



STANDING SEAM TECHNOLOGY

Checklist



For up-to-date information, technical reports, advanced technical information, parts lists, standard details or specifications please visit our website www.rheinzink.com

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1st updated edition

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NOTE!

Dear Tradespeople!

By choosing RHEINZINK, your customer has chosen a high-quality, durable material. The first step towards guaranteeing a long-term, maintenance-free service life is appropriate storage and processing for this type of quality material. Proper handling of RHEINZINK material is a must!

This applies to transportation, storage and processing. Many things can be done incorrectly by the time installation is complete. This Checklist provides some insight into the most important rules, which must be complied with when working with RHEINZINK. Please read these thoroughly and keep them close at hand.

Good luck!

Best regards
Your RHEINZINK-Team

Legend



Checklist

Important points to note



Attention!

Warning with respect to processing errors

CHECKLIST

1. MATERIAL	Page
1.1 Overview	4-5
What is RHEINZINK?	
What does RHEINZINK look like?	
How is RHEINZINK delivered?	
How is RHEINZINK transported and stored properly?	
How is RHEINZINK protected from corrosion?	
What is the life expectancy of RHEINZINK?	
2. KNOW HOW	Page
2.1 Roofing	
Ventilated roof structure, underlay	6
Double standing seam system, clips, square tiles, diamond tiles, flat lock tiles	7
2.2 Roofing details	
Eaves	8
Gable roof ridge, pent roof ridge	9
Valley, interior box gutters	10
Hip, verge, lateral wall connection	11
Pent roof, hipped gable roof	12-13
Roof penetration, connections, expansion strip, cross-seam	14
2.3 Façade cladding	
Ventilated substructure, angled standing seam system, tile system	15
2.4 Details of Façade cladding	
Window opening, window sill flashing, lintel, jamb, corner of building, wall penetration	16
2.5 Roofing and accessories	
Lightning protection system, snow guard system, ice guards for snow guard system, support for roof steps, roof anchor	17
2.6 Jointing techniques	
Soft soldering, bonding	18
2.7 Roof drainage systems and coping	
Roof drainage system, wall copings, connections, expansion elements	19



What is RHEINZINK?

RHEINZINK is titanium zinc according to DIN EN 988. The material has a high ductile yield and thus good processing capability. Precisely defined alloy components guarantee uniform colour for system products. RHEINZINK is a building metal with comparatively low CO₂-emissions during manufacturing and helps therewith protecting the climate.

RHEINZINK-Material Properties

- Melting point: 418° C
- Specific weight: 7.2 g/cm³
- Expansion factor: 2.2 mm/m x 100 K
- Chemical composition/alloy components:
 - 99.995 % pure zinc
 - 0.08-1.00 % copper
 - 0.07-0.12 % titanium
- Surface: natural finish



RHEINZINK guarantees precise alloy proportions to ensure uniform weathering for the entire building. Do not combine zinc with that of other manufacturers.

RHEINZINK Certification

- Natural material
- Minor energy consumption
- Durability
- An established cycle for valuable resources
- High rate of recycling > 95 %
- Shielded from electromagnetic radiation
- DIN EN ISO 9001:2008
- DIN EN ISO 14001:2004



What does RHEINZINK look like?

RHEINZINK-Surfaces

- RHEINZINK-bright rolled
- RHEINZINK-“preweathered^{PRO} blue-grey”
- RHEINZINK-“preweathered^{PRO} graphite-grey”

Properties of RHEINZINK-bright rolled

- Forms a natural patina, which, depending on the location, orientation and roof pitch of the building, will appear different at different times

Properties and features of RHEINZINK-“preweathered^{PRO}”

- Natural surface
- No coating
- Finished surface look
- Very little reflection
- Surface finish to reduce appearance of finger prints
- “Self-healing” (scratches become weathered over time)

Protective plastic film

To protect surfaces during transportation, storage and installation, RHEINZINK-strips and panels can be covered with plastic film. The one-sided, self-adhesive plastic film is applied at the plant.



- *Following installation and, at the end of each working day, the plastic film must be removed!*



How is RHEINZINK delivered?

RHEINZINK-Strips (Coils)

- Standard width for roofing: 670 mm, 600 mm
- Standard width for façade cladding: 500 mm
- Weight: max. 1000 kg
- Small Coil - weight: max. 200 kg
- Inner diameter:
 - ≥ 500 kg = 508 mm
 - < 500 kg = 400 mm

RHEINZINK-Sheets

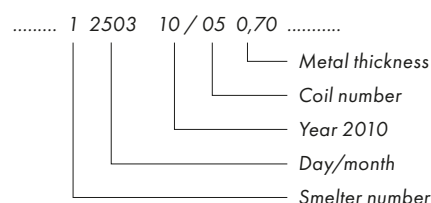
- Standard width: 1000 mm (for “preweathered^{PRO} graphite-grey surfaces”: 700 mm)
- Standard thickness: 0.7 mm, 0.8 mm, 1.0 mm
- Standard length: 2000 mm, 3000 mm
- Pallet weight: max. 1000 kg



- *RHEINZINK-Strips and Panels are shipped on leased pallets*

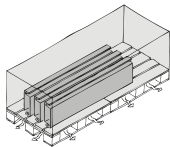
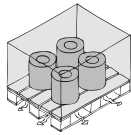
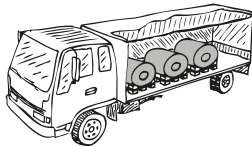
Markings – absolute certainty!

Each component comes with very specific identification, including material data and certification, which is stamped onto the product. This facilitates follow-up in the event of claims or disputes, even for components that have already been installed.





How is RHEINZINK transported and stored properly?



- Request a dry, well-ventilated room at the construction site, or store the material in containers

What should you look for when working with the material?



- Do not knock over or throw coils
- Do not step or run on profiles
- Do not buckle profiles/panels or package them unprofessionally
- Do not place on moist floor

What can damage the RHEINZINK-surface?

- Improper storage or transportation causes the formation of zinc hydroxide (durability is not affected)
- Sulfur deposits from oil heating causes brown discolouration (durability is not affected)
- Negative influences of other building materials (acidity, caustic solutions) or contact with other metals



External Influences



Oxidation – acidic corrosion

- Using seals made of non-protected bitumen or certain synthetic materials can lead to acidic erosion (low pH-value). RHEINZINK should be protected with a full-surface coating (e.g. ENKE Metall Protect; sign maintenance agreements)
- Have the manufacturer of bituminous roofing sheets sign off on the capabilities of the product when used together with RHEINZINK



Contact corrosion with metals

- Avoid placing copper on top of zinc
- RHEINZINK can be combined with aluminum, stainless steel, galvanized steel, as well as lead



Mortar corrosion

- Avoid contact with fresh mortar (high basic pH-value)
- Protective measures: full-surface coating



Corrosion in areas where wall termination profiles are used, e.g. on balconies

- Where wall termination profiles are installed, avoid constant moisture or acidic chemical components
- Full-surface coating on angled plates up to 2 cm above accessible sealant

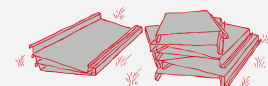


Hot water corrosion

- Pay attention to design safety, e.g. minimum roof pitch, jointing technique, etc.
- Use suitable underlays or structured underlays



Zinc hydroxide (surface rust)



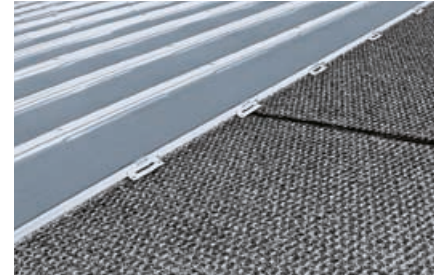
If zinc becomes moist while in storage or during transportation, the contact surfaces of materials stacked on top of each other begin to oxidize – and zinc hydroxide begins to form. This white, water-insoluble coating is very unattractive and, in most cases, cannot be removed. However, durability is not affected.



- No truck transport without tarpaulin
- Store dry and well ventilated
- Do not place on wet floors
- For work done by painters, plasters and other Trades after installation: temporary protective barriers (e.g. plastic films, tarps) must be removed at the end of each day!
- Do not stack panels on top of each other; transport panels in an upright position

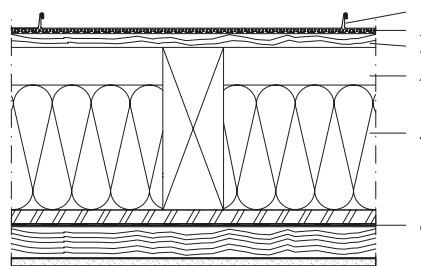
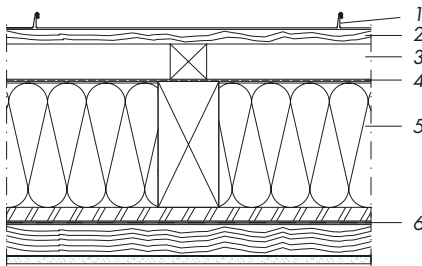
What is the life expectancy of RHEINZINK?

Life cycle assessments are using an life expectancy of RHEINZINK unlike to coated materials of 75 years. (Institute TNO, NL).



Ventilated roof structure 1
with non-ventilated supporting structure and full rafter insulation

Ventilated roof structure 2
with ventilated supporting structure, without full rafter insulation and with a structured underlay



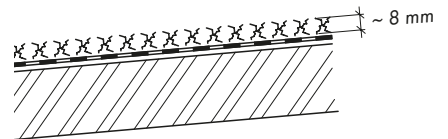
- 1 RHEINZINK-Standing Seam System
- 2 Wooden sheathing 160 mm x 24 mm
- 3 Ventilated space (see Tab. 1)
- 4 Underlay as a sub-roof (function layer)
- 5 Thermal insulation/rafters
- 6 Airtight layer with vapour barrier function (glue joints/edge connections and fasten directly to substructure)

- 1 RHEINZINK-Standing Seam System
- 2 Structured underlay VAPOZINC or bituminous sheeting V13 with AIR-Z from RHEINZINK
- 3 Wooden sheathing 160 mm x 24 mm
- 4 Ventilated space (see Tab. 1)
- 5 Thermal insulation/rafters
- 6 Airtight layer with vapour barrier function (glue joints/edge connections and fasten directly to substructure)

- RHEINZINK can be installed directly onto wooden sheathing.
- Simple fastening of clip
- Optimum ventilation technique (no arching of insulation)
- Optimum heat insulation technique using a wind barrier (underlay)
- Protected from snow penetration
- Resistant against external fire exposure

- Do not use water absorbing underlays
- Avoid the use of double underlays
- Unfavourable ventilation technology (insulation arches = reduced net section)
- Thermal insulation technique is not optimum (no wind barrier)
- No protection from snow penetration
- Resistant against external fire exposure*

Structured underlay VAPOZINC or structured mat AIR-Z from RHEINZINK



V13 with RHEINZINK-AIR-Z

- Protects the structure during the construction phase
- Function level or second drain-off level in the event of leakage, ice dam water, etc.
- For roof pitches $\leq 15^\circ$: for underlays on site, e.g. V13, a structured mat, e.g. RHEINZINK-AIR-Z must be installed
- For roof pitches $\geq 15^\circ \leq 70^\circ$ and ventilated roof structure on wooden sheathing: underlay is not required
- For roof pitches $\geq 3^\circ \leq 70^\circ$ with large surface plywood boards: structured underlay VAPOZINC or install structured mat AIR-Z on suitable underlay
- All underlays can be used, depending on requirements (e.g. plastic sheets, bituminous sheets, structured underlays)
- Underlays should not trap or absorb water

Roof pitch	$\geq 3^\circ$ to $\leq 15^\circ$	$> 15^\circ$
Ventilated space, minimum height	80 mm	40 mm
Intake and exhaust vent openings, min. net width	40 mm	30 mm
Gross cross-section of RHEINZINK-Diamond Mesh Sheet with 63 % free ventilation shaft	approx. 65 mm	approx. 50 mm
Gross cross-section of perforated sheet with approx. 45 % free ventilation shaft	approx. 90 mm	approx. 70 mm

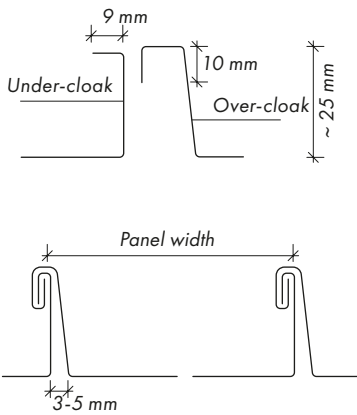
Tab. 1: Height of ventilated space in relation to roof pitch

For a full overview of roofing sub-structures, please request RHEINZINK-Design Recommendations for Roof coverings!

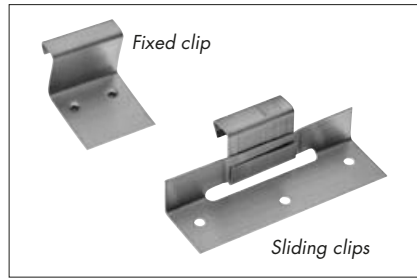
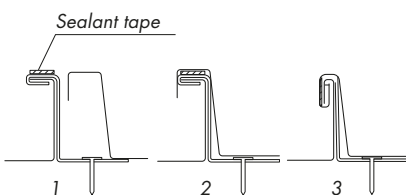
* Applies for:
 ■ RHEINZINK-Vapozinc for roof pitches $< 20^\circ$
 ■ V13 + RHEINZINK-AIR-Z for all roof pitches



RHEINZINK-Standing Seam System



- Surfaces: bright rolled, "preweathered^{pro} blue-grey", "preweathered^{pro} graphite-grey"
- Metal thickness: 0.7 mm
- Coil width: 670 mm (600 mm)
- It is absolutely essential to comply with the seam dimensions specified, otherwise, problems will arise during profiling and mechanical seaming
- Coil width minus 70 mm (loss of seam) = ca. panel width
- For roof pitches $\geq 3^\circ \leq 7^\circ$ with sealant tape
- If using a sealant tape, close the panel every ca. 0.5 m immediately following installation – otherwise the sealant tape will expand
- Processing temperature for seaming and forming involving impact: $\geq 10^\circ\text{C}$ metal temperature



Clips, minimum number of clips

- The amount of clips depends on building height and panel width/material thickness according to DIN 1055 Part 4 design loads or prEC 1
- Windloads according to static calculation
- n = min. no. of clips/m²
- s = max. distance of clips in mm

	Wall	Roof
Coil width in mm	500	670 ¹⁾
Panel width, ca., in mm	430	600
Material thickness in mm	0,8	0,7
min. number of clips ²⁾		
per m ² /max clip intervals in mm	n/s	n/s
Wind loads (kN/m ²)		
$\leq -0,3$	4/500	4/500
$\leq -0,6$	4/500	4/500
$\leq -0,9$	4/500	4/500
$\leq -1,2$	4/500	4/500
$\leq -1,5$	6/350	6/300
$\leq -1,8$	7/300	7/300
$\leq -2,1$	8/250	9/250
$\leq -2,4$	8/250	9/250
$\leq -2,7$	10/200	10/200
$\leq -3,0$	11/200	11/150
$\leq -3,3$	11/200	11/150
$\leq -3,6$	13/150	13/150
$\leq -3,9$	13/150	
$\leq -4,2$	15/150	
$\leq -4,5$	15/150	
$\leq -4,8$	17/100	
$\leq -5,1$	17/100	

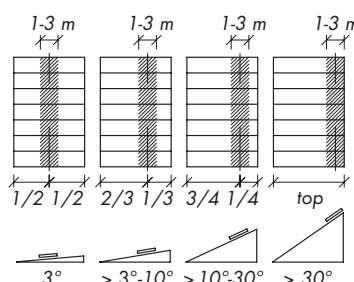
¹⁾ Coil widths for pent roofs and roofs in exposed areas ≤ 500 mm, material thickness 0.8 mm

²⁾ RHEINZINK-clips

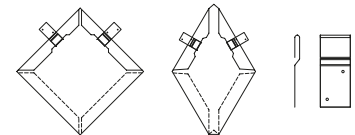


Arrangement of fixed clips

- Dependent on roof pitch
- 1-3 m for panel lengths of ≤ 10 m
- 3 m for panel lengths > 10 m
- Use sliding clips for the rest of the roof surface



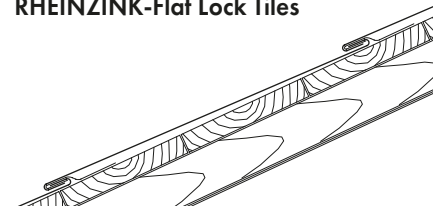
RHEINZINK-Square Tiles/Diamond Tiles



- Surfaces: bright rolled, "preweathered^{pro} blue-grey", "preweathered^{pro} graphite-grey" (except diamond tile)
- Roof pitch $\geq 25^\circ$, recommended roof structure: ventilated roof structure 1, see page 6, other structures on request
- Material thickness: 0.7 mm
- Standard size (standard tiles): 400 mm, 250 mm



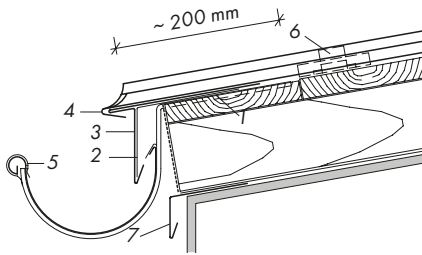
RHEINZINK-Flat Lock Tiles



- Surfaces: bright rolled, "preweathered^{pro} blue-grey" and "preweathered^{pro} graphite-grey"
- Roof pitch $\geq 25^\circ$, recommended roof structure: ventilated roof structure 1 other structures upon request
- Material thickness: 0.7, 0.8 and 1.0 mm
- Standard size: 333 mm x 600 mm and 400 mm x 800 mm (other sizes available)



Eaves on wooden sheathing without structured underlay



- 1 Fascia board, lowered
- 2 Continuous cleats made of galvanized steel 1.0 mm
- 3 Eaves flashing made of RHEINZINK, 0.7 mm
- 4 Round eave termination with backfold
- 5 Gutter, gutter bracket, snap-lock bracket
- 6 Install clip adjacent to eaves flashing (ca. 200 mm)
- 7 Eaves profile for function layer (underlay)



- Lowered fascia board
- Gutter brackets, flush-mounted
- Galvanized continuous cleats 1.0 mm
- RHEINZINK-eaves flashings 0.7 mm
- Panel backfold open
- Comply with expansion area
- Result: guaranteed water course at the edge of the eave; no standing water!



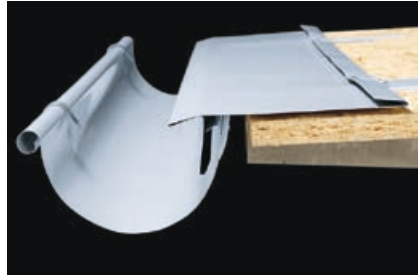
Eaves termination, standing round (favoured solution)



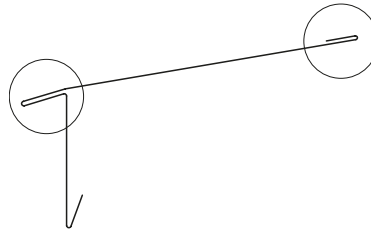
Eaves termination, standing diagonal



Eaves termination, standing straight (only recommended for areas where aesthetics are less important)



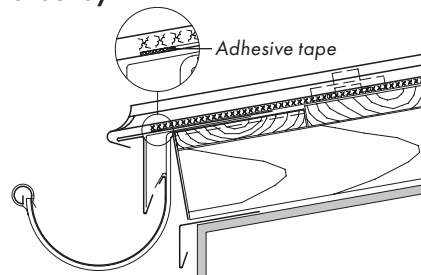
Detail optimization: Eaves Flashings



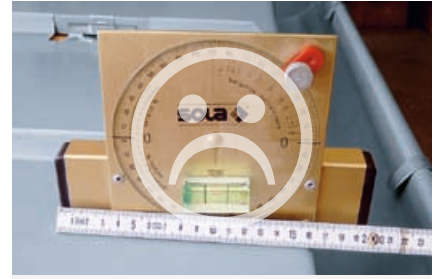
- Roof pitch $\geq 3^\circ \leq 10^\circ$
- Water check at the end of the eaves flashing = **reduced capillary action**
- Increase fold in eaves flashing by 5° in area where panel is being hung = **improved drainage**



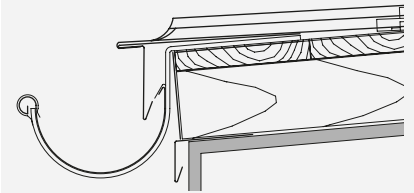
Eaves termination with structured underlay



- Remove approx. 50 mm of the underlay including structured mat
- Optional: glue underlay onto eaves flashing as additional measure



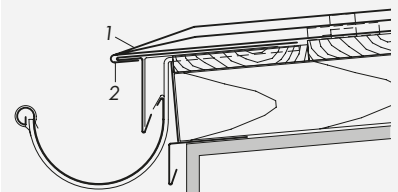
Eaves on wooden sheathing with negative detail designs



- Fascia board has not been lowered
- Gutter bracket has not been flush-mounted
- Eaves flashing without galvanized continuous cleat (unstable)
- Eaves termination too long
- Panel backfold has been pressed shut
- Insufficient room for expansion

Result:

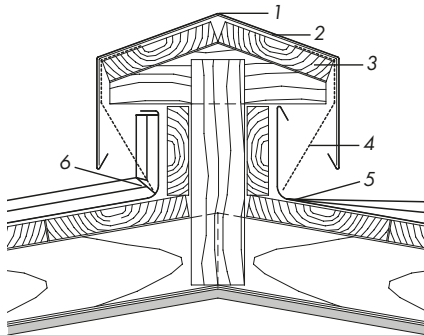
- "leaky eaves" because the roof pitch has been reduced to $\leq 3^\circ$ at the edge of the drainage area due to the poor detail solutions
- Capillary penetration as a result of an extremely flat pitch (unfavourable drainage conditions)
- Standing water (puddles) leads to formation of zinc hydroxide
- Lack of expansion area; panels arch as they contract during low temperatures = potential counter-incline



- Re 1: Eaves design with turned down seam = potential stress fractures
- Re 2: Thermal expansion (contraction of panels) not possible = dents or stress fractures



Ridge for a vented gable roof – high design with ventilation cross-sections



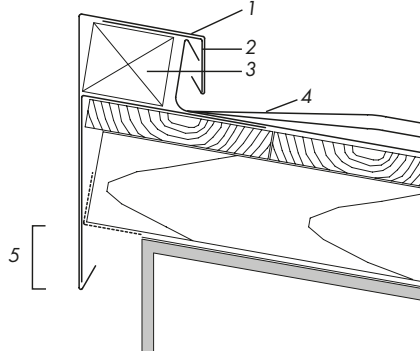
- 1 RHEINZINK-Coping
- 2 Continuous cleat made of galvanized steel 1.0 mm
- 3 Wooden sheathing 160 mm x 24 mm
- 4 Perforated sheet acts as protection from snow
- 5 Panel termination – turned down seam
- 6 Panel termination – pinched seam



- Wooden substructure
- Set-up height of panel, per roof pitch $\geq 80/100/150$ mm
- Upper termination with water check
- Design of panel termination: turned down seam or pinched seam (in order to avoid tearing the material, do not set the turned down seam on anything with a sharp-edge)
- Watch for size of intake and exhaust vent openings
- Provide expansion area for panels
- With no function layer (membrane), only a restricted solution with regard to snow penetration is possible



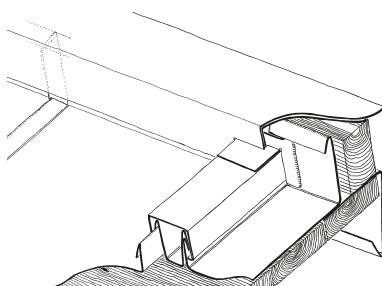
Gable roof ridge with wooden battens



- 1 RHEINZINK-Coping
- 2 1.0 mm continuous cleats made of galvanized steel
- 3 Wooden batten, height ≥ 60 mm
- 4 Panel termination – turned down seam
- 5 Overlap façade depending on height of building ≥ 50 mm ≤ 100 mm



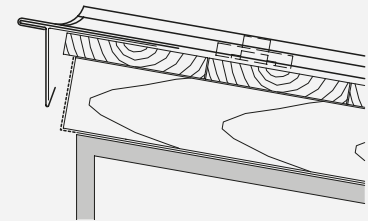
- Overlap of RHEINZINK-Coping on the façade, depending on height of building ≥ 50 mm/ 80 mm/ 100 mm
- Design of panel termination: turned down seam with connection height of ≥ 60 mm; proper connecting height for expansion strip is ≥ 40 mm to accommodate thermal expansion of panel
- Upper termination complete with water check
- Design expansion area for panel ≥ 15 mm



Expansion strip on gable roof ridge with wooden batten



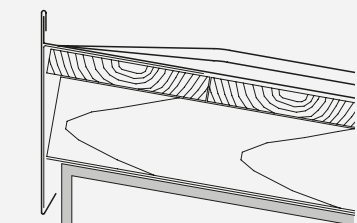
Gable roof ridge – eaves termination



- Non-waterproof termination due to lack of upstand on panel
- Water overrun at edge of ridge
- Eaves termination is too long and no expansion area = potential leaking



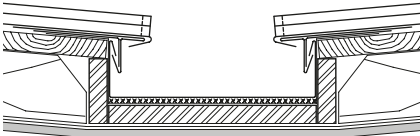
Gable roof ridge without expansion area and insufficient installation height



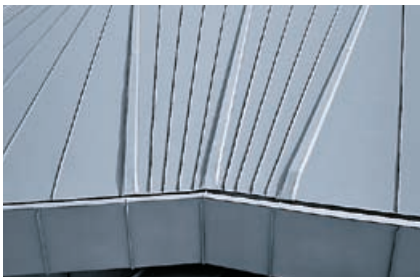
- Edges of turned down seam are too sharp = pinched material
- No water check
- Insufficient installation height
- No expansion area = dents, stress fractures, etc.



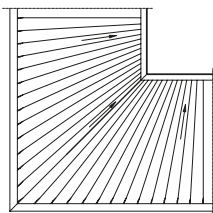
Valley gutter recessed on structured mat



- For roof pitch of $\leq 10^\circ$
- Opening ≥ 150 mm
- Height of valley ≥ 60 mm
- Valley to drain into the roof gutter at the eave
- Set up snow guard system
- Additional waterproofing of roofs on wooden sheathing ca. 50 cm wide
- Design cross-vent in valley!



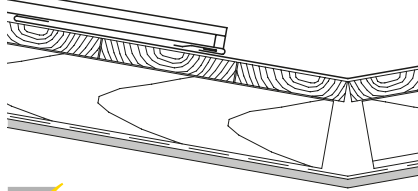
Valley by using tapered panels



- For roof pitches of $\geq 5^\circ$ to $\leq 10^\circ$
- Panel width eave min. 100 mm
- Expensive/difficult with panels that are 6 m and longer due to the diagonal cut of the strips and creating the seam using tapered panels
- A better solution: a recessed valley gutter/channel



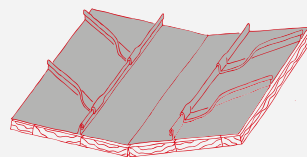
Valley with a single seam and soldered continuous cleat



- For a roof pitch of $> 10^\circ$
- Girth ≥ 800 mm
- Girth of soldered cleat ca. 80 mm, solder with panel
- Profile joints for valley pitch of $\leq 10^\circ$, solder with expansion elements
- Development of soldered cleat (s. page 14)
- Design cross-vent in valley!



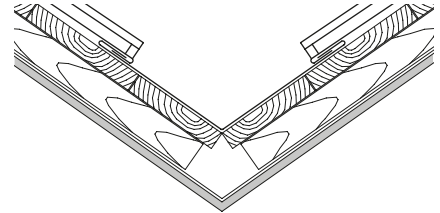
Seamed valley



- Only valley lengths up to max. 3 m
- Roof and valley panels are seamed together. Stress fractures occur as a result of varying thermal expansion
- Intersections are difficult to design and realize (material cut-outs etc.)



Valley with a single seam

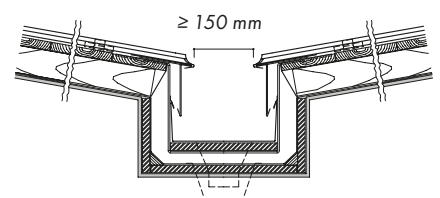


- For roof pitch of $\geq 25^\circ$ (35° *)
- Designed with a water check, 50 mm wide
- Girth ≥ 400 mm
- Profile joint designed as a single seam; with soldered cleat or solder with expansion elements
- Design cross-vent in valley!

* in areas with heavy snowfall



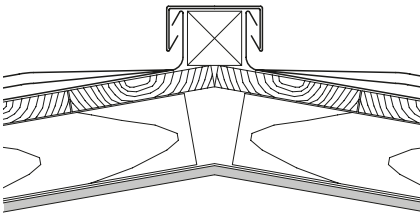
Valley gutter with lined overflow gutter



- Design overflows: design according to size of gutter (dimensioning)
- Position snow guard system
- Install expansion elements, clearance max. 6 m (s. Tab. page 19)
- Position gutter heaters
- Design roof drains for overflow gutter (take into account height-width dimensions)



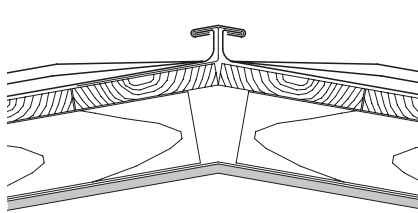
Hip with batten and coping profile



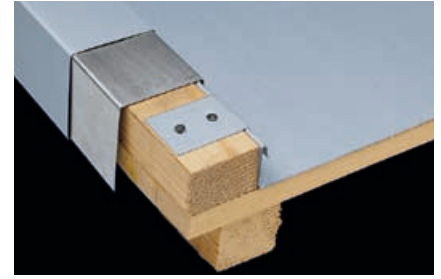
- Connection height ≥ 40 mm
- Design type: turned down seam
- Seam layout without offset possible
- Design and expansion technique benefits vis-à-vis "hip designed as a double standing seam"
- Coordinate connection height with verge and pent roof ridge with batten



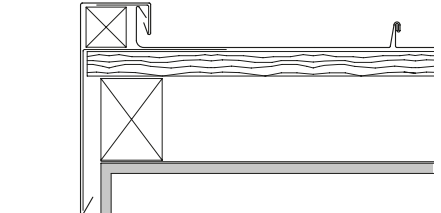
Hip without batten, with coping profile



- Connection height ≥ 40 mm
- Alternative to "Hip with batten and coping profile"
- Design type: turned down seam
- Seam layout without offset possible
- Narrower solution is suited particularly for smaller components, e.g. dormers



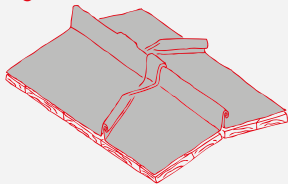
Verge with Batten



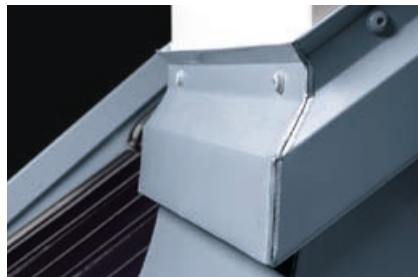
- Connection height ≥ 40 mm
- Design: lateral panel connection with water check
- Depending on height of building, overlapping width of fascia in the façade area is ≥ 50 mm or ≥ 100 mm
- Coordinate connection height: see hip and pent roof ridge detail



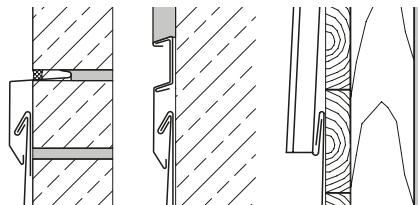
Hip or ridge designed as a double standing seam



- Only for panel lengths of < 3 m, otherwise possibly problems with stress cracks due to thermal length expansion
- Seam gradient is not straight
- Seams must be staggered, cut outs are necessary, cracks are still possible



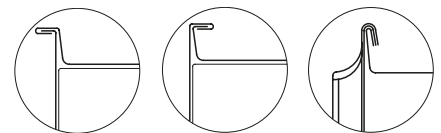
Lateral wall termination



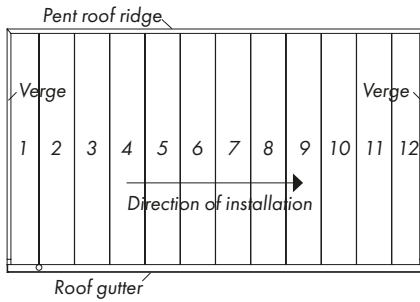
- Connection height $\geq 80/100/150$ mm
- Upper termination with water check
- Coping using cover flashing or façade components
- Design variations on stucco wall, brick work or EIFS (exterior insulated finish system)



Verge for dormers, attics, fascias and small surfaces with short panels



- Connection height ≥ 25 mm designed as a profile or standing seam fascia
- Suitable for round dormers and small surfaces (position sealant tape)
- Segmentation of fascia (round): work is done manually or products manufactured by Krehle (Germany) can be used



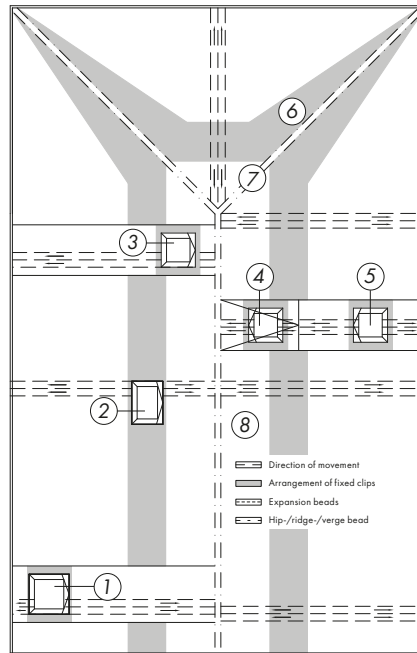
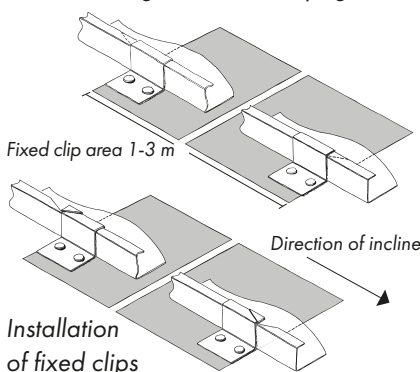
Installation sequence for pent roof without roof penetrations



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

Design/steps:

- Symmetrical panel segmentation, verge panel 1 + 12, installation height ≥ 40 mm with water check (see page 11)
- Do not piece panels together
- Eave and pent roof ridge details (see page 8 + 9)
- Length to be added to panel: ca. 15 cm for eave, ca. 10 cm for ridge
- Check profile dimension
- Profile panel using Profimat (rollformer), under-cloak 9 mm, no plus tolerance
- Over-cloak (vertical leg) 10 mm, tolerance ± 0,5 mm
- Note: if the over-cloak is too wide (e.g. 12 mm) seaming by machine is no longer possible
- Establish fixed clip area (each fixed clip is to be designed as illustrated below.)
- Fasteners to be distributed equally on clip
- Distance between clips (see page 7)
- Each day, prior to leaving the construction site, the panels should be seamed shut or partially terminated like an angled seam (see page 7)



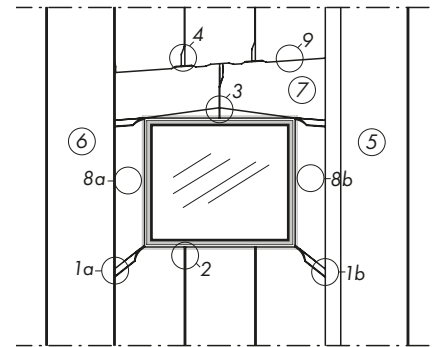
Installation sequence for a gabled roof with a hipped end and eaves off-set



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

Design/steps:

- Hip area: location of hip and expansion strips (7)
- Note direction of installation
- Ridge development (see page 9)
- Fixed clip (see page 7)
- Distance between clips (see page 7)
- Each day, prior to leaving the construction site, the panels should be seamed shut or partially terminated like an angled seam (see page 7)
- Penetration (2): within fixed clip area without expansion strip
- Penetration (1) + (3): outside fixed clip area (6) with expansion strips
- Penetration 4: located one behind the other; optimum design: elevated design of 10 cm (planning stage)



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 strip-width ≥ 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 page 14) is preferred!**



Roof penetration

Details: proper seaming technique design (drawing – see page 12)



- Details should be designed exclusively using a seaming technique!
- Do not solder seam terminations with panel surfaces
- Do not place any ventilators or other penetrations in the linear seam
- Do not fasten any safety hooks directly onto the panel surface
- During installation, please observe the following sequence: front, side, back apron



Pinched seam on roof penetration (2)
Front area



Expansion strip with wood or metal

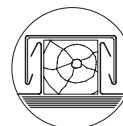


Expansion strips

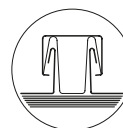
- To ensure lengthwise panel expansion where roof penetrations are located outside areas with fixed clips
- If temperatures (metal temperatures) are < 10° C, seam termination details should always be heated using hot air



Double pinched seam in cross joint (3)
Back apron



Expansion strip with wood



Expansion strip with metal bracket



Rounded seam connection (1a)

Upstand ≥ 150 mm with water check, pinched seam round seamed to double standing seam



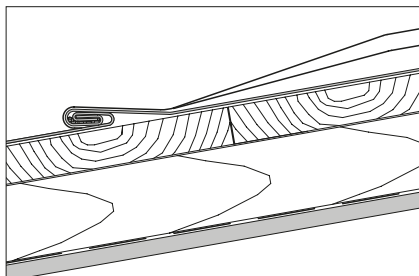
Intersection (4)
Panel on cross joint, back apron

Result:
Detail design and implementation for roof penetrations requires expert craftsmanship.

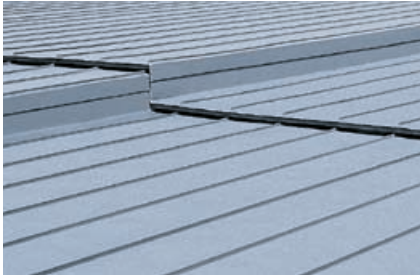


Rounded seam connection (1b)

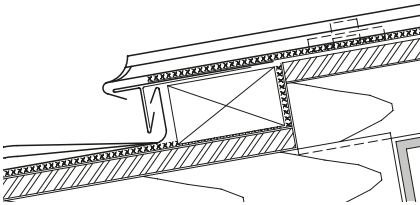
As 1a, but seamed to expansion strip



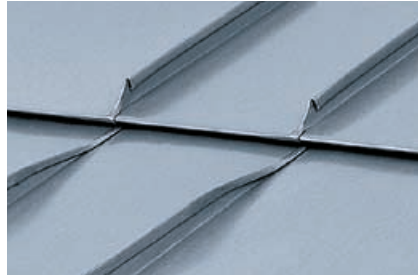
Cross-joint designed as double standing seam, horizontal (9)
with sealant tape



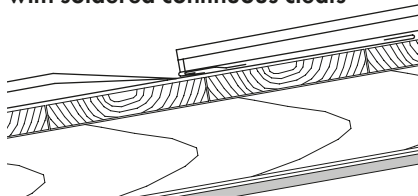
Cross joint designed as stepped falls



- Roof pitch $\leq 10^\circ$
- Panel length 10 to 16 m, installation using long sliding clips
- Stepped falls with turned down seam
Note: install wood structure (spacer blocks) later!
- Step height ≥ 60 mm
- Expansion area ≥ 15 mm



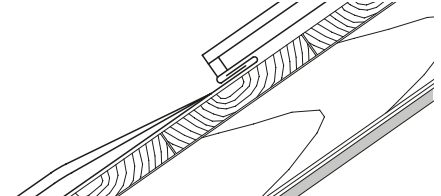
Cross joint designed as a single seam with soldered continuous cleats



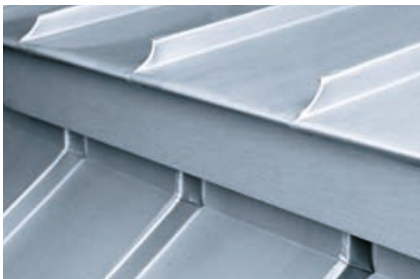
- Roof pitch $\geq 10^\circ < 25^\circ$ (35° *)
- Material thickness of soldered continuous cleats 0.80 mm
- Panel length max. 16 m
- Overlapping of panel ca. 250 mm
- Water check designed as a seam; do not notch or slit!
- Expansion area ≥ 15 mm



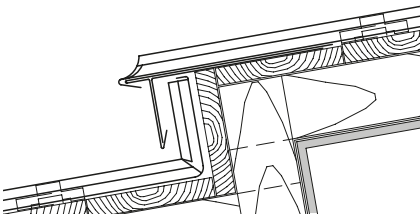
Cross joint designed as a single seam



- Roof pitch $\geq 25^\circ$ (35° *)
- For double and angled standing seam system
- Overlap panel 50 mm depending on panel length
- Expansion area = 10 mm



Stepped falls with pinched seam

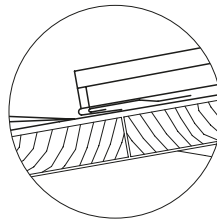


- Detail design of upper panel (see page 8, eave detail without structured underlay)
- Step height ≥ 80 mm

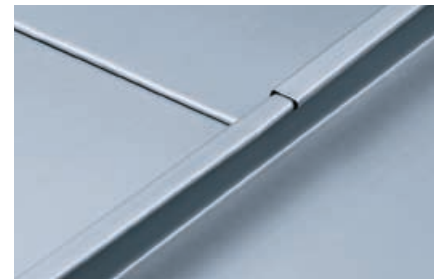
* in areas with heavy snowfall



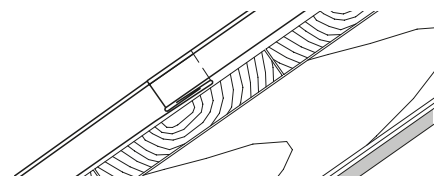
Detail optimization: soldered continuous cleats



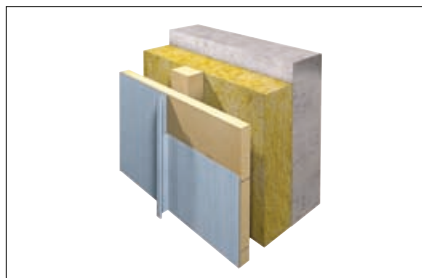
- Soldered continuous cleats with backfold for panel hook-in (more stability)
- Material thickness 1.0 mm
- Length ≥ 2 m ≤ 3 m, profile joint with overlap, do not solder
- Solder to panel



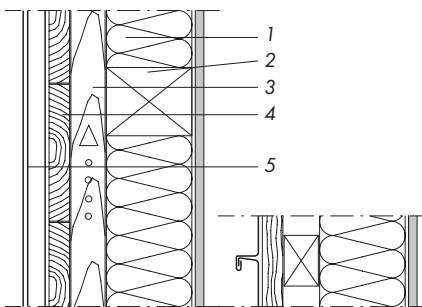
Seam in seam cross joint for angled standing seam system



- Roof pitch $> 25^\circ$ (35° *)
- **Only for angled standing seam system!**
- Panel length ≤ 6 m
- Overlap area must accommodate thermal linear expansion of panel in the seamed area as well



Ventilated substructure 1
Wood design

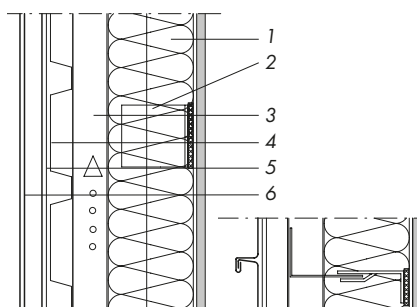


- 1 Thermal insulation
- 2 Wooden batten
- 3 Ventilation space
- 4 Wooden sheathing
- 5 Angled standing seam system

- Sheet material preferred
- Angled standing seam system coil width 500 mm x 0.8 mm
- Panel length ≤ 6 m (handling)
- Always fabricate panels and adapter panels from the same batch (colour discrepancies!)
- Panel fastening – see “Roofing – Double Standing Seam System”
- Wooden sheathing 100 mm x 24 mm or suitable OSB/BFU-boards, 22 mm
- Ventilation space ≥ 20 mm
- Thermal insulation (as per country standard)
- Windproofing is done on site!
- Fix panel on ridge, length of fixed clip area – 1 m



Ventilated substructure 2
Metal Design

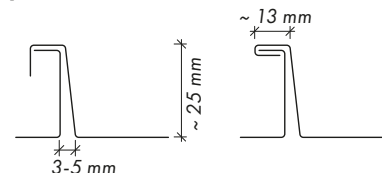


- 1 Thermal insulation
- 2 Bracket system made of metal with thermal break
- 3 Ventilation space
- 4 Trapezoidal profile
- 5 Underlay (buffer)
- 6 Angled standing seam system

- Sheet material preferred
- Angled standing seam system coil width 500 mm x 0.8 mm
- Panel length ≤ 6 m (handling)
- Always fabricate panels and adapter panels from the same batch (colour discrepancies!)
- For panel fastening, see “Roofing – Double Standing Seam System” – using suitable rivets/screws
- Use suitable underlay as a buffer
- Trapezoidal profile, galvanized steel with/without coating – type of profile depends on wind load
- Metal substructures are used as fasteners
- Ventilation space ≥ 20 mm
- Thermal insulation
- Windproofing is done on site!
- Fix panel at ridge point, length of fixed clip area: 1 m



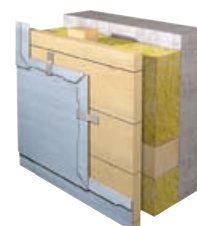
RHEINZINK-Angled Standing Seam System



- Surfaces: “preweathered^{pro} blue-grey” and “preweathered^{pro} graphite-grey”
- Coil width: 500 mm
- Material thickness: 0.8 mm
- Optimum aesthetics when using sheets
- Always produce wall claddings from the same batch in order to avoid colour discrepancies



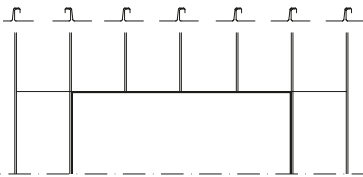
RHEINZINK-Tile Systems



- Surfaces: “preweathered^{pro} blue-grey” and “preweathered^{pro} graphite-grey”
- Standard size: 333 mm x 600 mm und 400 mm x 800 mm (other sizes are available)
- Material thickness: 0,7, 0,8 and 1,0 mm



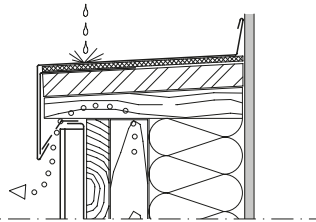
Window opening with symmetrical segmentation



- Panel width change up to ca. 50 mm is not discernable visually
- Seam should always be used at jamb locations
- If cross joints are used, these should be in the lintel area
- No soldering work around window sills. Traces left by soldering fluid cannot be repaired



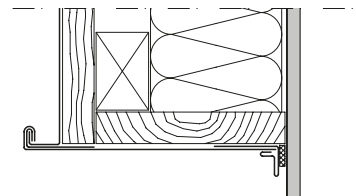
Window sill coping



- Coping should be full-surface bonded with Enkolit®, in order to prevent drumming sounds!
- Indirect fastening using continuous cleats is required if the leg height is ≥ 50 mm



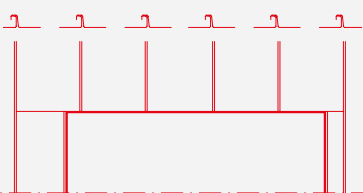
Jamb



- Angled standing seam designed at jamb connection
- Connect jamb to window frame using a receiver strip
- No direct fastening using screws or nails
- Do not solder window sill coping to jamb



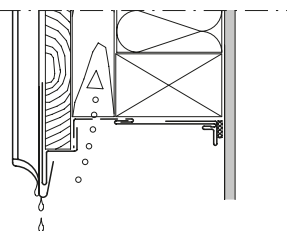
Assymetrical window opening



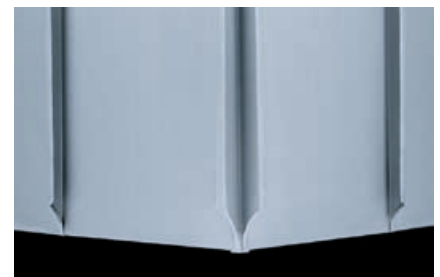
- This is the result of unprofessional craftsmanship and lack of planning.
- A design using only one coil width is seldom possible.
- Change of seam is not designed.
- Soffit/lintel overlap is a sloppy detail



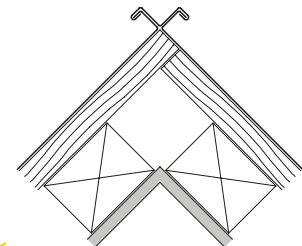
Lintel



- Air intake through perforated sheets or stamped openings in lintel profiles
- Lintel attached to window frame using receiver strips
- Surface connection flush with edge of eave



Corner of Building

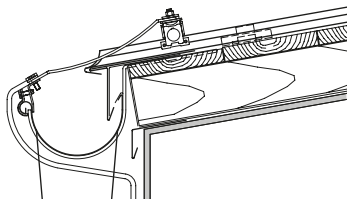


- Symmetrical design
- Stable solution to prevent arching of corner panels



Lightning Protection System

Eave design with flexible brackets



- Use lightning protection clamps made of aluminum wrought alloy
- Flexible connecting wires can accommodate changes in panel length
- Arrester devices should be placed every ca. 20 m as per specifications
- Metal roof surfaces function as outer lightning protection, if there is grounding



Lightning protection

Fix panel on point of eave = expansion cracks on panel

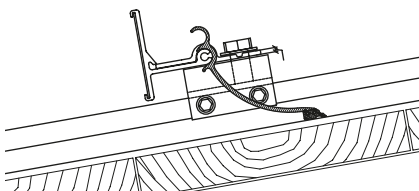


Snow guard system

The clamp has to allow thermal length expansion of the tube.



Snow Guard System S5



- Do not use galvanized components (risk of rust formation)
- Do not use snow guard clamps that are too narrow (cracks as a result of construction errors and installation in seam area)
- As a rule, install one snow guard clamp per seam



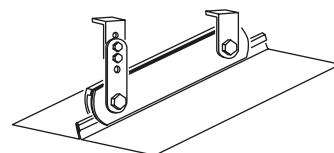
Ice guards for snow guard system



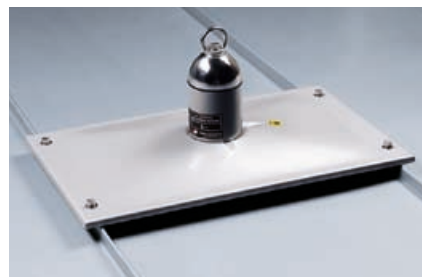
- Install ice guards to prevent sheet ice from falling
- Install 1 to 2 ice guards per panel, as required
- Do not use fasteners made of galvanized steel (risk of rust formation)



Retainers for roof steps

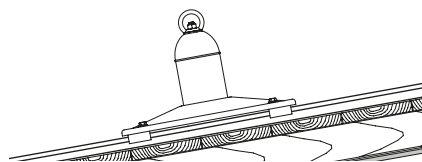


- Fasten clamping brackets to double standing seams
- Can be used for roof pitch of $\leq 40^\circ$



Latchways Roof Anchor Type 65618-00

Fall protection for craftsman working on standing seam roofs

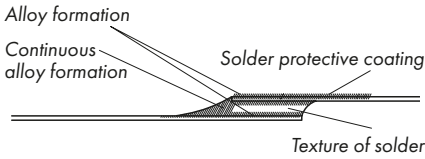


- Guides force directly into the construction without damaging the panel
- Fastened to the standing seam using S5 brackets – without penetration
- Coil in roof anchor dampens dynamic forces
- Allowed for eave and verge load according to DIN 4426



Soft soldering

Soft soldering is an impervious solid connection performed in one operation



The following steps are to be taken into account to create a proper, professionally soldered seam:

Preparation:

- Clean dirty surfaces manually or with chemicals
- Sheet metal overlap ≥ 10 mm ≤ 15 mm
- Using a brush, apply flux full-surface and generously to the parts to be connected

Soldering process:

- Hammer bit > 350 g, preferably 500 g
- Working temperature ca. 250 °C
- Soldered gap $\leq 0,5$ mm, the narrower the soldered gap, the stronger the soldered seam
- Using the pre-tinned hammer edge, heat the parts to be joined to melting temperature
- The solder will be melted on the soldering bit in the amount required
- Soldering tin S-Pb60Sn40, (low in antimony) penetrates the soldering gap with capillary action
- Pre-tin metal if metal thickness is > 0.8 mm

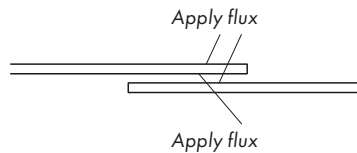
Finishing:

- Remove residual flux with a damp cloth = this is important aesthetically (see RHEINZINK-Soldering Instructions)



Flux for soft soldering

Coat the RHEINZINK-surface



- Removes oxide residue and rolling emulsion
- Soldering flux is discharged
- Suitable for bright-rolled and "preweathered^{PRO} blue-grey": liquid flux "ZD-pro" by Felder
- Suitable for "preweathered^{PRO} graphite-grey": solvent + liquid flux "ZD-pro" (pre-clean manually or by using chemicals)



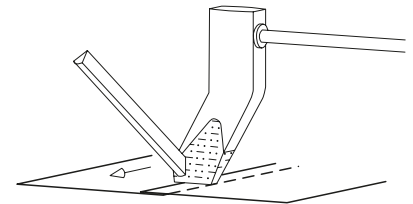
Sources of error when soft soldering



- Wrong soldering bit (pointed soldering bit)
- Overheated bit
- Soldering too quickly
- Insufficient weight = insufficient heat transfer
- Unsuitable flux (acid, etc.)
- Overlap of metal parts too big
- Soldering temperature too cold
- Do not leave profile joints for days without soldering (dirt reduces strength of soldered seam)



Proper handling of hammer bit



- Guide soldering iron, thoroughly solder overlap
- Heat to right temperature (ca. 250 °C)
- Solder using even speed



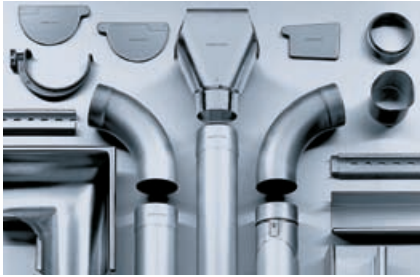
Adhesive bonding of copings



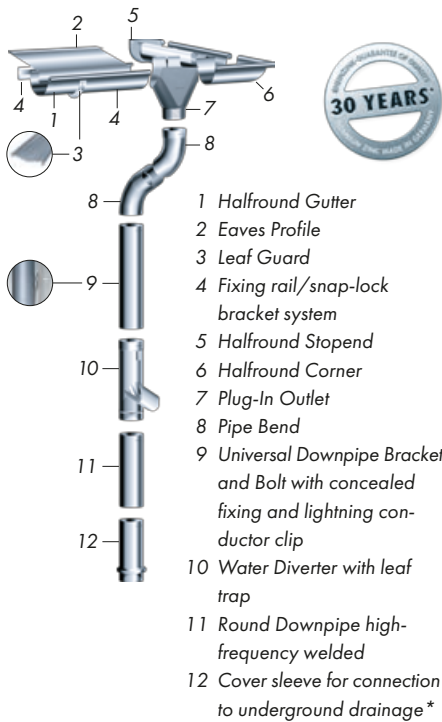
- Clean substructure
- Full-surface application of Enkolit[®] using a notched trowel
- Create joints using butt straps or UDS connectors
- For vertical legs ≥ 50 mm, continuous cleats should be used

The permanently elastic bituminous adhesive, Enkolit[®], has been used successfully in sheet metal technology for 40 years.

For proper usage, please see installation instructions provided by Enke for Enkolit[®].



RHEINZINK-Roof Drainage System



* Alternatively a Pipe Bend (Shoe) for ground level drainage



- Surfaces: bright rolled, "preweathered^{PRO} blue-grey", "preweathered^{PRO} graphite-grey"
- It's always a good fit: our complete roof drainage system consists of over 500 parts. Just ask!

Gutters, half-round or box-shaped

- Material thickness for standard sizes ≤ 333 mm = min. 0.7 mm
- Material thickness for standard sizes ≥ 400 mm = min. 0.8 mm
- Standard sizes: 200 mm, 250 mm, 280 mm (only for half-round gutters), 333 mm, 400 mm, 500 mm
- Standard length: 3 m
- Fasten with suitable gutter brackets: RHEINZINK covered or galvanized
- Fasten with proven snap-lock bracket system made of aluminum die casting
- Clearance of gutter bracket/snap-lock bracket or bracket retainer: ≥ 50 cm ≤ 90 cm
- Soft solder profile joint
- Expansion elements – see Table

Downpipe, round

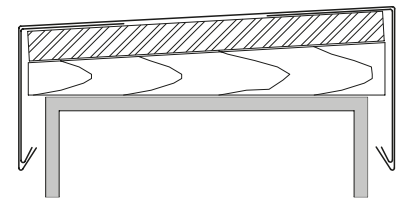
- Downpipe according to DIN EN 612
- Material thickness for standard sizes $\leq 60/80$ mm = 0.65 mm
- Material thickness for standard sizes $\geq 100/120/150$ mm = 0.7 mm
- All pipe sizes are high frequency welded
- Standard length: 2 m or 3 m,
- Fasten with RHEINZINK-Downpipe Bracket or RHEINZINK-Universal-Downpipe Bracket

Maximum distance for expansion elements

Gutters	Standard size/cut length	max. distance (m)* for expansion elements
Bracket-mounted gutters	≤ 500	15.0
Edge gutter	> 500	8.0
Valley gutters (not glued in place)	> 500	8.0
Shed roof gutters	> 800	6.0
Building profiles fastened indirectly	all standard sizes	8.0
Building profiles – glued in place	all standard sizes	6.0

* cut max. distance in front of corners and other fixed-points in half!

RHEINZINK-Coping



- Surfaces: bright rolled, "preweathered^{PRO} blue-grey", "preweathered^{PRO} graphite-grey" (Profile up to max. 700 mm cut length)
- Material thickness: 0.8 mm (as a rule)
- Connect profile lengths properly and professionally
- Lateral inclination $\geq 3^\circ$
- Fasten indirectly using continuous cleats or through adhesive bonding using Enkolit[®]

Connections and Expansion Elements

- Soft Soldering and Expansion Elements (industrial)



- UDS-Connectors (industrial)



- Flat Expansion Joint (manually)



- Single Seam (manually)





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