is desired, start cutting or punching from the non-visible side. The minimum diameter of the perforation is 4 mm, minimum distance between and distance from the edge must also be 4 mm.

Milling and folding: NOVA COMPOSITE can be worked with specially hardened milling heads. Avoid scratches on the surface of the panel caused by loose cuttings and excessive pressure of the milling machine on the panel. It is important that at least 0.2 mm of the LDPE core remains. The panel can be bent after milling. The groove shape determines the radius of the bend. Never bend zinc under 7°C; risk of cracks in the zinc surface.

Bending and rolling: The panel can be formed by conventional shaping tools and rollers. The minimum bend radius is 10x plate thickness. For production series a prototype should be made. Certain specific points should be noted relating to the multilayer structure combining materials of different characteristics.
The surface should be protected from damage by affixing plastic film strips during processing.
The rolling direction is very important for the possible degree of warp of the panel. When bending in the longitudinal direction, tension in the metal is taken up less well, which can lead to the formation of cracks.

Screws: When screwing the panel in an exterior application it is important to maintain the waterproofing of the facade. For this, neoprene washers may be used with stainless steel top rings. In order to provide for thermal movement of the panel, the hole in the panel must be large enough. The screws must be set to the supported load and meet the set requirements. If the screws are screwed tight, the material can have insufficient movement and there is a chance of damaging the panel.

Chapter 11 - Reveal Panel system

Figure 11.1

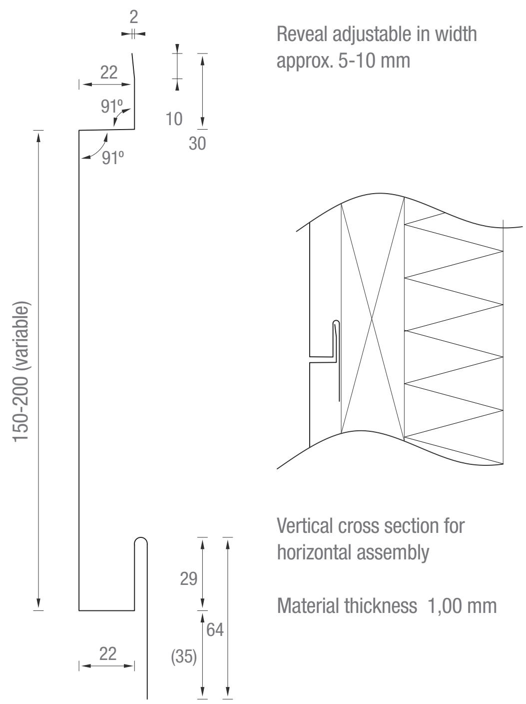
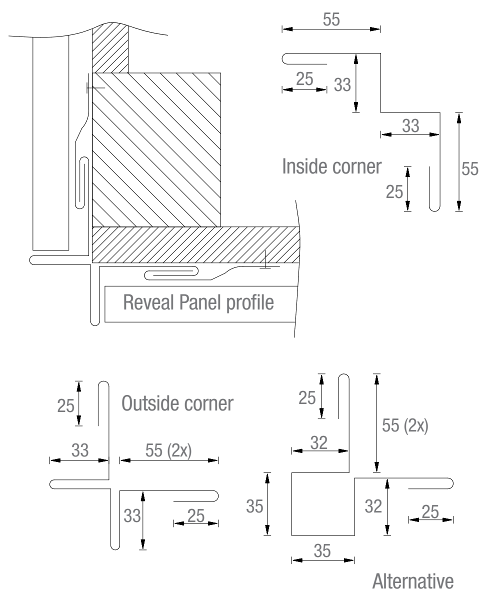


Figure 11.2



GENERAL

The Reveal Panel system is suitable for facade cladding and can be installed both vertically and horizontally. The system consists of profiled zinc sheets with a variable width size from a 150 to 200 mm face (fig. 11.1). The Reveal Panel profiles are assembled such that a joint (reveal) is created. The Reveal Panel system is connected with a tongue and groove. The dimensions of the panels and joints are variable, as are the lengths of the reveal panels.

Generally the system is applied with a material thickness of 1.0 mm. A standard solution is available for most connections, such as inside and outside corners. Different profiles are available, such as corner, joint and water check profiles (figs. 11.2 + 11.3).

AREA OF APPLICATION

The Reveal Panel profile forms a zinc-titanium cladding for facades. The profile offers the possibility of quickly and efficiently covering a facade with NedZink NTZ®, because prefabricated bays can be used. The pre-profiled bays are delivered on site and then fastened against the façade substructure.

Figure 11.3

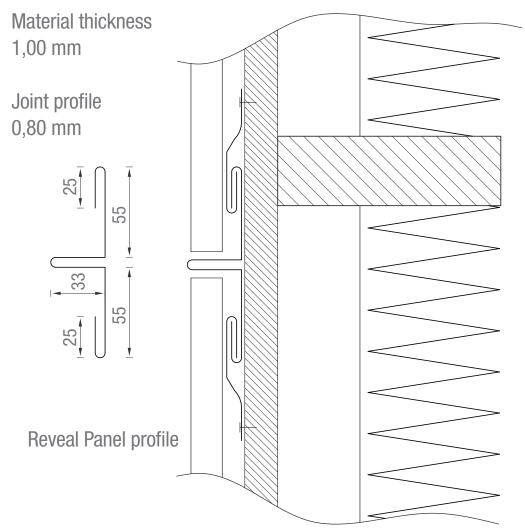
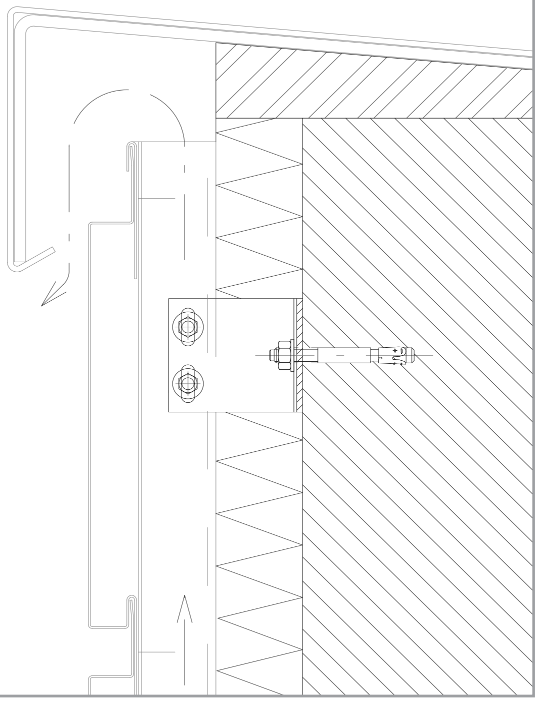


Figure 11.5 Ridge attachment



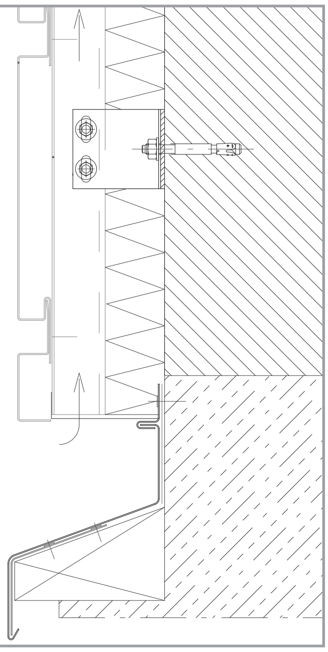
SUPPORT

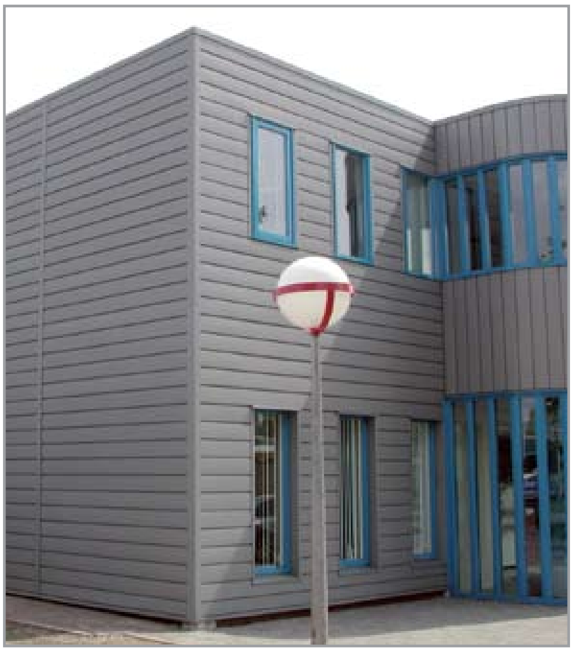
unplaned timber bording 23 - 25 mm thick without tongue and groove.
The timber boards must have gaps of at least 5 to 10 mm. The boards may be spaced up to 100 mm, to be determined by the builder.

ASSEMBLY

The profiled panels are secured to the underlying timber boards, preferably using galvanized steel screws. Depending on the chosen panel profile type, a reveal is created between the different parts, that can be set between 5 and 10 mm width. The profile lengths are a maximum of 5000 mm. For lengths longer than 4000 mm, slotted holes are recommended to take up length changes of the zinc.
Examples of a top and bottom connection are shown in figures 11.4 and 11.5.

Figure 11.4
Eaves abutment





Chapter 12 - Zinc-titanium and other materials

BITUMEN

Bitumen-based roofing materials are based on petroleum with modifications, known as APP- and SBS modified bitumen. These will partially break down (SBS- to a lesser extent) in soluble substances under the influence of sunlight (UV rays). These substances are carbolic acids, which increase the acidity of the rainwater. When this water then runs off over the zinc, the zinc will corroded badly.

For most plastic roofing materials there are no problems with zinc and substances discharged. However, PVC roofing materials can have problems with chlorine binding discharges (softeners) that damage the zinc. Corrosion only occurs if the roofing is applied over the zinc and rainwater runs over the zinc.

COPPER

Copper is more precious (great difference in potential) than zinc. The electrochemical potential between zinc and copper means that copper cannot be used above zinc. If this does occur the zinc will quickly degrade (electrochemical corrosion). Corrosion also takes place if the two substances come into direct contact. If water flows from copper to zinc, the zinc will be damaged.

LEAD

The potential difference between zinc and lead is small and therefore there should be no difficulties in using those metals together. Partly because of the patination of zinc and lead, a transition zone is created, making the potential difference almost equal. We do recommend treating lead with patination oil immediately after assembly. That will prevent the lead from leaving tracks on the zinc. To prevent damage when using a lead flashing in a zinc gutter, use of a plastic separation layer, such as EPDM rubber, is recommended.

THATCHED ROOFS

Zinc cannot be used under a thatched roof because it is corroded by the humus acids that leach out of the reed. The zinc literally dissolves. Zinc is used for ridges, chimneys (above the thatch) and roof penetrations so water does not run off from the thatch onto the zinc.

WOOD TYPES

Preferably do not use the following in direct contact with zinc:

Plywood: built up of veneer layers that have been glued together (water-tight). If condensation should form between the plywood and the zinc, the moisture will damage the zinc after long term exposure.

Preserved wood: check which preserver have been used to the wood with the applier.

Western Red Cedar used in an untreated form leaches over time. It contains corrosive substances that can damage the zinc. This only causes problems if the wood is applied above the zinc and water runs off over the zinc.

TYPES OF GLUE

A precondition for gluing zinc is use of an elastic glue not based on silicone and which does not contain any acidic substances. The glue must be elastic to deal with expansion and contraction. Types of glue that are not recommended are: acidic silicones and epoxies, urea/melamine glues, phenol-formaldehyde glues.

MINERAL BUILDING MATERIALS

Mineral construction materials are used in great quantities in construction, such as fresh concrete, calcium, gypsum, cement and mortar, They can damage zinc in combination with moisture. We recommend applying the zinc as late as possible in the building proces to reduce the chance of contamination and damage to a minimum.

DIRECT CONTACT IS PERMITTED BETWEEN

titanium zinc and:

- galvanized steel: attention: in case of wear, rust can occur that will leave tracks on the zinc.
- anodised aluminium.
- stainless steel

Chapter 13 - Soldering

GENERAL

Soldering means the connection of two metal parts using another metal that has a lower melting point. The metals to be connected are not melted in this process. The metal that creates the connection is the solder.

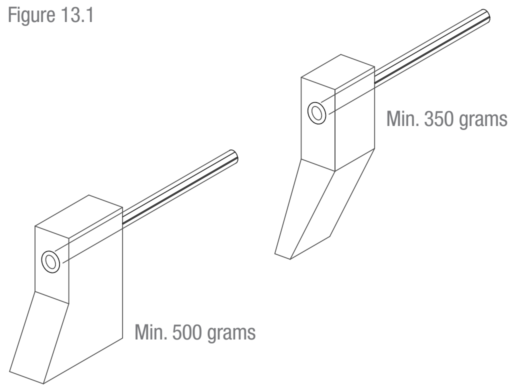
The soldering of new zinc

The soldering should preferably be carried out in the workshop. If this is not possible or not economically viable then soldering is carried out at the construction site.

The soldering work must be carried out in such way that the solder flows satisfactorily and that the minimum overlap requirements are met:

- for vertical soldered joints (e.g. rainwater downpipes) and soldered joint of gutter ends and other accessories min. 4 to 5 mm.
- for horizontal and inclined soldered joints an overlap of min.10 mm.

Figure 13.1



The bit

One must use a soldering bit with a weight of more than 500 grams at the correct temperature (250-400°C).

For soldering of most joints in zinc work a bit with a flat sole of a width of 10-15 mm gives the best results. One may need a bit with another form, min. weight 350 gram and a sole of 5 mm in width, only for places that are difficult to reach. For the form of the bits see figure 13.1.

MAINTENANCE

The lifespan of a soldering bit is determined by regular maintenance. The copper oxide on the bit will always have to be removed and deeply worn bits must be forged into its proper shape. The removal of copper oxides and fluid remnants on the sole of the bit is done using a sal ammoniac block. This is done by rubbing the soldering bit back and forth on the stone at working temperature.

Soldering flux

There are various brands of soldering flux 'suitable for zinc-titanium', that can produce good soldering results. We recommend the use of soldering fluxes for new and old zinc.

These soldering fluxes must have the following properties:

a) the zinc is not or scarcely corroded after soldering.
b) do not produce any harmful vapours.
c) the flux residue can be easyly removed.
d) do not cause rust on tools.

Sequence of applying soldering flux:

- Apply soldering flux to the top of the bottom sheet where the soldered joint is to be made. Make sure there is a 10 mm overlap for a strong joint.
- Apply soldering flux to the botoom surface of the top sheet.
- Place the top sheet onto the bottom sheet and apply the top sheet with soldering flux. Make sure that you also cover the joint.
- Solder the materials together using a hot bit and 50/50 or 40/60 solder. Use a bit with a weight of 500 to 750 gram
- Carefully remove any remaining soldering flux with a damp sponge or cloth.

It is especially advisable not to work with hydrochloric acid whether or not mixed with soldering flux,as this is harmful to health, the tools and the zinc. Before applying the soldering flux,ensure that the zinc surface is clean and that the lap to be soldered will properly close. The maximum permissible gap is 0.5 mm. After completion of the soldering the joints must be cleaned as quickly as possible with a damp sponge or cloth.

SOLDER

For soldering the zinc two alloys are recommended:

a) Tin-lead 50/50, poor in antimony,
   melting range 183-216 °C.

b) Tin-lead 40/60, poor in antimony,
   melting range 183-235 °C.

For b) a 19 °C hotter bit than for a) is required on average in order to obtain the same flow through.

Soldering temperatures which are too low or too high result in weak and brittle soldered joints, or even melted material.

The soldering of old zinc

The difference between the soldering of old and new zinc is the pollution and the patina layer that have formed on the zinc. In order to acquire a good solder joint the overlaps to be soldered must first be thoroughly cleaned and restored to bright metal surfaces. This can best be done by scraping and/or sandpapering. Then apply the solderinf flux and solder as described for new zinc above.

Soldering NedZink NOVA

In order to obtain a good soldering joint the joint must first be polished to bright metal surface.

The pre-patina layer must therefore be removed in advance. This can be done by sanding or by brushing soldering flux onto the layer. After brushing, the flux must work into the pre-patina layer for several seconds.

This can then be removed with a dry cloth. Then apply soldering flux again and solder the bright metal parts as for new zinc.

Chapter 14 - Construction and installation of zinc cappings

ZINC CAPPINGS

Application

Zinc cappings of NedZink NTZ® are successfully applied as a covering for roof edge of flat roofs which are covered with bituminous, plastic or rubber material, wether or not with gravel or terras tiles as a load. These roofing materials can cause problems on the roof edge.

This is the result of a number of factors:
- Effect of sunlight (heat and U.V. rays)
- Differences in expansions between trim, substructure and covering
- Bulging of bitumen due to a low softening point
- Loosing of the glued edge of the roof trim
- Mechanical damage of the roof edge

These harmfull effects can be avoided by fully covering the edge of the roof with a zinc-titanium capping. If NedZink NTZ® is used and applied with the necessary craftsmanship, the expected service life is 50 years or longer.

CONSTRUCTION FOR NEW BUILDING

The zinc capping is designed according to the example figures 14.1, 14.2, 14.3 and 14.4.

A number of important construction details;
- the drip slip can be formed with a bead or a so-called 'flat drip' of at least 35 mm high, see figures 14.1 and 14.2.
- the upper surface of the zinc capping must slope down in the direction of the roof or must be provided with a rain ridge, see figures 14.2 and 14.3.
- the zinc capping is attached by means of zinc clips of a width of at least 80 mm that are fastened to the edge of the roof with at least 2 screws or zinc nails. The distance between the clips amounts to maximum of 1 metre.
  If zinc cappings are used that have been set at 3 metre length, then folded clips are used on the side of the roof between the solder joints, see figures 14.2 and 14.5.
- the material for the clips must be at least 0.80 mm thick.
- the use of stainless steel or galvanized steel clips is recommended for zinc cappings with a long sloping part of > 150 mm. The same goes for zin cappings with a developed width as from from 450/500 mm, by which the zinc capping can be regarded as a roof bay. The number of clips must be adapted to this.

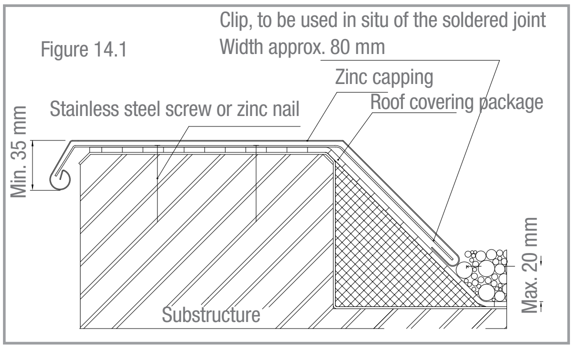


Figure 14.1

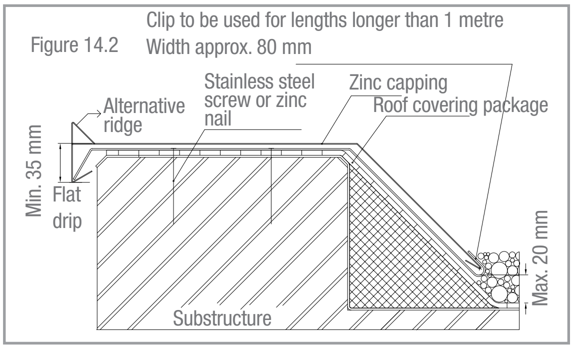


Figure 14.2

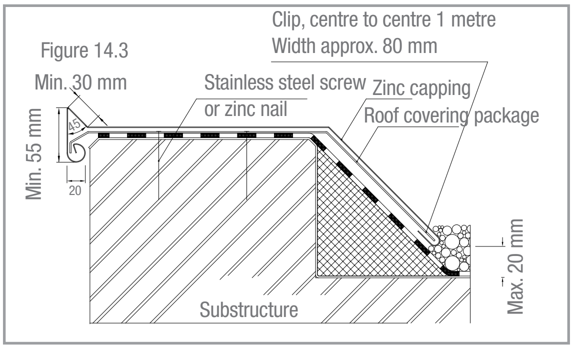


Figure 14.3

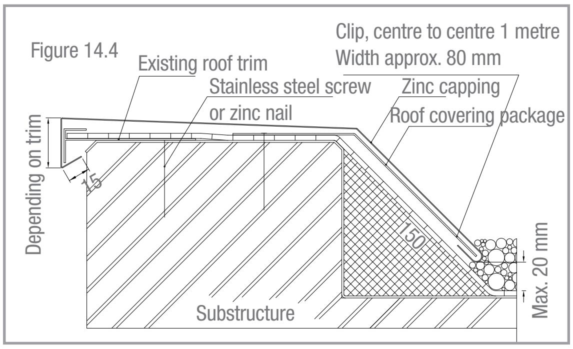


Figure 14.4

- above 20 m in height, increase the number of clips.
- in order to prevent damage to the roof covering the zinc capping is given a folded edge on the roof side and must end at approximately 20 mm from the rim.
- the zinc cappings must be soldered to one another up to a maximum of 12 metres length with an overlap of at least 15 mm. After every 12 metres an expansion sleeve must be fitted at one's option, see fig. 14.6.
- the profile of the zinc capping must be made in such a way that it fits "falling spaciously" , i.e. with at least 5 mm space on all sides, over the base.
- the underlying roof covering must be glued over the entire width of the roof edge.
- in case of roofs with a gravel load, the sloping side of the zinc must be covered for a few centimetres by the gravel; see fig. 14.1.

INSTALLATION FOR NEW BUILDING

For lengths of 1 metre:
Choose, if possible, the installation from left to right, to start with a mitred corner, and the zinc capping is slipped over the first clip (appr. 300 mm from the corner). At each joint the clip is slid half way under the already laid zin capping and secured. Than the next capping is slid over the preceding one with an overlap of 15 mm.

The installation is simpler when the folded section of drip side and roof side of each zinc capping are cut splayed. Continue in this way until the entire roof edge has been covered, after which the joints (except for the expansion joints) can be soldered. For soldering see chapter Soldering.

For lengths of 3 metres:
The first clip is attached beforehand and at the same time the two following clips are respectively 1 and 2 metres from the first one, see fig. 14.5. The clips must have excess length at the roof side in order to be able to be bent over later. Further follow the same procedure as above, with the advantage that only one-third of the number of joints need to be soldered.

CONSTRUCTION IN THE CASE OF RENOVATION

There are 2 methods for this in principle:

a. To repair the existing roof edge in such way that the same starting condition is achieved as would be for a new building. To this end, any existing roof trim must be removed and the roof covering over the roof edge must be repaired up to approximately 20 cm on the roof surface. Then one can work in accordance with the construction and installation for new construction.

b. If a still undamaged and well attached aluminium roof trim is on hand then this roof trim can be used as a clip for the outer side of a zinc-titanium capping. The 'flat strip' construction can only be used in this case where the folded-section of the drip hooks behind the edge of the roof trim. The other side of the zinc capping is attached with normal clips of zin-titanium, see fig. 14.4. If this method is chosen it is advisable to first make a small test piece of the zinc capping and to check the fitting at various places on the roof edge before starting production of the zin cappings.

Figure 14.5

Dimensions in mm

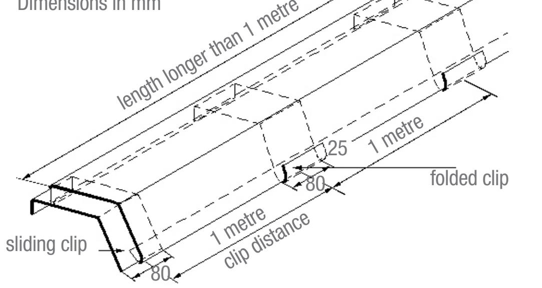
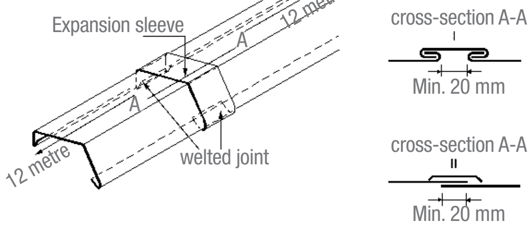


Figure 14.6

Dimensions in mm



INSTALLATION WITH EXISTING ROOF TRIM

- Repair of the weathered and/or cracked roof covering of the top of the sloping upstand up to approximately 20 cm of the roof surface.
- Check wether the aluminium roof trim is still well secured to the edge of the roof, repair if necessary.
- Saw off a piece of one cm of the roof trim at least every 4 metres, so that the roof trim can freely expand.
- When installing lengths of 1 metre: attach a clip at each soldered joint in accordance with fig. 14.4.
- When installing lengths of 3 metres: attach a clip at each soldered joint and at approximately 1 metre distance from one another 2 clips in-between in accordance with fig. 14.5. The clips must allow for a sliding movement of the zinc capping.
- For long zinc cappings an expansion sleevemust be fitted every 12 metres, see figure 14.6.

REMARKS

The use of aluminium roof trim as a continuous clip for the zinc capping can be recommended without any danger of the zinc becoming corroded as in range of stress of metals aluminium has a lower potential than zinc. The zinc capping can continue at the place of the glued outlet grating, possibly with an opening to enable free thermal movement. A mitre corner, installed with the required space of 5 mm can be regarded for the working of the zin capping as an expansion sleeve.
The free expansion of the zin capping must always be guaranteed.

- Wall capping. The principle of the zinc capping for flat roof edges can be unreservedly applied to a wall capping. It is advisable to provide the top of the wall with wooden parts on which the zinc wall capping is attached.

Notes

The advice contained in this brochure is given free of any commitment.
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As a passionate player in the market for rolled titanium zinc (Nederlands TitaanZink (NTZ)), NedZink is inspired each day by the demand from architects, designers and users for existing and new possibilities.

NedZink stimulates the achievement of durable and high quality construction projects with bright- rolled, prepatinated and textured zinc. As a trading partner, NedZink ensures reliable deliveries, knowledge, quality and service. As the market leader NedZink is an active promotor of creative zinc applications.

NedZink is also aware of its responsibility with regard to people and the environment. Future-oriented business management and investments in up-to-date production techniques reinforce its market position, and create room for new developments.

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