RHEINZINK®

RHEINZINK®-PROFILE TECHNIQUE FOR FACADES

FLAT-LOCK TILES

DESIGN AND APPLICATION

RHEINZINK

Foreword

This installation manual – RHEINZINK® System Techniques for Flat-lock Tile Façades – is based on practical experience and our current status of knowledge in research and development.

The manual describes a general application of RHEINZINK tiles for façade cladding worldwide. It is the basis for proper planning and application technology in standard cases. However, there could be instances, in which this type of cladding can only be used in a restricted manner or not at all. The detail drawings in the manual describe the standard details of the systems.

In consideration of the current status of structural engineering and definite development trends, this manual provides a guideline for the designer as well as for the company executing the work. The planner must take into account the impact of the system application, the local and climatic conditions and the demands in terms of structural physics on the respective building. Using these guidelines does not preclude independent thinking and responsibility. We reserve the right to undertake changes, which result from further development of the systems.

Should you have any questions with respect to these systems, please contact our Department of Application Engineering. We welcome any suggestions you may have with respect to our products.

Datteln, January 2006

TABLE OF CONTENTS

RHEINZINK® – THE MATERIAL

1. Werkstoff RHEINZINK®

1.1 Alloy and quality

According to DIN EN 988, RHEINZINK® material is titanium zinc. RHEINZINK®-alloy consists of electrolytic high-grade fine zinc with a purity of 99.995 %, conforming to DIN EN 1179. The alloy has exact percentages of copper and titanium.
RHEINZINK®-products are certified according to DIN EN ISO 9001:2000 and are subject to voluntary testing by TÜV Rheinland Group (the relevant local inspection and monitoring body) according to the stringent requirements of the Quality Zinc Criteria Catalogue *(available upon request)*.

Ecological relevance
RHEINZINK® is a natural material, which meets today's strict ecological requirements in many areas. Environmental protection is evident in the production, transportation and installation of this material. State-of-the art facilities, well thought-out logistics and favourable processing properties attest to this.
Environmentally conscious handling is documented through the adoption of ISO 14001, the Environmental Management System, tested and certified by the TÜV Rheinland Group.
Other significant aspects of the overall ecological assessment of zinc are:

- **Natural material**
- **Low energy requirement**
- **Durability**
- **An established cycle for valuable resources**
- **High percentage of recycling**

Other significant properties of zinc are:

- **Vital trace element**
- **Extensive resources**

RHEINZINK® has been certified as an environmentally sound building product according to ISO 14025 Type 3 by AUB (the Association for Environmentally sound Building Products). The environmental product declaration includes the entire life cycle of RHEINZINK products, from raw material extraction to production and use phase, right up to the end-of-life stage and recycling. An integral part of the environmental product declaration is a life cycle assessment (LCA) according to ISO 14040 (certificate available upon request).

RHEINZINK® provides protection against electromagnetic radiation
There is a very controversial discussion in the public domain surrounding electromagnetic radiation; within this context, the International Society for Electro-Smog Research (IGEF e.V.) has analyzed and determined the protective properties of RHEINZINK®. The result: more than 99 % of electromagnetic radiation are screened off by RHEINZINK®. Biological tests on humans confirm this and indicate a harmonizing effect on heart, circulation and nervous system, especially when grounded, and a relaxing effect on the whole body.

1.2 Material properties

- Density (spec. weight) 7,2 g/cm³
- Melting point 418 °C
- Recrystallization temperature > 300 °C
- Coefficient of thermal expansion (longitudinal): 2,2 mm/m x 100 K
- Coefficient of thermal expansion (transversal): 1,7 mm/m x 100 K
- Modulus of elasticity ≥ 80000 N/mm²
- Magnetic properties: non- magnetic
- Combustibility: non- combustible

Mechanical properties
(longitudinal)

RHEINZINK® bright rolled, RHEINZINK® "preweathered pro bluegrey":

- Yield strength ($Rp_{0,2}$): > 110 N/mm²
- Tensile strength (Rm): > 150 N/mm²
- Total elongation (A 50): ≥ 40 %
- Vickers hardness (HV 3): ≥ 40

RHEINZINK® "preweathered pro graphite grey":

- Yield strength ($Rp_{0,2}$): ≥ 130 N/mm²
- Tensile strength (Rm): ≥ 170 N/mm²
- Total elongation (A 50): ≥ 60 %
- Vickers hardness (HV 3): ≥ 45

Material thickness (mm)	Weight (kg/m²)
0.70	5.04
0.80	5.76
1.00	7.20

RHEINZINK®-Weight according to material thickness in kg/m² (numbers have been rounded)

ENVIRONMENTAL-PRODUCT-DECLARATION BY THE ASSOCIATION FOR ENVIRONMENTALLY PROOFED BUILDING PRODUCTS NUMBER OF CERT. AUB-RHE-11105-D *

* *recognized environmental symbol for building products put out by the Environmental Agency*

1.3 RHEINZINK®-"preweathered pro blue-grey", "preweathered pro graphite-grey" and bright-rolled:

Many years ago, RHEINZINK developed the "preweathered pro blue-grey" finish and, as of 2003, the "preweathered pro graphite-grey" finish, to be used specifically for façades, where a "finished look" of the RHEINZINK®-surface is required when the product is delivered.
By using a process, which is unique worldwide, it is possible to change the surface so that it looks very much like a naturally weathered surface – both in colour and in structure – without impairing the process capability nor the natural formation of the protective layer.
Insofar as possible, preweathering the material reduces the appearance of surface reflections, which are typical for thin sheet metal (the appearance of oil canning).
In 1988, a large-scale production facility was put into operation, in which coils of up to 1000 mm wide (blue-grey and bright-rolled) or 700 mm (graphite-grey) are cleaned and scoured (followed by the pickling of the surface).
This process results in an even colour, which, however, cannot be compared to RAL-colour.
By undergoing a new organic surface treatment, this material, which is 100 % recyclable, is protected, for the most part, from processing traces such as fingerprints. It also provides better protection during storage and transportation.

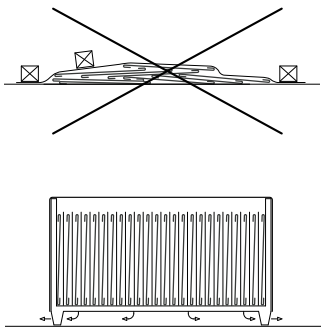
Recommendation:
Oil-free cloth gloves should be used during processing and handling.

Generally speaking, in order to eliminate the possibility of visual disparities, material should be ordered from the same batch for a specific project.
Surface disparities are purely visual and, as a rule, disappear bit by bit as the patina forms.

In order to protect the surface during transportation, storage and installation as well as from negative influences during construction, the façade systems are provided with a thin strippable film. **This is a one-sided protective adhesive film, which should be removed at the end of each working day, immediately following installation.**

1.4 Storage and transportation

Always store and transport RHEINZINK®-products in a dry, well-ventilated area.



Storage and transportation of tiles (schematic)

Note:
For optimum storage on the construction site, please ask construction management for a dry, well-ventilated space or use containers.
Do not place cover sheets directly on the material.

1.5 Surfaces

RHEINZINK®-façades do not require cleaning and maintenance. As a result of natural weathering, the façade will get slightly darker with time.

1.6 Structural physics

- Weather protection
- Moisture regulation
- Thermal economy
- Rear ventilation
- Sound proofing/fire protection

The rear-ventilated façade is a multi-layered system, which, when designed properly, guarantees permanent functional capability.
By functional capability, we mean that all requirements pertaining to structural physics are met. This is described in detail below.

By separating the rain screen façade from the thermal insulation and supporting structure, the building is protected from the weather.

The supporting outer walls and the insulation remain dry and thus fully functional. Even when driving rain penetrates open joints, it is quickly dried out as a result of the air circulation in the ventilation space.

The bracket-mounted rear-ventilated façade protects the components from severe temperature influence. Heat loss in the winter and too much heat gain in the summer are prevented.

Thermal bridges can be reduced considerably.

In the case of rounded parapets and dormer girders, the substructure and thermal insulation should be protected from penetrating moisture with a suitable layer.

1.7 Windproofing

This does not apply to the rear-ventilated façade, as this component itself cannot be windproof.
The building must be windproof before the rear-ventilated façade is installed. A solid brick or concrete wall will ensure that the building is windproof. Penetrations (e.g. windows, ventilation pipes, etc.) must be sealed from the building component to the supporting structure.
In the case of a skeleton construction, the wall surface must also be sealed.
If the building envelope is improperly sealed (wind suction, wind pressure), there is a high degree of ventilation/ energy loss, which, along with drafts, creates unpleasant room temperature. Dew or condensation can be expected on the leeward side of the building.
Air circulation in the room should be provided through air conditioning or by opening the windows.

1.8 Weather protection

Rear-ventilated façade cladding protects the supporting structure, the water-proofed thermal façade insulation, and the substructure, from the weather.
Bracket-mounted rear-ventilated façades provide a high degree of protection from driving rain.
Because of the physical structure, it is impossible for the rain or capillary water transfer to reach the insulating layers. Furthermore, moisture can always be drawn out through the ventilation space. This allows the insulating layers to dry out quickly, without impeding thermal insulation.

1.9 Moisture

Rear-ventilated façade cladding provides protection from driving rain and moisture. Moisture penetration as a result of diffusion does not occur in the rear-ventilated façade.
When the supporting structure is windproof, the diffusion current density is too small to cause the dew point temperature to drop.

1.10 Thermal economy

In order to understand the thermal economy of the rear-ventilated façade, we must first consider the various heat flow rates, as well as the air exchange between the rear-ventilation space and the outside air, separately, in terms of structural physics.

1.10.1 Thermal insulation
In the winter, heat flow from the inside to the outside is referred to as a heat transfer co-efficient (U-value).
The smaller the value, the smaller the quantity of heat escaping to the outside. The U-value is determined by the heat conductivity of the thermal insulation and insulation thickness.
The high-grade thermal insulation is a contribution to environmental protection and pays for itself in a relatively short period of time through low heating costs.

1.10.2 Summer thermal insulation
Summer thermal insulation should provide comfort: The amount of heat flowing from the outside to the inside should remain as small as possible. Proper thermal insulation, as well as a certain mass in the construction itself, will help to achieve this objective.
The advantage of a bracket-mounted, rear-ventilated façade, is that a large portion of the heat which streams onto the cladding is diverted through convective air exchange.

1.10.3 Thermal bridges
Thermal bridges are elements of the building envelope, that have high thermal conductivity (have high U-values) and are continuous from the warm side to the cold side of the thermal insulation.
Apart from general design-dependent thermal bridges of a building, e.g. protruding balconies, the installation of the substructure must be taken into account in the case of a rear-ventilated façade.
Thermal bridges can be reduced significantly by installing an insulating strip between the supporting structure and the substructure (Thermostopp).
Proper installation of the insulation reduces the formation of thermal bridges.

1.11 Fire protection

Metal façades with a metal substructure and appropriate fasteners meet the highest requirements for non-combustibility (Building Material Class A1, DIN 4102). In the case of bracket-mounted, rear-ventilated façades, it may be necessary to install firestops.

1.12 Rear-ventilation

The free ventilation cavity between the façade cladding and the layer behind it must be at least 20 mm. Building tolerances and the slant of a building must be taken into account. In some places, this rear-ventilation space may be reduced locally up to 5 mm – e.g. by means of the substructure or the unevenness of the walls.

1.12.1 Air intake and exhaust openings
The rear-ventilation space requires air intake and exhaust openings. These openings must be designed so that their functionality is guaranteed for the lifetime of the building. Their functionality may not be hindered through dirt or other external influences. The openings are located at the lowest and highest point of the façade cladding, as well as in windowsill and window lintel areas, and penetrations. In the case of higher, multi-storey buildings, additional air intake and exhaust openings should be provided (e.g. at each floor).

1.13 Soundproofing

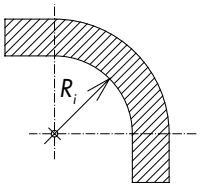
To prove that a façade design is soundproof, the entire wall structure, as well as each building component (windows, etc.) must be defined. The use of proper static fasteners will prevent any potential noise development as a result of the cladding.

1.14 Processing

Bending radii
Zinc and its alloys are anisotropic, which means they have different properties parallel and across to the rolling direction.

The mechanical effects of this anisotropy is reduced to such a degree with RHEINZINK® through the alloys and the rolling process, that RHEINZINK®, independent of the direction of rolling, can be folded at 180° without cracking. When processing in order to manufacture a cold-rolled or pressed profile, it is recommended that the minimum radii be complied with (see Table).

Material thickness	Bending radius R_i Min.
0.70 mm	1.23 mm
0.80 mm	1.40 mm
1.00 mm	1.75 mm



Recommended bending radii (inner radius) for RHEINZINK®

1.15 Other applicable standards and guidelines

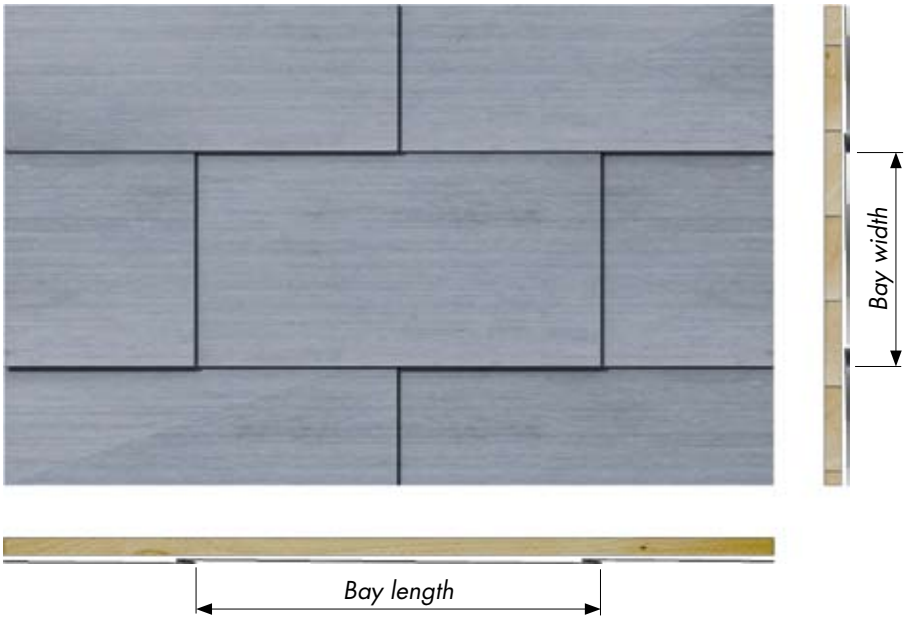
All trades must adhere to applicable DIN EN-/DIN-standards.
Guidelines for the design of metal roofs/outer wall cladding and sheet metal work. Government regulations, building codes.

PROFILE GEOMETRY

2. RHEINZINK®-Profile group GR 8 Flat-lock tile

Using the RHEINZINK®-Flat-lock tile, the designer has almost endless options in structuring the design of his building. The Flat-lock tile can be installed vertically, horizontally and diagonally. Even complex building shapes with convex and concave designs can be realized. Standard tile widths of 333 – 600 mm are available. Baywidths of > 600 mm must be discussed and coordinated with RHEINZINK's Department of Application Engineering.

System profile



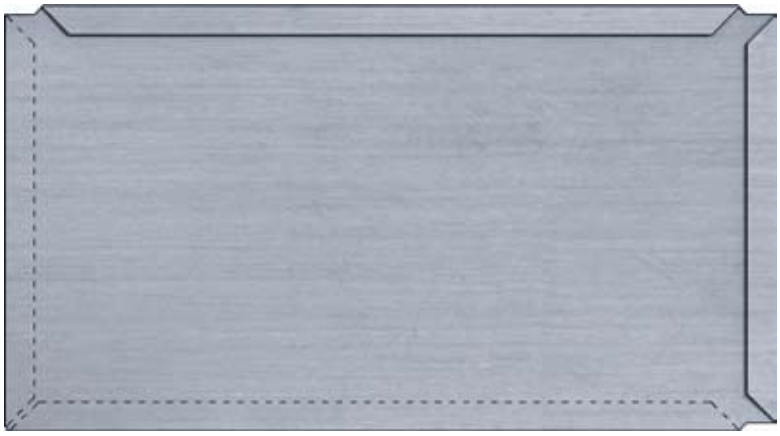
View with system profile

2.1 Profile geometry

Material thickness
s = 0.70 mm/0.80 mm/1.00 mm
Face width = baywidth

Standard sizes in mm	Weight 1.00 mm
333 x 600 mm	~9.90 kg/m²
400 x 800 mm	~8.54 kg/m²
500 x 1000 mm	~8.90 kg/m²
600 x 1200 mm	~8.62 kg/m²

All sizes in between can be produced.



View of Flat-lock tile

Application for outside areas
- Façades
- Soffits
- Parapets
- Roofs

Application for inside areas
- Walls
- Ceilings

Fasteners
Flat-lock tiles are screwed/riveted indirectly to the substructure using RHEINZINK®- tile clips.
This type of indicect fixing allows for linear expansion of tiles up to 3000 mm.

Tolerances
Length and width: +3 mm

Installation tips
- Direction of installation from bottom to top
  – from right to left
  – from left to right
- The protective film must be removed immediately following installation
- Only tested and approved fasteners and clips may be used, e.g. RHEINZINK®- tile clips.
- Flat-lock tiles are manufactured with a plus-tolerance of 3.00 mm larger than ordered.

PROFILE GEOMETRY

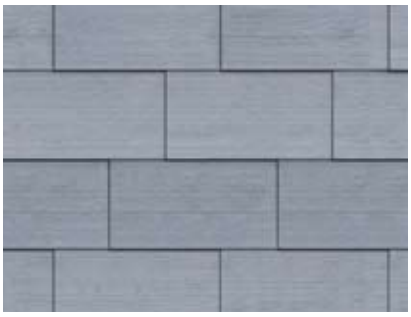
Weber State University, USA

2.1.1 RHEINZINK®-Flat-lock tile, vertical installation

RHEINZINK®-Flat-lock tile, GR 8, vertical installatiion 1/4 staggered

Apartment building, Coburg, Germany

2.1.2 RHEINZINK®-Flat-lock tile, horizontal installation



RHEINZINK®-Flat-lock tile, GR 8, horizontal installation 1/3 staggered

JOINT FORMATION

2.2 Tile Layout

2.2.1 Staggered Joint layout

2.2.1.1 General vertical or horizontal installation

The design possibilities are virtually endless. It is up to the designer whether to use 1/2 staggered, a "random structure" or a 1/3 or 1/4 staggered.
Another variation is the formation of a cross-joint. The cross-joint is a visually calm, statically balanced design.
The random structure is borrowed from nature. It is an extremely vibrant design visually, which integrates the adaptor tiles discreetly into the overall design. Because of the flexibility of the diverse baywidths, it is ideally suited for the grid system in renovations.
A diagonally staggered installation has a dynamic, vibrant and exciting energy.

View of vertical installation

1/2 staggered

1/4 staggered

Random structure

View of horizontal installation

1/3 staggered

Cross-joint

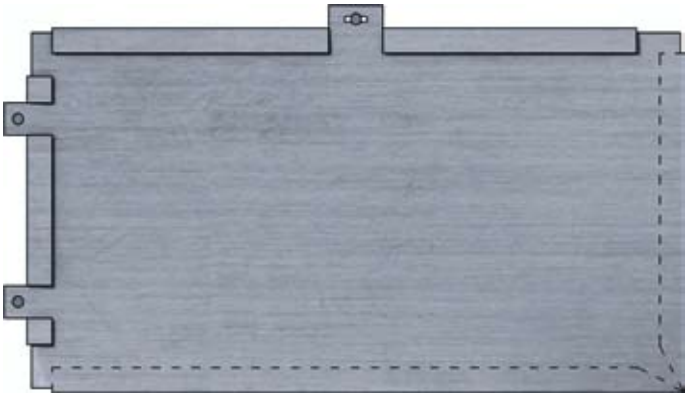
Diagonal staggered

2.3 Thermal expansion

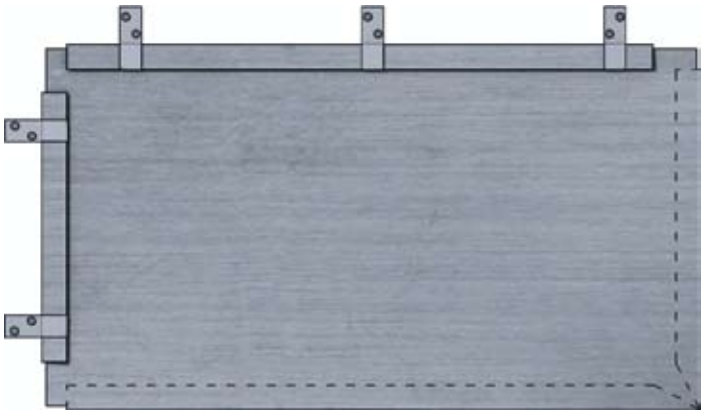
As a rule, Flat-lock tiles are fastened indirectly to the substructure using certified RHEINZINK®- tile clips or continuous cleats. The general waviness typical of thin sheet metal is determined by material thickness and the source material selected. 1.00 mm thick RHEINZINK®-material is less wavy than 0.7 mm or 0.8 mm thick titanium zinc. It is standard to use sheet material for RHEINZINK®-Flat-lock tile production. This in turn, results in a less wavy appearance. Indirect fastening allows for unimpeded expansion of the tiles.

Possible tile sizes

- ≤ 800 x ≤ 3000 mm, 1.00 mm material thickness
- ≤ 500 x ≤ 4000 mm, 1.00 mm material thickness



Direct fastening of tiles



Indirect fastening of tiles

Continuous cleats are used in edges and corners to accommodate potential high wind suction loads.

SUBSTRUCTURES

2.4 Substructures

Sketches 1a, 1b:
Wooden substructure

Advantages:
- Tiles can be fastened at all points of the substructure
- Full-surface support provides protection from impact

Disadvantages:
- The cost of installing thick insulation material is very high
- The cost and timing involved to adjust positive and negative tolerances on the supporting structure is high
- Only B2-designs are possible (Fireproof Classification B2, DIN 4102)

Sketch 1a

Sketch 1b

Sketches 2a, 2b:
Metal substructure

Advantages:
- Fireproof design of A1-façades is possible (Fireproof Classification A1, DIN 4102)
- The cost of installing thick insulation material is reasonable
- Tolerances in the supporting structure can be adjusted easily

Disadvantages:
- Increased cost of installation

Sketch 2a

Sketch 2b

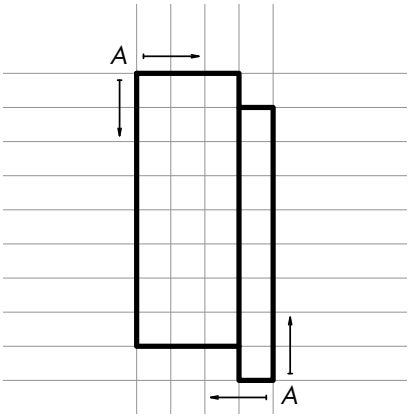
Sketches 3a, 3b:
Combined substructure of wood/metal

Advantages:
- The cost of installing thick insulation materials (> 120 mm) is reasonable
- Full-surface support provides protection from impact
- Tiles can be fastened at all points of the substructure

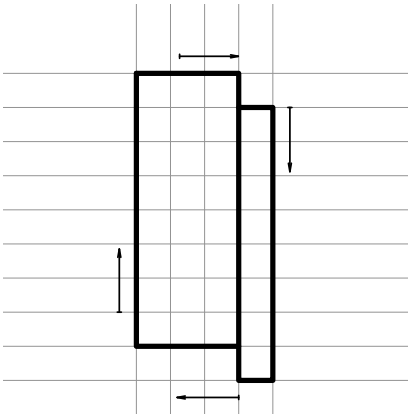
Disadvantages:
- Fireload because of the wood content the façade construction

Sketch 3a

Sketch 3b



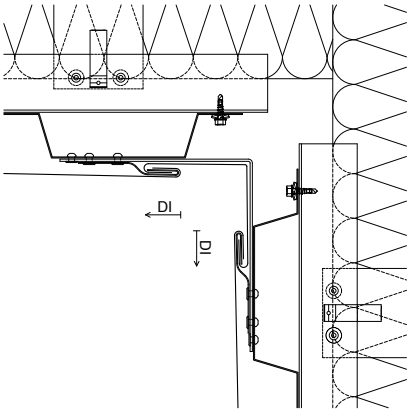
Installation from various starting points



Continuous installation

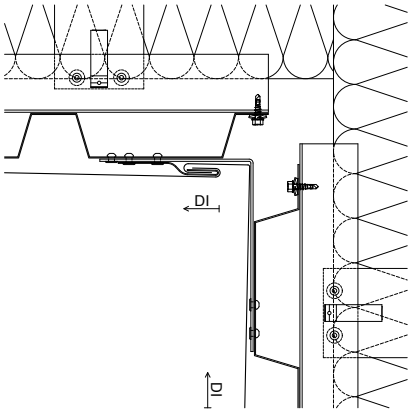
2.5 Installation sequences

Direction of installation (DI)
Start at the left and at the right
Flat-lock tiles are installed from the bottom to the top. The direction of installation – from right to left or from left to right - is determined by the appearance desired. Building tolerances can only be balanced slightly using individual Flat-lock tiles. Tolerance equalization by using adaptor tiles should not exceed 15 mm of the overall height, in order not to impede the aesthetics. The overall length should be proportional to the overall height.



Inside corner

The inside corner profile allows installation to be done to the left and to the right using two different installation teams.



Inside corner using adaptor tiles

When this type of installation is used, a continuous horizontal visual orientation is accentuated.

DETAIL DESIGN

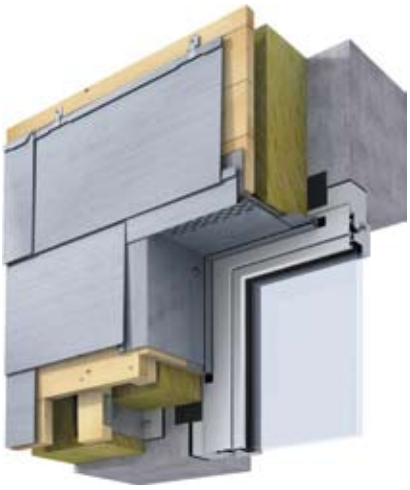
2.6 Detail design

The design and quality of details determines the appearance of the façade. Details such as building corners, window reveals, roof edges, bases, as well as connections and terminations can be transformed with special tiles or building profiles. It is an indication of a good overall design, if the components are well-coordinated.
Three fundamental design variations are indicative of this.

Width of building profile or section
The spectrum ranges from sharp-edged profiles to profiles that are several centimeters wide. Exact planning makes it possible to design all of the connection and structural profiles the same, or, to vary these proportionately, as desired.

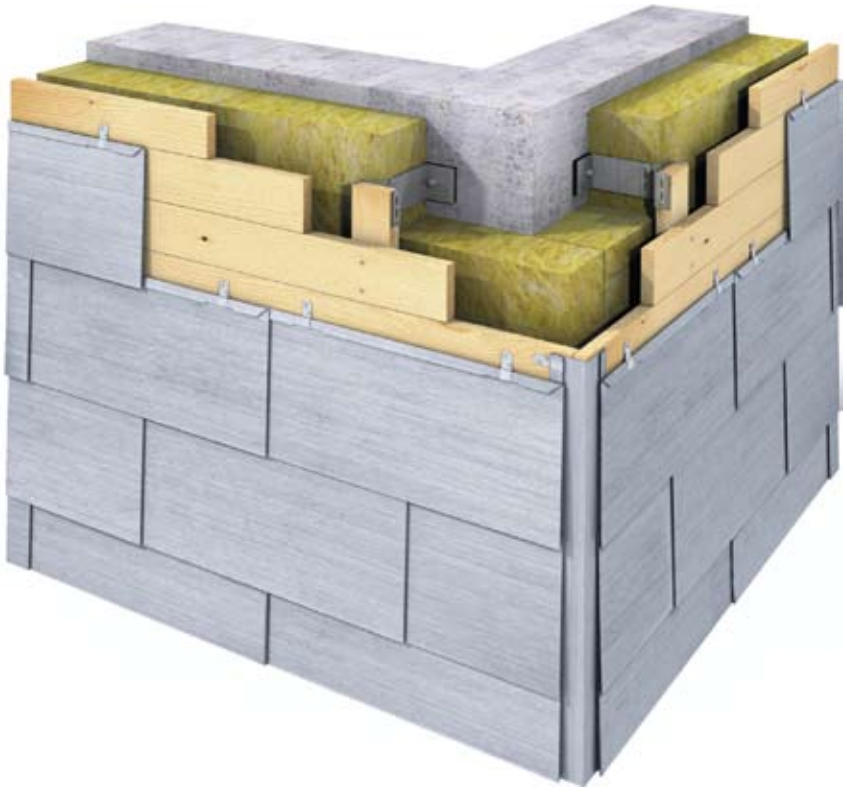
Projection of profiles
Depending on the detail design, profiles either protrude from the façade surface or are flush with it. The overview clarifies the principle of flush connections:

- Window lintel
  Installation of RHEINZINK®-Flat-lock tile on full-surface wooden sheathing. Lintel and reveal profiles form a frame with a face of ca. 60 mm. The lintel profile is partially perforated and comes with a drip edge.
- Windowsill
  The frame width of the lintel and reveal panels is determined by the face of the windowsill. In this case, the substructure is designed as Fire-proof Classification A1 (DIN 4102).
- Outside corner
  The outside corner profile corres ponds directly with the window connection profiles. Due to the flush design, the visual affect is very conservative.



Window lintel/
Wood-metal-substructure

Window reveal/
Metal-substructure



Outside corner/wood-metal-substructure

2.7 Details

2.7.1 General instructions

Third party Trades
Contracting third party trades for the façade cladding connections is necessary and unavoidable in most cases, to ensure impermeability. Because of the warranty obligations on the part of the craftsman, sub-contracting connections and fasteners to third party trades (e.g. windows), must always be approved by the project manager of the trade in question.

Wall construction
Layered construction is commensurate with a rear-ventilated metal façade. A solid brick or concrete wall serves as the supporting structure. Of course, it can also be substituted with a column or steel support structure.

Substructure
see Chapter 2.4

Load effect
The surface loads (wind suction/wind pressure), which affect the façade and the distance of the fasteners associated therewith, should be taken from the current Sheet Metal and Roofing Code. We would be happy to advise you on the system loads of RHEINZINK®-Tiles for individual cases.

Installation instructions
Detailed discussion pertaining to installation sequences has been left out deliberately, because in practical terms, these are heavily influenced by the supporting trades such as window and steel construction, etc.
Installation sequences should be determined separately for each project, taking into account the interfaces and installation sequence for each project. Noteworthy deviations are pointed out for different details.

Drip edges
The requirements as set out by standards and regulations must be taken into account for detail design, for example, drip edges over stucco façades (soiling as a result of atmospheric deposits).

Diagonal installation
RHEINZINK®-Flat-lock tiles can also be used in a diagonal façade segmentation.
In most instances, the technical design of the structure, in this case, corresponds to that of horizontal installation.

2.7.2 Pictogram

Horizontal sections (see Page 22)
H1: Outside corner
H2: Inside corner
H3: Window reveal
H4: Joint/lengthwise expansion separation

Vertical section (see Page 23)
V1: Base
V2: Windowsill
V3: Window lintel
V4: Roof edge

Variations
In some cases, variations are shown for the same detail (e.g. window lintel with/without sun shade). These are marked and explained with additional texts or drawings.

Applicability
The details and designs outlined here are suggestions, which were carried out on various projects. The detail suggestions must always be coordinated responsibly, taking into account the applicable standards and stipulations, as well as the designer's intentions for the project.

Building height	Overlap	Distance to drip edge
≤ 8 m	≥ 50 mm	≥ 20 mm
> 8 m ≤ 20 m	≥ 80 mm	≥ 20 mm
> 20 m	≥ 100 mm	≥ 20 mm

Distance and overlap dimensions for flashings (e.g. windowsills, wall copings, verge profiles, etc.)

PLANNING GRID

2.8 Planning grid

The grid principle in façade construction
A metal façade consists of components, which have been industrially manufactured with high degree of production precision.
These components determine the aesthetics through precise horizontal and vertical segmentation.
Penetrations and terminations, which are not coordinated with the axial segmentation are obtrusive.
The following instructions serve to provide for proper planning of façade segmentation:

Principles
Generally speaking, a distinction must be made between new buildings and renovations when discussing grid difficulties.

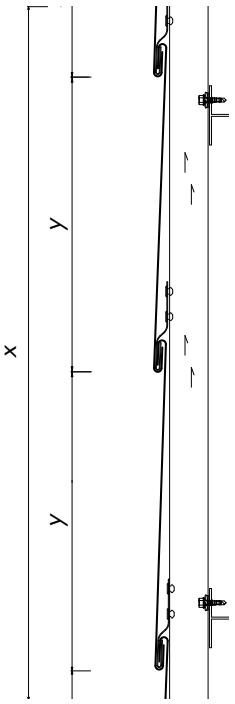
In the case of new buildings, the façade grid can be matched to the design; penetrations such as windows, chimney pipes, etc. are always ancillary to the grid.

However, when it comes to renovations, the penetrations (e.g. windows) are immovable, so that the grid must be coordinated with the penetrations. Aesthetically speaking, a random structure is best suited for this.
The following principles apply to grid deviations:

- One should start or end with a whole module (x or y) at the transitions
- Dimensional discrepancies of maximum 15 mm (deviations from module x or y on two-dimensional profiles) are not noticeable.
- Dimensional tolerances (dimensional change of x or y) which cannot be corrected, must be compensated in the windowsill or roof edge area.
- Adaptations or displacements of grid heights (height coordinates) can only be carried out in the roof edge and/or base area.

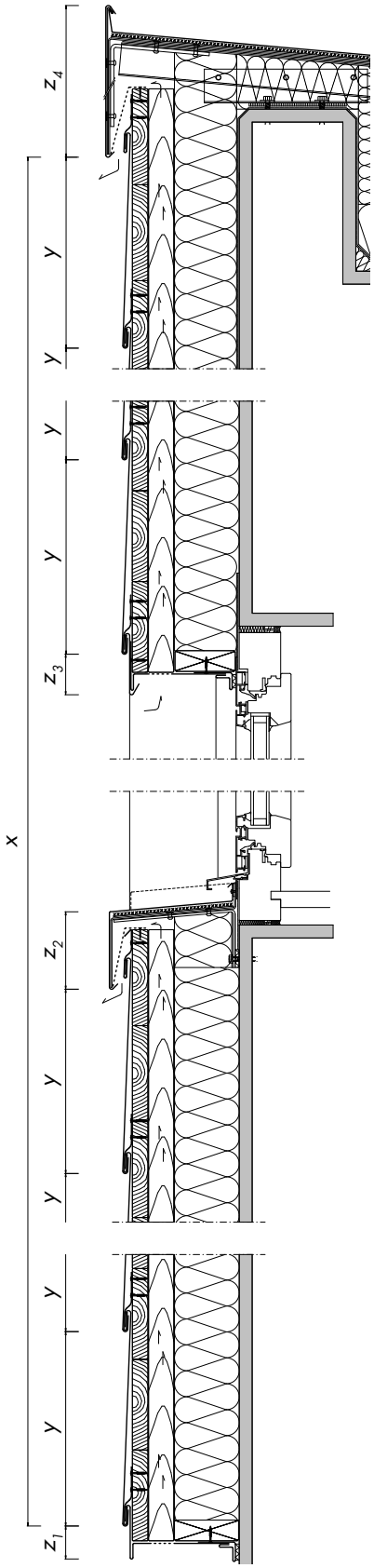
Module Y
Y corresponds to the smallest unit of the façade segmentation, which repeats itself, e.g. the baywidth. Grid module Y determines the precise location of penetrations and transitions. In the case of Flat-lock tiles, dimension y can be produced with bay widths of 333 mm to 800 mm, depending on the project. Dimensions > 600 mm must be discussed and agreed upon with RHEINZINK's Department of Application Technology.
The baywidth (y) is determined by the face or surface view of the tile from drip edge to drip edge.

Dimension X
All of the segments marked with an x are a whole multiple of the selected module y and, as a rule, correspond to the baywidth of a tile.



Random structure, horizontal installation

PLANUNGSRASTER



Position Z_4: Roof edge

Grid for new buildings, respectively renovations

If the height coordinates of the roof edge do not fit into the grid selected, the following corrective measures may be selected:

- Change the roof edge profile/slope
- Lower or raise the parapet or the roof edge frame.

As a rule, both of these possibilities only exist if the flat roof is being renovated at the same time.

- Changing module X or Y

Position Z_3: Window lintel
Position Z_2: Windowsill
Grid planning for new buildings

- Determine recess of building shell
- Establish window frame profiles
- Establish location of window
- Establish profile geometry of window connections
- Develop design details within the grid

Grid planning for renovation projects

- Establish window frame profile, new/old
- Establish location of window, new/old
- Establish the profile geometry of window connections
- Establish design details within the grid

If the location of the window or detail does not fit into the grid, the following corrective measures may be selected:

- Change the profile geometry of the window lintel profile or the windowsill
- Adapt to the height of the window
- Change the slope of the windowsill
- Change the X or Y module

Position Z_1: Base

Grid planning for new buildings, respectively renovations

- Define potential deviations toward the top or the bottom
- Establish the profile geometry of the base detail

If the location of the base does not fit into the grid, the following corrective measures may be selected:

- Move the façade connection toward the top or the bottom
- Change the profile geometry of the base profile
- Lower or raise the base brickwork, if it has been planned for or if it already exists

FACADE DESIGN

2.9 Examples of applications

RHEINZINK®-Square tile
Diagonal installation with pre-rounded window profiles

RHEINZINK®-Flat-lock tile
Horizontal installation, 1/2 staggered, flush window profile, profile width > 60 mm; baywidth and bay length of Flat-lock tile coordinated with overall design.

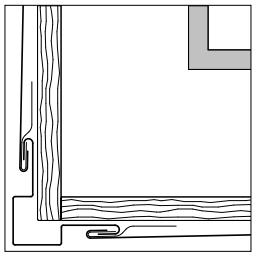
RHEINZINK®-Flat-lock tile
Vertical installation, random structure, window surround and outside corner - very conservative visually.

RHEINZINK®-Flat-lock tile
Horizontal installation, window profiles and outside corner – matched to fit the face width.

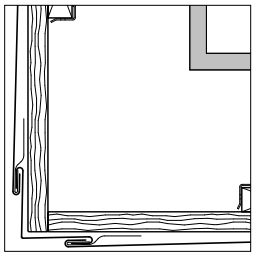
DESIGN
OVERVIEW OF HORIZONTAL APPLICATION

2.10 Flat-lock tile design, Horizontal section

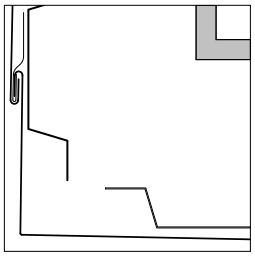
Detail H1: Outside corner



H1.1

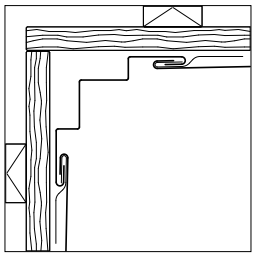


H1.2

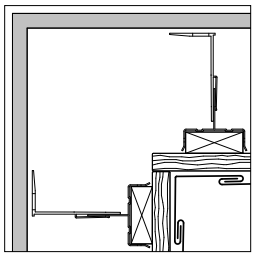


H1.3

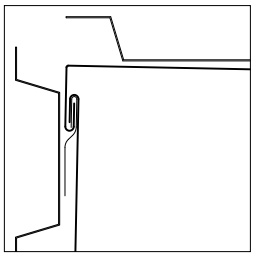
Detail H2: Inside corner



H2.1

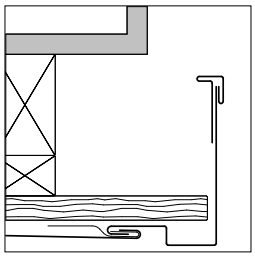


H2.2

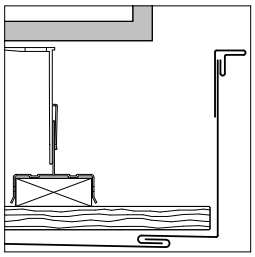


H2.3

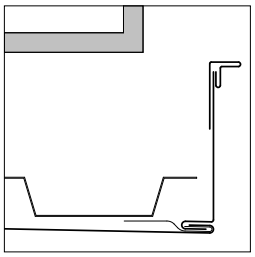
Detail H3: Window reveal



H3.1

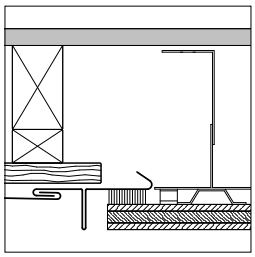


H3.2

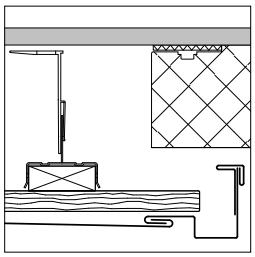


H3.3

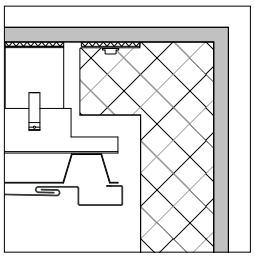
Detail H4: Connections/Terminations



H4.1



H4.2



H4.3

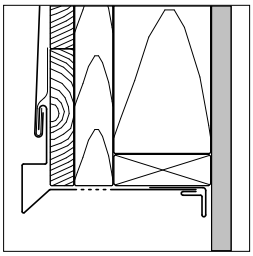
Wooden substructure

Wood-metal-substructure

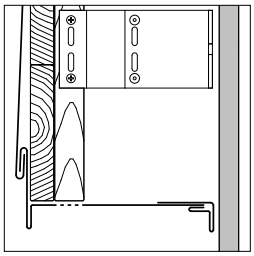
Metal substructure

DESIGN
OVERVIEW OF HORIZONTAL APPLICATION

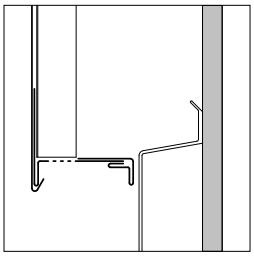
Detail V1: Base



V1.1

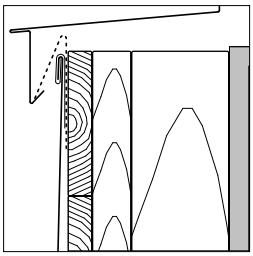


V1.2

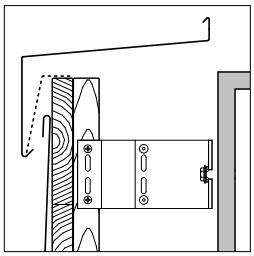


V1.3

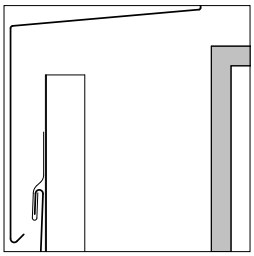
Detail V2: Windowsill



V2.1

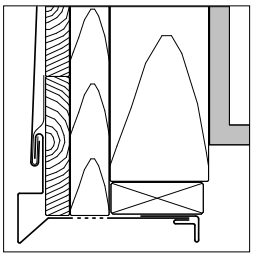


V2.2

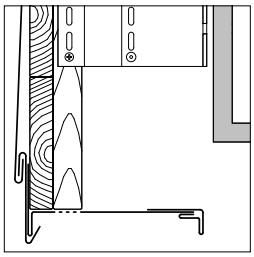


V2.3

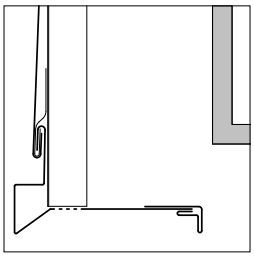
Detail V3: Window lintel



V3.1

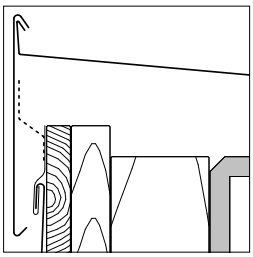


V3.2

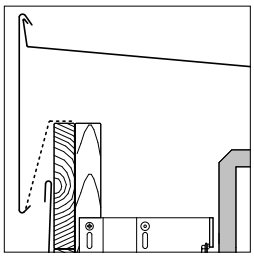


V3.3

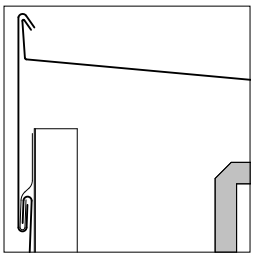
Detail V4: Roof edge



V4.1



V4.2



V4.3

Wooden substructure

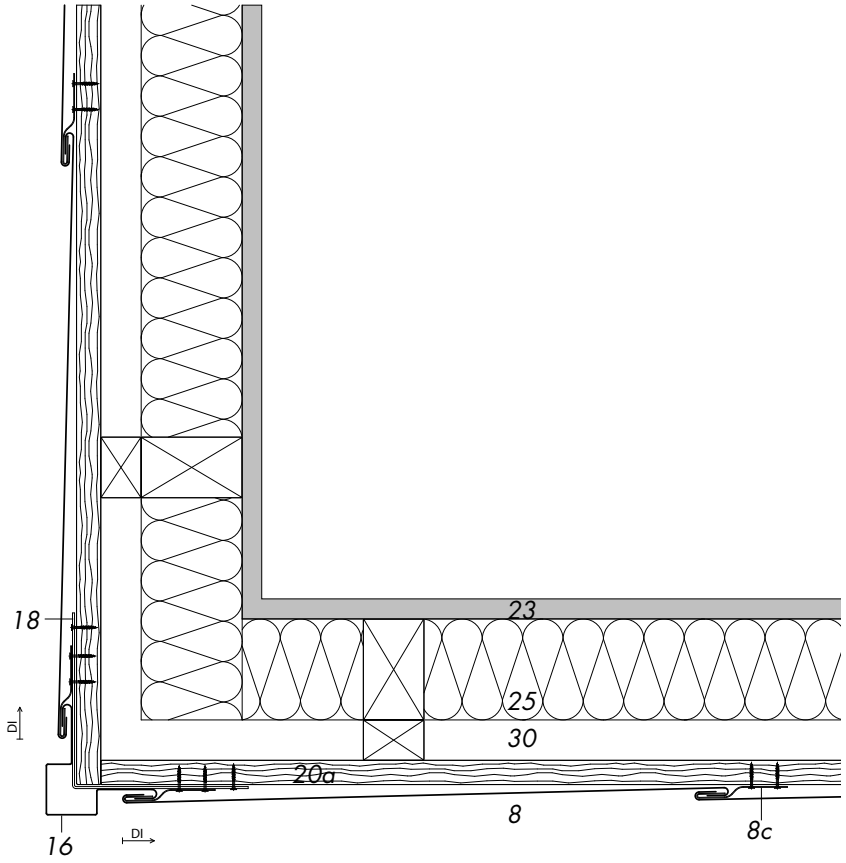
Wood-metal-substructure

Metal substructure

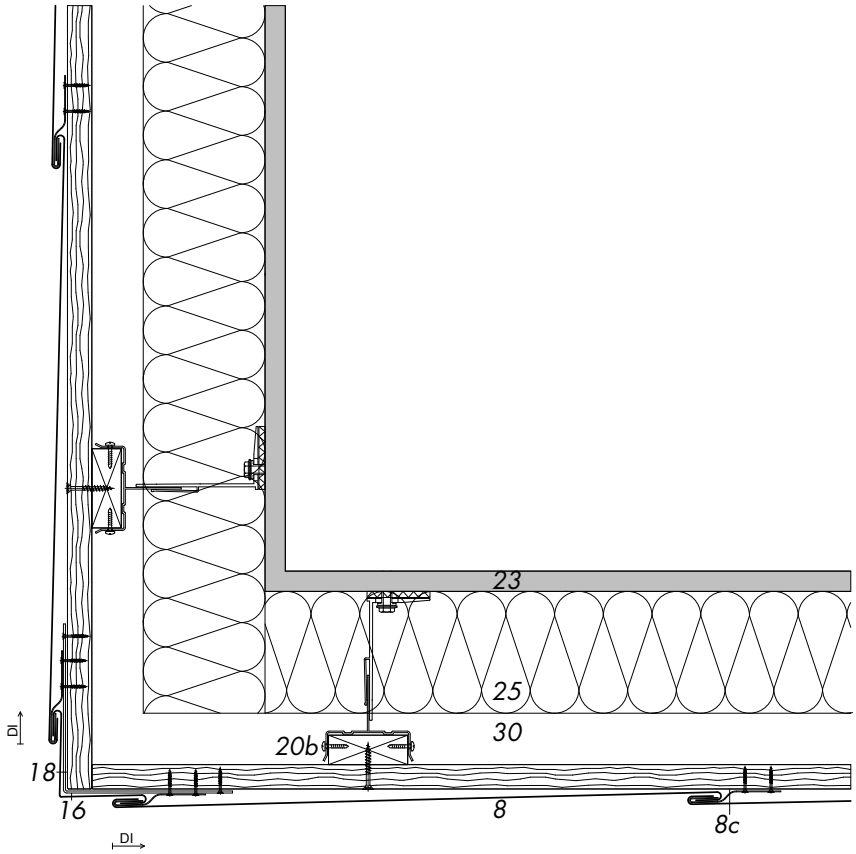
2.10 Flat-lock tile design, Vertical section

DESIGN – HORIZONTAL APPLICATION
DETAIL H1, OUTSIDE CORNER

H1.1

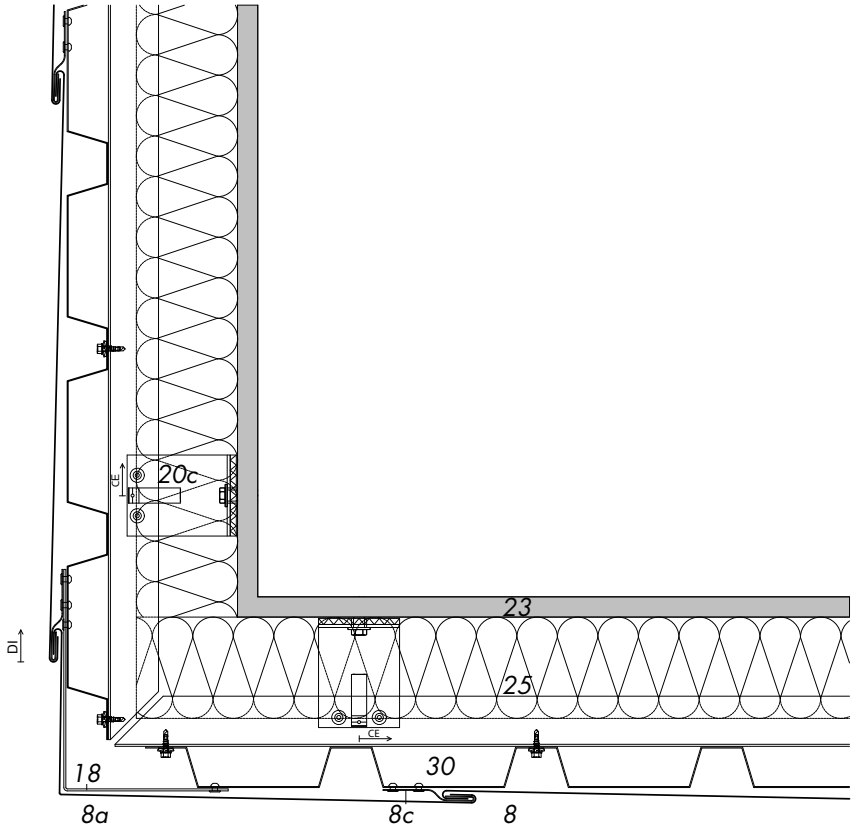


H1.2



DESIGN – HORIZONTAL APPLICATION
DETAIL H1, OUTSIDE CORNER

H1.3



2.10.1 Detail H1: Outside corner

8 RHEINZINK®-Flat-lock Tile, GR 8
- ■ Standard tile
  - a Adapter tile
  - c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- ■ Outer corner profile

18 Support profile
- ■ Made of aluminium

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermø stopp* and coated steel trape-zoidal profile

23 Supporting structure

25 Thermal insulation

30 Ventilation space
- ■ Height of ventilation space ≥ 20 mm

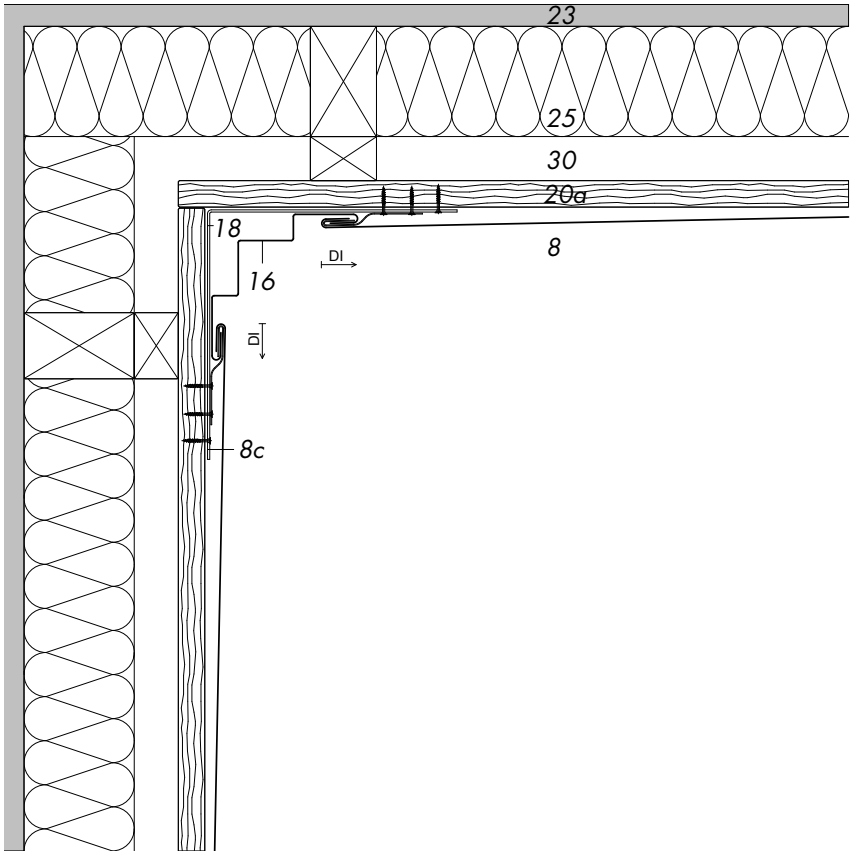
DI Direction of installation

CE Controlled expansion of substructure

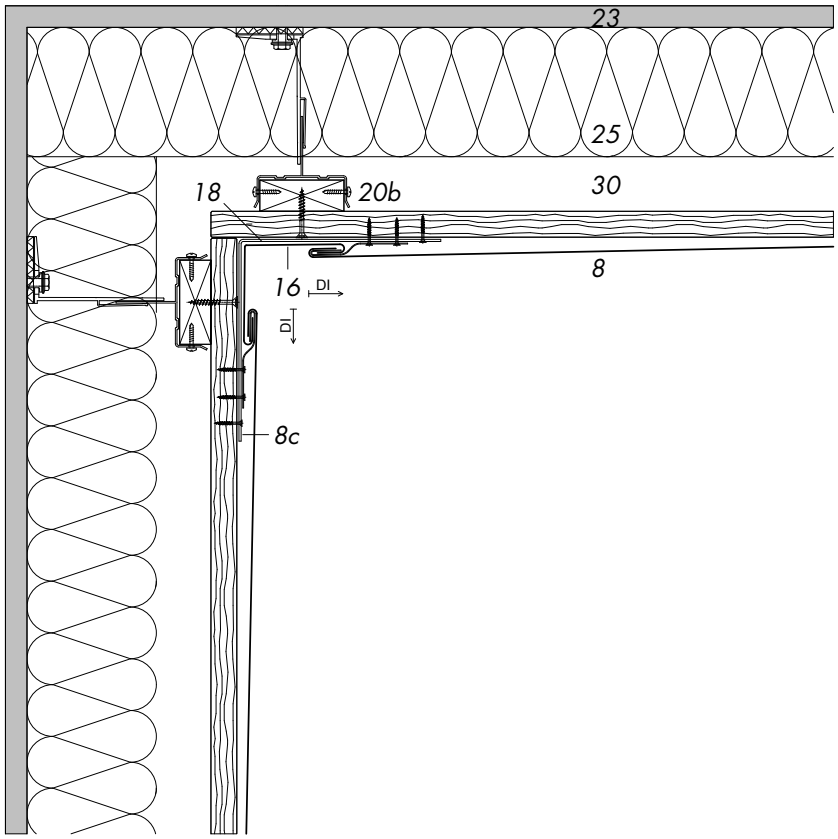
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL H2, INSIDE CORNER

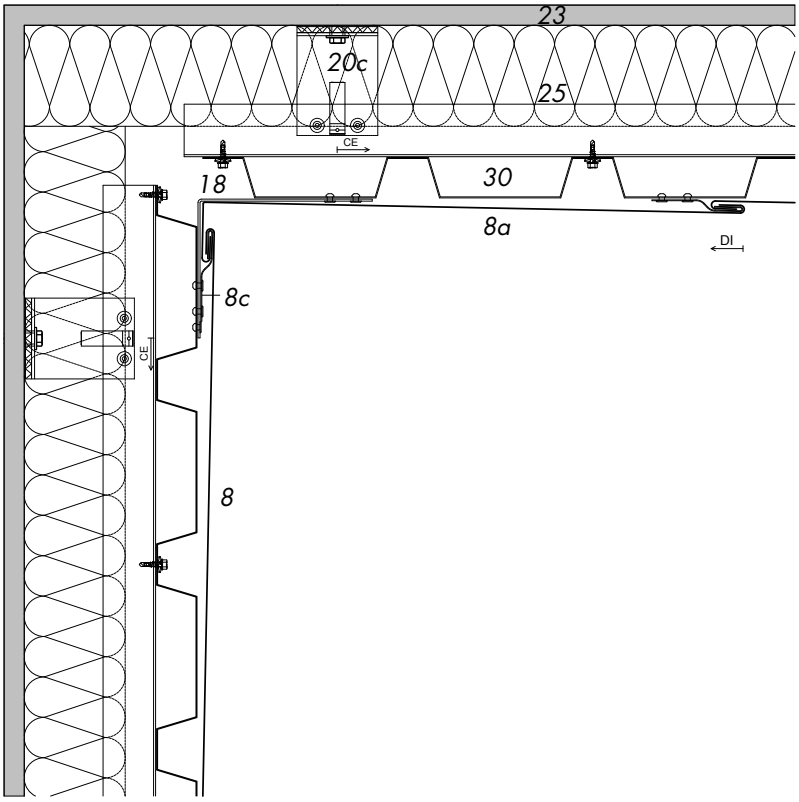
H2.1



H2.2



DESIGN – HORIZONTAL APPLICATION
DETAIL H2, INSIDE CORNER



H2.3

2.10.2 Detail H2: Inside corner

8 RHEINZINK®-Flat-lock Tile, GR 8
- Standard tile
  a RHEINZINK®-Adapter tile
  c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- Inside corner profile

18 Support profile
- Made of aluminium

20 Substructure
a Wooden sheathing on batten
b Wooden sheathing on batten and bracket system with Thermo-stopp*
c Bracket system with Thermə stopp* and coated steel trapezoidal profile

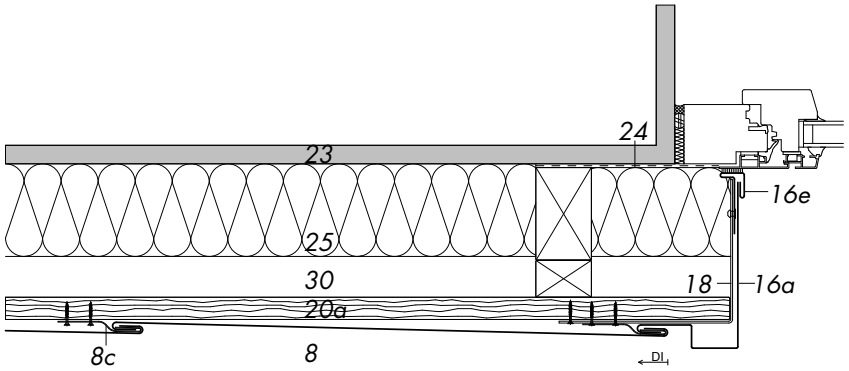
23 Supporting structure
25 Thermal insulation
30 Ventilation space
- Height of ventilation space ≥ 20 mm

DI Direction of installation
CE Controlled expansion of substructure

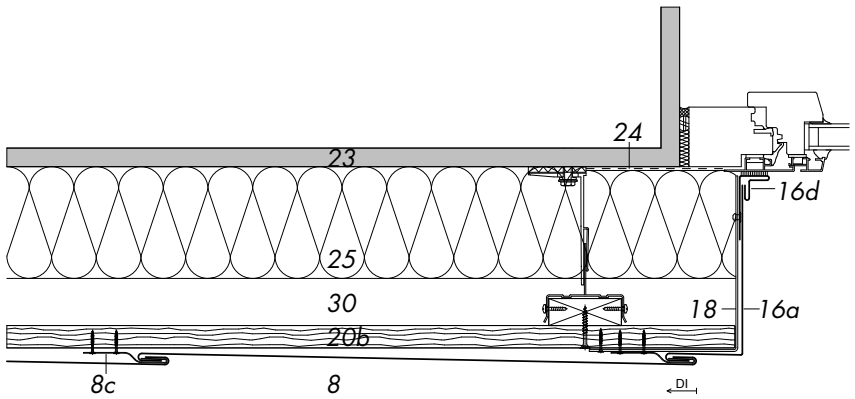
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL H3, WINDOW REAVEAL

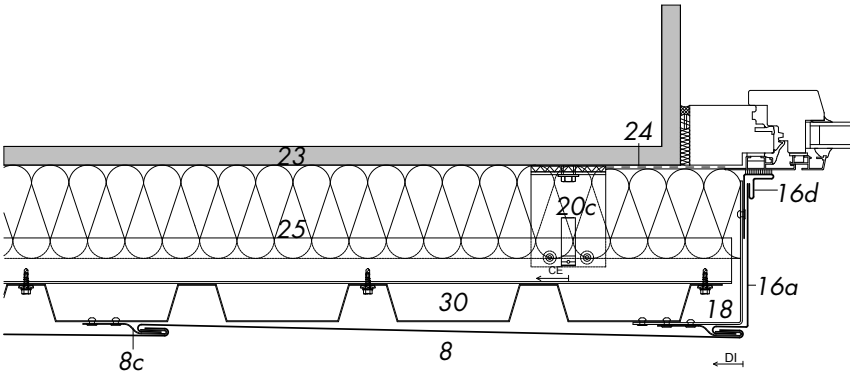
H3.1



H3.2



DESIGN – HORIZONTAL APPLICATION
DETAIL H3, WINDOW REAVEAL



2.10.3 Detail H3: Window reveal

8 RHEINZINK®-Flat-lock Tile, GR 8
- Standard tile
- c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- a Jamb profile
- d Plug-in pocket with visible mounting leg and sealing strip
- e Plug-in pocket with non-visible mounting leg and sealing strip

18 Support profile
- Made of aluminium

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile

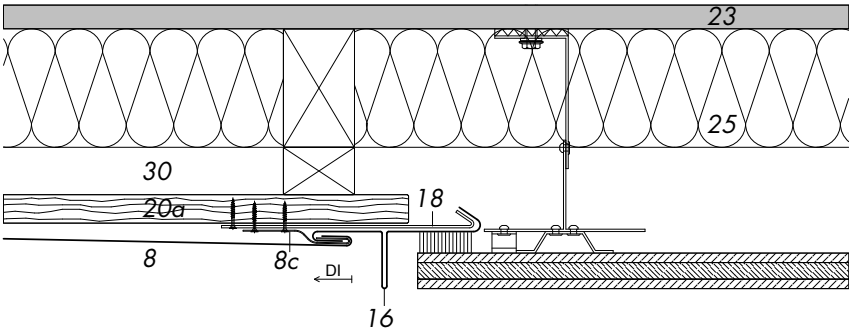
23 Supporting structure
24 Wind proofing
25 Thermal insulation
30 Ventilation space
- Height of ventilation space ≥ 20 mm

DI Direction of installation
CE Controlled expansion of substructure

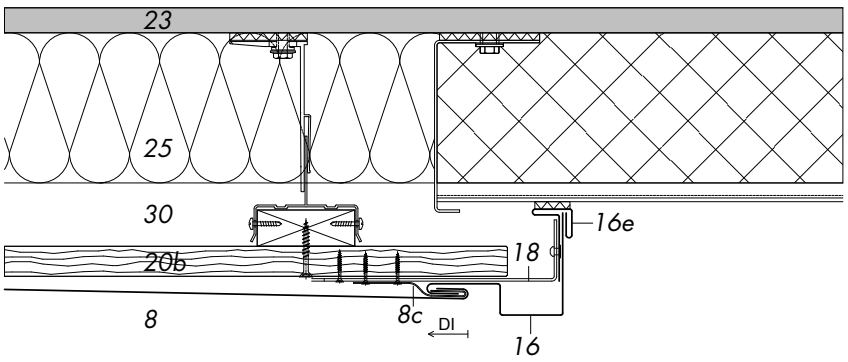
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL H4, CONNECTIONS AND TERMINATIONS

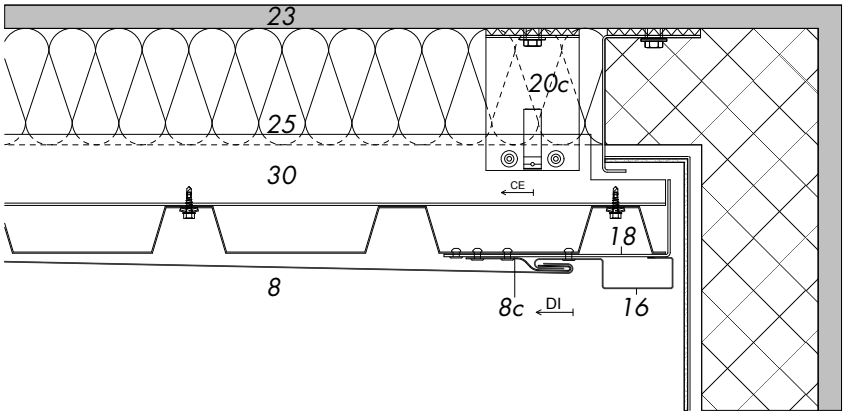
H4.1



H4.2



DESIGN – HORIZONTAL APPLICATION
DETAIL H4, CONNECTIONS AND TERMINATIONS



H4.3

2.10.4 Detail H4: Connections/ Terminations

8 RHEINZINK®-Flat-lock Tile, GR 8
- ■ Standard tile
- c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- ■ Connection/termination profile
- e Plug-in pocket with non-visible mounting leg and sealing strip

18 Support profile
- ■ Made of aluminium

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile

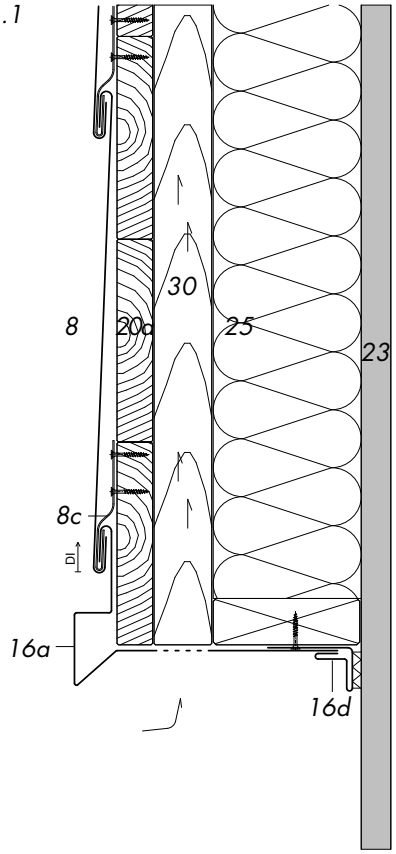
23 Supporting structure
25 Thermal insulation
30 Ventilation space
- ■ Height of ventilation space ≥ 20 mm

DI Direction of installation
CE Controlled expansion of substructure

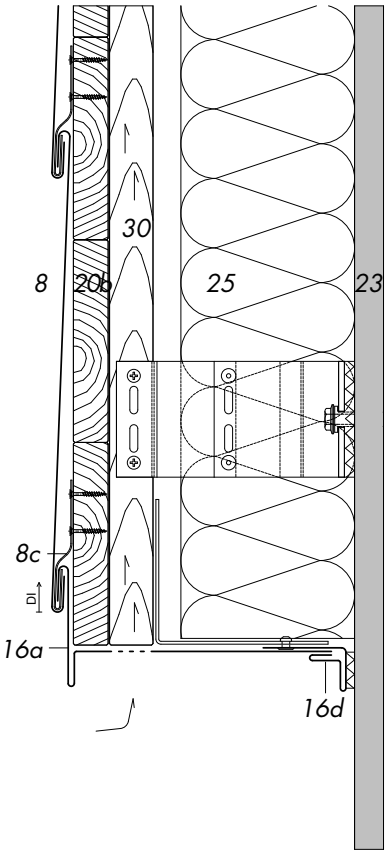
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL V1, BASE

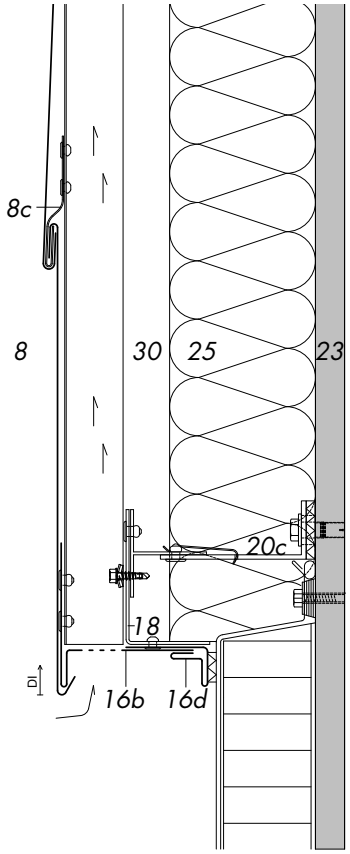
V1.1



V1.2



DESIGN – HORIZONTAL APPLICATION
DETAIL V1, BASE



V1.3

2.10.5 Detail V1: Base

8 RHEINZINK®-Flat-lock Tile, GR 8
- Standard tile
- c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- a Base profile, partially perforated
- b Base trim, partially perforated
- d Plug-in pocket with visible mounting leg and sealing strip

18 Support profile
- Made of aluminium

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile

23 Supporting structure

25 Thermal insulation

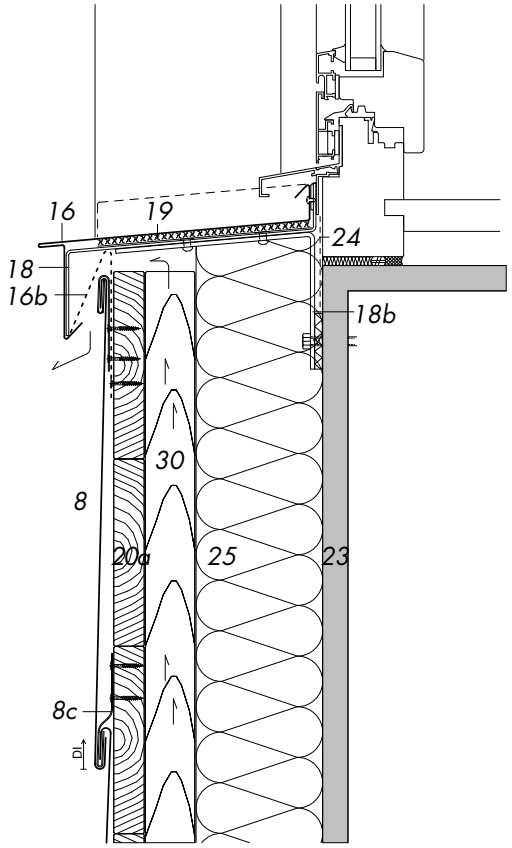
30 Ventilation space
- Height of ventilation space ≥ 20 mm

DI Direction of installation

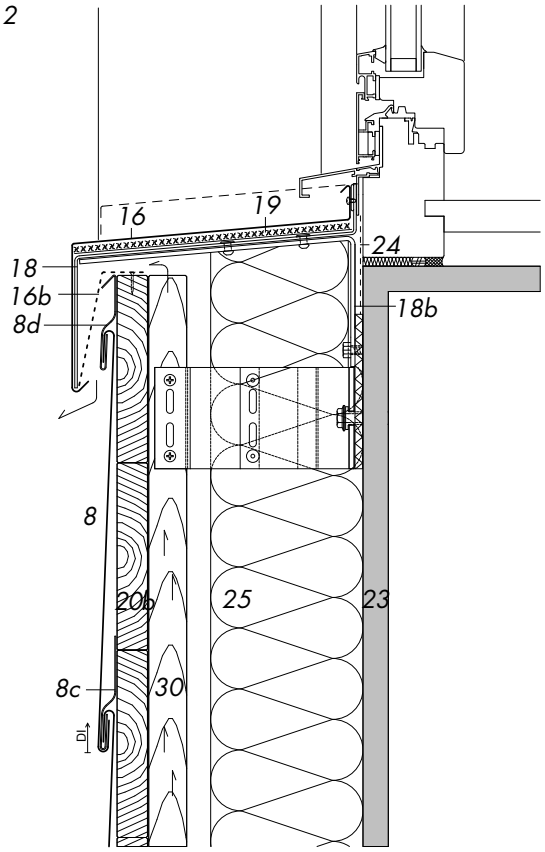
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL V2, WINDOWSILL

V2.1

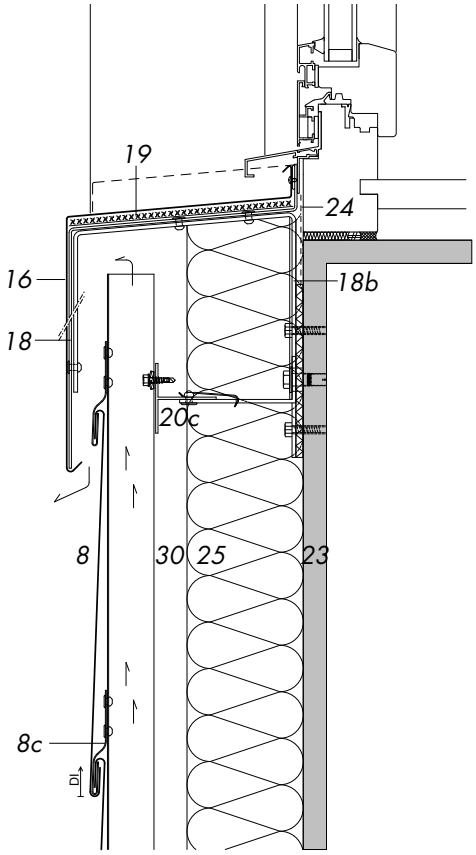


V2.2



DESIGN – HORIZONTAL APPLICATION
DETAIL V2, WINDOWSILL

V2.3



2.10.6 Detail V2: Windowsill

8 RHEINZINK®-Flat-lock Tile, GR 8
- ■ Standard tile
- c RHEINZINK®-Tile clip
- d RHEINZINK®-Continuing clip with water drip

16 RHEINZINK®-Building profile
- ■ Window sill profile, slope ≥ 3°
- b Perforated strip

18 Support profile
- ■ Made of aluminium
- b Made of corrosion resistant steel with Thermostopp

19 Seperating Layer
- ■ Structured Layer

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile

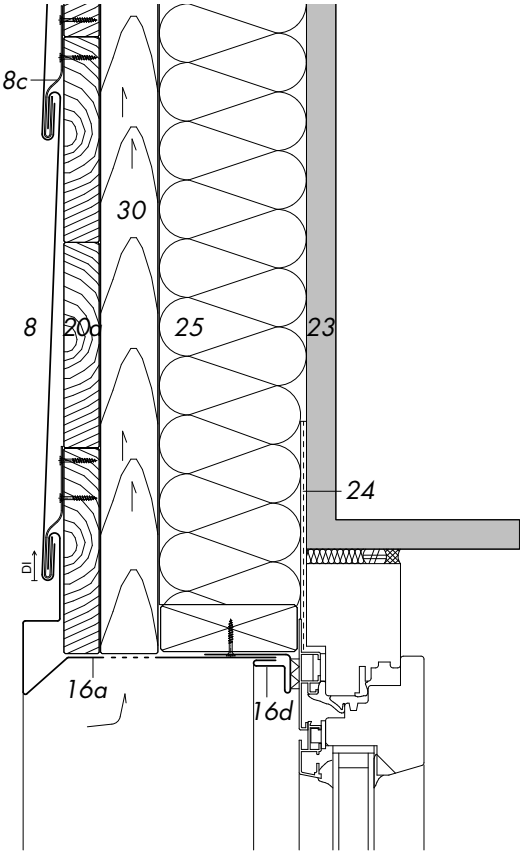
23 Supporting structure
24 Wind proofing
25 Thermal insulation
30 Ventilation space
- ■ Height of ventilation space ≥ 20 mm

DI Direction of installation

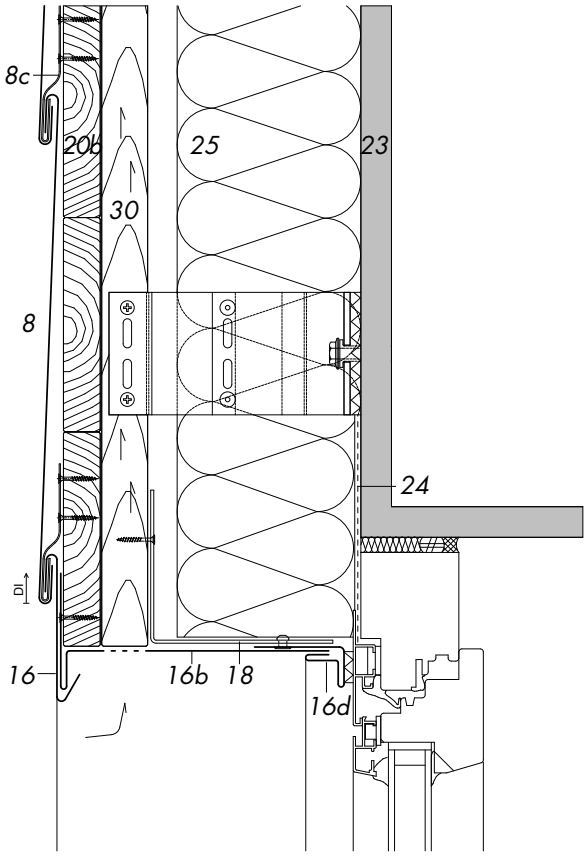
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL V3, WINDOW LINTEL

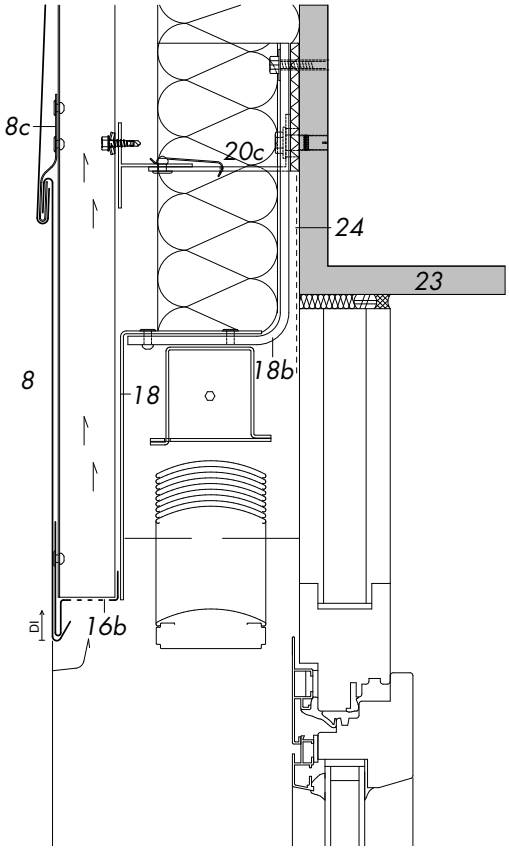
V3.1



V3.2



DESIGN – HORIZONTAL APPLICATION
DETAIL V3, WINDOW LINTEL



V3.3

2.10.7 Detail V3: Window lintel

8 RHEINZINK®-Flat-lock Tile, GR 8
- ■ Standard tile
- c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- ■ Lintel profile
- a Partially perforated
- b Base trim, partially perforated
- d Plug-in pocket with visible mounting leg and sealing strip

18 Support profile
- ■ Made of aluminium
- b Made of corrosion resistant steel with Thermostopp

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile

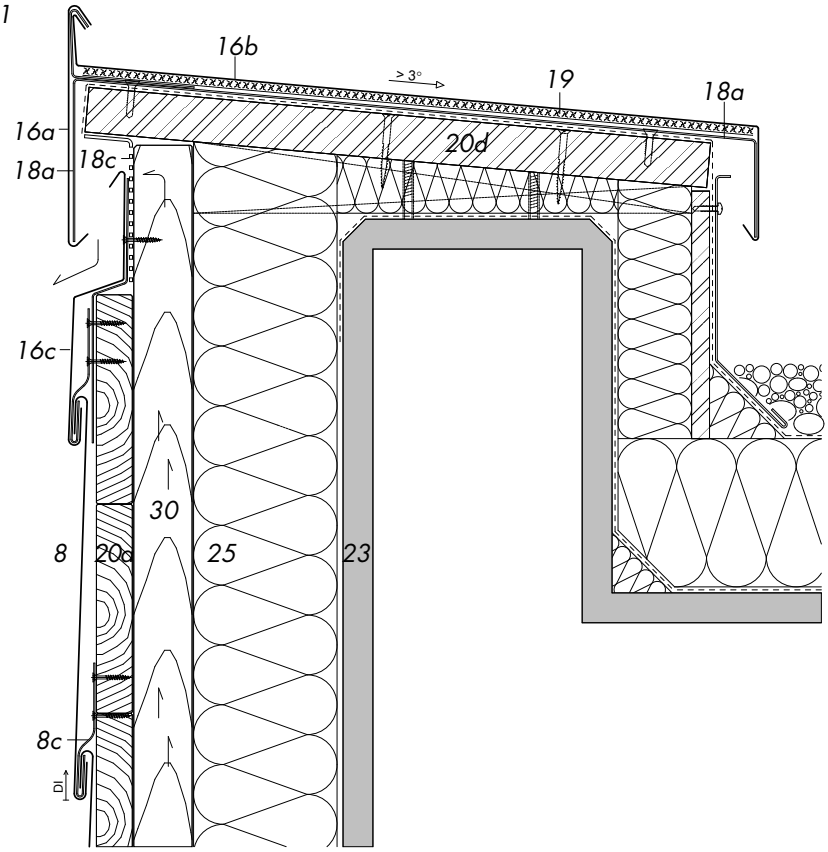
23 Supporting structure
24 Wind proofing
25 Thermal insulation
30 Ventilation space
- ■ Height of ventilation space ≥ 20 mm

DI Direction of installation

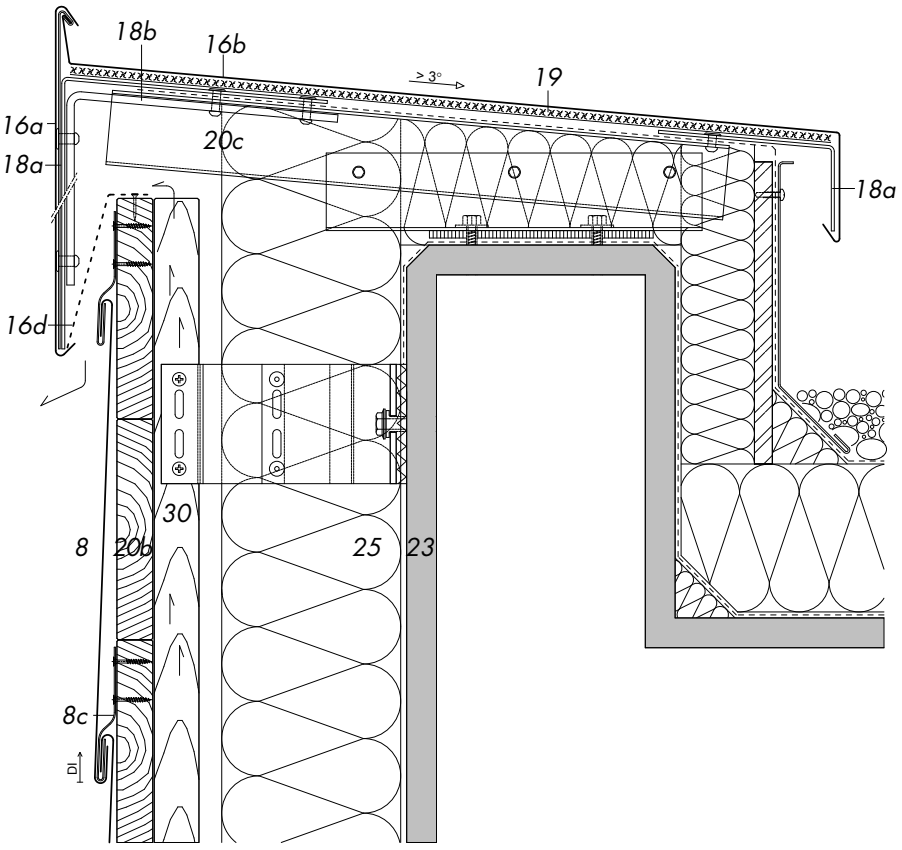
*Manufacturers' guidelines must be complied with

DESIGN – HORIZONTAL APPLICATION
DETAIL V4, ROOF EDGE

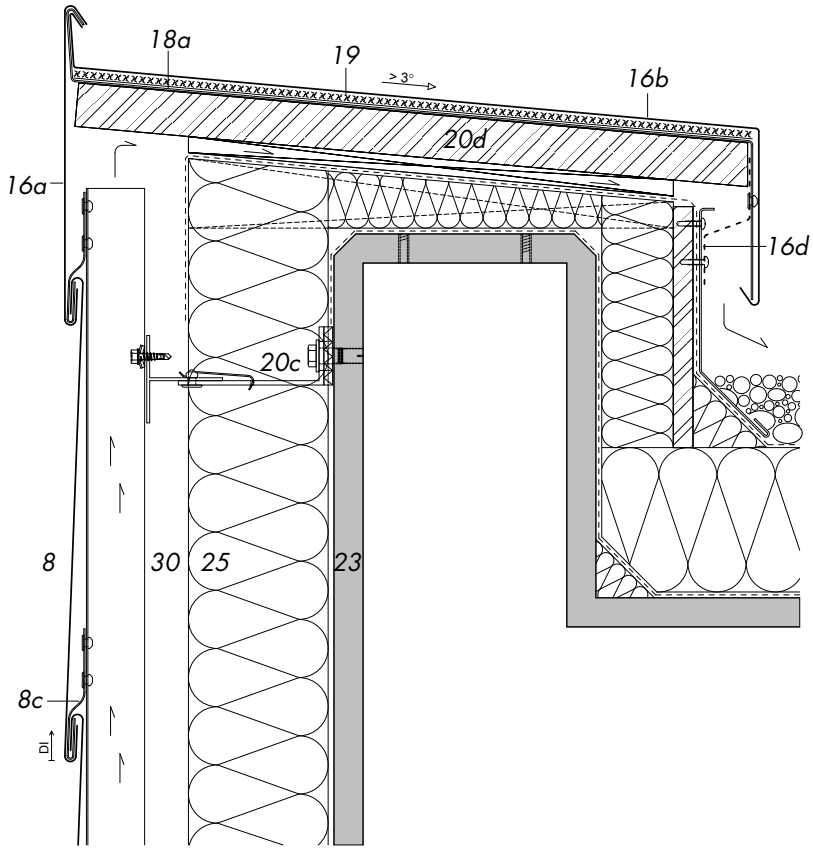
V4.1



V4.2



DESIGN – HORIZONTAL APPLICATION
DETAIL V4, ROOF EDGE



V4.3

2.10.8 Detail V4: Roof edge

8 RHEINZINK®-Flat-lock Tile, GR 8
- ■ Standard tile
- c RHEINZINK®-Tile clip

16 RHEINZINK®-Building profile
- a Edge profile
- b Wall coping, slope ≥ 3°
- c Termination profile with water drip
- d Perforated strip

18 Support profile
- a made of aluminium
- b made of corrosion resistant steel
- c made of aluminium, partially perforated

19 Seperating Layer
- ■ Structured Layer

20 Substructure
- a Wooden sheathing on batten
- b Wooden sheathing on batten and bracket system with Thermo-stopp*
- c Bracket system with Thermo stopp* and coated steel trapezoidal profile
- d Plywood or sterling board on wedged board

23 Supporting structure
25 Thermal insulation
30 Ventilation space
- ■ Height of ventilation space ≥ 20 mm

DI Direction of installation

*Manufacturers' guidelines must be complied with

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Additional project references
can be found on
the Internet at
www.rheinzink.com

ILLUSTRATIONS

Title:
New lecture hall, Victoria University, Werribee Campus, Werribee, Victoria, Australia
Architect: Michael McKenna Pty Ltd., Melbourne, Australia
RHEINZINK®-work done by:
HM METALCRAFT Pty Ltd., Victoria, Australia

1. **Weissbad Hotel, "Flickflauder" Restaurant, Weissbad, Switzerland**
Architects: agps architecture, Zürich, Switzerland
RHEINZINK®-work done by:
Stephan Sutter, Appenzell, Switzerland
Renato Egli, St. Gallen, Switzerland
and Blumer-Lehmann AG, Gossau SG, Switzerland

2. **Apartment building, Linz, Austria**
Architect: Arkade Project Group, Linz, Austria
RHEINZINK®-work done by:
Edtbauer GmbH, Pasching, Austria

3. **Factory building, W. Zultner & Co. KG, Graz, Austria**
Architect: ARGE Domenig-Eisenköck, Graz, Austria
RHEINZINK®-work done by:
Gruber Ges. m.b.H., St. Stefan/Lavanttal, Austria

4. **Observation Tower, Haenam Gun, Jeon-Nam Province, Korea**
Architect: Mr. Park, Dong-Joon/4-A Architect, Wolsan-Dong, Nam-Gu, Gwang-Ju City, Korea
RHEINZINK®-work done by:
Mijie Industrial Co., Ltd., Seoul, Korea

5. **Tirolia Spedition GmbH, Ebbs, Austria**
Architect: Architekturhalle Wulz-König, Telfs, Austria
RHEINZINK®-work done by:
Weißbacher Spenglerei, Wörgl, Austria

6. **Apartment building, Coburg, Germany**
Architect: Archi Viva, Coburg, Germany
RHEINZINK®-work done by:
Albert Nemmert, Ahorn, Germany

7. **Apartment building, Linz, Austria**
Architect: Atelier Sturmberger-Moser, Leonding, Austria
RHEINZINK®-work done by:
Spenglerei Horst Mayr jun., Leonding, Austria

8. **Friendship House, London, Great Britain**
Architect: MacCormac Jamieson & Prichard, London, Great Britain
RHEINZINK®-work done by:
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9. **Haus der Presse, Berlin, Germany**
Architect: Jo. Franzke, Architekten BDA, Frankfurt, Germany
RHEINZINK®-work done by:
Lummel GmbH & Co. KG, Karlstadt/Main, Germany
Bernd-R. Bahn GmbH, Berlin, Germany

10. **Friendship House, London, Great Britain**
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RHEINZINK®-work done by:
Weißbacher Spenglerei, Wörgl, Austria

12. **Health Centre, Berlin, Germany**
Architect: Alten Architects, Berlin, Germany
RHEINZINK®-work done by:
Bauklempnerei Ness, Berlin, Germany

13. **Edinburgh Airport Traffic Control Tower, Edinburgh, Scotland**
Architect: Reid Architecture, London, Great Britain
RHEINZINK®-work done by:
Lummel GmbH & Co. KG, Karlstadt/Main, Germany

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