RHEINZINK®

STANDING SEAM TECHNOLOGY

Checklist

DESIGN AND APPLICATION

You can find current information, reports and specialist publications, extended technical information, measurement lists, standard details and tender texts at **www.rheinzink.de**

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17th updated edition.

Important notice

With RHEINZINK, the decision was made in favour of a high-quality, durable material. But only storage and processing that is appropriate for the quality of the material ensures a long, maintenance-free life. Therefore, the proper handling of RHEINZINK material is essential.

Whether during transport, storage or processing – a lot can go wrong before the final assembly. This small checklist provides an insight into the most important rules that must be observed when working with RHEINZINK.

Information on the material and processing can be found at:
https://www.rheinzink.com/craftsmen/information-about-the-material/

Our technical sales team will be happy to support and assist you in theory and practice.

Good luck with your next project!

The RHEINZINK Team

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Important points to note

Attention!
Processing error warning

Checklist

1 Material

1.1 OVERVIEW

2 Know how to do it!

What is RHEINZINK?

RHEINZINK is the brand name for titanium zinc according to DIN EN 988.

The material has a high breaking elongation an is therefore easy to process. The precisely defined alloy components ensure a long service life and function of the products in the system.

Patina formation

The product lines CLASSIC, prePATINA and GRANUM EXTRA require low to no maintenance.

The patina of zinc carbonate that forms over time provides lasting protection against corrosive atmospheric conditions.

Regular maintenance to preserve the function and service life of the material is not required.

Only in regions with a maritime climate, where salt deposits occur, or where road salt is applied to the surface in winter, is it recommended that the surfaces be cleaned regularly as required for aesthetic reasons.

Further information on patination and use in regions with a maritime climate is available at: **https://www.rheinzink.com/craftsmen/information-about-the-material/**

RHEINZINK guarantees precise alloying ratios.

For even weathering over the entire building. Do not combine with zinc from other manufacturers.

RHEINZINK material properties

- Melting point: approx. 420 °C
- Specific weight: 7.2g/cm³
- Expansion factor: 2.2mm/(m · 100 K)
- Chemical composition/alloy components:
  High-grade zinc, 99.995 % pure
  0.08-1.00 % copper
  0.07- 0.12 % titanium
- Manufactured in accordance with DIN EN 988

RHEINZINK certification

- Natural material
- Low energy input
- Long service life
- Secured material cycle
- High recycling rate > 95 %
- Electromagnetic radiation is safely shielded.
- ISO 9001
- ISO 14001
- ISO 50001

How is RHEINZINK delivered?

RHEINZINK coils

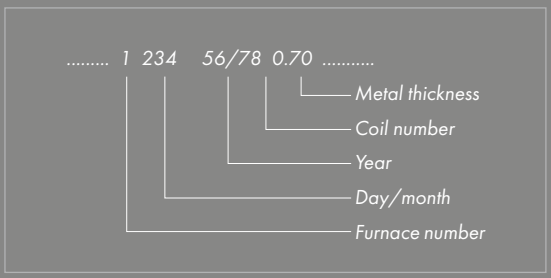
- Standard width for roof covering: 670mm, 600mm, 500mm
- Standard width for cladding: 500mm
- Standard thickness: 0.70mm; 0.80mm
- Weight: max. 1000kg
- Small coil weight: max. 200kg
- Inner diameter:
  ≥ 500kg = 508mm
  <500kg = 300mm

RHEINZINK sheets

- Standard width: 1000mm
  Standard thickness:
  0.70mm; 0.80mm; 1.00mm
- Standard length:
  2000mm, 3000mm
- Maximum pallet weight: 1000kg

RHEINZINK coils and sheets are delivered on rental pallets.

RHEINZINK-prePATINA® –
EN 988 Titanzink/Titanium Zinc/Zinc titane –
RHEINZINK® – Datteln – MADE IN GERMANY –
Rückseite/back side/verso
– RHEINZINK-prePATINA® – 123456/78 0,70

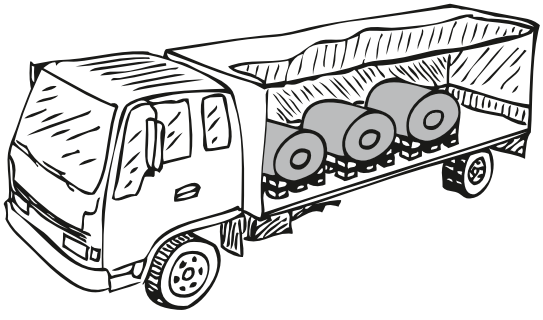


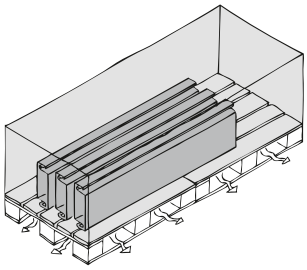
Labelling – for sure!

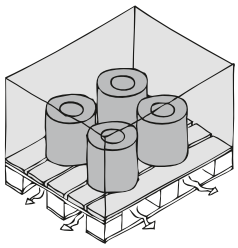
RHEINZINK sheets and coils are marked with a consecutive stamp. Roof drainage systems are embossed. The labelling contains information about conformity to standards and manufacturing parameters.

What is the correct way to transport and store RHEINZINK?

Request a dry, well-ventilated room on the construction site or store in containers.







What should be observed during processing?

- Do not knock over or throw coils
- Do not step on or walk on profiles
- Do not bend profiles/panels or pack them in an unprofessional manner.
- Do not place on wet ground.

How can the RHEINZINK surface get damaged?

- Zinc hydroxide is formed during incorrect storage/transport (does not reduce durability)
- Brown discolouration occurs when oil heating systems deposit sulphur (does not reduce durability)
- In the event of negative impact of other materials (acids, alkalis) or contact with other metals

External influences

Acid oxidation corrosion

- Acid run-off (low pH value) can occur with unprotected bitumen or certain plastic roof membranes. RHEINZINK should be protected over its entire surface with a coat of paint (e.g. ENKE Multi Protect, requires frequent maintenance).
- Have the suitability of membranes in combination with RHEINZINK confirmed in writing by the manufacturer.

Contact corrosion with metals

- Avoid copper above zinc
- RHEINZINK can be combined with aluminium, stainless steel, galvanised steel and lead.

Mortar corrosion

- Avoid contact with fresh mortar (high alkaline pH values)
- Protective measure, e.g. full-surface coating

Corrosion in the area of wall connection profiles, e.g. on balconies

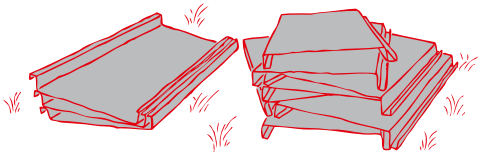
- Avoid constant moisture or acidic chemical components at wall connections.
- Fully coat profiles up to 2 cm above the walkable layer.

Hot water corrosion

- Observe design safety, e.g. minimum roof pitch, jointing technology, expansion, etc.
- Depending on the roof structure, a structured underlay can/must be used.

Zinc hydroxide

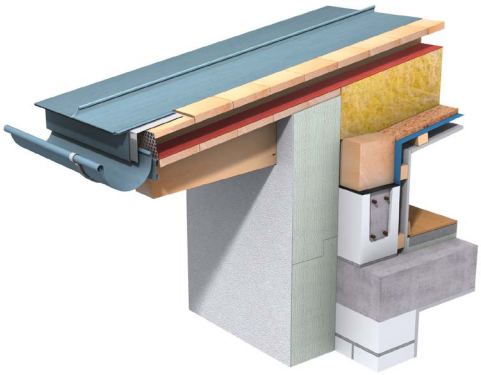
If zinc becomes damp during storage or transport, zinc hydroxide forms on the contact surfaces. This white, water-insoluble top layer can cause visual impairments, but has no effect on the lifespan.



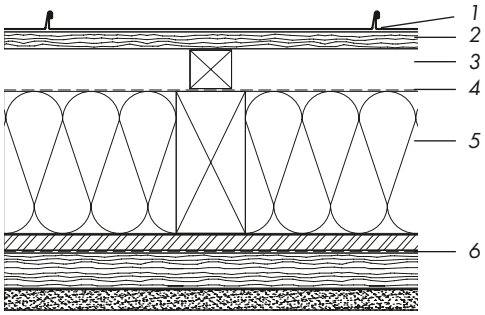
- No lorry transport without a tarpaulin
- Store in a dry, well-ventilated place.
- Do not place on wet ground.
- Do not pack in construction film without air circulation
- The following applies to follow-up work by painters and plasterers etc.: remove protective film after the end of the day's work!
- Do not stack panels on top of each other. Always transport them upright.

Ventilated roof structure*

Direct installation on timber boarding



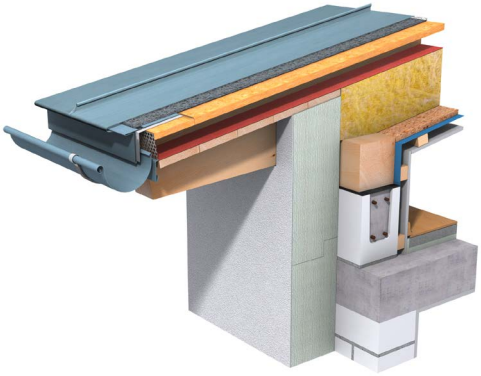
- RHEINZINK can be installed directly on softwood boarding.
- Easy attachment of the clips
- Optimal ventilation (no bulging of the insulation)
- Optimal thermal insulation thanks to wind barrier
- Protection against drifting snow
- Resistant to flying sparks and radiant heat, B_{roof}(t1). (Please request our test certificate.)



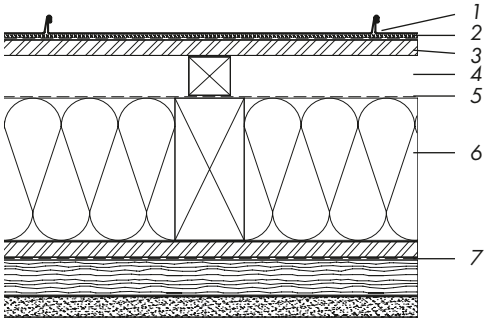
1 RHEINZINK standing seam system
2 Softwood boarding, w ≤ 160mm, t ≥ 24mm
3 Ventilation space (see table below)
4 Breather membrane
5 Thermal insulation/rafters
6 Vapour control layer (glue and mechanically fasten joints/edges)

Ventilated roof structure*

Installation with a structured underlay on plywood/OSB boards



- Use of large-format plywood/OSB boards possible, max. length/width ≤ 2.5m
- Roofing, clips and structured underlay coordinated with each other
- Protection against drifting snow
- Do not use any water-storing underlays.
- Resistant to flying sparks and radiant heat, B_{roof}(t1). (Please request our test certificate.)

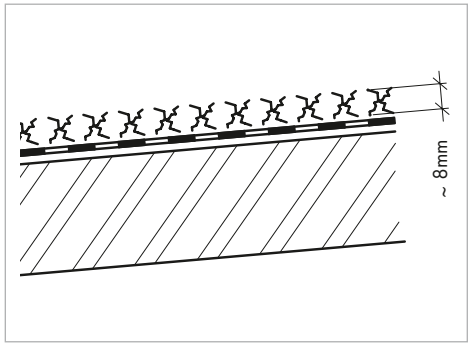


1 RHEINZINK standing seam system
2 structured underlay VAPOZINC or separating layer made of bitumen sheeting with glass fleece or glass fibre reinforcement in accordance with DIN EN 13707 with AIR-Z from RHEINZINK
3 plywood/OSB, d ≥ 22mm
4 Ventilation space (see table below)
5 Breather membrane
6 Thermal insulation/rafters
7 Vapour control layer (glue and mechanically fasten joints/edges)

* Further detailed information on roof construction can be found in the RHEINZINK design recommendations.

Structured underlay VAPOZINC or structured mat AIR-Z from RHEINZINK

- Protection of the construction during the construction phase
- Second drain-off layer for leaks, meltwater from accumulated ice, etc.
- For roof pitches ≤ 15°: if a separating layer is present on site, a structural mat, e.g. RHEINZINK-AIR-Z should also be installed.
- For roof pitches ≥ 3° and ≤ 75° and ventilated roof structures with wooden sheathing: a separating layer is not required
- For roof pitches ≥ 3° ≤ 75° with plywood/OSB: install a structured underlay VAPOZINC ≥ 3° < 20° or mount the RHEINZINK-AIR-Z structure on a suitable separating layer.
- Underlays must not store or absorb water.

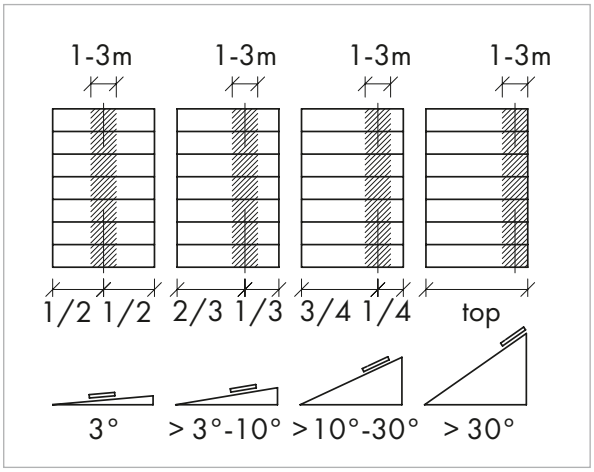


Roof pitch	≥ 3° to < 5°	≥ 5°
Height of ventilation space		
Our recommendation	**≥ 60mm**	**≥ 40mm**
DIN 4108-3	≥ 50mm	≥ 20mm
Width of the ventilation/exhaust slots		
Our recommendation	**≥ 20mm**	**≥ 20mm**
DIN 4108-3	≥ 20mm ≥ 1/500 of the sloping roof area	≥ 20mm ≥ 1/500 of the sloping roof area

Heights of ventilation space and width of ventilation slots in relation to the roof pitch

Clip fixing & number of clips

- The number depends on the building height and the width of the panels/ metal thickness according to the load assumptions of DIN EN 1991-1-4.
- Please ask the planner/architect about the applicable wind loads.



Arrangement of the clips

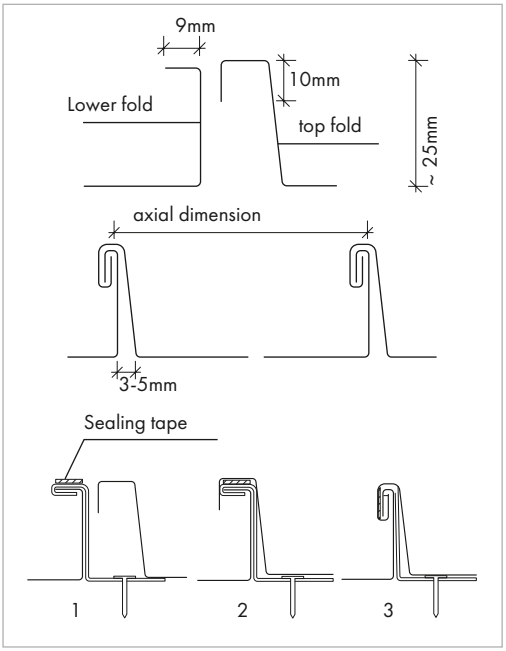
- Depending on roof pitch and e.g. roof penetrations
- 1-3m for panel lengths ≤ 10m
- 3m for panel lengths >10m
  (please contact us about extra-long panels)
- Arrange sliding clips on the remaining roof area

Minimum number of RHEINZINK-clips (per m²) / maximum centre in mm depending on wind loads
Based on the load capacity $F_{R,d}$ of **600 N/clip** (including safety factor 1.5)

Coil width [mm]	**500**		**570**		**600**		**670**		**700**	
Panel width [mm]	**430**		**500**		**530**		**600**		**630**	
Specified wind load [kN/m²]	**Number of clips [pcs]**	**Clip centre [mm]**	**Number of clips [pcs]**	**Clip centre [mm]**	**Number of clips [pcs]**	**Clip centre [mm]**	**Number of clips [pcs]**	**Clip centre [mm]**	**Number of clips [pcs]**	**Clip centre [mm]**
-0.3	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-0.6	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-0.9	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-1.2	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-1.5	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-1.8	5.0	500	4.0	500	4.0	500	3.5	500	3.5	500
-2.1	5.0	500	4.0	500	4.0	500	3.5	460	3.5	440
-2.4	5.0	500	4.0	500	4.0	460	4.0	400	4.0	380
-2.7	5.0	500	4.5	440	4.5	400	4.5	360	4.5	340
-3.0	5.0	460	5.0	400	5.0	360	5.0	320		
-3.3	5.5	420	5.5	360	5.5	340	5.5	300		
-3.6	6.0	380	6.0	320	6.0	300	6.0	260		
-3.9	6.5	340	6.5	300	6.5	280				
-4.2	7.0	320	7.0	280	7.0	260				
-4.5	7.5	300	7.5	260	7.5	240				
-4.8	8.0	280	8.0	240	8.0	220				
-5.1	8.5	260	8.5	220	8.5	220				

Notes:

- Minimum number of clips rounded up to 0.5.
- Maximum clip centres rounded down to 20 mm steps.
- Clip spacing corresponds to the distance from centre of clip to centre of clip.
- For wind loads above the red line, the maximum spacing of 500mm is decisive, not the wind load.
- Recommendation for pent roofs with roof overhangs: panel width ≤ 430mm, metal thickness 0.80mm.
- In order to be able to use the roof area retrospectively (e.g. to attach seam clamps), a linear arrangement of the clamps (parallel to the eaves) is recommended.

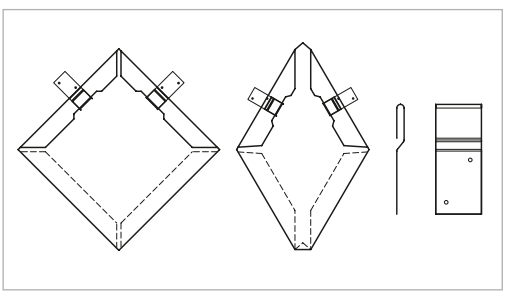


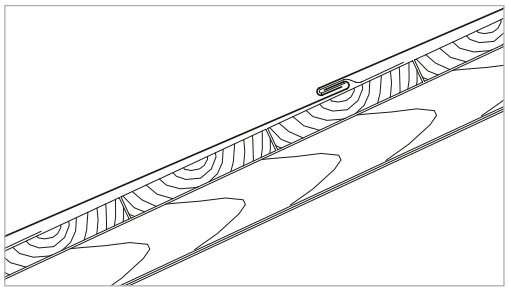
RHEINZINK double standing seam

- Surfaces: see product range
- Metal thickness: 0.70 and 0.80mm
- Coil width: 600mm, 500mm
- It is essential to observe the specified seam dimensions, otherwise problems may arise during mechanical folding when profiling.
- Width minus 70mm (loss due to folding) = approx. centre-to-centre distance
- for roof pitches ≥ 3° ≤ 7° with sealing tape
- When installing with sealing tape, close the panels at a distance of approx. 0.5m to the angled standing seam immediately after laying, otherwise the sealing tape will swell.
- Processing temperature for seaming, folding, bending and profiling ≥10° metal temperature
- At metal temperatures of <10 °C, the processing area should be heated using a hot air gun, for example.

RHEINZINK square tile/diamond tile

- Can be used in the roof and façade
- Surfaces: see product range
- Roof pitch ≥ 35°, recommended roof structure: ventilated roof structure with direct installation on softwood boarding, rainproof underlay, overlapping of the underlay membrane welded or glued, other roof structures on request.
- Metal thickness: 0.70mm
- Width of square tile: 325 x 325mm, see product range for other widths
- Width of diamond tile: 330 x 228mm, see product range for other widths





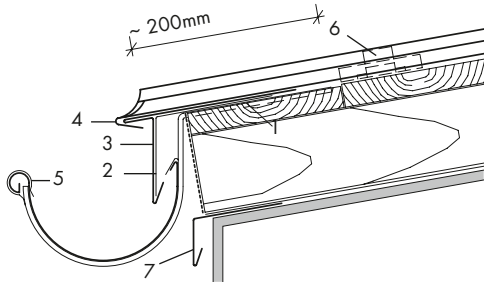
RHEINZINK flat-lock tile

- Can be used in the roof and façade
- Surfaces: on request
- Roof pitch ≥ 35°, recommended roof structure: ventilated roof structure with direct installation on softwood boarding, rainproof underlay, overlapping of the underlay membrane welded or glued, other roof structures on request.
- Metal thickness: 0.70; 0.80 and 1.00mm
- Width ≤ 600mm
- Installation length ≤ 3000mm (optimally ≤ 2000mm)
  We recommend construction lengths ≤ 2000mm for better handling.

Visible width = overall width

Standard sizes in mm	**Weight 1.0mm**
333 x 600mm	~9.90kg/m²
400 x 800mm	~8.54kg/m²
500 x 1000mm	~8.90kg/m²
600 x 1200mm	~8.62kg/m²

We would be happy to advise you on other dimensions/intermediate sizes.



1 Eaves board, lowered
2 Continuous cleats made of galvanised steel 1.00mm
3 Eaves flashing made of RHEINZINK, 0.80mm
4 Round eaves with return
5 Gutter, gutter bracket, swivel bracket
6 Install the mounting directly after the eaves strip (approx. 200mm)
7 Drip tray for functional level

Eaves on softwood boarding without a structured underlay

- Lower the board
- Insert gutter bracket (rafter)
- Galvanised continuous cleat 1.00mm
- RHEINZINK eaves flashing 0.70mm
- Round standing eaves closure
- Open panel backfold
- Adhere to expansion area
- Conclusion: safe water flow at the eaves, no standing water!

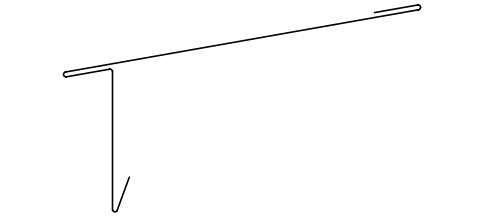
Eaves closure, standing round

Eaves closure, standing at an angle

Eaves closure, standing straight
(only for visually undemanding applications)

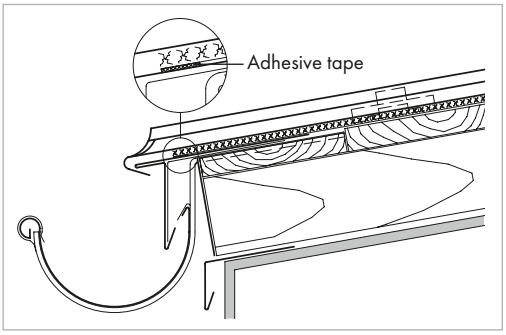
Optimisation of details: eaves flashing

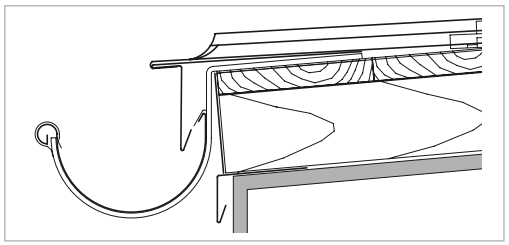
- Roof pitch ≥ 3° ≤ 10°
- Water check at the end of the eaves strip = reduced capillarity
- Lower the eaves board sufficiently.

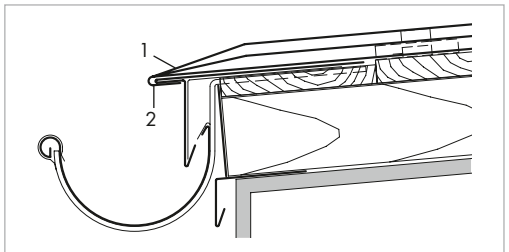


Eaves closure with structured underlay

- Remove the underlay with the structural mat approx. 50mm
- If necessary, additionally bond a sealant tape to the eaves flashing







1: Folded eaves design = stress cracks possible

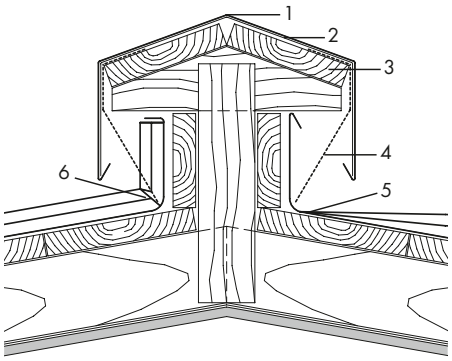
2: Temperature-related change in length (contraction of the panels) not possible = buckling or stress cracks

Eaves on wooden boarding with negative details

- Eaves board not lowered
- Gutter bracket not recessed
- Eaves strip without galvanised continuous cleat (unstable)
- Eaves closure too long approx. 60mm
- Panel return compressed
- Insufficient space for movement

Conclusion

- "Leaking eaves" possible due to reduction of the roof pitch at the discharge edge to ≤ 3° due to the poor detailed solutions mentioned above
- Capillary penetration due to extremely flat inclination (unfavourable drainage behaviour)
- Standing water (puddles) leads to the formation of zinc hydroxide
- Lack of movement, therefore bulging of the panel due to contraction at low temperatures = counter-slope possible



1 RHEINZINK covering
2 Continuous cleats made of galvanised steel 1.00mm
3 Timber boards 160 mm x 24mm
4 Perforated profile as protection against drifting snow
5 Panel end as a turned down seam
6 Panel end as a pinched seam

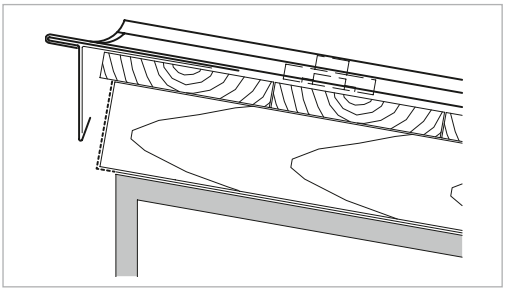
Gable roof ridge, high version with ventilation

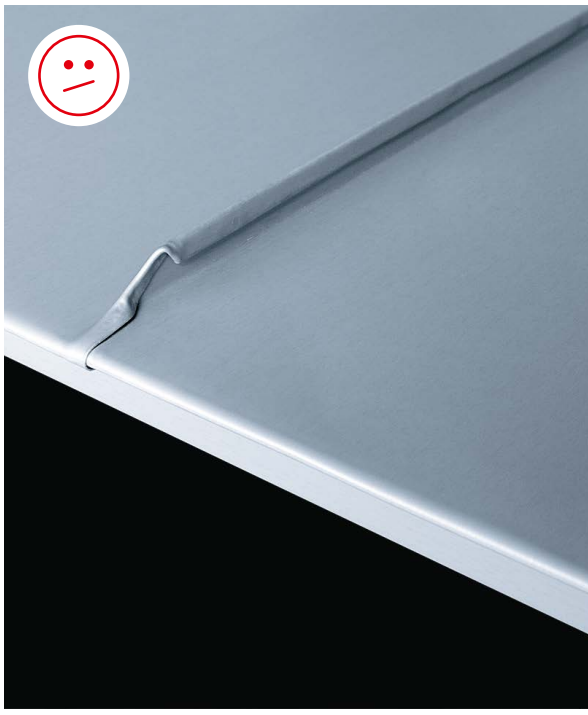
- Upstand height of the panel depending on the roof pitch ≥ 80/100/150 mm (≥ 22°/< 22°/< 5°)
- Top end with water check
- Note the size of the ventilation openings.
- Execution of panel ending: turned down or pinched – provide space for movement of the panels. Fold gently and without tension – then raise using rounded pinch pliers; using sharp-edged tools will cause cracks in the material (see also RHEINZINK Interactive Webinar online)

Setting up with rounded pinch pliers

Pent roof ridge with eaves ending

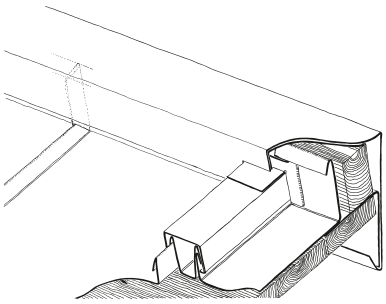
- Leaking end due to missing panel upstand
- Water overflow at ridge edge
- Excessively long eaves ending and lack of movement = possible leaks



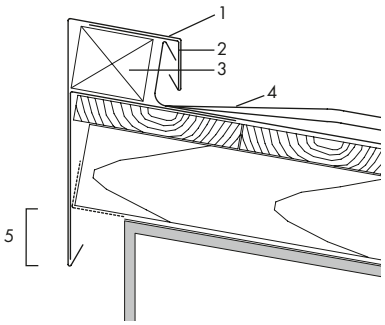


Pent roof ridge with timber battens

- Overlap of RHEINZINK ridge profile on the facade, depending on the height of the building ≥ 50mm/80mm/100mm
- Execution of the panel ending: turned down seam with a connection height of ≥ 60mm
- When integrating expansion strips (≥ 40mm), the ridge strip should be selected ≥ 20mm higher (see figure). Top end with water check.
- Design expansion area for panels ≥ 15mm



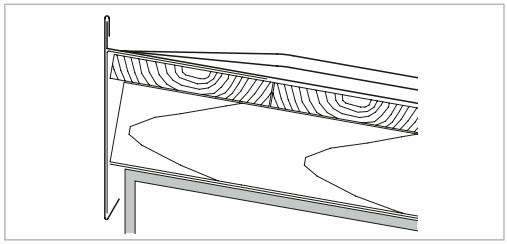
Expansion strip on the ridge of the pent roof

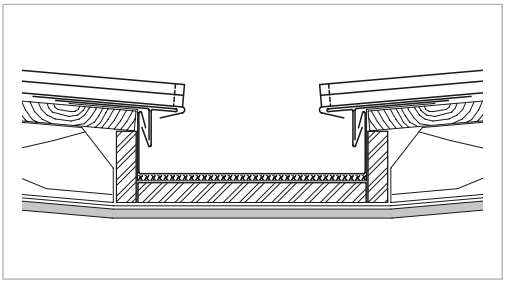


1 RHEINZINK coping
2 Galvanised steel cleat 1.00mm
3 Timber batten, height ≥ 60mm
4 Panel end as a turned down seam
5 Overlap façade, depending on building height, ≥ 50mm

Pent roof ridge without expansion area and insufficient installation height

- Folding is too sharp-edged = material dented
- Missing water check
- Insufficient installation height
- Missing expansion area = dents, stress cracks, etc.



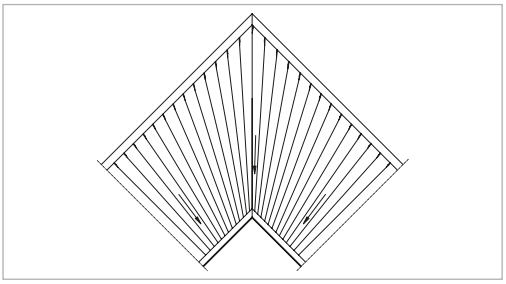


Valley gutter recessed on structured mat

- For roof pitch ≤ 10°
- Opening ≥ 150mm
- Gutter height ≥ 60mm
- The valley gutter in the eaves area should be at the same height as the eaves gutter
- Arrange snow guard system
- Additional roof sealing on timber boarding, approx. 50cm wide
- Plan for cross ventilation in the valley area!

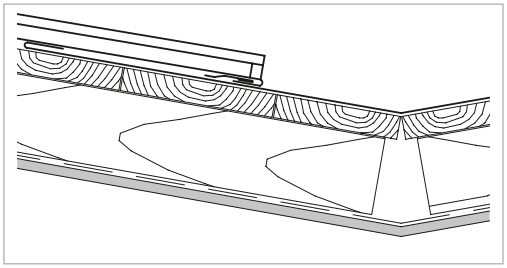
Valley with tapered panels

- For roof pitches ≥ 5° to ≤10°
- Panel width at eaves at least 100mm
- Complex/difficult for panel lengths ≥ 6m due to diagonal cuts of the panels and forming of the seams for tapered panels
- Better: recessed valley gutter



Valley with single seam and soldered continuous cleat

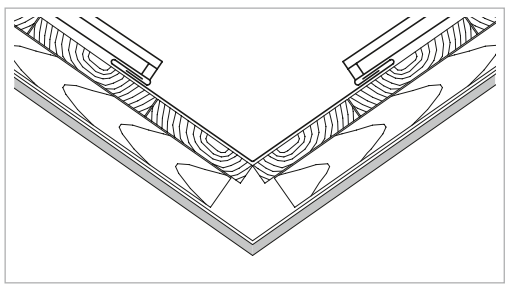
- For roof pitch > 10°
- Girth ≥ 800mm
- Girth of cleat approx. 80mm, solder on panels
- Profile joints at valley inclination ≤ 10°, solder with expansion elements
- Execution of soldered cleat (see section 2.2.7)
- Plan for cross ventilation in the valley area!

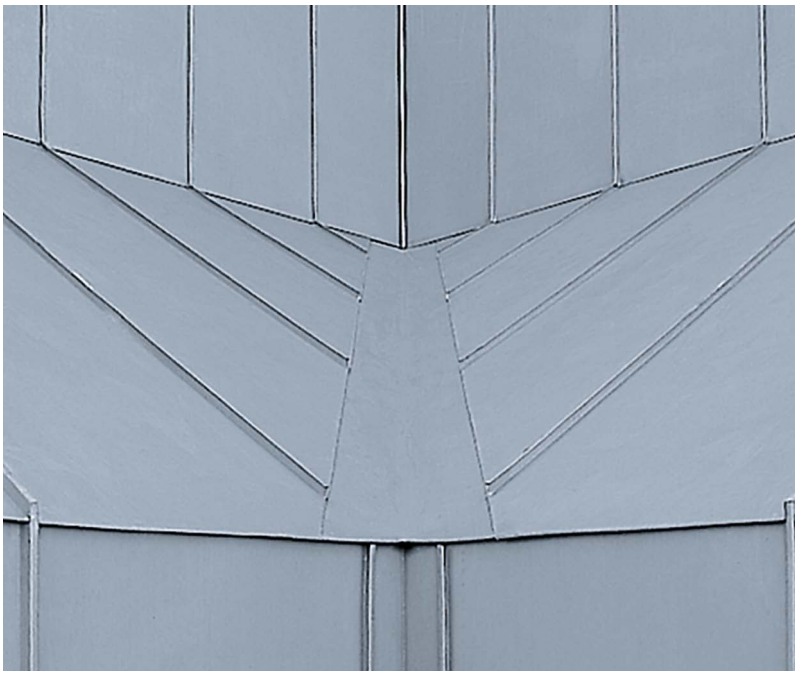


Valley with single seam

- For roof pitch ≥ 25° (35° *)
- With water check, width 50mm
- Girth ≥ 400mm
- Profile joints as single seam, with soldered cleat or solder with expansion element
- Plan for cross ventilation in the valley area!

* in areas with heavy snowfall



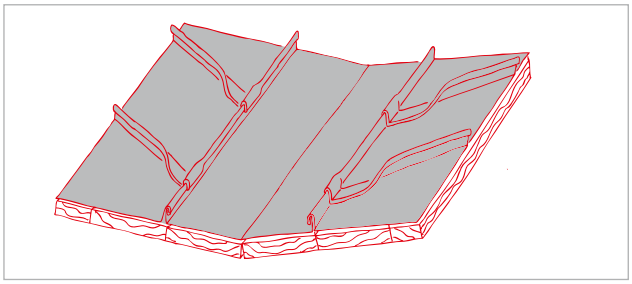


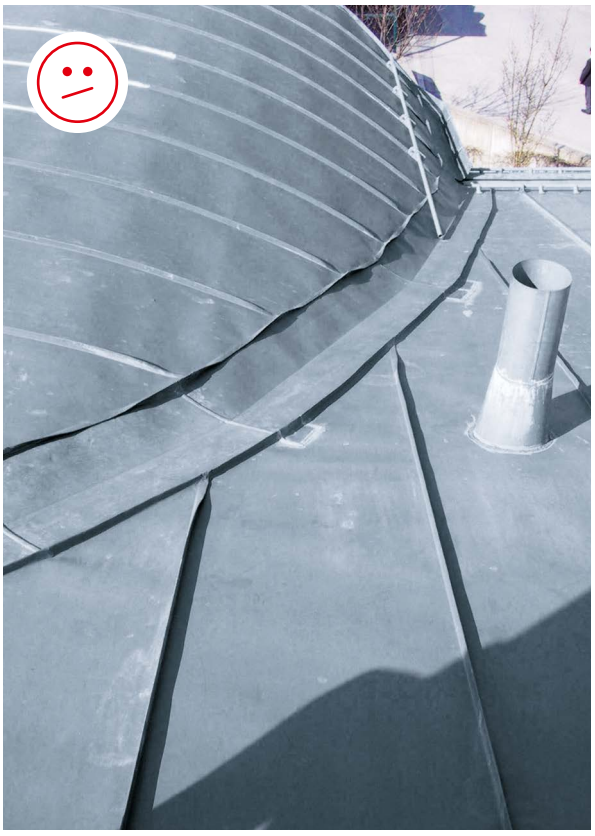
Folded valley

- Folded valleys can be used for both straight and curved valley geometries (e.g. barrel-vaulted dormers).
- Highly leak-proof, as they do not need to be soldered

Seamed valley

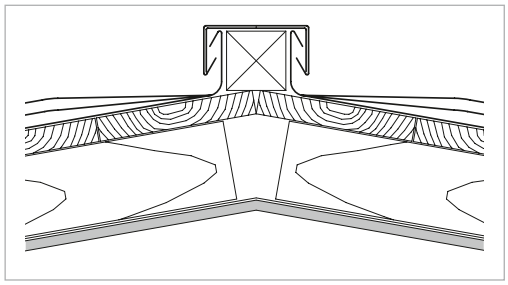
- Only up to 3 metres in valley length
- The roof and valley panels are firmly seamed. Stress cracks are caused by temperature-related changes in length
- Junctions are difficult to execute (material cut-outs etc.)

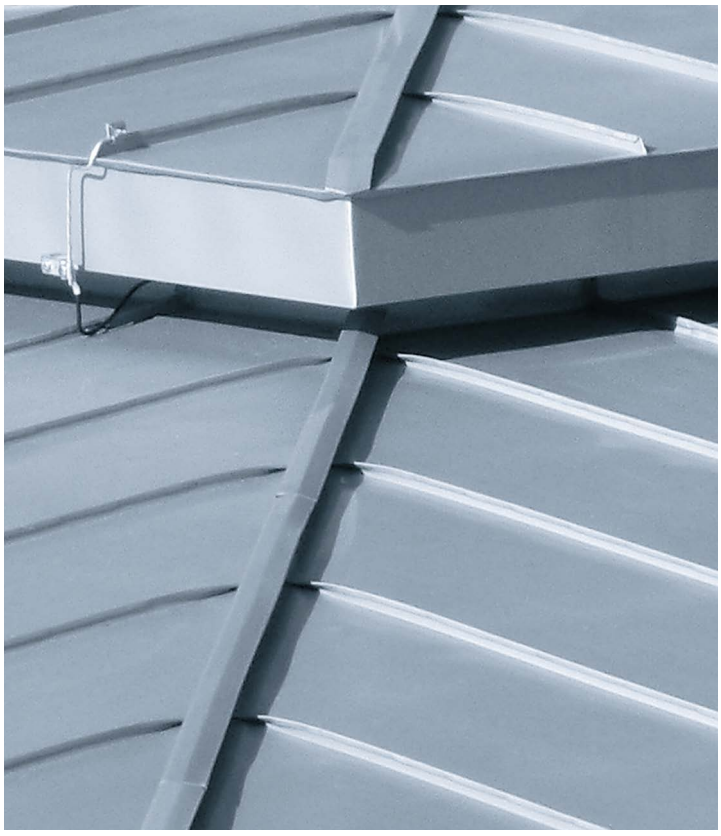




Hip with batten and capping

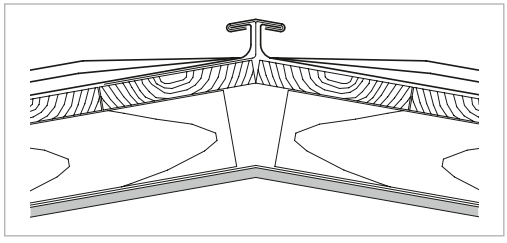
- Connection height ≥ 40mm
- Type of execution: turned down seam
- Seam layout without offset
- Design and expansion advantages over "ridge as a double standing seam"
- Alignment of the connection height with the verge and the pent ridge using a batten





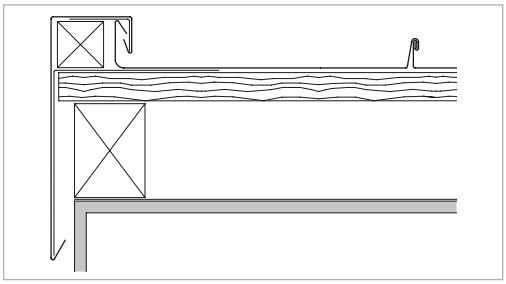
Hip without batten, with capping

- Connection height ≥ 40mm
- Alternative to the "ridge with batten"
- Type of execution: turned down seam
- Seam layout without offset
- Narrower solution particularly suitable for smaller components such as dormers etc.



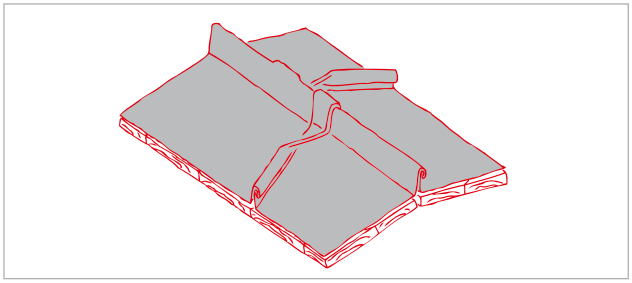
Verge with batten

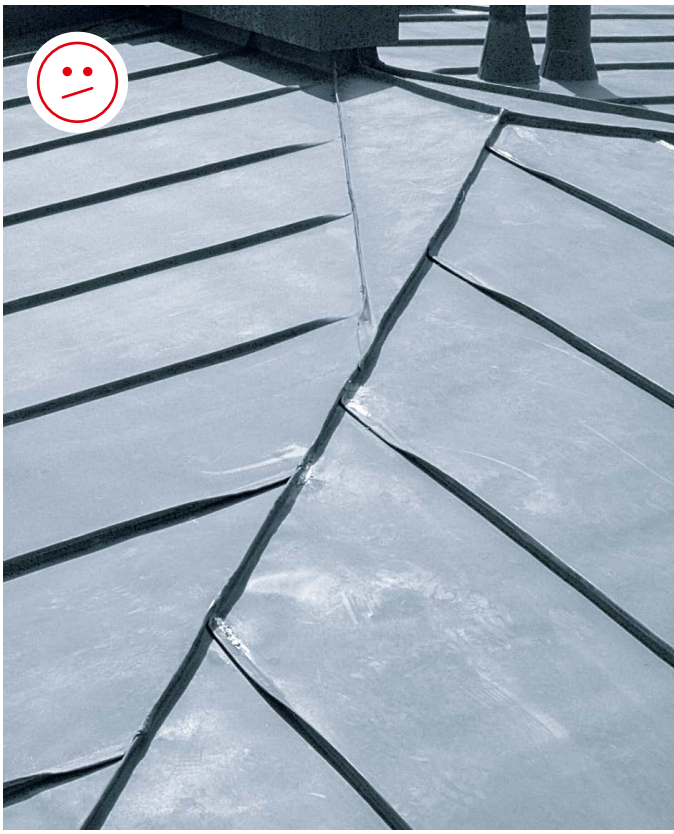
- Connection height ≥ 40mm
- Design: side-mounted panel connection with water check
- Overlap of the verge profile width in the façade area depending on the building height ≥ 50mm to ≥ 100mm
- Alignment of the connection height: see details of hip and pent roof ridge



Hip or ridge as a double standing seam

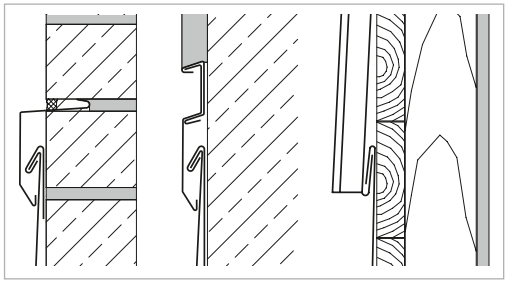
- Only for panel lengths of < 3m, otherwise problematic: temperature-related stress cracks!
- Hip is not straight
- Seam arrangement only possible in offset position, material cut-outs required, but material cracks are still possible





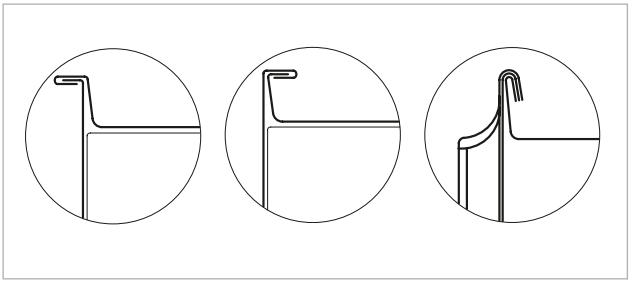
Lateral wall connection

- Connection height ≥ 80/100/150mm
- Top end with water check
- Covered by a capping or façade elements
- Design variants for brickwork, plaster or standing seam fascia



Verge, especially for dormers and small areas with short panels

- Connection height ≥ 25mm as a profile or standing seam fascia
- suitable for round dormers and small areas (arrange sealing tape)
- Segmented fascia (round): by craftsman

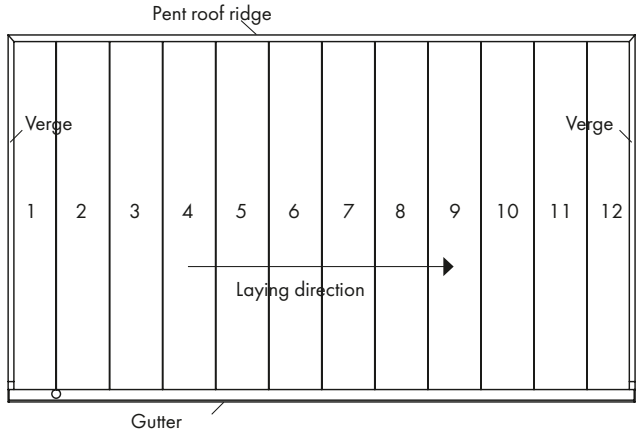


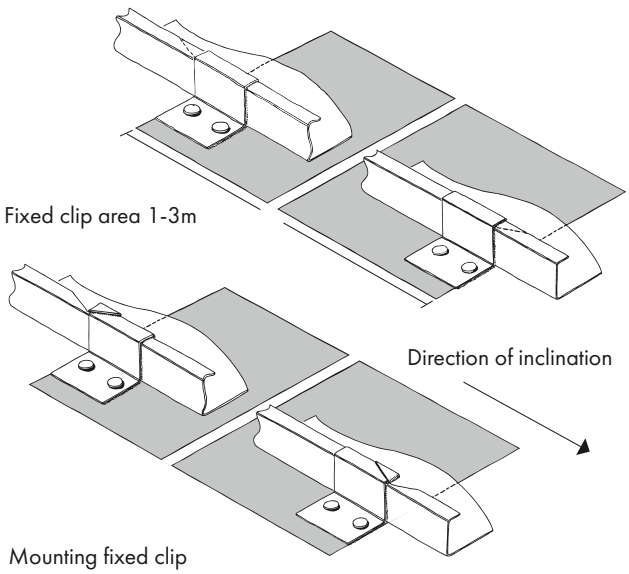
Installation procedure for a pent roof without roof penetrations

- Roof pitch 7°
- Panel length 10m (max. 16m), coil width 570mm
- Assembly with Profimat/Falzomat

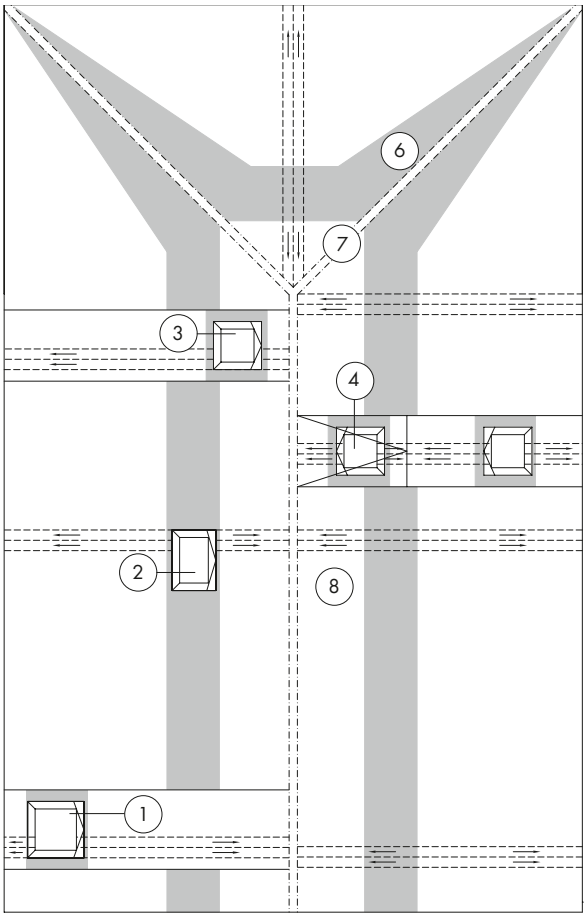
Planning/ work steps:

- Symmetrical distribution of the panels, verge panel 1 + 12, installation height ≥ 40mm with water check (see section 2.2.4)
- Do not divide panels
- Details of eaves and pent roof ridge (see sections 2.2.1 and 2.2.2)
- Additional length of the panel: approx. 15cm for eaves, approx. 10cm for ridge
- Check profile dimensions
- Profiling of the panels with the Profimat, under seam 9mm
- Over seam (vertical side) 10mm
- Attention: if the over seam is too wide, it can no longer be folded by machine.
- Arrange the fixed clip area (each fixed clip is to be designed as shown below)
- Distribute the fixing evenly over the surface.
- Clip centres (see section 2.1.2)
- Fold the panels or partially close them as an angled fold every day before leaving the construction site (see section 2.1.3)





Assembly instructions for gable roof with hip



Direction of expansion

Arrangement of the fixed clips

Expansion joints

Edge/ridge/verge batten

- Panel length ≤ 10m
- Roof pitch ≥ 3° ≤ 15°
- Roof penetrations on the left-hand side of the roof: position near the eaves (1), in the centre of the roof (2) and near the ridge (3)
- Roof penetrations on the right side of the roof: (4) + (5) arranged one behind the other

Planning/work steps:

- Hipped area: arrangement of ridge and expansion strips (7)
- Note the direction of laying
- Ridge formation (see section 2.2.2)
- Fixed clips (see section 2.1.2)
- Clip centres (see section 2.1.2)
- Fold the panels or partially close them as an angled fold every day before leaving the construction site (see section 2.1.3)
- Penetration (2): within the fixed clip area without expansion strip
- Penetration (1) + (3): outside the fixed clip area (6) with expansion strips
- Penetration (4): arranged in a row, optimally designed as a 10cm raised structure (planning phase)

Roof penetration

Back apron with tilting fillet and cross seam, front area with pinched seam, side flashing with expansion strip and double standing seam

Roof penetration: connections

1a: Rounded seam, H = 150 mm in linear seam (preferred option, if penetration is located within fixed clip area)

1b: Rounded seam in expansion strip

2: Pinched seam to front area

3: Double pinched seam to back apron

4: Intersection, linear seam in cross seam (double seamed)

5: Panel on expansion strip

6: Panel on linear seam

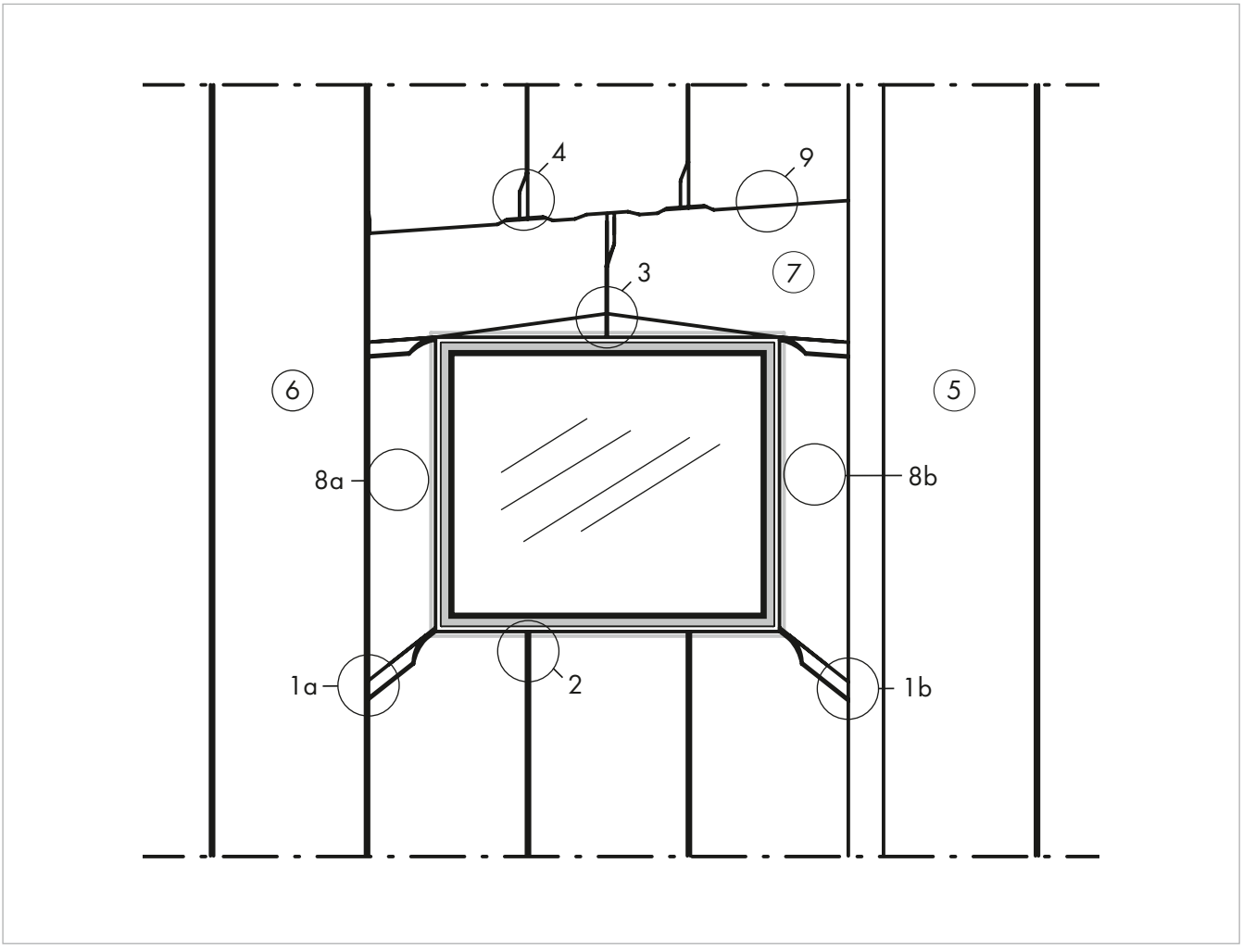
7: Back apron with tilted fillet

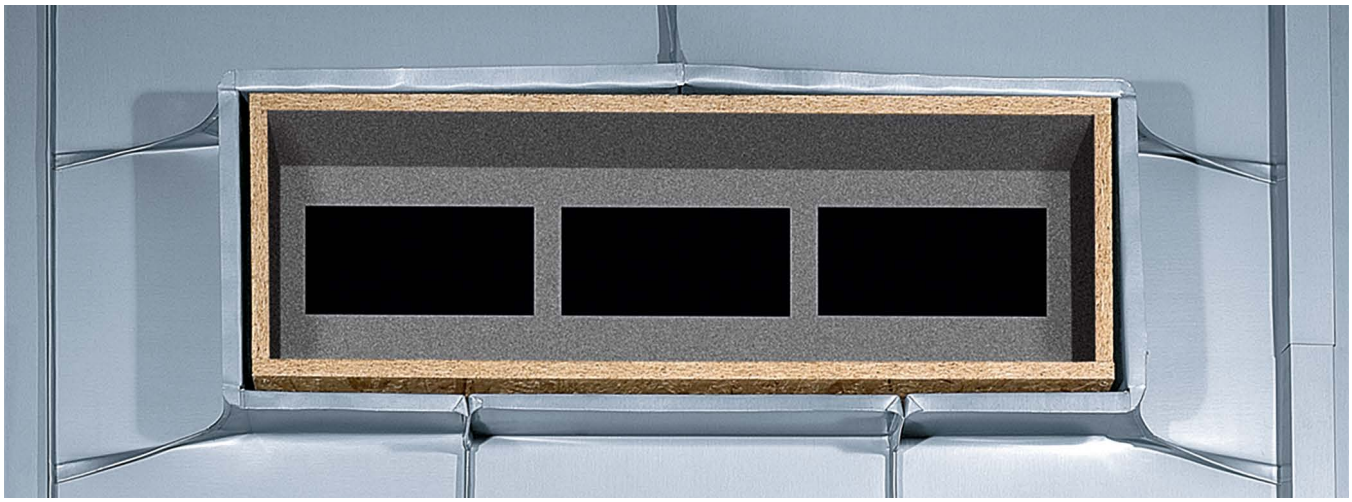
8a: Side flashing on linear seam

8b: Side flashing on expansion stripwidth ≥ 20 cm (8a and b)

9: Cross joint panel/back apron: double seamed with sealant tape running diagonally

Note: For roof pitches starting at ≥ 10°, a cross joint – single seam with soldered cleat (see chapter 2.2.7) is preferred!





Roof penetration

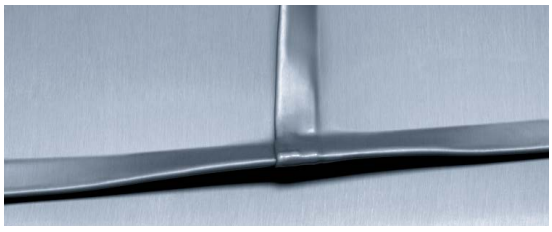
Details: correct seaming technique (see drawing in section 2.2.5)

- Only use seaming techniques to create details!
- Do not solder the fold ends to the panel surface.
- Do not place a sanitary vent or other openings in the longitudinal seam.
- When fitting, follow the sequence: front, side, back apron

Rounded seam connection (1b)
As 1a, but seamed to expansion strip

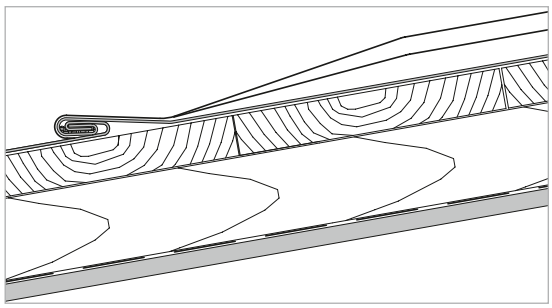
Rounded seam connection (1a) Upstand ≥ 150 mm with water check, pinched seam round seamed to double standing seam

Pinched seam on roof penetration (2) Front area



Intersection (4) Panel on cross joint, back apron

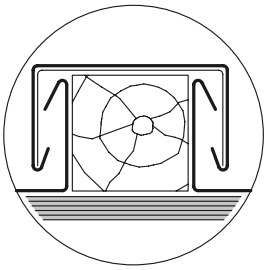
Double pinched seam in cross joint (3) Back apron



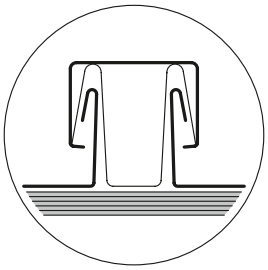
Cross-joint designed as double standing seam, horizontal (9)
with sealant tape

Expansion joints

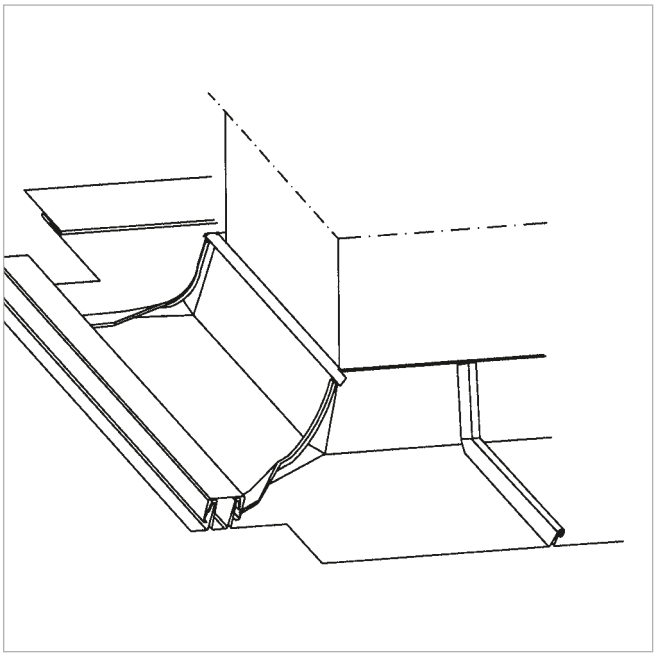
- For ensuring temperature-related length changes of the panels in the longitudinal direction in roof penetrations outside of fixed clip areas
- Details: fold ends should always be warmed at temperatures (metal temperatures) < 10° C, e.g. with a hot air device.



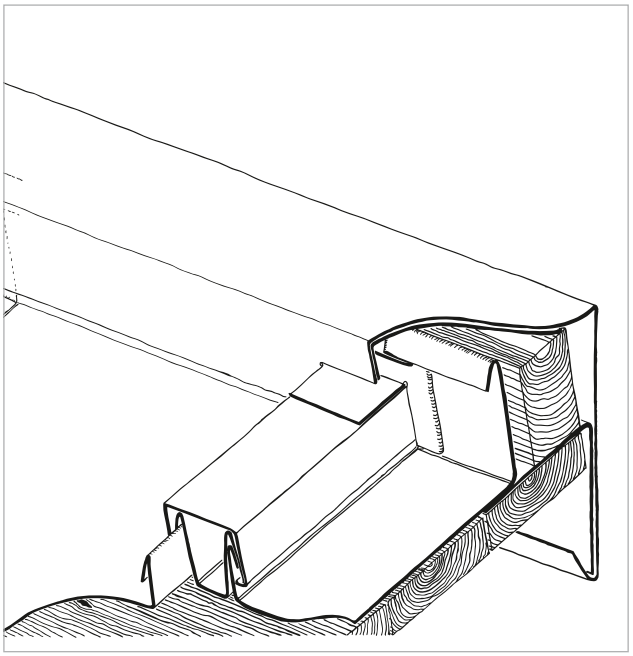
Expansion strip with batten



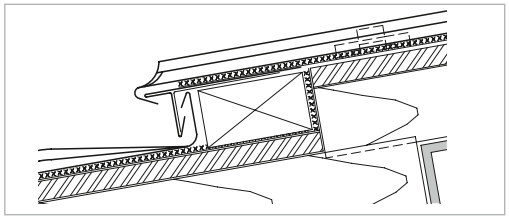
Expansion strip with metal bracket



Expansion strip required for roof penetrations outside the fixed clip area

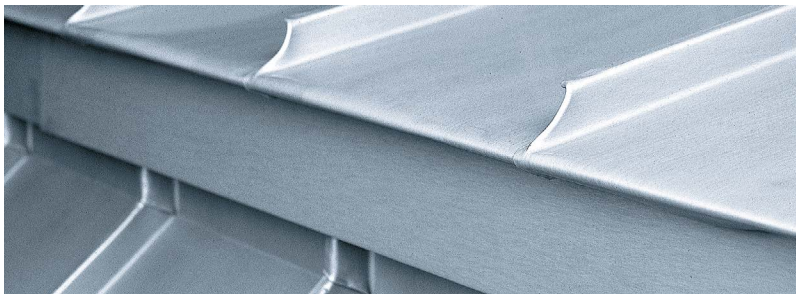


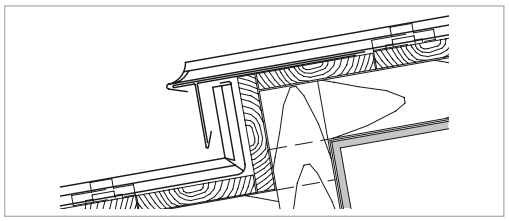
Expansion joint on the ridge of the pent roof



Cross seam designed as a stepped fall

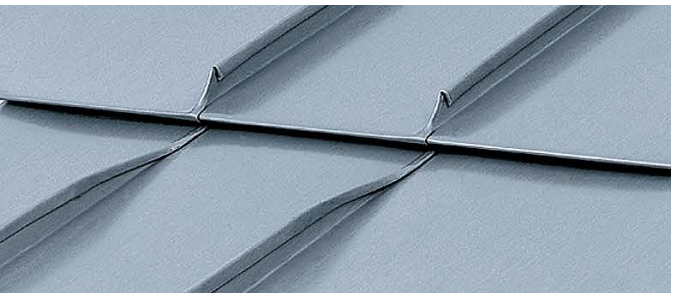
- Roof pitch <10°
- Panel length 10 to 16m (assembly with long sliding clips)
- Stepped fall with turned down seam.
  Note: wooden structure spacer blocks to be installed later!
- Step height ≥ 60mm
- Expansion area ≥ 15mm

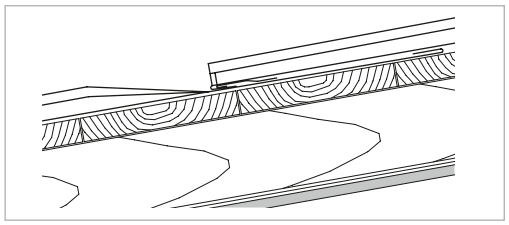




Stepped fall with pinched seam

- Detailed design of upper panels (see section 2.2.1, eaves detail without structured underlay)
- Step height ≥ 80mm





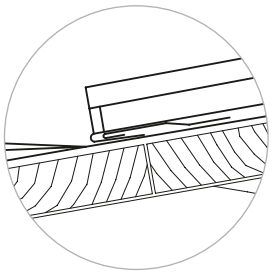
Cross joint as a single seam with soldered continuous cleat

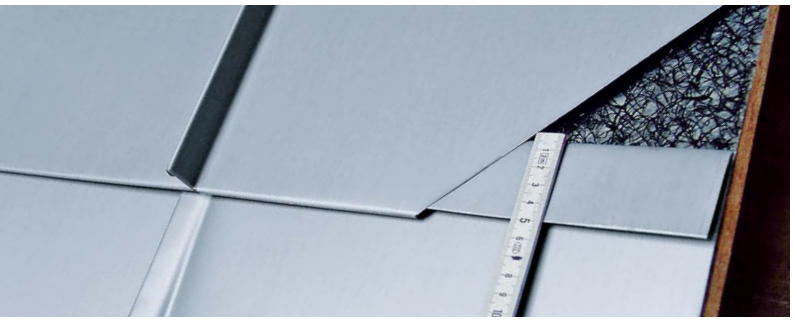
- Roof pitch ≥ 10° < 25° (35° *)
- Metal thickness of continuous cleat 0.80mm
- Panel length max. 16m
- Overlap of the panels approx. 250mm
- Do not cut into the water fold!
- Expansion area ≥ 15mm

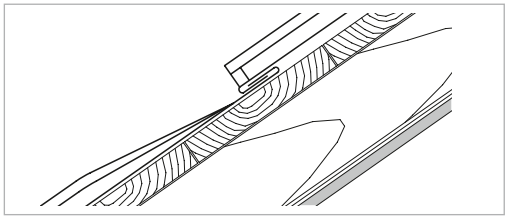
** in areas with heavy snowfall*

Detail optimisation: soldered continuous cleat

- Continuous cleats with backfold for panel hook-in (more stability)
- Metal thickness 1.00 mm
- Length ≥ 2 m ≤ 3 m, overlap the profile joints, do not solder
- Solder to panel







Cross seam as single seam

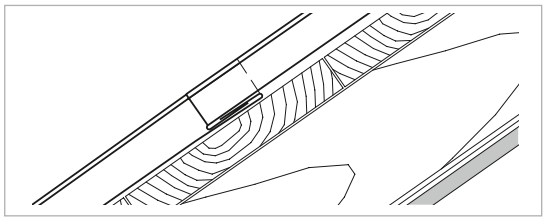
- Roof pitch ≥ 25° (35° *)
- For double and angled standing seam system
- Overlap of the panel 50mm depending on the panel length
- Expansion area = 10mm

* in areas with heavy snowfall

Seam in seam cross joint for angled standing seam system

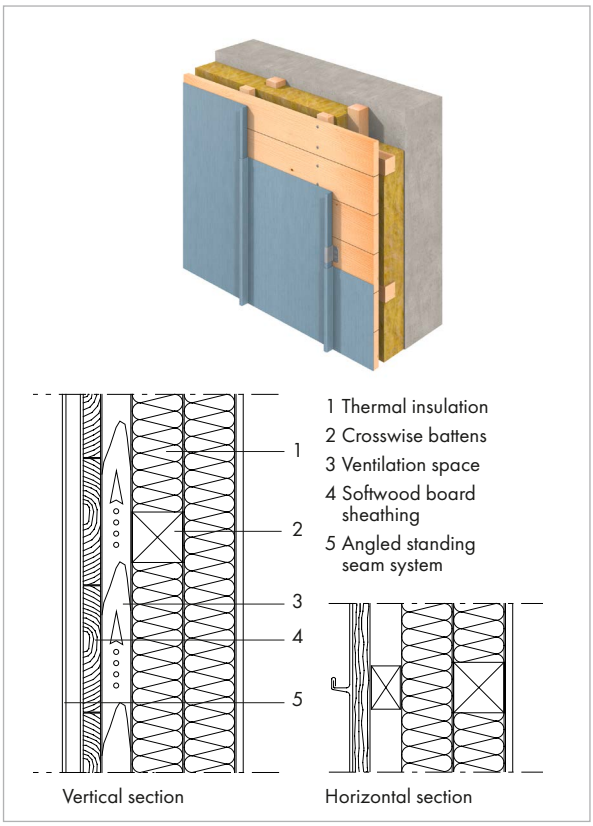
- Roof pitch > 25° (35° *)
- **For angled standing seam system only!**
- Panel length ≤ 6m
- Overlap area must accommodate thermal linear expansion of panel in the seamed area as well.

* in areas with heavy snowfall



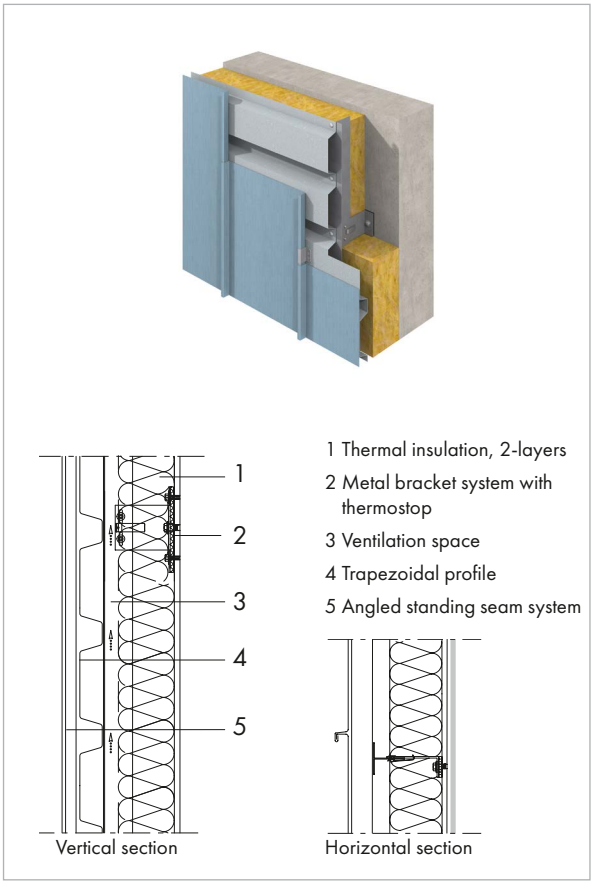
Ventilated façade
Wooden version

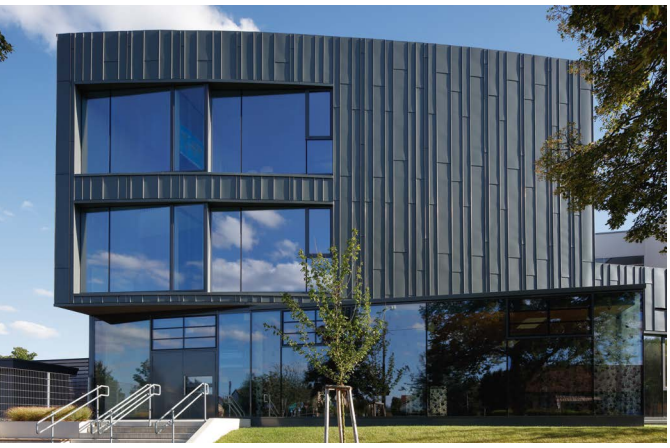
- Prefer sheet material
- Angled standing seam system, coil width 500mm x 0.80mm
- Panel length ≤ 6m (handling)
- Always produce panels and fitting panels from the same batch (colour differences!)
- For information on how to attach the panels, see “Double standing seam roof covering system“
- Wooden boarding 100mm x 24mm or suitable OSB/BFU board, 22 mm
- Ventilation space ≥ 20 mm
- Thermal insulation (according to national standards)
- Ensure windproof installation on site!
- Fixing the panel at the ridge point, length of fixed clip area 1m

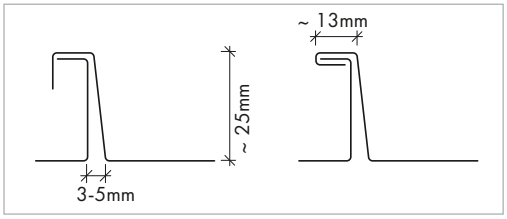


Ventilated façade
Metal version

- Prefer sheet material
- Angled standing seam system, coil width 500mm x 0.8mm
- Panel length ≤ 6m (handling)
- Always produce panels and fitting panels from the same batch (colour differences!)
- For information on how to attach the panels, see “Double standing seam roof covering system“
- Trapezoidal profile, galvanised steel – profile type depending on the statics, separating layer for decoupling if necessary
- Mounting with metal substructure systems
- Ventilation space ≥ 20mm
- Thermal insulation (according to national standards)
- Ensure windproof installation on site!
- Fixing the panel at the ridge point, length of fixed clip areas 1m





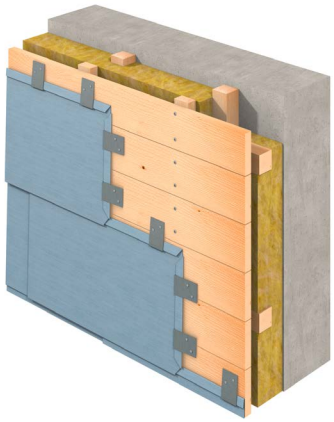


RHEINZINK angled standing seam system

- Surfaces: see product range
- Coil width: 500mm
- Metal thickness: 0.80mm
- Optimal appearance with sheet material
- Always order/install material from the same batch to avoid colour differences!

RHEINZINK tile system

- Surfaces: see product range
- For widths and material thicknesses, see section 2.1
- Further detailed information can be found in the RHEINZINK brochure “Flat-lock Tile Systems, Design and Application”.

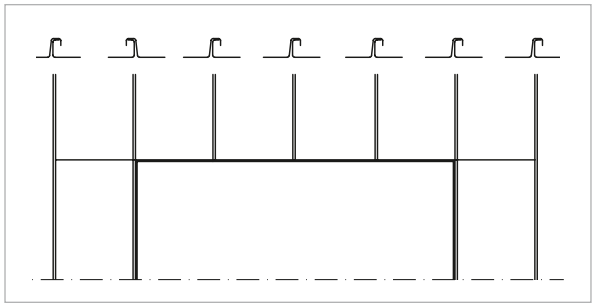


Window opening with symmetrical division

Asymmetrical window opening

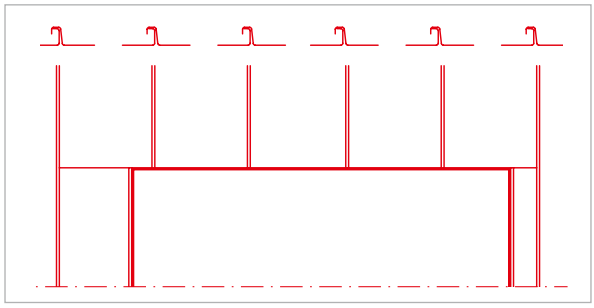
Window opening with symmetrical layout

- Changes in width of up to approx. 50mm are not visually perceptible
- Fold as reveal edge if possible
- If cross seam, then arrange in the lintel area
- No soldering work on window sill covers. Traces of soldering fluid are not repairable



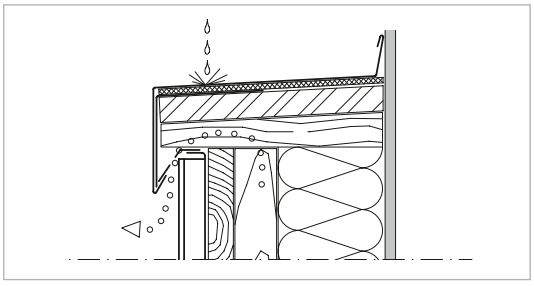
Asymmetrical window opening

- This is the result of poor workmanship and a lack of planning.
- The design with only one coil width is rarely possible.
- No change in seam performed
- Transition between soffit and lintel visually not clean in detail



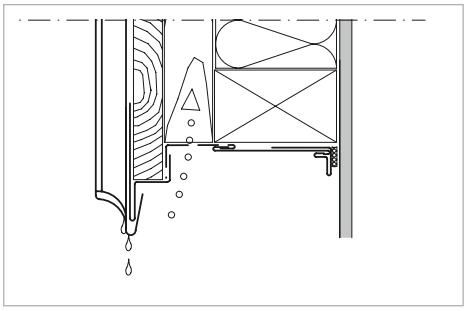
Window sill coping

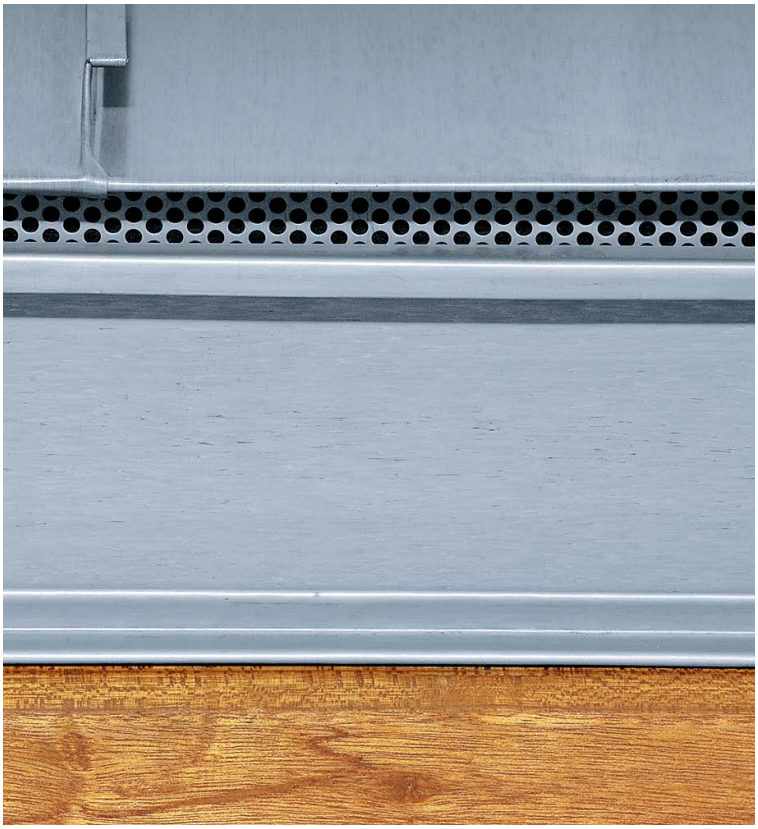
- Coping glued on with Enkolit® over the entire surface, to avoid drumming noises!
- Indirect mounting with continuous cleats required for leg heights ≥ 50mm



Lintel

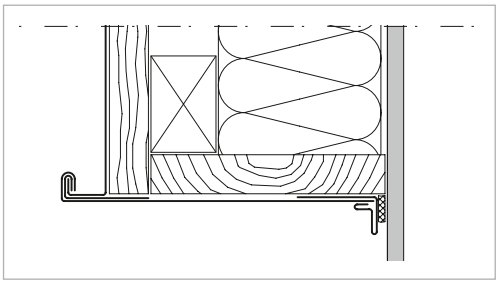
- Supply air via perforated strips or punched openings in lintel profiles
- Connection of the lintel profiles to the window frame using receiver strips
- Flush surface connection with eaves edge





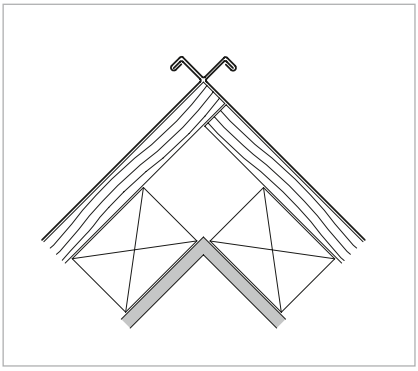
Jamb

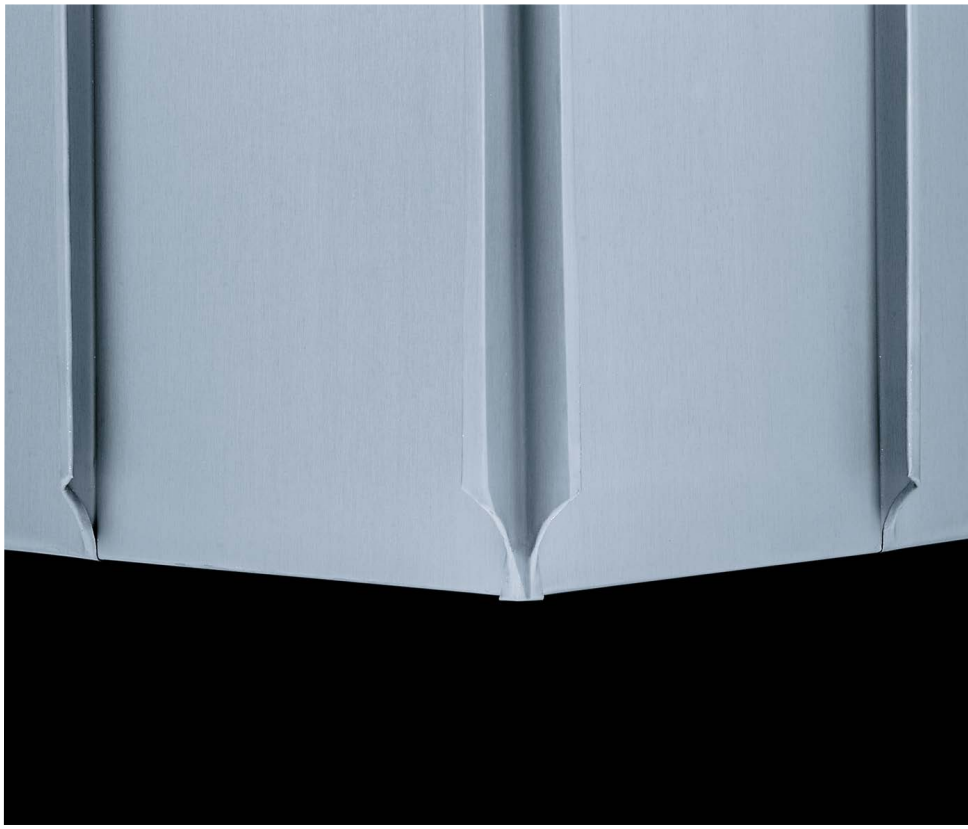
- Angled standing seam as jamb detail
- Connection of jamb profile to window using receiver strip
- No direct fastening with screws or nails
- Do not solder the window jamb to the window coping

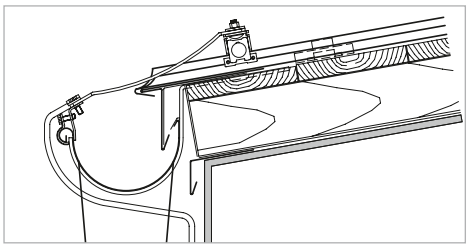


External corner

- Symmetrical design
- Stable solution to avoid bulging in corner sections







Lightning protection device

Eaves design with flexible holders

- Use lightning protection clamps made of wrought aluminium alloy.
- Flexible connecting wires allow for lenghtwise expansion of the panels.
- Arrange the arresting device in accordance with regulations approx. every 20 metres
- RHEINZINK roof surfaces are part of the external lightning protection system if they are earthed.

Lightning protection

- Fixing the panel at the eaves point = expansion cracks on the panel

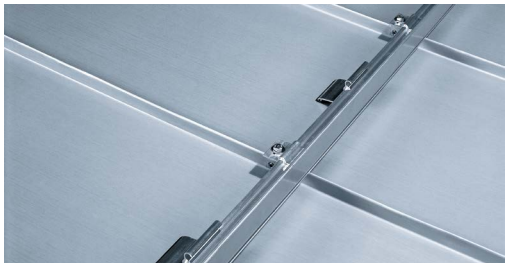
Snow guard system

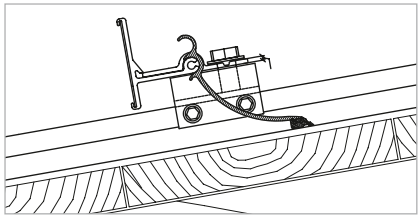
- The clamp must absorb the thermal expansion of the pipe.

S5 snow guard system

- Do not use any galvanised components (risk of rust run-off)
- Do not use snow guard clamps that are too narrow (cracks due to design faults and installation in the folded area)
- Arrange the snow guards at a distance of at least 25mm from the sliding clips.
- A static pre-dimensioning can be requested from the RHEINZINK application technology department.

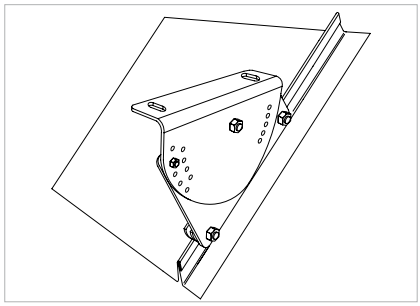
E-mail: anwendungstechnik@rheinzink.de or phone: +49 2363 605-490





Ice holder for snow guard system

- Arrange ice holders to prevent ice sheets from slipping
- Depending on the requirements, 1 to 2 ice holders per panel
- Fasteners not made of galvanised steel (risk of rust marks)
- Static dimensioning is required for both snow guard systems and solar installations.

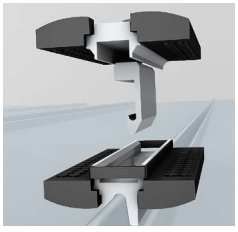


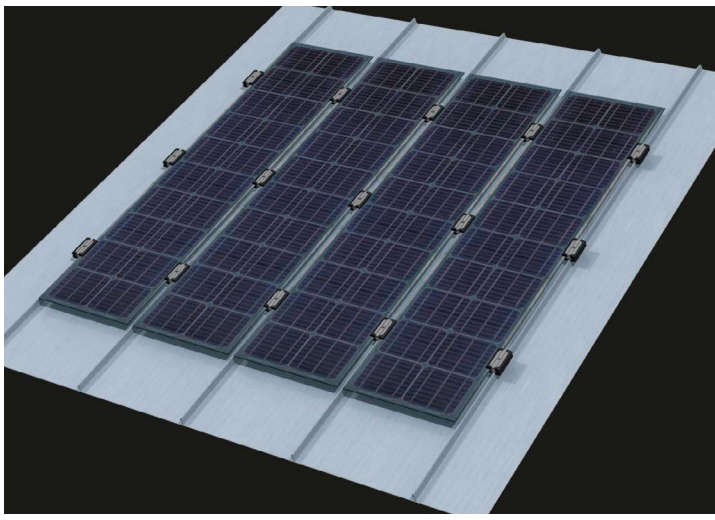
Clamps for roof steps

- Fixing the clamping brackets to the double standing seams
- Can be used for roof pitches of up to 40°
- Arrange the clamping brackets at a distance of at least 25 mm from the sliding grip.

RHEINZINK-PV

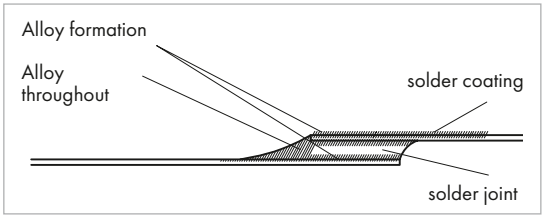
- Seam and module clamp in one product
- Frameless, integrated solar modules – vertical installation, parallel to the roof
- For RHEINZINK-double standing seam roofing with panel width of 530mm





Soft soldering

Soft soldering is a force-locked connection in a single operation.



The following steps should be taken into account for a correct and technically sound soldered joint:

Preparation:

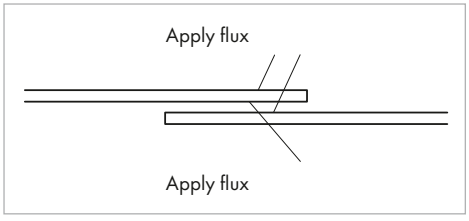
- clean dirty surfaces chemically or mechanically
- overlap of sheet metal parts ≥ 10mm ≤ 15mm
- apply a generous amount of flux over the entire surface of the parts to be joined using a brush.

Soldering process:

- hammer bit > 350g, ideally 500g
- operating temperature approx. 250 °C
- soldering gap ≤ 0.5mm; the narrower the soldering gap, the better the soldered seam strength
- use the pre-tinned hammer edge to heat the parts to be joined to melting temperature
- the solder is melted on the soldering iron according to the required quantity.
- RHEINZINK-SnZn 801 solder (lead-free) penetrates the soldering gap by capillary action.
- for sheet metal thickness > 0.8mm, pre-tin the sheets.

Completion

- clean any remaining flux residue with a damp cloth = important for a visually good result (see RHEINZINK joining techniques)



Flux for soft soldering

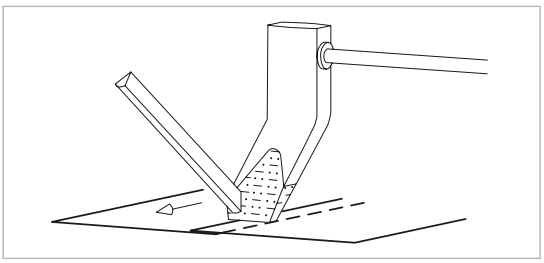
Brushing the RHEINZINK surface

- dissolves oxide residues and rolling emulsion
- solder flow is promoted
- suitable for CLASSIC bright-rolled and prePATINA blue-grey: "ZD-pro" soldering flux
- suitable for prePATINA graphite-grey: stainless steel wool + soldering fluid "ZD-pro" (mechanical and chemical pre-cleaning)
- suitable for GRANUM EXTRA: Felder "EXTRA" solvent + "ZD-pro" soldering flux or stainless steel wool + "ZD-pro"

Sources of error in soft soldering

- wrong soldering iron (pointed soldering iron)
- overheated hammer bit
- rapid soldering
- insufficient weight = insufficient heat transfer
- unsuitable flux (acid etc.)

- excessive overlap of the sheet metal parts
- brazing temperature too low
- do not leave profile joints unsoldered for days (dirt reduces strength of soldering seam)



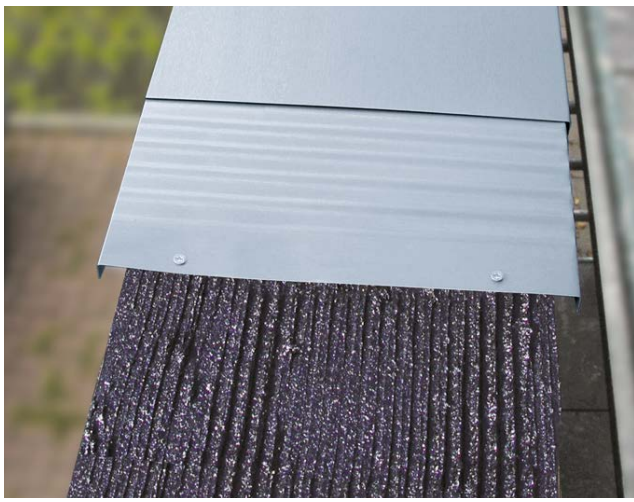
Correctly holding the hammer bit

- holding the soldering iron, overlap soldered
- heat to temperature (approx. 250 °C)
- solder at a constant speed

Bonding of copings

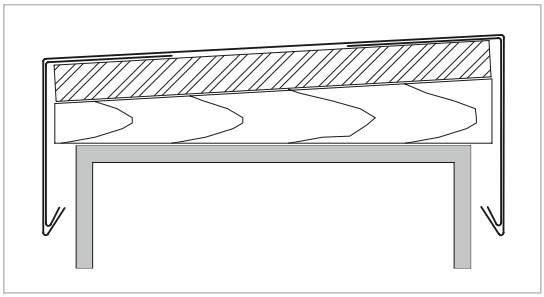
- cleaned substructure
- Enkolit® should be applied over the full surface using a notched trowel.
- create joint areas with a joint profile or UDS connector
- continuous cleats must be arranged for vertical legs ≥ 50mm.

The permanently elastic bitumen adhesive Enkolit® has been used successfully in plumbing for 40 years. For correct installation, see also the Enkolit® installation instructions from Enke.



RHEINZINK copings

- Surfaces: coil/sheet material, see delivery programme
- Metal thickness: depending on the size of the coping width; 0.80mm (standard)
- Lateral inclination ≥ 3°
- Indirect fixing with continuous cleats or gluing with Enkolit® recommended
- Please refer to the table below for information on how to perform expansion elements.
- Detailed information on copings can be found in the RHEINZINK brochure "Copings and Connections, Design and Application".



Maximum distances for expansion joints for copings/construction profiles

Construction profiles/copings

	Nominal size/cut	Max. distance (m)* for expansion joints
Construction profiles/indirectly fixed copings	all nominal sizes	8.0
Construction profiles/copings glued in	all nominal sizes	6.0

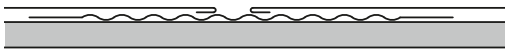
* divide max. distance from corners and other fixed points in halve!

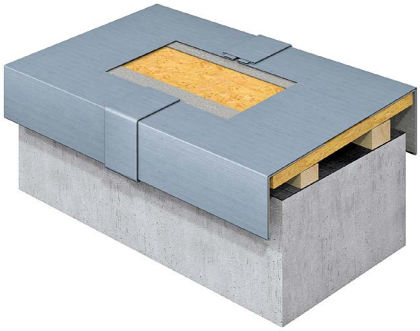
Bulging of the cornice coping due to missing expansion joints

Connection techniques and formation of profile joints

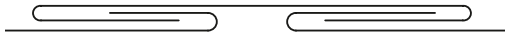
- Joint with expansion element (industrial) and cap

- Joint with UDS connector (industrial)





- Flat joint with cap (crafted)

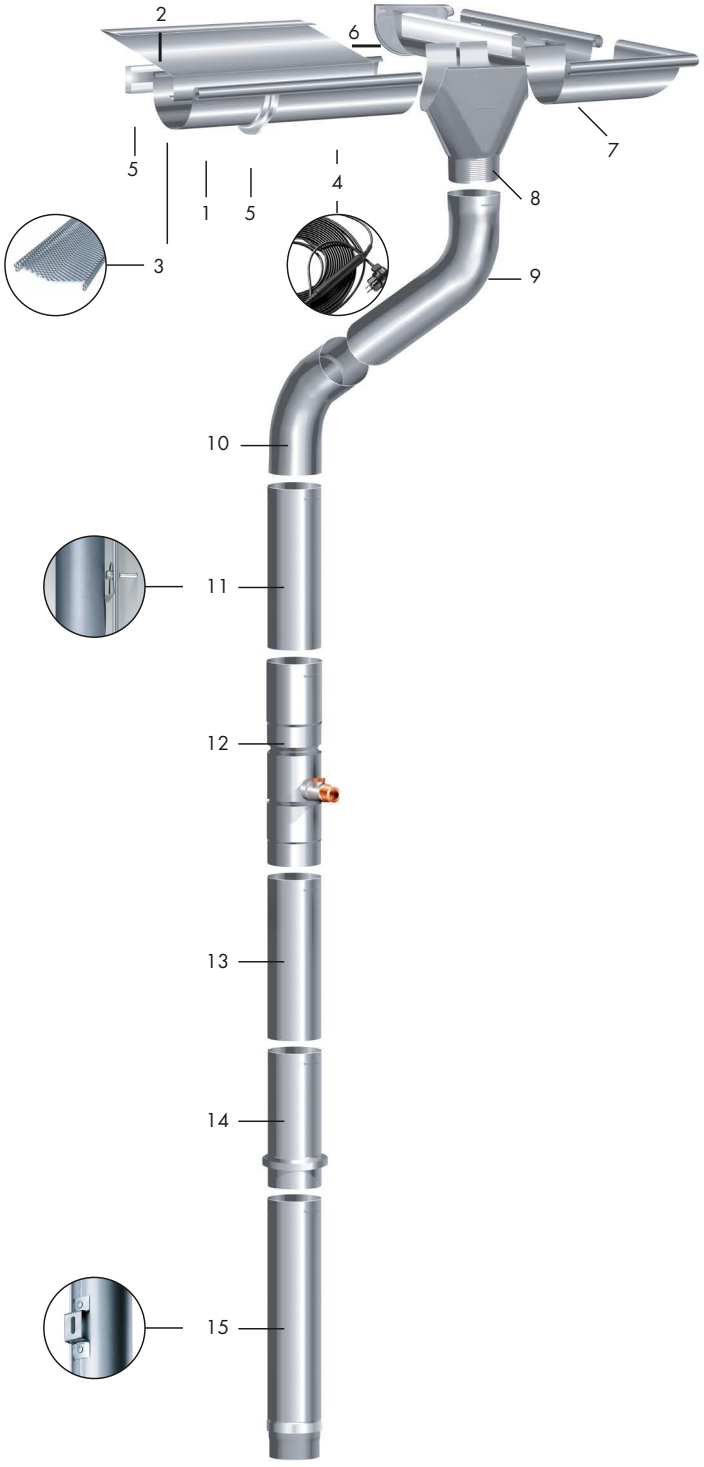


- Joint with single seam (crafted)

RHEINZINK roof drainage system

System components

- Surfaces: see product range
- Always the right fit: our complete roof drainage system consists of over 500 parts. Information on this can be found in the RHEINZINK delivery range!
- RHEINZINK offers a 40-year system guarantee on its roof drainage range.



1 half-round roof gutter
2 eaves profile
3 leaf protection
4 gutter heating
5 fixing rail/snap-lock bracket system
6 stop end
7 gutter corner
8 plug-in outlet
9 extended pipe bend
10 pipe bend
11 Universal downpipe bracket with lightning protection clamp
12 rain collector
13 patented high-frequency welded downpipe
14 Reviso sliding piece
15 standpipe

Standards / Regulations / Guidelines

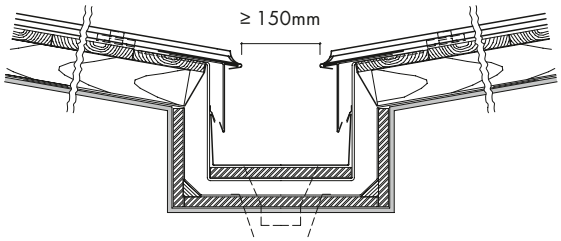
Manufacturing

- RHEINZINK gutters and downpipes are manufactured in accordance with the requirements of DIN EN 612.
- They correspond to class X (A) and thus fulfil the requirements of class Y (B).

Labelling

All RHEINZINK gutters and downpipes are labelled in accordance with DIN EN 612. This consists of:

- trade name or trademark of the manufacturer
- abbreviation of the country of manufacture
- number of this European Standard (EN 612)
- identification block: nominal size of the gutter or the diameter or cross-section of the downpipe in mm
- type of material
- all RHEINZINK roof drainage products bear the RHEINZINK stamp and are therefore clearly identifiable.



Interior box gutter with glued-in safety gutter

Dimensioning

External roof drainage systems

- DIN EN 12056-3, DIN 1986-100, the technical rules of the professional associations and the technical information of the ZVSHK for the design of external and internal gutters can be used for the design of roof drainage systems.
- Our “gutter calculation” tool is available at www.rheinzink.de to help you size external roof drainage systems.

Internal roof drainage systems

- Provide emergency overflows: design according to gutter size (dimensioning by specialised engineer)
- Install expansion elements, max. spacing 6m (see section 2.7.2)
- Arrange gutter heating
- Plan roof outlets for safety gutter (note height/width dimensions)
- Arrange snow guard system

For maintenance/cleaning purposes, keep a minimum distance of 150mm.

Gutters, half-round and box-shaped

Installation/laying of gutters

- Gutters can be laid with or without a slope towards the drains.
- Water residues are unavoidable due to unavoidable changes in the substructure and also due to the installation of expansion elements and in horizontally laid gutters, and thus do not constitute a defect. Any water remaining in the gutter will not affect its lifespan.
- The individual gutters are to be soldered or glued together. For detailed information, please refer to the RHEINZINK brochure “Joining techniques”.

Availability of RHEINZINK half-round gutters

Nominal size half-round	Metal thickness in mm	Standard length in metres
250	0.65/0.70	3.00
280	0.70	3.00/5.00
333	0.70/0.80	3.00/5.00/6.00
400	0.80	3.00

Availability of RHEINZINK box-shaped

Nominal size Box gutter	Metal thickness in mm	Standard length in metres
250	0.65/0.70	3.00
333	0.70	3.00
400	0.80	3.00

Information on the available surface qualities can be found in the RHEINZINK product range.

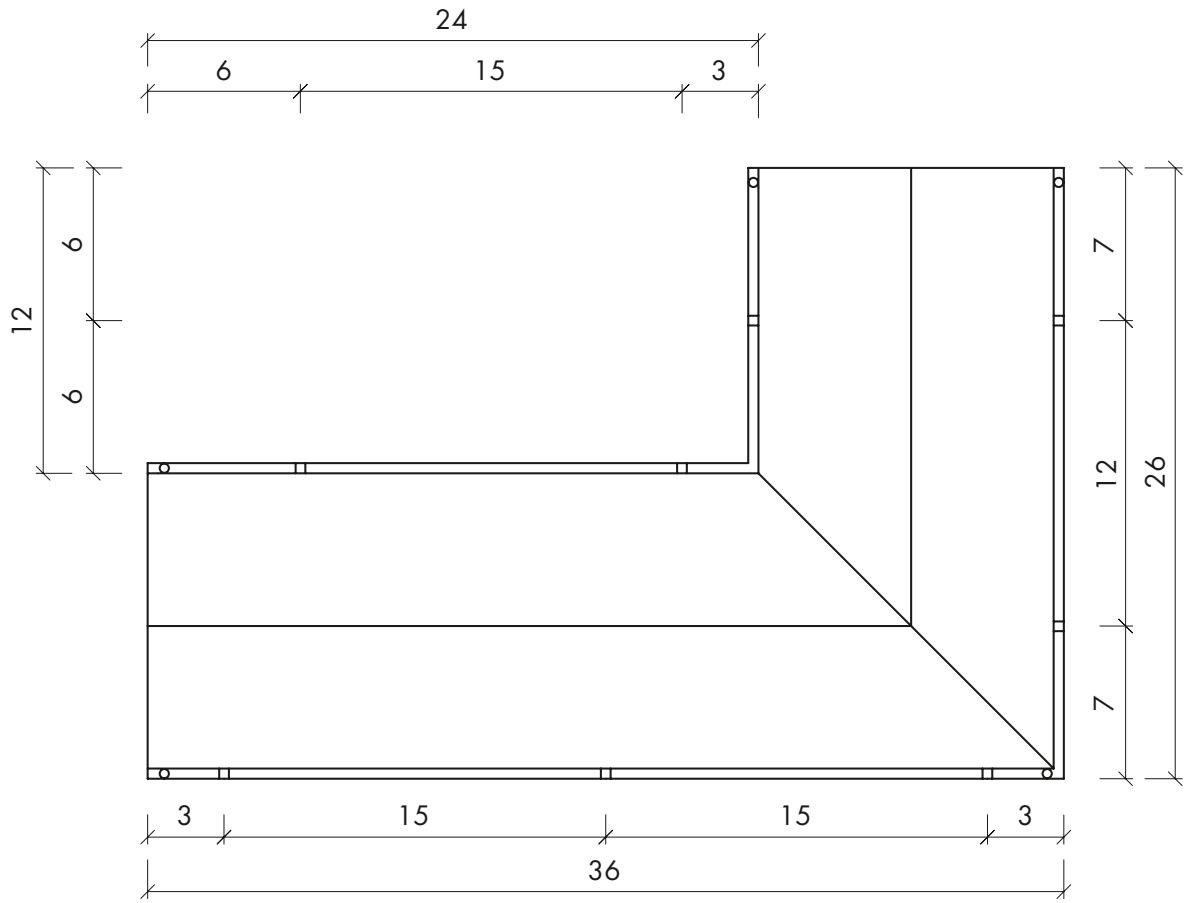
Installation/assembly of expansion elements

Maximum distances for expansion elements for gutters

Gutters

	Nominal size/cut	Max. distance (m)* for expansion elements
Gutters bracket mounted	≤ 500	15.0
Roof-mounted gutter/edge gutter	> 500	8.0
Interior gutters (not glued in)	> 500	8.0
Shed gutters	> 800	6.0

* divide max. distance from corners and other fixed points in halve!



Example:

Arrangement of expansion joints in a RHEINZINK roof drainage system (nominal size ≤ 500 mm), half-round or box-shaped, in accordance with DIN EN 612 for an L-shaped building (curtain-type bracket mounted system, dimensions in m)

Mounting the gutter bracket

- Fixing with suitable gutter brackets: RHEINZINK coated/galvanised or with a tested and proven Snap-lock system made of die-cast aluminium.
- All RHEINZINK gutter brackets/Snap-lock brackets meet the requirements of the highest load-bearing class, "H", in accordance with DIN EN 1462.
- Spacing between gutter brackets/Snap-lock brackets: ≥ 50 cm ≤ 84 cm

Availability of RHEINZINK gutter brackets, half-round

Nominal size half-round	Cross-section in mm	Leg length short/long
250	25 x 6	k/l
280*	25 x 6	k/l
333*	25 x 6	k/l
400	25 x 6	k/l

* The RHEINZINK-Snap-lock bracket is also available for these nominal sizes.

Availability of RHEINZINK gutter brackets, box-shaped

Nominal size box-shaped	Cross-section in mm	Leg length short/long
250	25 x 6	l
333	25 x 6	k/l
400	25 x 6	k/l

Information on the available surface qualities can be found in the RHEINZINK product range.

Rainwater pipes, round and square

- All round downpipes are high-frequency welded.
- All square downpipes are welded.
- Fixing with RHEINZINK-pipe brackets/universal downpipe brackets (the latter for round downpipes only)

Installation/laying

- The distance between the pipe brackets for downpipes with an internal pipe diameter of up to 100mm must not exceed 3m and for larger diameters 2m. Rainwater pipes must be installed so that there is a minimum distance of 20mm to the facade finish.
- Measures must be taken above the pipe bracket of the downpipes to prevent slipping. It is advisable to install the brackets directly below the downpipe sockets.
- To avoid flooding on the floors below, balcony or loggia drains with closed balustrades must not be connected to rainwater downpipes from roof drainage. Not even if there is emergency drainage in the balustrade.

Availability of RHEINZINK round downpipes

Nominal size round downpipe	Metal thickness in mm	Standard length in metres
120	0.70	2.00/3.00
100	0.65/0.70	2.00/3.00
87	0.65	2.00/3.00
80	0.65/0.70	2.00/3.00
76	0.65	2.00/3.00
60	0.65	2.00/3.00

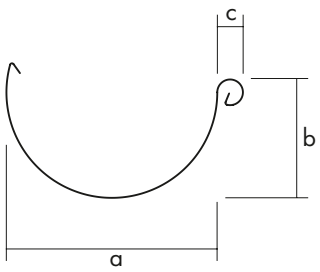
Information on the available surface qualities can be found in the RHEINZINK product range.

Availability of RHEINZINK square downpipes

Nominal size square downpipe	Metal thickness in mm	Standard length in metres
120/120	0.80	2.00
100/100	0.70	2.00
80/80	0.65	2.00

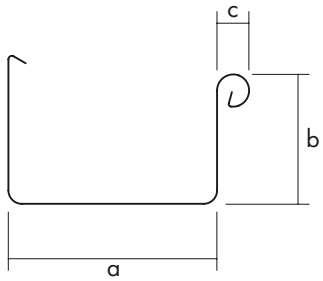
Nominal sizes and installation dimensions for the RHEINZINK roof drainage system

Half-round gutter



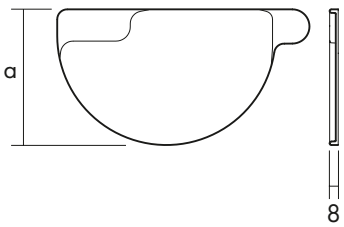
Nominal size	400	333	280	250
a	192	153	127	105
b	107	87	73	62
c	22	20	18	18

Box gutter



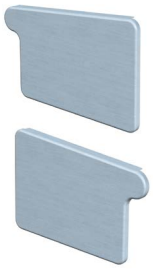
Nominal size	400	333	250
a	150	120	85
b	90	75	55
c	22	20	18

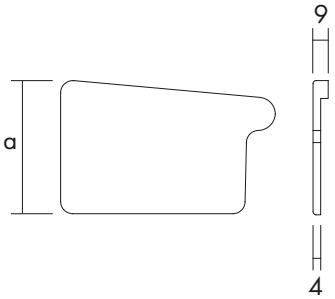
Stop end, pluggable (right and left)



Nominal size	400	333	280	250
a	117	95	81	70

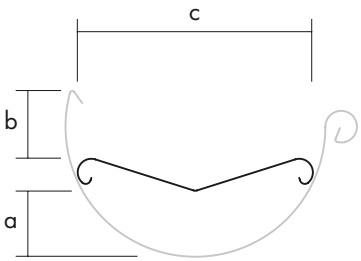
Stop end for boxed gutters (right and left)





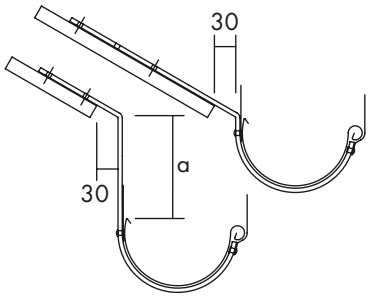
Nominal size	400	333	250
a	150	120	85

Leaf protection



Nominal size	400	333	280	250
a	40	36	31	28
b	52	42	36	31
c	174	140	116	93

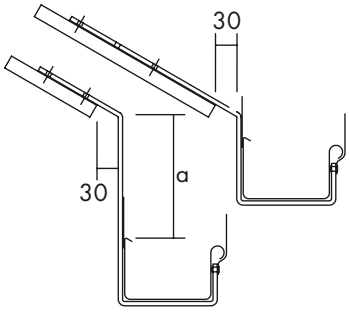
Gutter bracket, RHEINZINK-coated



Nominal size	400	333	280	250
a max. (short version)	25	30.5	15.5	22.5
a max. (long version)	80	80.5	75.5	72.5

The values in the table are based on an average roof pitch of 30° and on the surface qualities CLASSIC bright rolled and prePATINA blue-grey.

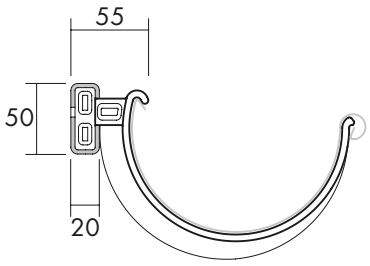
Box gutter bracket, RHEINZINK-coated



Nominal size	400	333	250
a max. (short version)	33	38	–
a max. (long version)	83	83	69

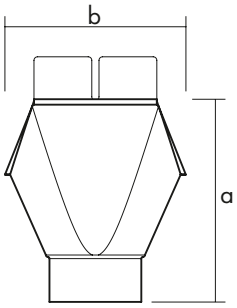
The values in the table are based on an average roof pitch of 30° and on the surface qualities CLASSIC bright rolled and prePATINA blue-grey.

Snap-lock bracket



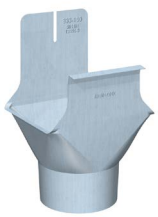
Nominal size	333	280

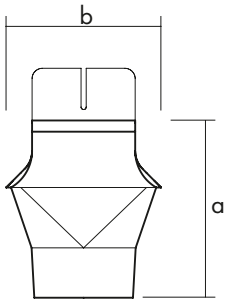
Plug-in outlet (shape G)



Nominal size	400/ 120	333/ 100	280/ 80	250/ 80
a	253	215	188	162
b	210	185	165	140

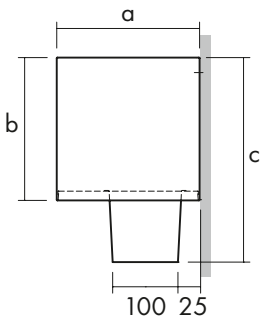
Box-type plug-in outlet





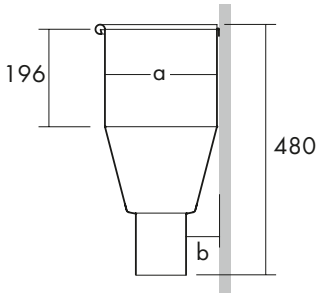
Nominal size	400/ 120	333/ 100	250/ 80	250/ 76
a	205	172	122	121
b	168	140	108	109

Water cube



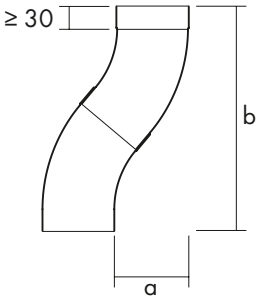
Nominal size	100	100
a	300	200
b	300	200
c	370	270

Hopper head, square



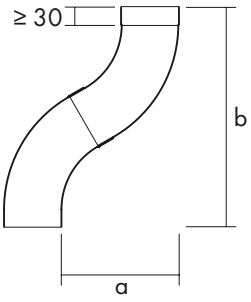
Nominal size	120	100	87	80	76
a	240	220	220	220	220
b	65	65	72	75	77

40° pipe bend



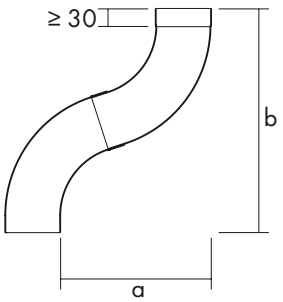
Nominal size	120	100	87	80	76
a	118	101	91	85	81
b	353	308	281	263	253

60° pipe bend



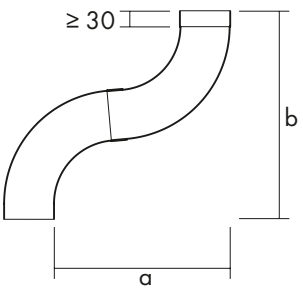
Nominal size	120	100	87	80	76	60
a	236	201	180	166	158	131
b	439	378	342	318	306	257

72° pipe bend



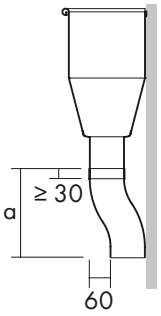
Nominal size	120	100	87	76	60
a	319	270	241	211	174
b	469	402	362	320	269

85° pipe bend



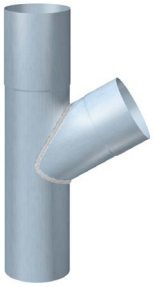
Nominal size	100	87	80	76
a	349	311	286	271
b	411	369	342	326

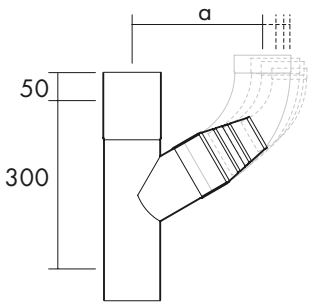
Base elbow



Nominal size	120	100	87	80	76
a	275	268	252	254	240

60° pipe branch with fitting cone and 60° elbow

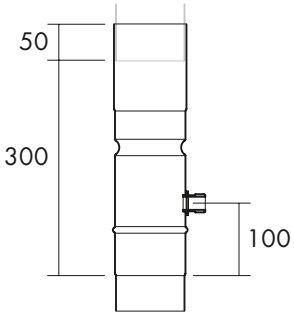




Nominal size	100*	87	76
a for pipe ND 120	198	215	226
a for pipe ND 100	209	225	237

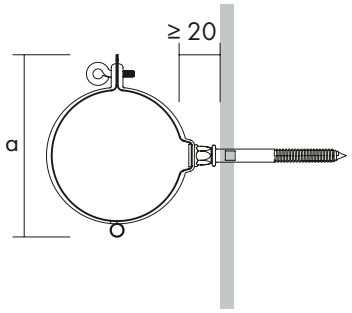
* without fitting cone

Rain collector set



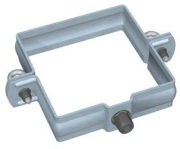
Nominal size	100	87	80	76

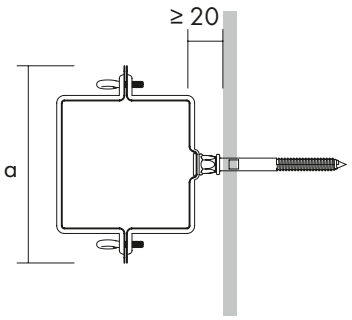
Round pipe bracket



Nominal size	120	100	87	80	76	60
a	161	140	129	120	118	99

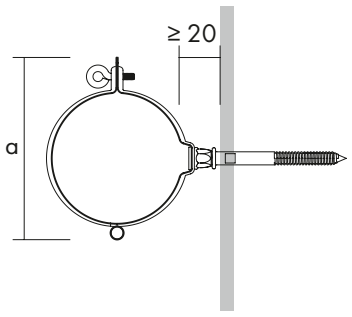
Box-shaped pipe bracket





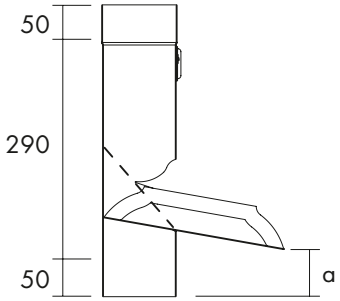
Nominal size	120	100	80
a	184	164	145

Pipe bracket PRO with RHEINZINK coating



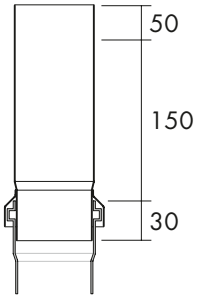
Nominal size	120	100	80	60
a	161	140	120	99

Rainwater pipe flap



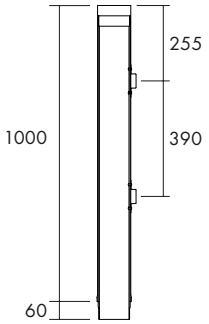
Nominal size	120	100	87	80	76
a	28	43	51	53	53

Reviso slide



Nominal size	120/ 150	100/ 116	87/ 116	80/ 116	76/ 116

Standpipe



Nominal size	125	110

Subject to change and errors

Notes

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