RHEINZINK®

# FLAT-LOCK TILES

Profile Technique for Roofing and Facades

DESIGN AND APPLICATION

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

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12th edition

## Foreword

This document describes the use of RHEINZINK-Flat-Lock Tiles. Although it forms the basis for proper planning and classical application solutions, it is no more than a guide for users. The de-tailed drawings included here describe solutions which are feasible at a practi-cal level.

We should like to explicitly point out that in actual practice it may not be possible to create the type of cladding illustrated in this document – or not to their full ex-tent. In this context every situation should be examined in detail by the planner in charge. It is necessary here to take ac-count of the system-specific effects on the property and local/climatic condi-tions as well as the requirements in terms of building physics. Compliance with the application techniques and specifications described here does not release users from any responsibility in this regard.

This document is based on our practi-cal experience and represents the latest findings from research and development, recognised standards and state-of-the-art technology. We reserve the right to make changes at any time in the course of further development.

If you have any queries or suggestions, please contact your customer advisor or get in touch with your local RHEINZINK sales office. All contact data can be found on our homepage
**www.rheinzink.com/contact**.
For an overview of our sales offices
see page 58 of this document.

Datteln, August 2016

TABLE OF CONTENTS

## 1. Material RHEINZINK Titanium Zinc

### 1.1 Alloy and Quality

RHEINZINK is titanium zinc according to DIN EN 988. The RHEINZINK alloy consists of electrolytically refined zinc according to DIN EN 1179 with a purity grade of 99.995% and precisely determined proportions of copper and titanium.

All RHEINZINK products are certified according to DIN EN ISO 9001:2008

**Ecological Relevance**

RHEINZINK is a natural, 100% recyclable material that has always complied fully with today's strict ecological requirements. The latest production facilities, sophisticated logistics and favourable processing properties are available. Environmentally-conscious action is documented through the introduction of the environmental management system ISO 14001:2004. It is checked and certified according to TÜV Rheinland.

We also document responsible action in regard to the environment through the introduction of an energy management system according to ISO 50001:2011. It is our intention to save as much energy as possible, to save resources and to keep the environmental impact of our products as low as possible.

**Aspects of ecological Assessment**

According to the holistic assessment from the Institute for Construction and Environment e.V., RHEINZINK is declared an environmentally friendly construction product according to ISO 14025, type III (EPD) and EN 18504 „Sustainability of construction works. Environmental product declarations". The examination of the environmental and health compatibility criteria also includes the entire life cycle of RHEINZINK products, from the raw material extraction to processing and use to recycling and disposal. It is based on a life cycle assessment according to ISO 14040 (LCA) *(please request the certificate free of charge)*.

**Electromagnetic Radiation is safely shielded**

There is much public controversial debate about electromagnetic radiation. The International Society for Electrosmog Research (IGEF e.V.) has provided information here on RHEINZINK's shielding properties. The result: Over 99% of electromagnetic smog present is shielded. Biological measurements on people confirm the technical measurements and show a harmonising effect on heart, circulation and the nervous system. Body relaxation increases.

**Remaining Values**

With a service life that spans several generations, RHEINZINK is a material that sets news standards. The 30-year guarantee highlights the durability of the 100% recyclable material. This offers additional protection.

### 1.2 Marking

*RHEINZINK sheets and coils:*
Recognisable by the consecutive coloured stamping on the metal underside.

*RHEINZINK-*
*Roof Drainage Products:*
Recognisable by the brand embossing.

*RHEINZINK-*
*Roof Drainage Accessories:*
Recognisable by the brand embossing.

*RHEINZINK-Palette Identification:*
Recognisable by the packaging label with detailed product data.

### 1.3 Material Properties

- Density (spec. weight) 7.2 g/cm³
- Melting point 418 °C
- Expansion coefficient: in a longitudinal rolling direction: 2.2 mm/m x 100 K in a transverse rolling direction: 1.7 mm/m x 100 K
- Typical joining techniques: seaming, soft soldering, bonding, screwing, riveting
- Non-magnetic
- Non-combustable
- Electromagnetic radiation shielding
- Recyclability 100%
- High recycling rate
- Assured material cycle
- Environmentally compatible (EPD)
- Natural material
- Low energy use
- Long service life
- Vital trace element
- Extensive resources

| Metal thickness (mm) | Weight (kg/m²) |
|---|---|
| 0.70 | 5.04 |
| 0.80 | 5.76 |
| 1.00 | 7.20 |

*RHEINZINK weight according to Metal thickness in kg/m² (Numbers are rounded)*


*A*


*B*


*C*


*D*

### 1.4 Patina Formation

On the natural RHEINZINK-prePATINA surface forms a bonded natural patina in the atmosphere. In so doing all the environmental influences from the air and rain water are integrated into the surface development. The material surface is maintenance free and as a natural product does not require care or cleaning.
When using the natural RHEINZINK-PATINA LINE surfaces in areas subject to a marine climate, white deposits may develop on the surface due to the salt in the atmosphere. These natural deposits integrate into the natural patina and because of the colour contrast, are more visible on the darker, RHEINZINK-prePATINA graphite-grey surface. This will not affect the function or expected service life of the material when used on facades, roofs or other cladded building components. The natural patina will appear lighter when used in locations where the air contains chlorides. When used in environments where sulphur levels are higher, (e.g. industrial pollution), the patina may appear somewhat darker than usual.
If a change to the surface is not desired from the formation of patina, we recommend using RHEINZINK-PROTECT for surface quality (see page 7).

#### 1.4.1 RHEINZINK-prePATINA bright rolled

Application for all sheet metal work in seaming and soldering techniques. Natural patina forms at different times depending on the application or roof pitch. In areas protected from rain water e. g beneath eaves or on roof edges sometimes only after a few years.

#### 1.4.2 RHEINZINK-prePATINA blue-grey and graphite-grey

The pre-weathering process was developed by RHEINZINK 25 years ago especially for use in areas where a "finished" picture of the RHEINZINK surface is desired even at the hand-over of keys. This process allows the production of colour of a natural patina although the natural patina itself only forms after installation.

RHEINZINK is the only manufacturer world wide who uses this unique pre-weathering process. The use of a pickling process compared to a coating or phosphating process has two distinct advantages: Pickling gives the surface the appearance of a genuine patina, something that only occurs otherwise after a long time through natural influences. Pickling produces an even colour tone but is not comparable however with a RAL shade. A protective coating applied to the surface achieves temporary protection for storage, transport and processing. This protective film makes oil-free forming possible for processing in the profile roll forming machines.

The RHEINZINK quality prePATINA graphite-grey is the dark alternative and may, after a few years during the formation of patina and depending on the regional climate, develop a slight dark green sheen as with slate.

During the pickling process other natural surface properties are preserved - the surface remains solderable. The visible "Ageing with dignity" is not prevented by pre-weathering and has proved its worth in practice over many decades. The material largely reduces the typical reflections of the surface of thin sheets (oil canning).

#### 1.4.3 Information about Processing

In order to avoid surface reactions from excessive sweating from the skin and other impurities caused by the building site, oil-free clean textile gloves should be worn.
Suitable products can be found at
**www.rheinzink.de/werbemittelshop**

#### 1.4.4 Surface Uniformity

We make every effort to supply profiles with surface uniformity. Production-related slight differences can occur, which are purely of appearance in nature and which, in the PATINA LINE, usually even out during the formation of patina. In order to exclude specific product-related visual imperfections, particular requirements should be requested with respect to surface uniformity.

Environmental Profile Scheme
ENP 453

* *environmental label for building products recongnized by the German Federal Environmental Agency*

### 1.4.5 Protection during Transportation and Installation

Because of the high quality of our products, the surface qualities of PROTECT LINE, COLOR LINE, INTERIEUR LINE and prePATINA graphite-grey are supplied with a protective film. Our facade profiles are also supplied with this protective film. The film protects the surface during transportation, storage and installation and against negative influences during the building stage.

The foliation is a self-adhesive protective plastic film that is applied at the factory and is exposed during installation to UV radiation and temperature variations. If this exposure continues for a long time, the properties of the film may change and cause adhesive residues on the metal surface. To avoid these changes, we recommend removing the film immediately after the installation process. The film should be removed at once from the surface as moisture could be hold back at loose film edges. This could cause visual imperfections (formation of zinc hydroxide).

### 1.4.6 Information on Wave Formation Strip Material

A characteristic surface phenomenon with strip material is the typical slight wavy structure of thin sheet metal.
These waves form because of the reaction of a natural material to the winding and unwinding process in the factory and the corresponding reworking (profiling etc.) during workshop preparation and installation.

The surface finish prePATINA bright rolled emphasises the changing appearance because of light reflection. With increasing patination this perception reduces. If from the start e. g. for facades and roof surfaces, a high grade appearance is desired, we recommend, the surface finishes prePATINA blue-grey or prePATINA graphite-grey.

**Sheet Material**

An improved evenness is obtained by using sheet material, which RHEINZINK can manufacture and supply at lengths up to 6 m. The measurement of corrugations is subject to strict controls and must not exceed the value defined under DIN EN 988 (max. 2 mm per metre). The RHEINZINKworks standard prescribes for each metre of sheet length e. g. max. 1 wave 1 mm in height.

## 1.5 Response to external Influences

### 1.5.1 Influence of other Metals placed on Top

Unproblematic:

- Aluminium, shiny or coated
- Lead
- Stainless steel
- Galvanised steel (rust streaking possible, e. g. caused by unprotected cut edges)

Problematic:

- Copper

### 1.5.2 Influence of other Building Materials placed on Top

Problematic:

- Unprotected bitumen roof sheeting without grit layer/gravel fill (acid oxidation)
- PVC roof sheeting (hydrochloric acid emissions)

### 1.5.3 Influence of other substances incl. Mortar

- Mineral-based materials such as chalk, cement or plaster plus moisture have a corrosive effect on metals.
- A suitable separating layer must be fitted between RHEINZINK building profiles and these building materials.
- Installation sequence: Plasterwork prior to RHEINZINK (if possible use material with plastic film)

### 1.5.4 Effect of Oil Heating

Discolouration on RHEINZINK surfaces can occur in the case of oil-driven heating systems because of the ingredients of the heating oil and additives. Such discolouration is more or less visible on all covering materials and has no influence on the durability of the roofing.

**Note:**
The builder must be informed about this situation. With gas-operated plants, discolouration is not expected.

### 1.5.5 Base and Splash Water Areas, Rock Salt

At base areas splash water can cause staining and disturb the patination process. Rock salt in connection with moisture has a corrosive effect on metals. Therefor facade claddings should be installed with a sufficient space to the ground, not less than 30 cm as a rule.

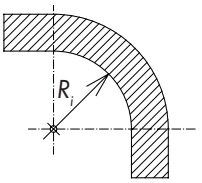
## 1.6 General Processing Principles

### 1.6.1 Marking

Mark using soft pens and not sharp pointed objects (scribing tool, pocket knife).

### 1.6.2 Forming/Radii of Curvature

Zinc and its alloys are anisotropic, which means they have different properties parallel and crosswise to the rolling direction.
The mechanical effect of this anisotropism is reduced to such a degree with RHEINZINK through the alloy and rolling process, that RHEINZINK independent of the rolling direction can be folded at 180° without incipient cracking.




| Material thickness | Radius of curvature $R_i$ minimum |
|---|---|
| 1.00 mm | 1.75 mm |
| 1.20 mm | 2.10 mm |
| 1.50 mm | 2.63 mm |

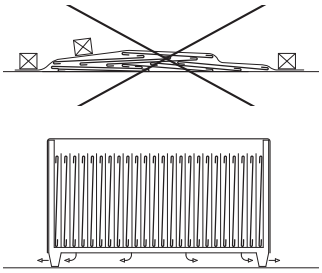
*Recommended radii of curvature (inner radius) for RHEINZINK*

### 1.6.3 Length Change caused by Temperature

With coverings, roofs, and facade cladding (panel length), sheet metal work and roof drainage (profile length), changes in length caused by temperature (expansion and contraction) must be taken into account in the design. In particular for penetrations, corners, joints and other transitions, the right design measures must be implemented; e. g. panels or profiles must be installed stress-free from the expansion technology perspective.

## 1.7 Storage and Transportation

RHEINZINK products must always be stored and transported in dry and ventilated conditions.



*Storage and Transportation (Schema)*

**Note:**
**Container storage is the best method for optimum storage at the building site. If necessary request a dry and well-ventilated room from the building management. Do not place covers directly over the material as this can cause moisture or rain water to penetrate between the profiles and in the absence of ventilation lead to deterioration in appearance because of the formation of zinc hydroxide.**

**1.8 Structural Physics**

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

The rear-ventilated facade 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 facade 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 facade 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.

**1.9 Windproof Building Envelope**

This does not apply to the rear-ventilated facade, as this component itself cannot be windproof.

The building must be windproof before the rear-ventilated facade 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.

**1.10 Weather Protection**

Rear-ventilated facade cladding protects the supporting structure, the waterproofed thermal facade insulation, and the substructure, from the weather.

Bracket-mounted rear-ventilated facades 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.

**1.11 Moisture**

Rear-ventilated facade cladding provides protection from driving rain and moisture. Moisture penetration as a result of diffusion does not occur in the rear-ventilated facade.

When the supporting structure is windproof, the diffusion current density is too small to cause the dew point temperature to drop.

**1.12 Thermal Economy**
In order to understand the thermal economy of the rear-ventilated facade, 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..

**1.12.1 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

**1.12.2 Summer thermal Insulation**
Summer thermal insulation should provide comfort: The amount of heat flowing from the outside to the inside sh ould 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 facade, is that a large portion of the heat which streams onto the cladding is diverted through convective air exchange.

**1.12.3 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 facade. Thermal bridges can be reduced significantly by installing an insulating strip between the supporting structure and the substructure (thermal break).
Proper installation of the insulation reduces the formation of thermal bridges.

**1.13 Fire Protection**
Metal facades 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 facades, it may be necessary to install firestops.

**1.14 Rear-ventilation**
The free ventilation cavity between the facade 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.

**1.14.1 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 facade 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).

**1.15 Soundproofing**
To prove that a facade 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.

**1.16 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.

## 2.1 RHEINZINK-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.

### 2.1.1 Profile Geometry

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

Cover width ≤ 600 mm
Cover length ≤ 3000 mm
(optimal ≤ 2000 mm)*

We are happy to advise you on other dimensions.

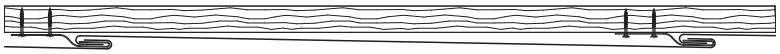
* Due to the better handling, we recommend an cover length of ≤ 2000 mm

All sizes in between can be produced.

| 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 |

**Application for outside Areas**
- Facades
- Soffits
- Parapets
- Roofs

**Application for inside Areas**
- Walls
- Ceilings



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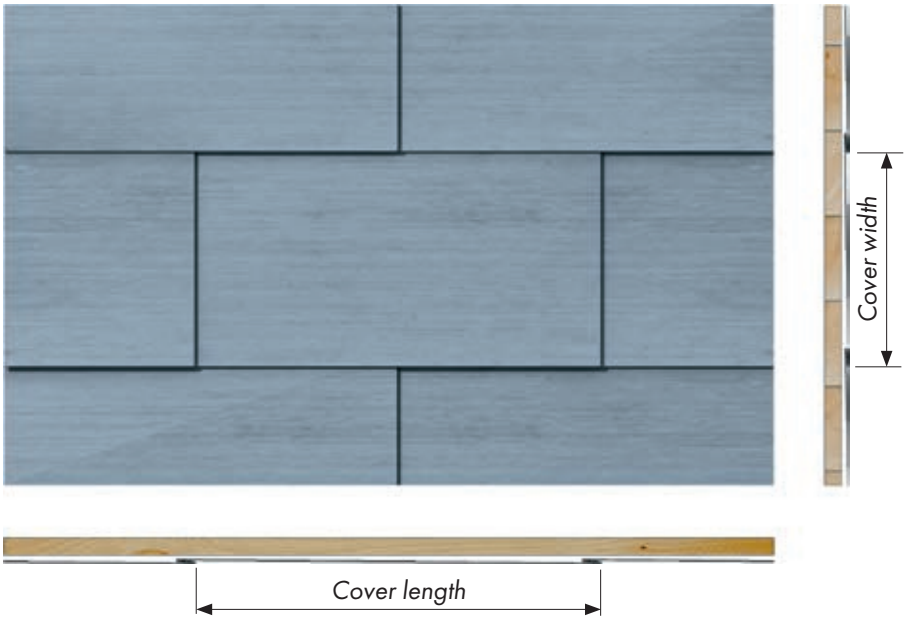


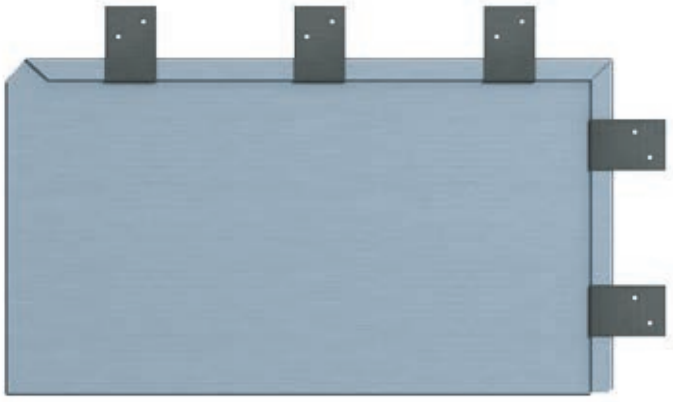

*View with system profile*

*View of flat-lock tile*
*Roof application*

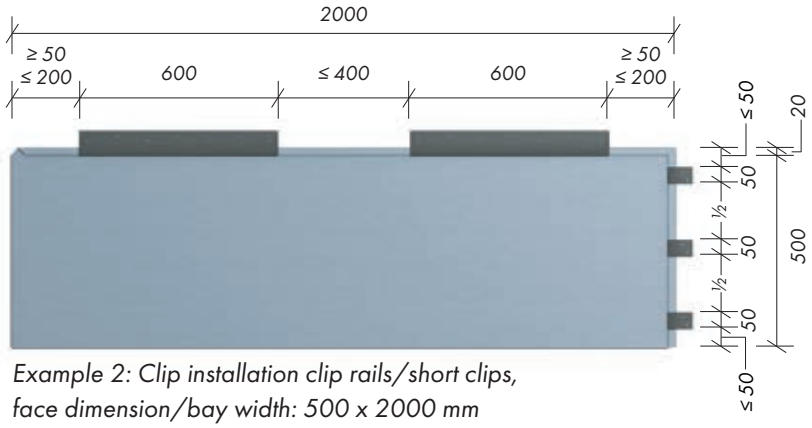
*View of flat-lock tile*
*Facade application*

### 2.1.2 Installation Direction/ Installation Instructions

- Installation direction from bottom to top
  – from right to left
  – from left to right
- Installation with cross-joint or offset possible
- With the roof tile, the fold-forward or fold-back must be slightly bent up and processed to allow for the plug-in due to the closed upper corner.
- Fixing with tested RHEINZINK-clips or clip strips, see item 2.1.3.
- The film over the visible surface is to be removed immediately after installation.



*Example 1: Clip installation with short clips, face dimension/bay width: 333 x 600 mm*




*Example 2: Clip installation clip rails/short clips, face dimension/bay width: 500 x 2000 mm*

### 2.1.3 Fixing

The stability of RHEINZINK-Flat Lock Tiles has been proven using wind suction tests according to the test criteria of ETAG 006. As a result from the tests, RHEINZINK has developed special clips and clip rails. These fixing elements consist of a special alloy and are factory pre-punched (hole diameter = 5 mm) in order to ensure the correct positioning of the fixing means. Roughened, hot-dip galvanised roofing nails 2.8 x 25 mm were used for the wind suction tests.

The maximum possible cover width of the flat-lock tiles and the required metal thickness are determined by the wind load on the building. The selection/ arrangement of the short clips (50 mm wide) and/or clip rails (600 mm wide) takes place adapted to the tile size and the wind load.

*Short clip 50 x 75 mm*

*Clip rail 600 x 75 mm*

| Cover width x cover length | 333 x 600 | | | | | | 400 x 800 | | | | | | 500 x 1000 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area, m² | 0.20 | | | | | | 0.32 | | | | | | 0.50 | | | | | |
| Metal thickness, mm | 0.70 | | 0.80 | | 1.00 | | 0.70 | | 0.80 | | 1.00 | | 0.70 | | 0.80 | | 1.00 | |
| Fixing clip | SC | - | SC | - | SC | - | SC | CR | SC | CR | SC | CR | SC | CR | SC | CR | SC | CR |
| Number of clips/ spacing in mm | 3/ 225 | - | 3/ 225 | - | 3/ 225 | - | 4/ 216.7 | 1 | 4/ 216.7 | 1 | 5/ 163 | 1 | 6/ 170 | 1 | 6/ 170 | 1 | 6/ 170 | 1 |
| perm. $w_d$ in kN/m² | -4.18 | - | -4.50 | - | -4.50 | - | -2.01 | -4.59 | -3.00 | -4.59 | -4.69 | -4.59 | -0.82 | -2.94 | -1.23 | -2.94 | -2.40 | -2.94 |

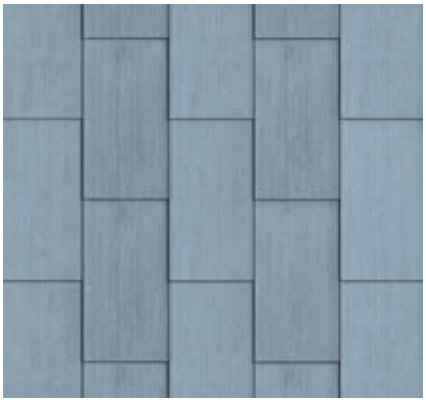
| Cover width x cover length | 500 x 3000 | | | | | | 600 x 1500 | | | | 600 x 2000 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area, m² | 1.50 | | | | | | 0.90 | | | | 1.20 | | | |
| Metal thickness, mm | 0.70 | | 0.80 | | 1.00 | | 0.80 | | 1.00 | | 0.80 | | 1.00 | |
| Fixing clip | SC | CR | SC | CR | SC | CR | SC | CR | SC | CR | SC | CR | SC | CR |
| Number of clips/ spacing in mm | 17/ 178.1 | 4 | 17/ 178.1 | 4 | 17/ 178.1 | 4 | 10/ 150 | 2 | 10/ 150 | 2 | 14/ 264.3 | 3 | 14/ 264.3 | 3 |
| perm. $w_d$ in kN/m² | -0.82 | -3.92 | -1.23 | -3.92 | -1.23 | -3.92 | -0.59 | -3.27 | -1.16 | -3.27 | -0.59 | -3.68 | -1.16 | -3.68 |

SC: Short clip
CR: Clip rail

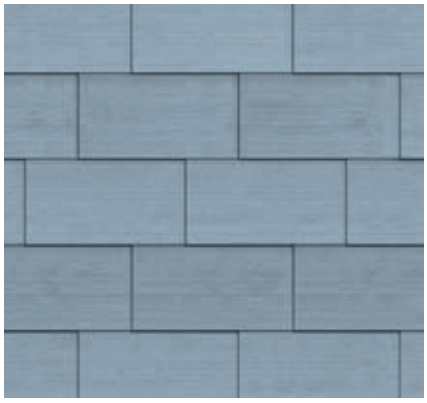
*The tables show the number of clips required for the long side of the tile.*
*A factor of safety of 1.5 has been allowed for. The short side of each tile requires 2 or 3 additional clips.*
*From a cover width of 500 mm 3 clips are required. Installation according to example 2.*

### 2.1.4 Shapes and Seam Offset

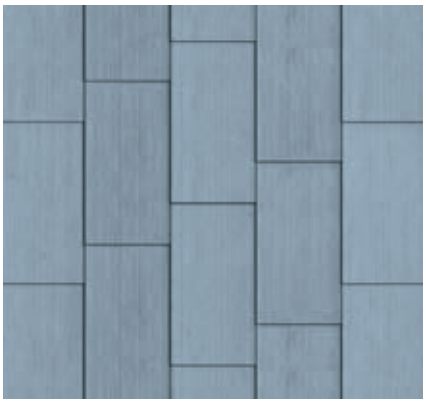
The design possibilities are virtually endless. It is up to the designer whether to use 1/2 staggered, a "random structure" or a 1/3 or 1/4 staggered.
Another variation is the formation of a cross-joint. The cross-joint is a visually calmer design.
The random structure is borrowed from nature. It is 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.
In addition to rectangular and square formats, tiles in parallelogram form are also possible in the facade, which is another design possibility of this versatile installation system.



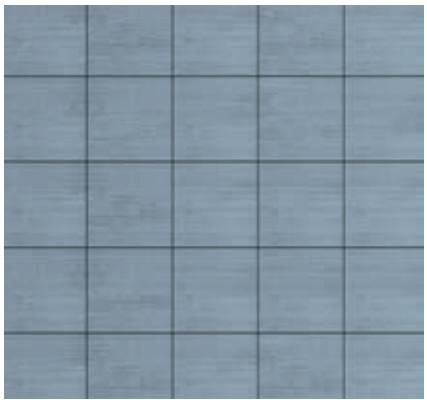
*1/2 staggered*



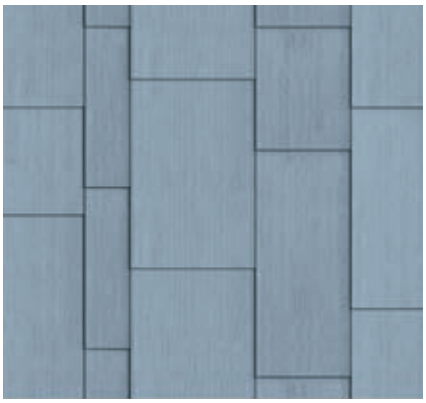
*1/3 staggered*



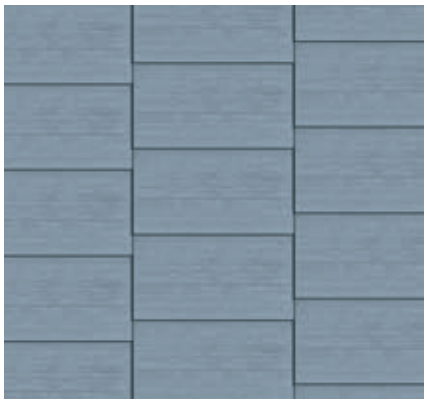
*1/4 staggered*



*Cross-joint*



*Random structure*



*Diagonal staggered*

*Cross-joint*

*1/4 staggered*

*Private residence, Strasswalchen, Austria*

*Construction of a new day hospital for the psychiatric care of children and adolescents, Düsseldorf, Germany*

**2.1.5 Thermal Expansion**

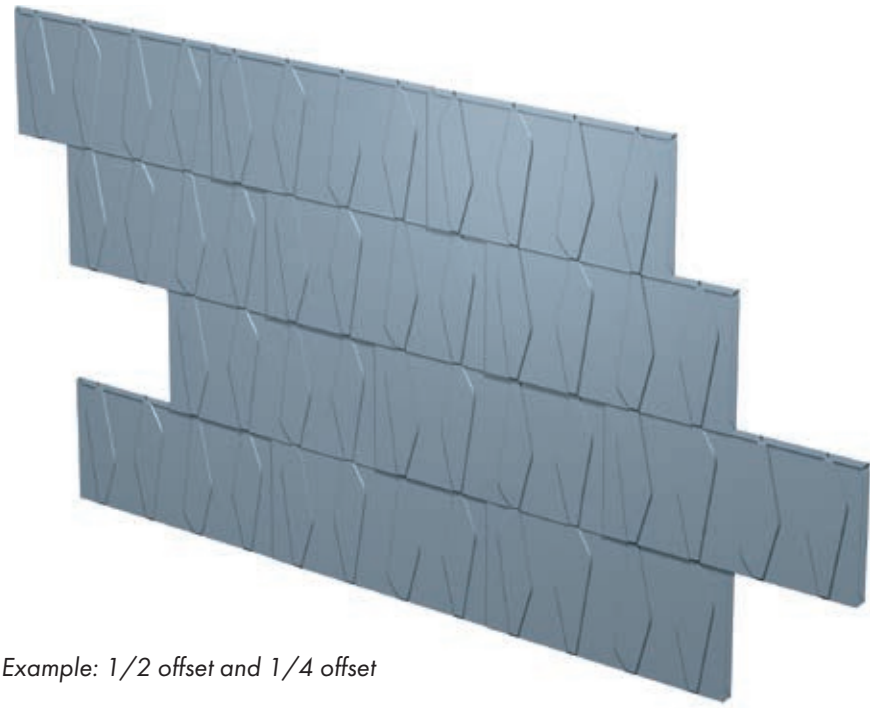
As a rule flat-lock tiles are indirectly fixed into the substructure using tested RHEINZINK clips or clip rails. The general waviness typical of thin metal sheeting depends on the thickness of the metal and the source material selected.

RHEINZINK material 1.00 mm thick is less wavy than 0.7 mm or 0.8 mm thick titanium zinc. Sheeting is used as standard for the production of RHEINZINK-Flat-Lock Tiles. This in turn reduces the effect of the tendency towards waviness. Indirect fixing allows the tiles to expand freely.

**2.2 RHEINZINK-Crystal Tile**

The RHEINZINK-Crystal Tile is a refined design for façade cladding with an innovative embossing technique. It is based on the RHEINZINK-Flat-lock Tile and is manufactured in the material variant RHEINZINK-prePATINA blue-grey. The RHEINZINK-Crystal Tile is available both in a left and right design.

The system solution opens up a variety of design options to you. Regardless of whether you opt for a 1/2 offset, a 1/4 offset or a design with the visually quieter cross-joint, the result is always convincing. With the offset design, a very lively look is realised in connection with the four embossings. The vertical seams that are strikingly visible with smooth tile claddings virtually disappear in the process.



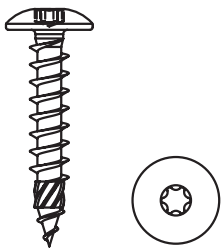
*Example: 1/2 offset and 1/4 offset*

**2.2.1 Profile Geometry**

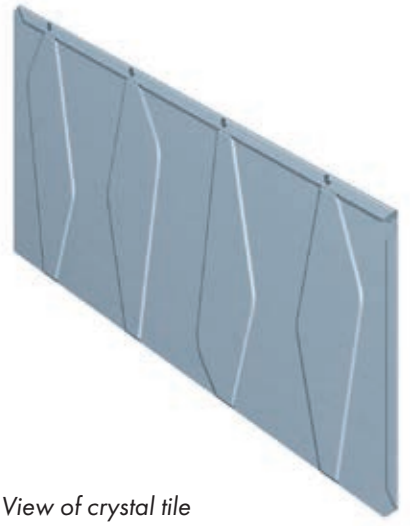
- Metal thickness s = 0.7mm
- Weight 6.24 kg/m²
- Cover width 425 x 935 mm (0,4 m²)
- Tile dimension 448 x 955 mm

**2.2.2 Fixing**

The RHEINZINK-Crystal Tiles are attached on the upper end with four tested, stainless steel fastening screws (4.5 x 25 mm) and fastened so that they are covered. Due to the small dimensions (448 x 955 mm), the temperature-induced change in length of the crystal tiles can be disregarded.



*Stainless steel fastening screw*



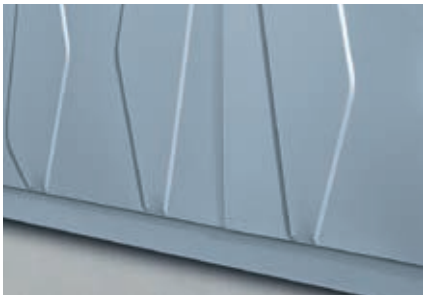
*View of crystal tile*

*Crystal facade: The alternating arrangement of the embossing provides for a lively structure.*

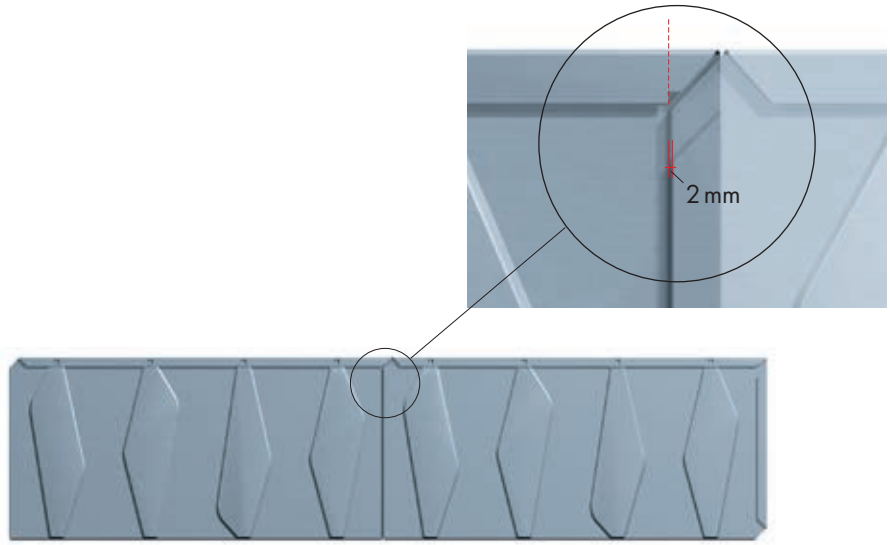
### 2.2.3 Detailed Solutions

The construction profiles required for the corners, jambs, flashing and cappings are identical to those profiles of the traditional RHEINZINK-Flat-lock Tile System used for the known detailed designs. They can be easily and simply adopted.

*Lateral capping*
*The crystal tiles are cut to length individually and suspended in the prefabricated connection profile.*



*Base connection*
*The crystal tiles are suspended in the prefabricated base profile.*




### 2.2.4 Installation Instructions

- Installation direction from bottom to top
  – from right to left
  – from left to right:
- The required fastening screws are included in the scope of delivery.

The crystal tile receives an additional notching on the edge of the upper fold-back. It is an identification mark that specifies the location of the tile that follows laterally (red line). This results in a margin of 2 mm in the lateral overlap, which allows a stress-free expansion and a minimal tolerance during installation. The craftsman must adhere to the spacing of 2 mm during installation, as the distribution of the embossing is tailored to this and only in this way does a correct vertical transition of the embossings take place from tile to tile.
The spacing of the tiles in the horizontal plug-in seams is determined by the craftsman at his own discretion.

## 2.3 Substructures

**Sketches 1a, 1b:**
**Timber 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)

**Sketches 2a, 2b:**
**Metal Substructure**
(Example with tile size 333/600 mm)

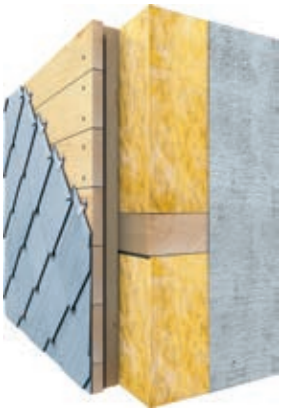
Advantages:
- Fireproof design of A1-facades is possible (Fireproof Classification A1, DIN 4102)
- The cost of installing thick insulation material is reasonable
- Tolerances in the supporting structure can be adjusted easily

Disadvantages:
- Increased cost of installation

**Sketches 3a, 3b:**
**Combined Substructure of Timber/ Metal**
(Example with tile size 333/600 mm)

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 timber content the facade construction



*Sketch 1a*

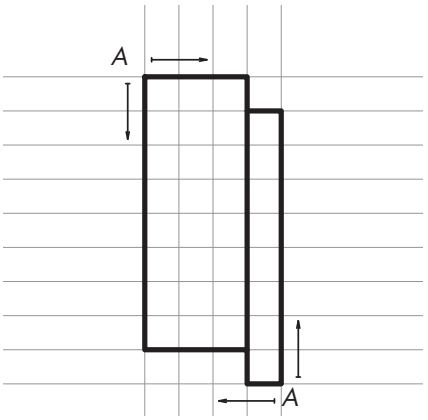
*Sketch 1b*

*Sketch 2a*

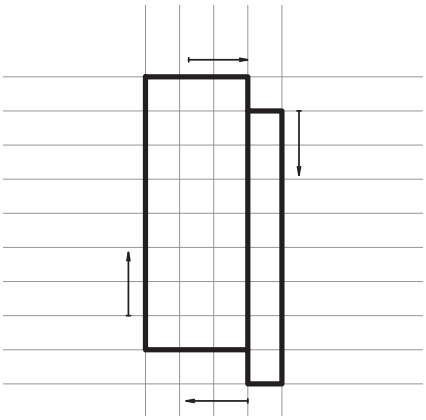
*Sketch 2b*

*Sketch 3a*

*Sketch 3b*

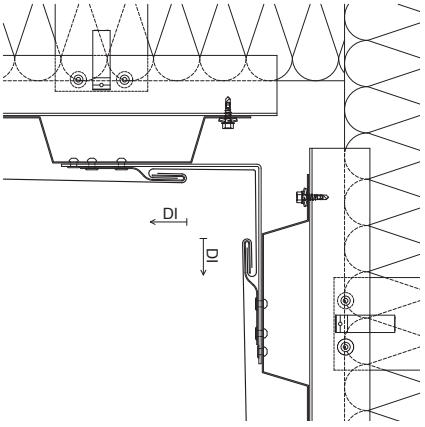



*Installation from various starting points*

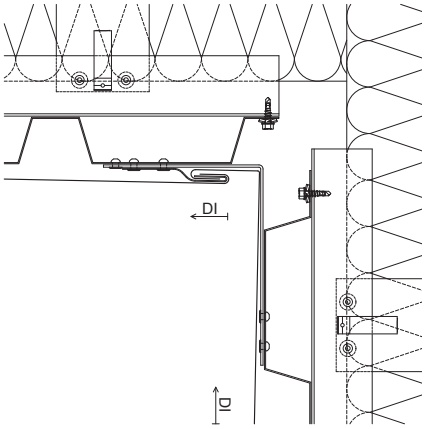


*Continuous installation*

**2.4 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 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.

## 2.5 Detail Design

The design and quality of details determines the appearance of the facade. 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.

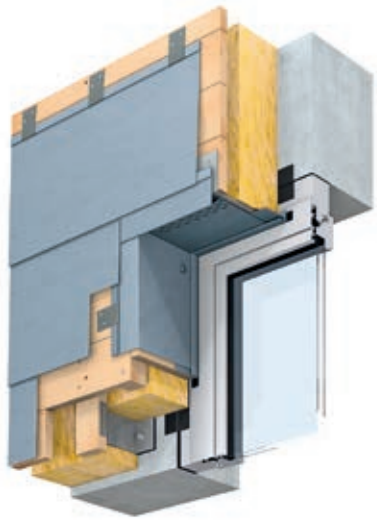
### Width of building Profile or Section

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.

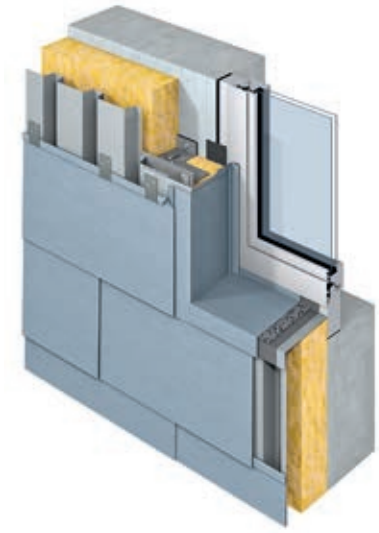
### Projection of Profiles

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

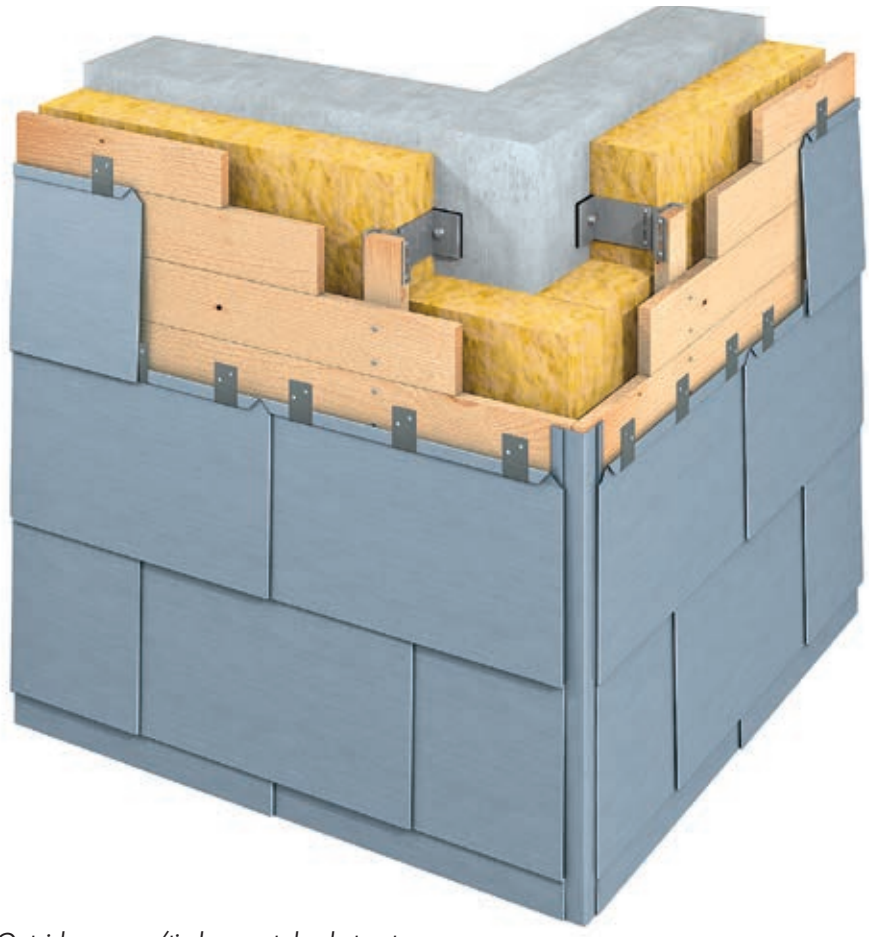
- Window lintel
  Installation of RHEINZINK-Flat-Lock Tile on full-surface timber boarding. Lintel and reveal profiles form a frame with a face of ca. 60 mm. The lintel profile is partially perforated and comes with a drip edge.
- Windowsill
  The frame width of the lintel and reveal panels is determined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



*Window lintel/*
*Timber-metal-substructure*



*Window reveal/*
*Metal-substructure*



*Outside corner/timber-metal-substructure*
(Example with tile size 333/600 mm)

## 2.6 Details

### 2.6.1 General Instructions

**Third party Trades**

Contracting third party trades for the facade 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 facade. 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 2.3

**Load Effect**

The surface loads (wind suction/wind pressure), which affect the facade 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 facades (soiling as a result of atmospheric deposits).

**Diagonal Installation**

RHEINZINK-Flat-Lock Tiles can also be used in a diagonal facade segmentation. In most instances, the technical design of the structure, in this case, corresponds to that of horizontal installation.

### 2.6.2 Pictogram

Horizontal sections (see page 28)
H1: Outside corner
H2: Inside corner
H3: Window reveal
H4: Joint/lengthwise expansion separation

Vertical section (see page 29)
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.)*

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 facade segmentation:

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

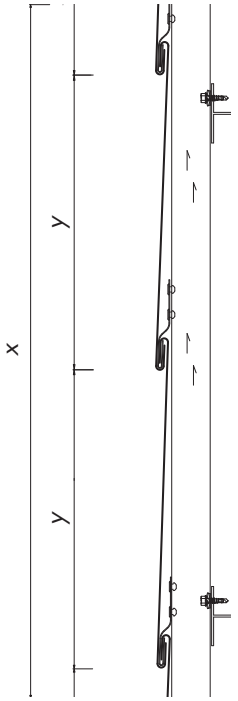
In the case of new buildings, the facade grid can be matched to the design; penetrations such as windows, chimney pipes, etc. are always ancillary to the grid.

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:

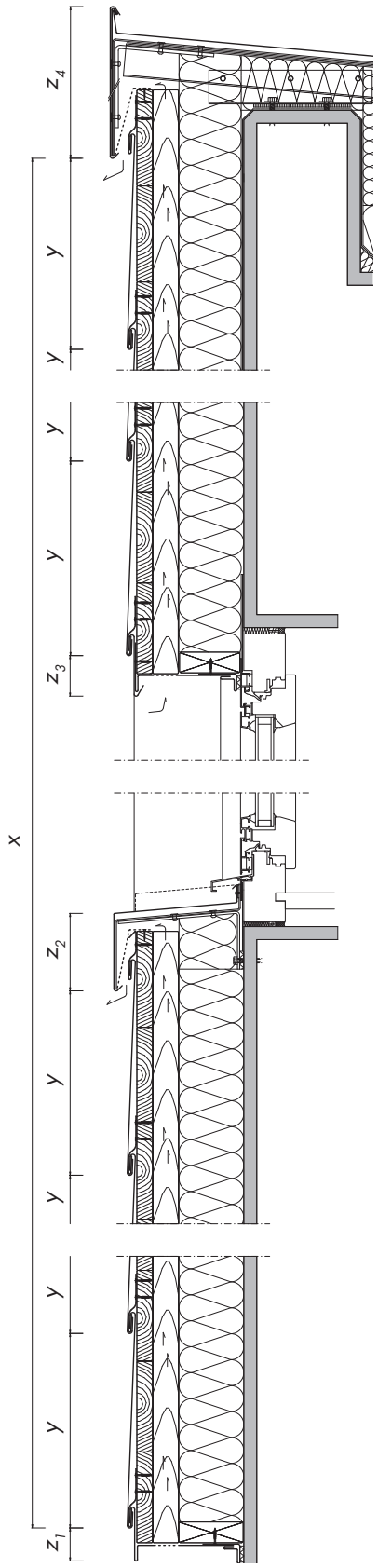
- One should start or end with a whole module (x or y) at the transitions
- Dimensional discrepancies of maximum 15 mm (deviations from module x or y on two-dimensional profiles) are not noticeable.
- Dimensional tolerances (dimensional change of x or y) which cannot be corrected, must be compensated 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 facade 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 cover 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 cover width (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 cover width of a tile.




*Random structure, horizontal installation*




**Position Z4: 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 board.

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 Z3: Window lintel**
**Position Z2: Windowsill**
**Grid Planning for new Buildings**

- Determine openings 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 Z1: Base**
**Grid Planning for new Buildings, respectively Renovations**

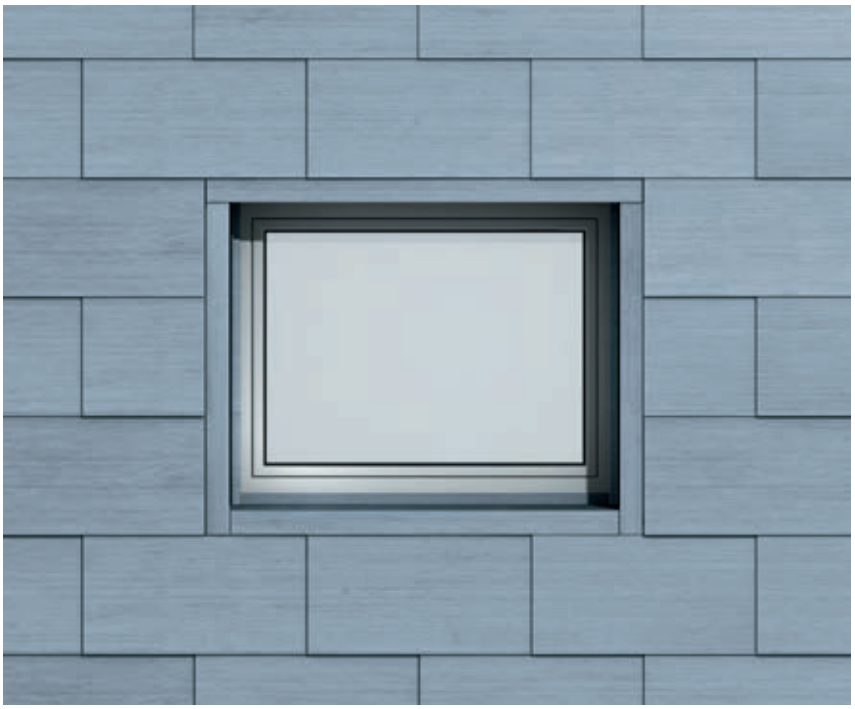
- Define potential deviations toward the top or the bottom
- Establish the profile geometry of the base detail

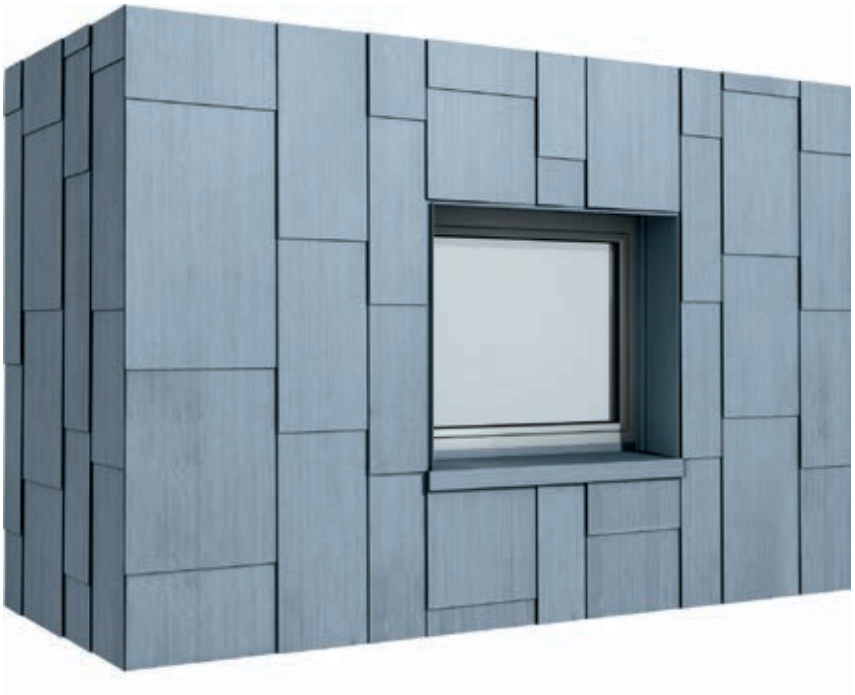
If the location of the base does not fit into the grid, the following corrective measures may be selected:

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

**2.8 Examples of Applications**
**RHEINZINK - Flat-Lock Tile**
Diagonal installation in square shape 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.





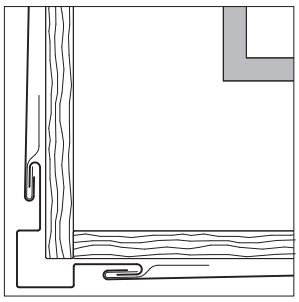
**RHEINZINK - Flat-Lock Tile**
Vertical installation, random structure, window surround and outside corner – very conservative visually.

**RHEINZINK - Flat-Lock Tile**
Horizontal installation, window profiles and outside corner – matched to fit the face width.

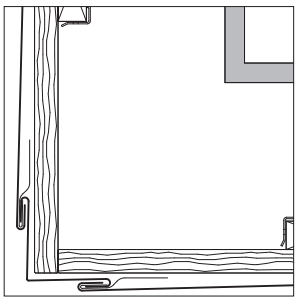
DESIGN
OVERVIEW OF HORIZONTAL APPLICATION

**2.9 Flat-lock Tile Design, horizontal Section**

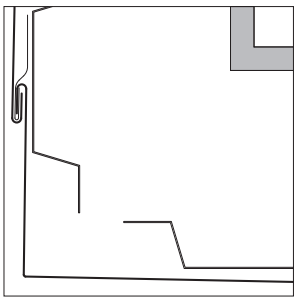
Detail H1: Outside corner, page 30



H1.1

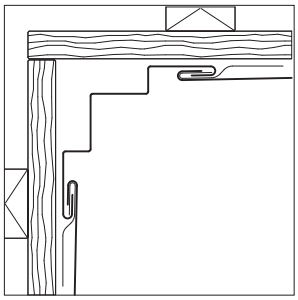


H1.2

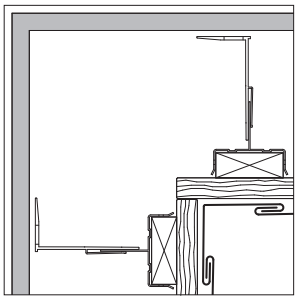


H1.3

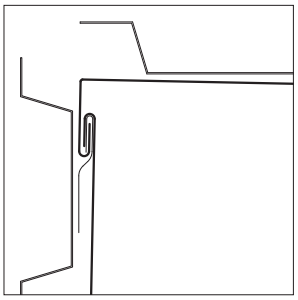
Detail H2: Inside corner, page 32



H2.1

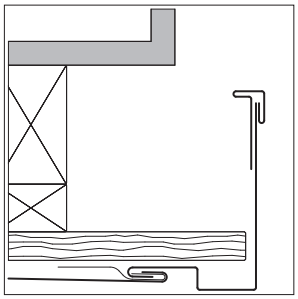


H2.2

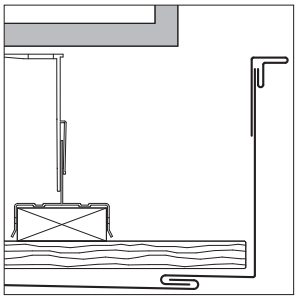


H2.3

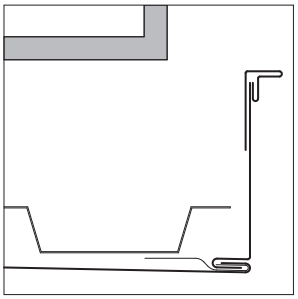
Detail H3: Windows reveal, page 34



H3.1

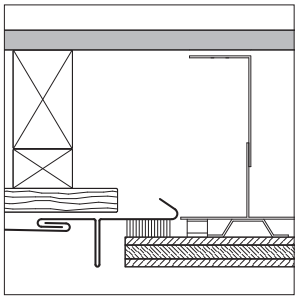


H3.2

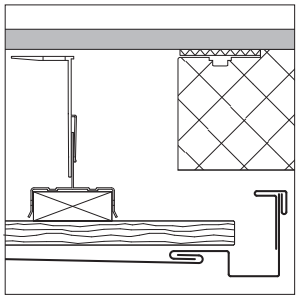


H3.3

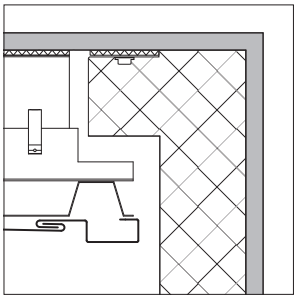
Detail H4: Connections/Terminations, page 36



H4.1



H4.2



H4.3

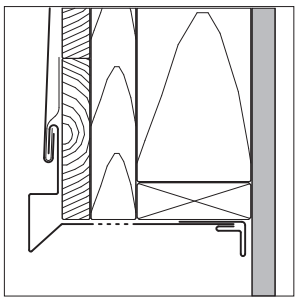
*Timber substructure*

*Timber-metal-substructure*

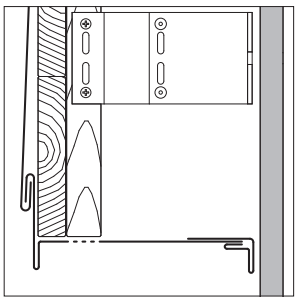
*Metal substructure*

**2.9 Flat-lock Tile Design, vertical Section**

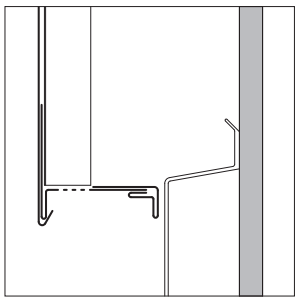
Detail V1: Base, page 38



V1.1

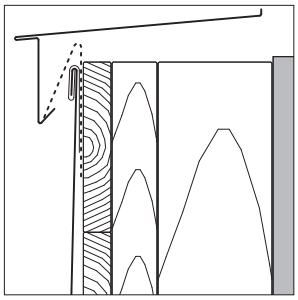


V1.2

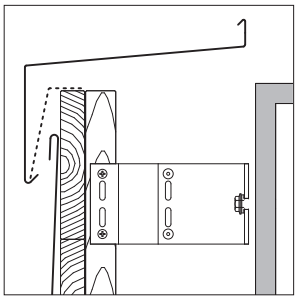


V1.3

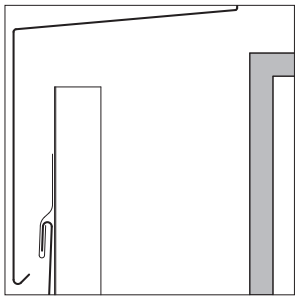
Detail V2: Windowsill, page 40



V2.1

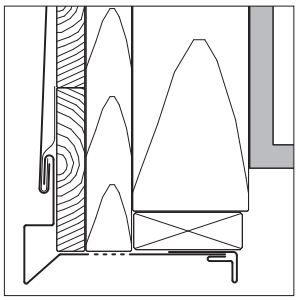


V2.2

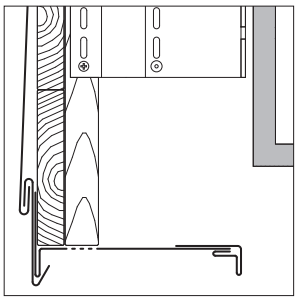


V2.3

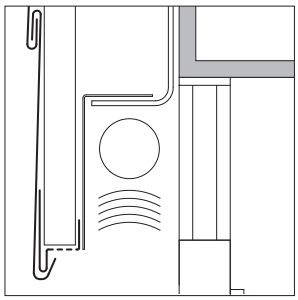
Detail V3: Window lintel, page 42



V3.1

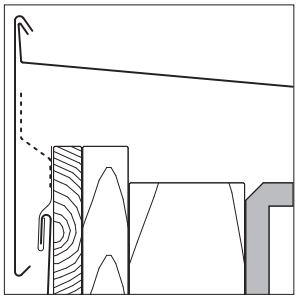


V3.2

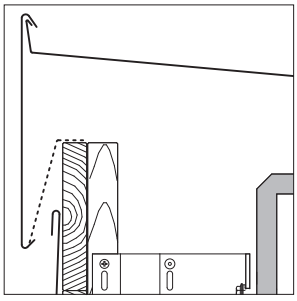


V3.3

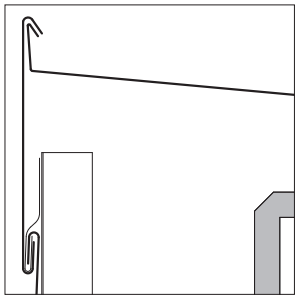
Detail V4: Roof edge, page 44



V4.1



V4.2



V4.3

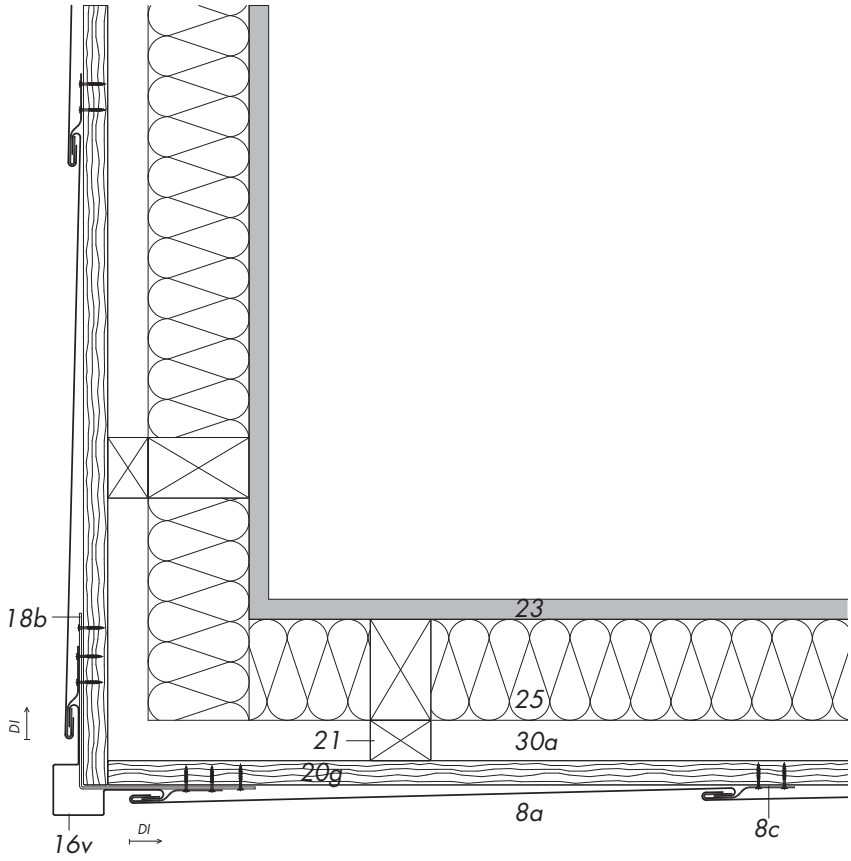
*Timber substructure*

*Timber-metal-substructure*

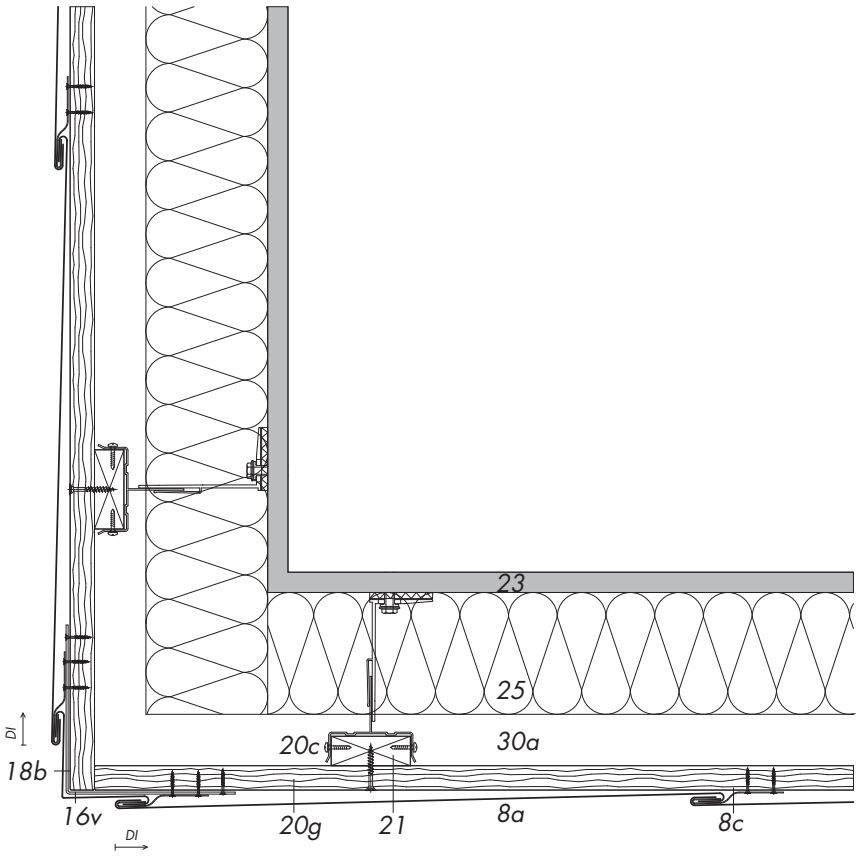
*Metal substructure*

DESIGN – HORIZONTAL APPLICATION
DETAIL H1, OUTSIDE CORNER

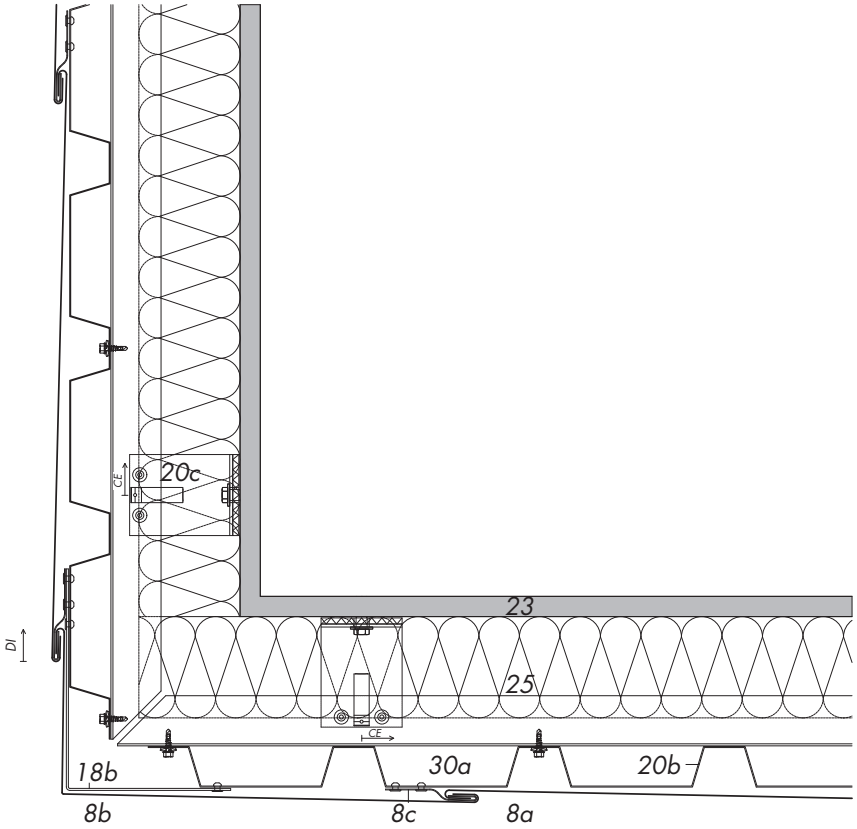
*H1.1*




*H1.2*



*H1.3*




### 2.9.1 Detail H1: Outside Corner

8 RHEINZINK-Tile
- a Standard tile
- b Fitting tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- v Corner profile

18 Support Profile
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

25 Thermal Insulation

30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

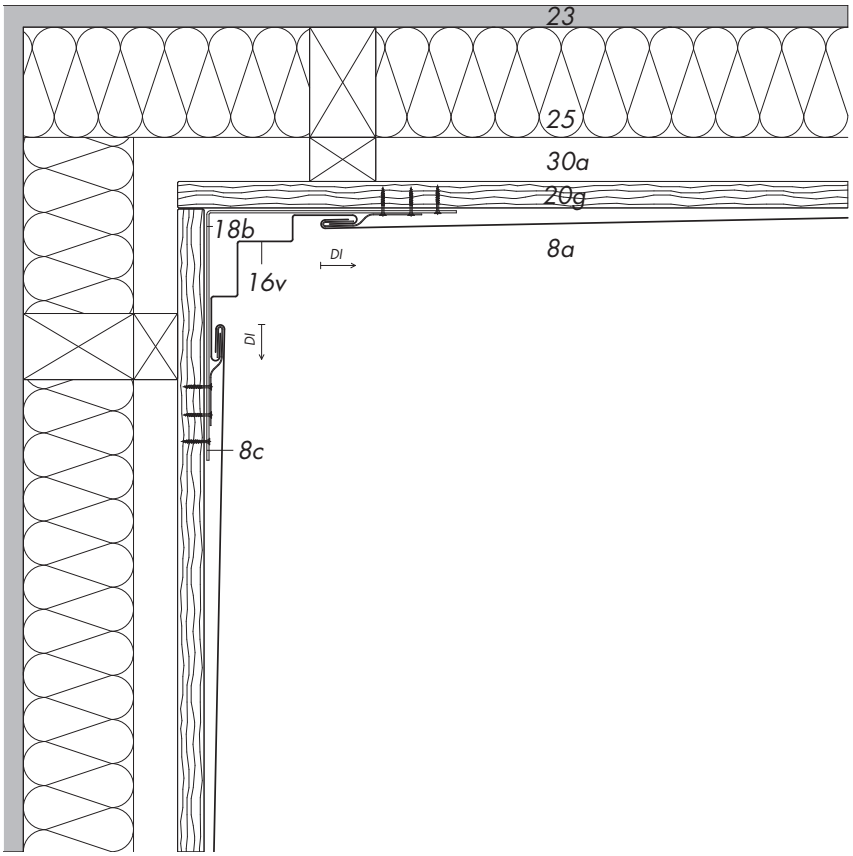
DI Direction of installation

CE Controlled expansion of substructure

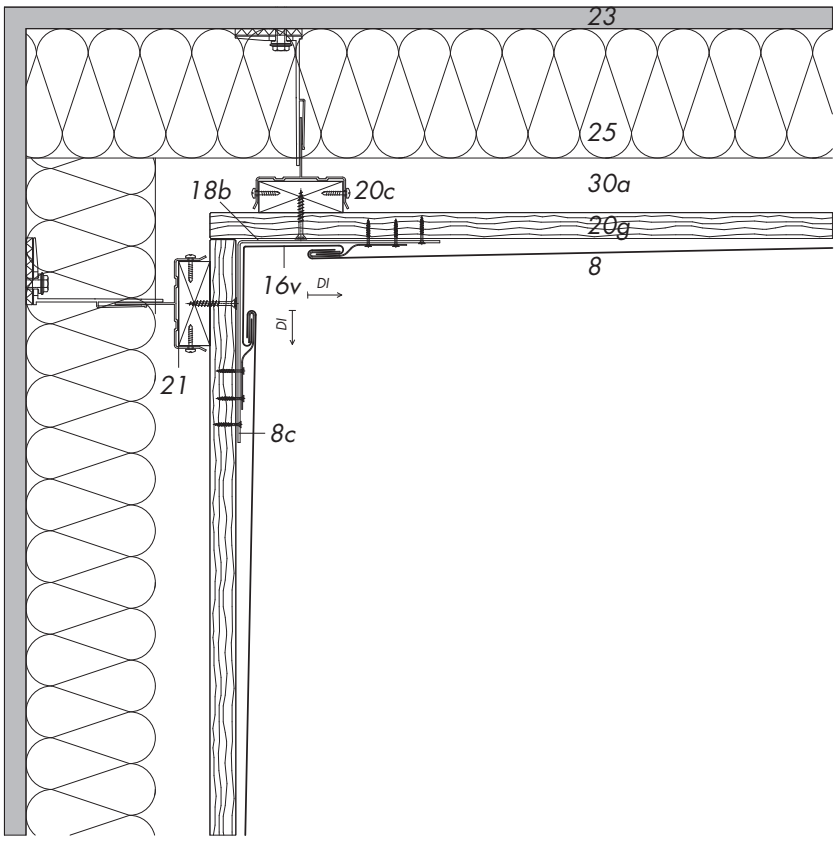
* Manufacturers' guidelines must be observed

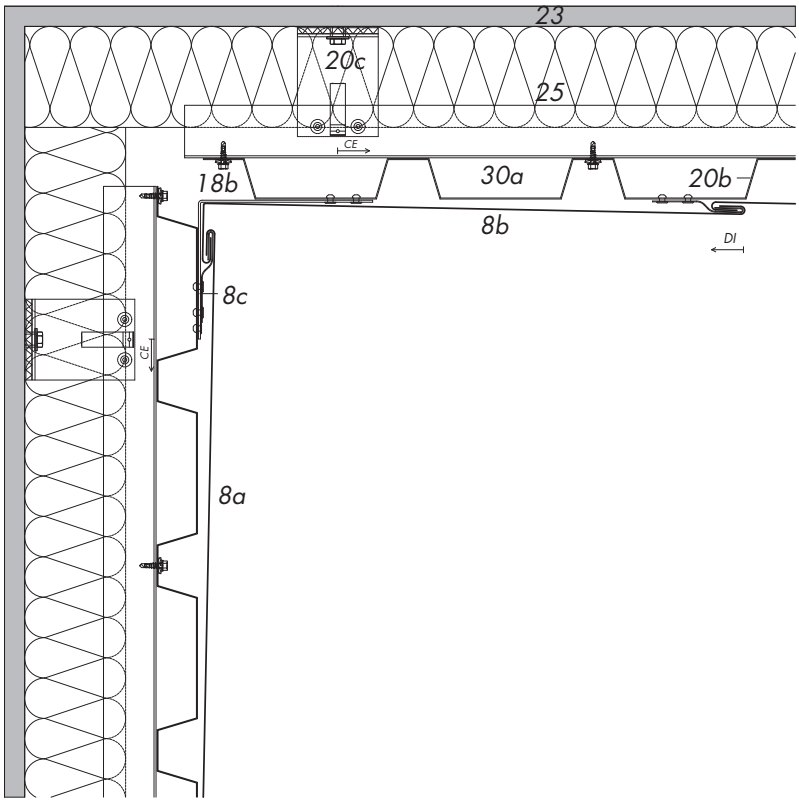
DESIGN – HORIZONTAL APPLICATION
DETAIL H2, INSIDE CORNER

*H2.1*




*H2.2*






H2.3

### 2.9.2 Detail H2: Inside Corner

8 RHEINZINK-Tile
- a Standard tile
- b Fitting tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- v Corner profile

18 Support Profile
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

25 Thermal Insulation

30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

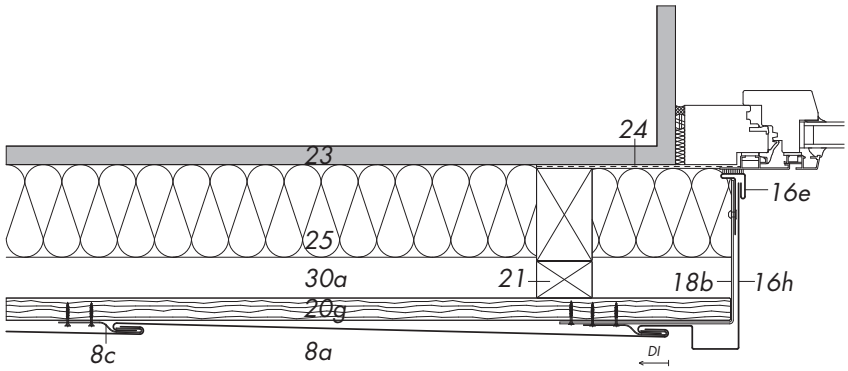
DI Direction of installation

CE Controlled expansion of Substructure

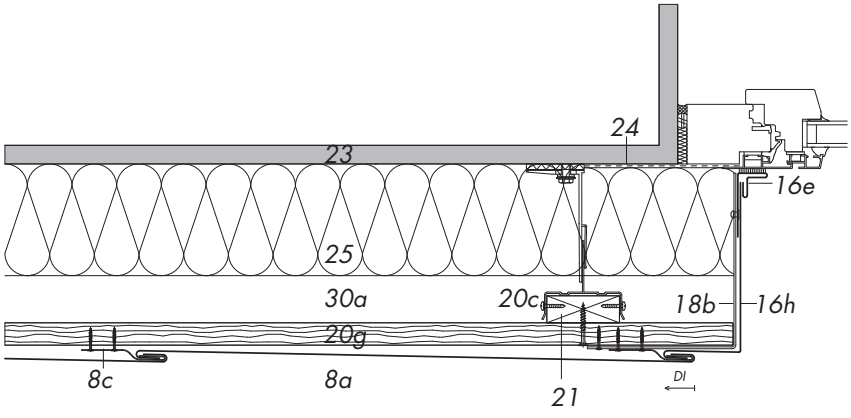
*Manufacturers' guidelines must be observed

DESIGN – HORIZONTAL APPLICATION
DETAIL H3, WINDOW REAVEAL

*H3.1*

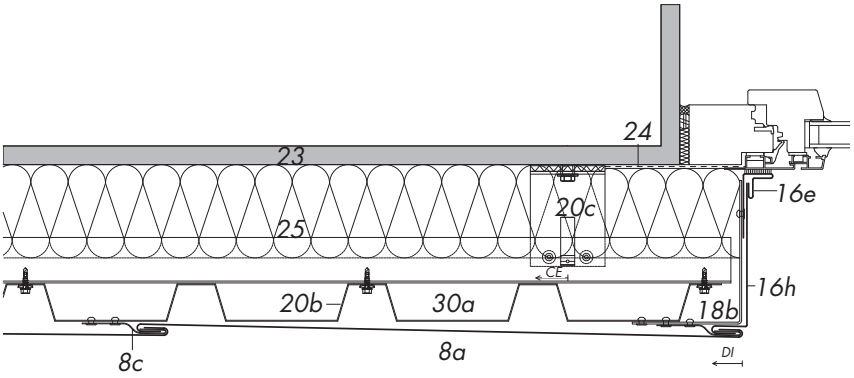



*H3.2*



DESIGN – HORIZONTAL APPLICATION
DETAIL H3, WINDOW REAVEAL

H3.3




### 2.9.3 Detail H3: Window Reveal

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- h Jamb profile
- e Receiver strip, with sealant tape

18 Support Profile
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

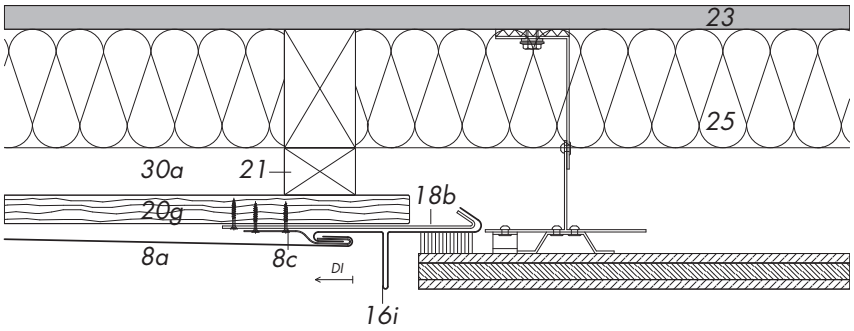
21 Batten/Squared Timber
23 Supporting Structure
24 Window Foil
25 Thermal Insulation
30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

DI Direction of installation
CE Controlled expansion of substructure

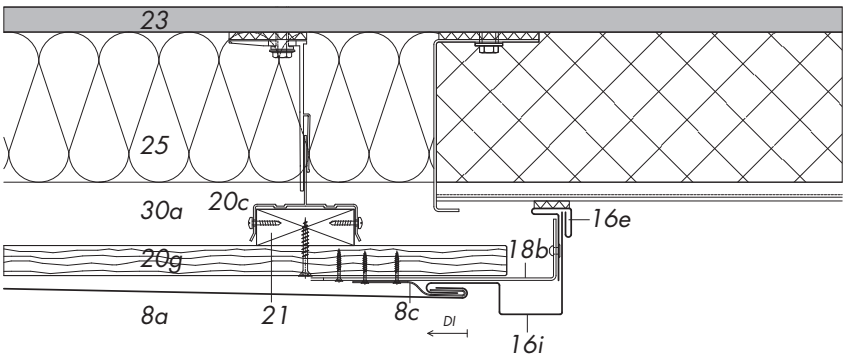
* Manufacturers' guidelines must be observed

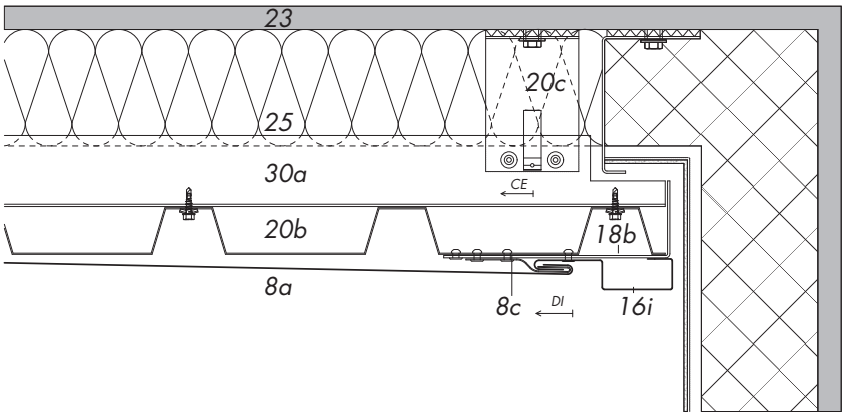
DESIGN – HORIZONTAL APPLICATION
DETAIL H4, CONNECTIONS/TERMINATIONS

*H4.1*




*H4.2*






*H4.3*

### 2.9.4 Detail H4: Connections/ Terminations

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- e Receiver strip, with sealant tape
- i Connection/termination profile

18 Support Profile
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

23 Supporting Structure

25 Thermal Insulation

30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

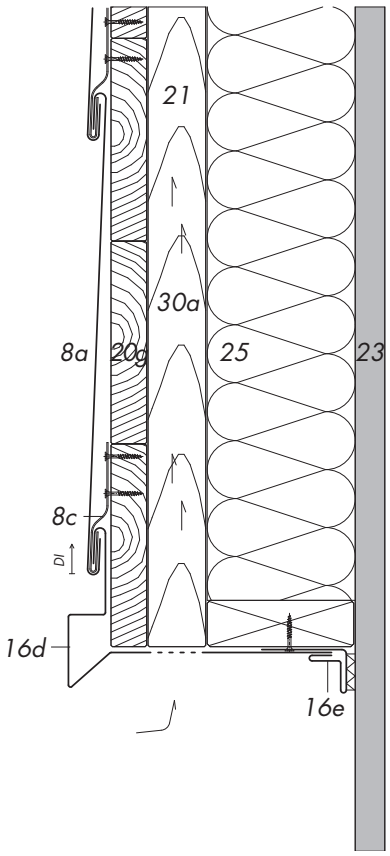
DI Direction of installation

CE Controlled expansion of Substructure

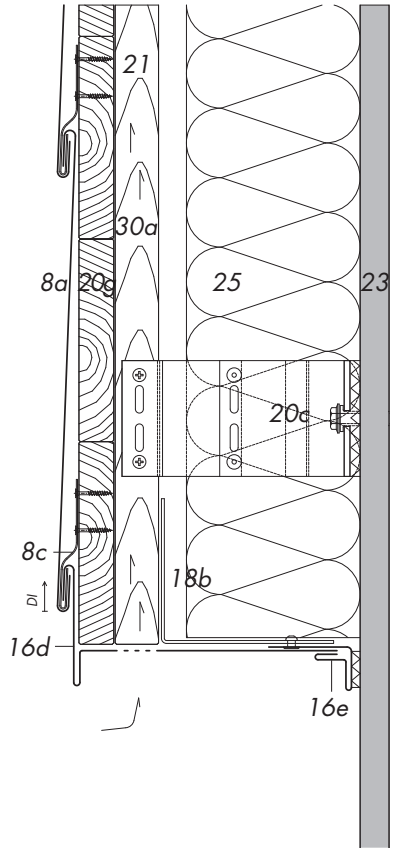
* Manufacturers' guidelines must be observed

DESIGN – HORIZONTAL APPLICATION
DETAIL V1, BASE

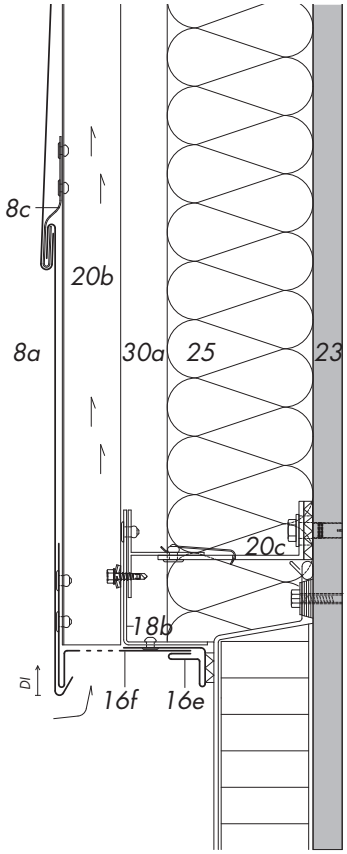
*V1.1*




*V1.2*



*V1.3*




**2.9.5 Detail V1: Base**

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- d Base profile, partially perforated
- e Receiver strip, with sealant tape
- f Base trim, partially perforated

18 Support Profile
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

25 Thermal Insulation

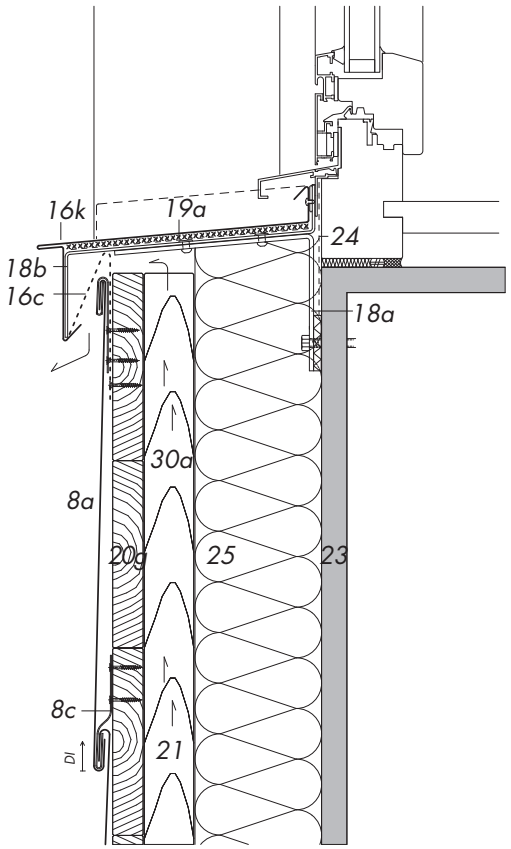
30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

DI Direction of installation

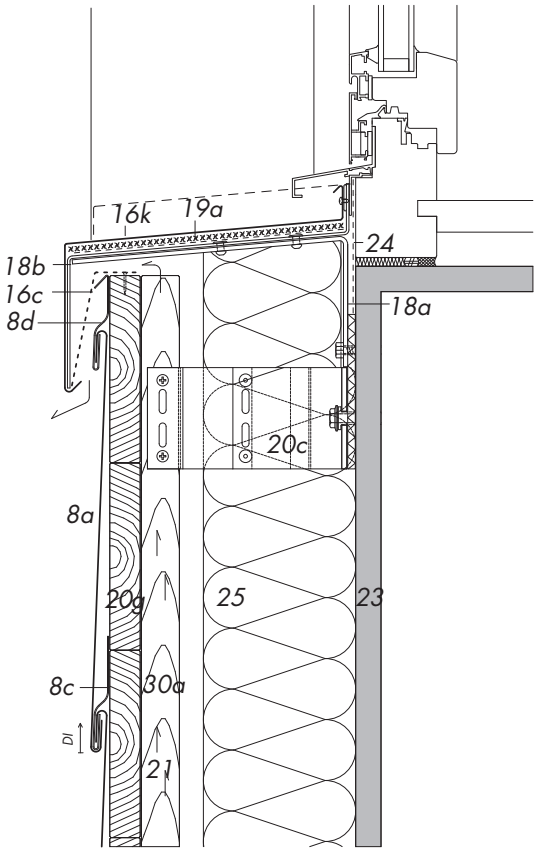
* Manufacturers' guidelines must be observed

DESIGN – HORIZONTAL APPLICATION
DETAIL V2, WINDOWSILL

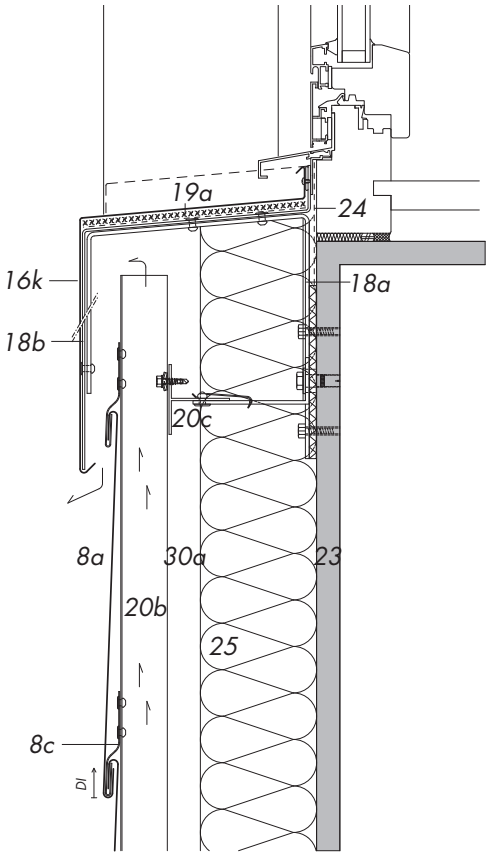
*V2.1*




*V2.2*



*V2.3*




### 2.9.6 Detail V2: Windowsill

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail
- d Long clip, continuous with water drip

16 RHEINZINK-Building Profile
- c Perforated strip
- k Window sill coping, ≥ 3° slope

18 Support Profile
- a Galvanised steel, support angle with thermal break
- b Aluminium

19 Separating Layer
- a Structured underlay VAPOZINC
- ■ Alternative: glued to support profile over entire surface

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

24 Window Foil

25 Thermal Insulation

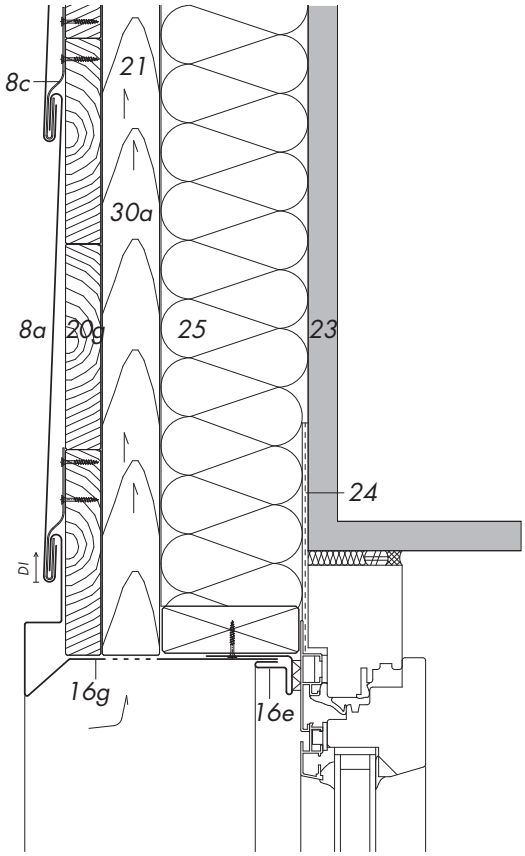
30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

DI Direction of installation

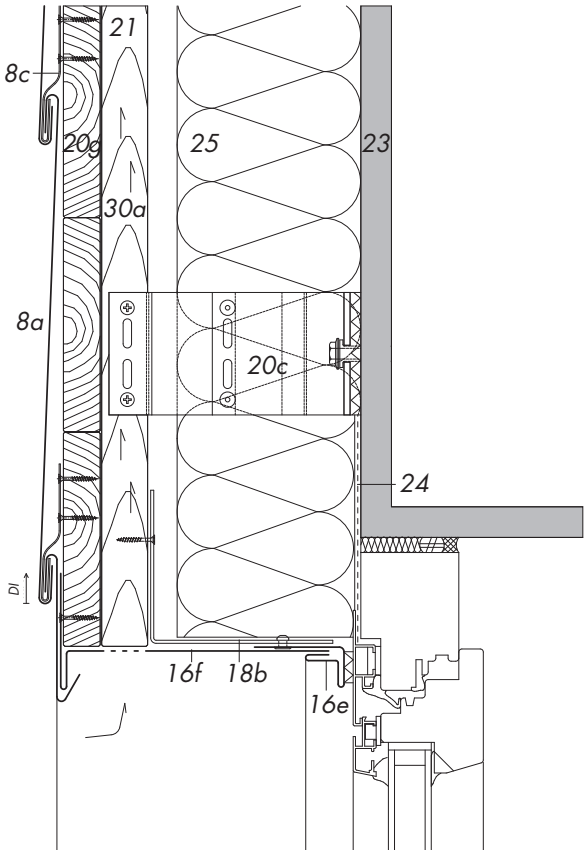
* Manufacturers' guidelines must be observed

DESIGN – HORIZONTAL APPLICATION
DETAIL V3, WINDOW LINTEL

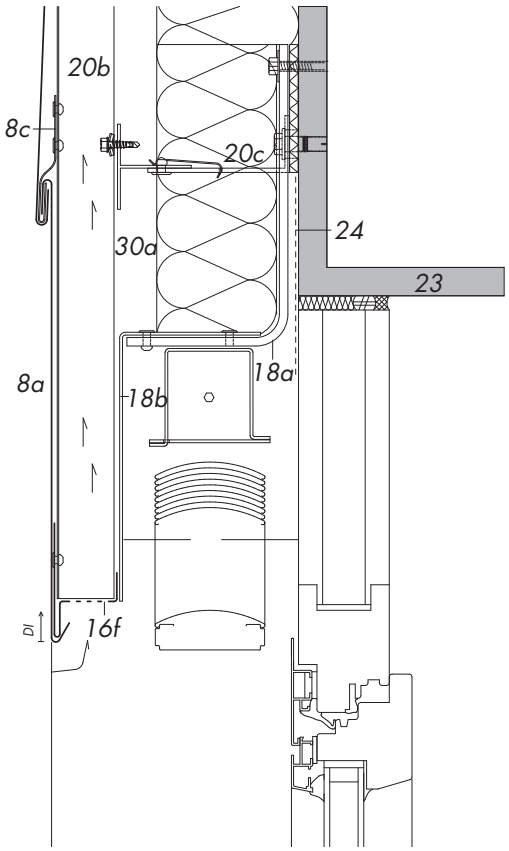
V3.1




V3.2



*V3.3*




**2.9.7 Detail V3: Window Lintel**

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- e Receiver strip, with sealant tape
- f Base trim, partly perforated
- g Lintel profile, partly perforated

18 Support Profile
- a Galvanised steel
- b Aluminium

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

24 Window Foil

25 Thermal Insulation

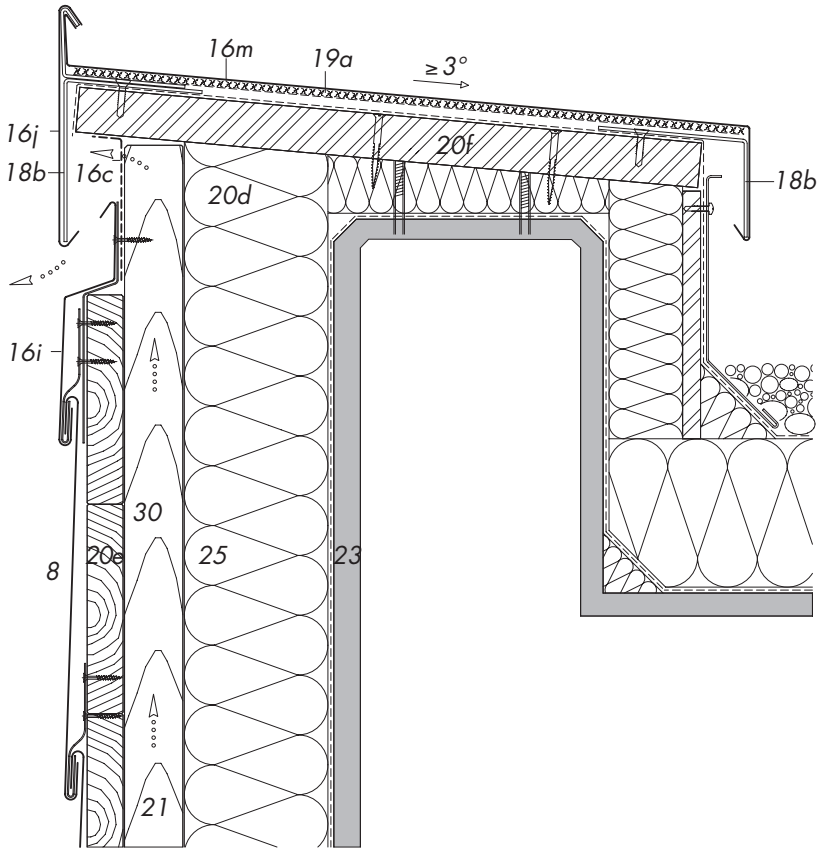
30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

DI Direction of installation

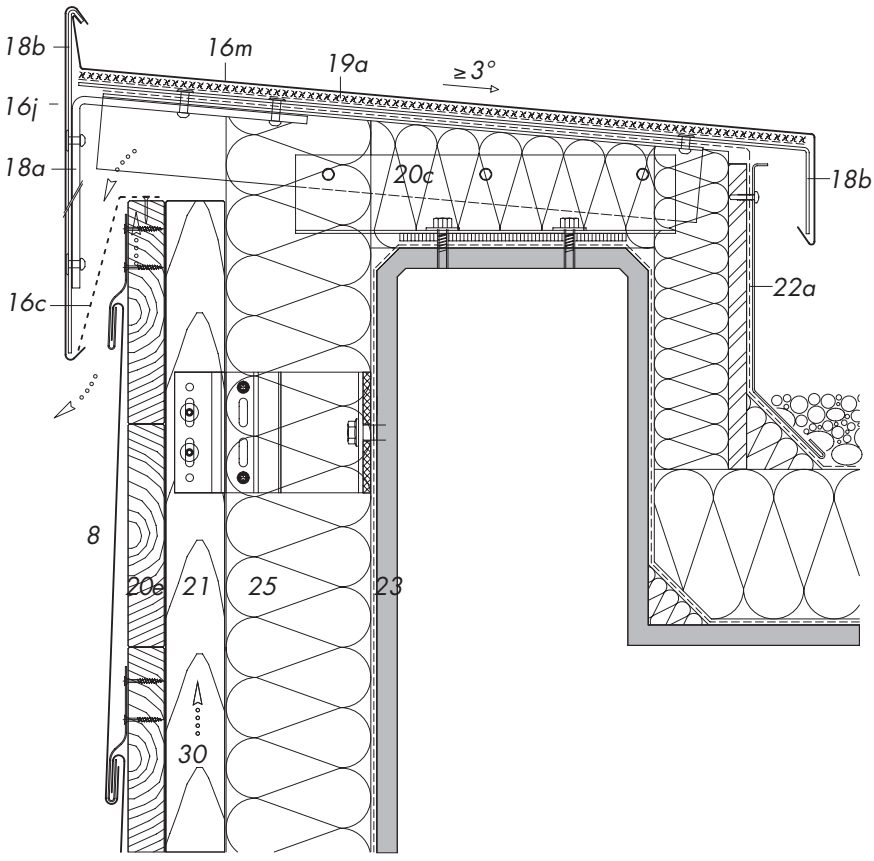
* Manufacturers' guidelines must be observed

DESIGN – HORIZONTAL APPLICATION
DETAIL V4, ROOF EDGE

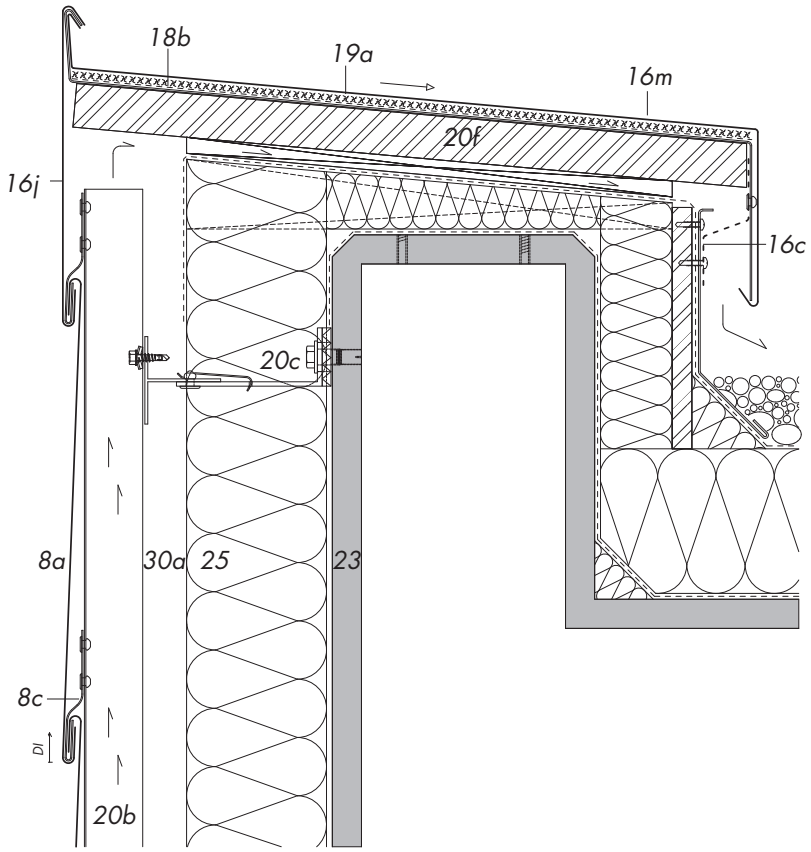
V4.1




V4.2



*V4.3*




**2.9.8 Detail V4: Roof Edge**

8 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- c Perforated strip
- i Termination profile
- j Fascia profile
- m Wall coping

18 Support Profile
- a Galvanised steel
- b Aluminium

19 Separating Layer
- a Structured underlay VAPOZINC, for copings with more than 50 cm width

20 Substructure
- b Metal, trapezoidal steel deck with coating*
- c Bracket system, with thermal break*
- d Wood, wooden wedge
- f OSB/veneer plywood sheathing, thickness min. 22 mm
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

21 Batten/Squared Timber

23 Supporting Structure

25 Thermal Insulation

30 Ventilated Air Space
- a Depth of air space ≥ 20 mm

DI Direction of installation

* Manufacturers' guidelines must be observed

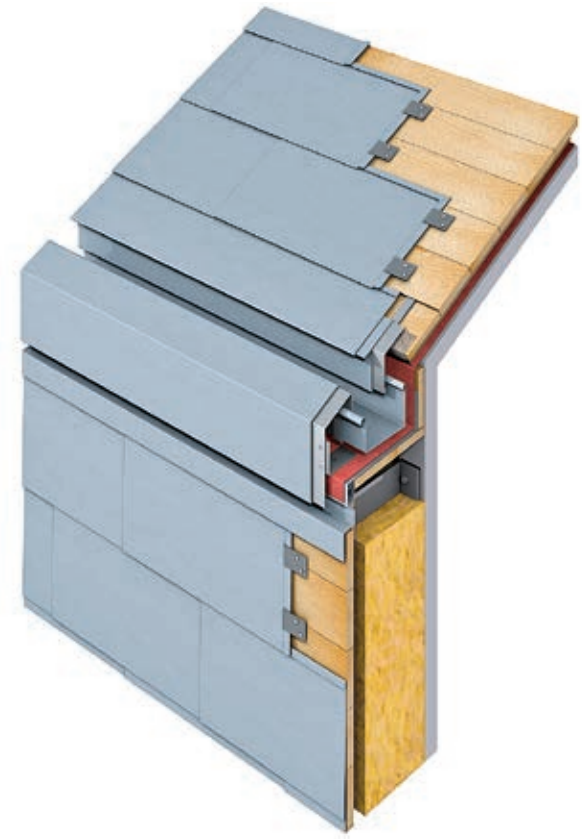


*Fig. left: Petter Dass Museum, Sandnessjøen, Norway*

**2.10 Application with Roofing**

The use of tiles for roofing has a long tradition behind it. Numerous examples from the 19th and 20th century involving prestigious buildings and dwellings testify to this skilled craft that dates back so many years.

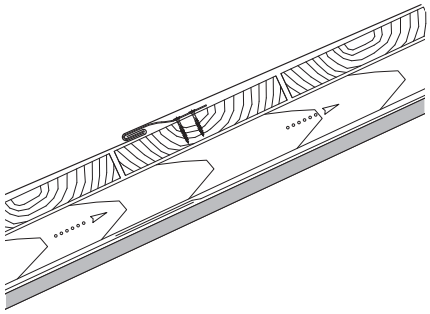
The design of modern roofs using a large-format tile flush with the wall is a popular design feature among architects and developers. It is even possible to create convex or concave roof surfaces, so offering the planner great scope for design.

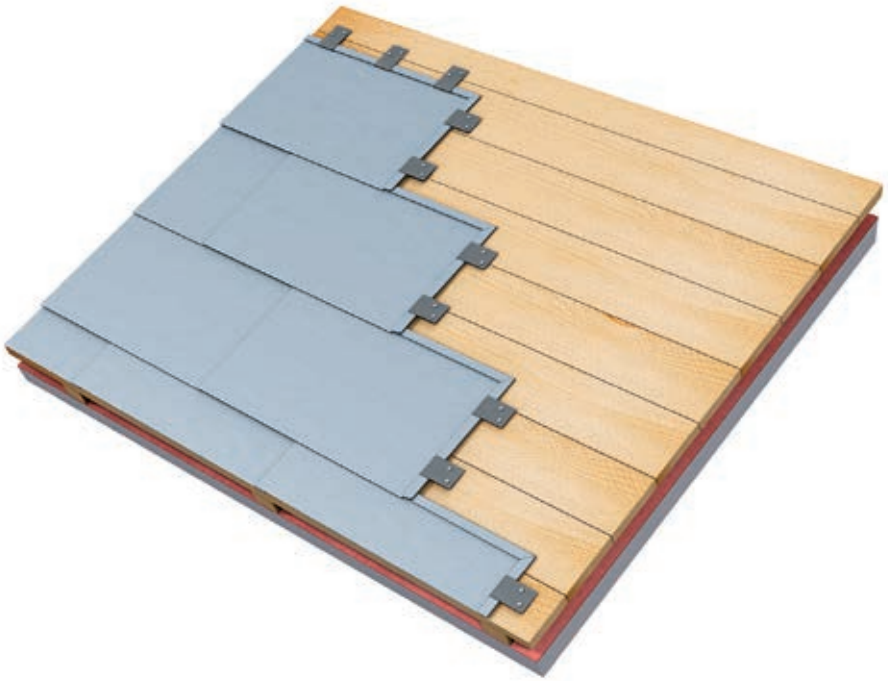
When it comes to building roofs with pitches ≥ 10° < 25° and ≥ 25°, RHEINZINK can provide solutions that are not only satisfactory in technical terms but also fulfil high demands in relation to aesthetics.

- Installation options/Orientation
- Format lying parallel to eaves
- Format standing parallel to eaves
- Rectangular/square format positioned diagonal to eaves

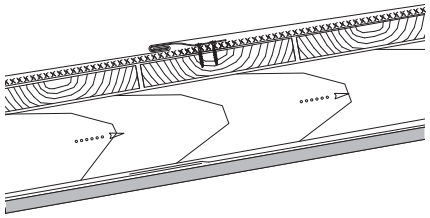
**2.11 Roof Structure**

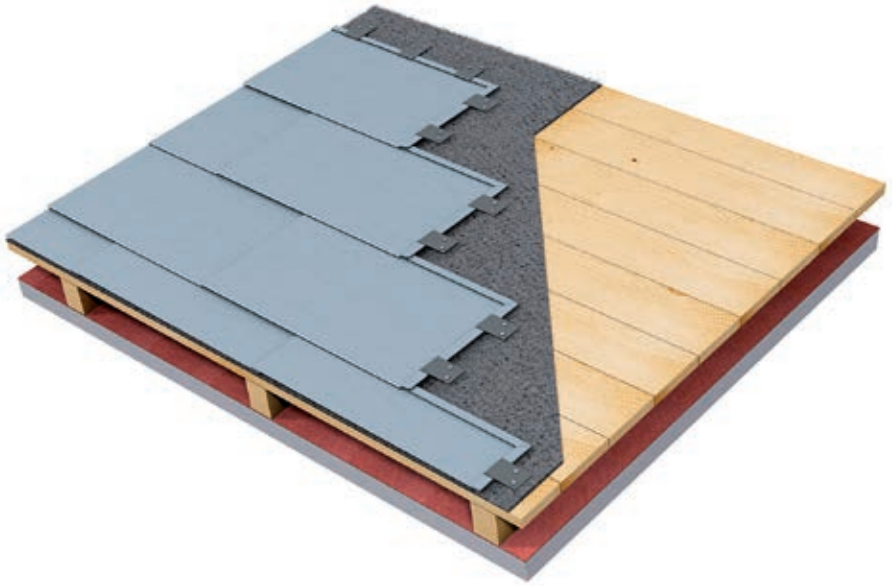
- Roof pitch ≥ 25°
- RHEINZINK-Flat-Lock Tile
- Softwood boarding
  d ≥ 24 mm, b ≤ 160 mm
- Rear ventilation, height of ventilation space: min. 40 mm
- Underlay covering, including wind and rainproof sealed overlaps





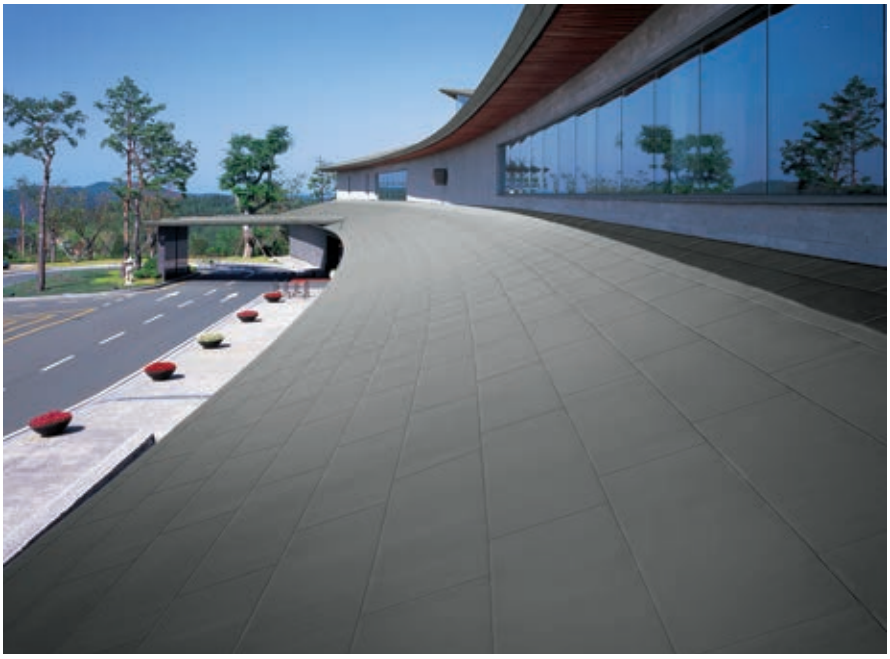
- Roof pitch ≥ 10° < 25°
- RHEINZINK-Flat-Lock Tile
- Underlay + AIR-Z*
- Softwood boarding
  d ≥ 24 mm, b ≤ 160 mm
- Rear ventilation,
  height of ventilation space
  ≥ 10° < 15°: min. 80 mm;
  > 15°: 40 mm
- Underlay covering, including wind and rainproof sealed overlaps





* *Underlay of bitumen sheeting with glass fibre or fibreglass inlay as per DIN 52143, DIN 52130 or DIN 52131 in combination with a structured underlay ≤ 8 mm thick (e.g. V13 + AIR-Z)*

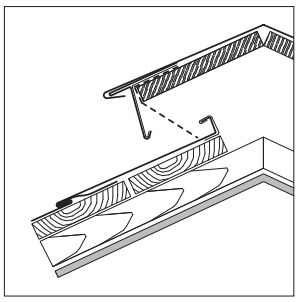
**2.12 RHEINZINK-Flat-Lock Tile, Roofing Application**



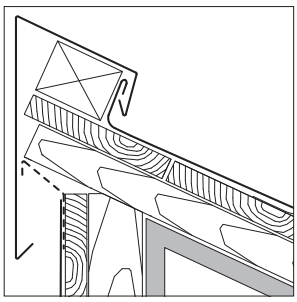
*O´Phel Golf Club, Yeongcheon, Korea*

*TRUMPF Sachsen GmbH, Neukirch, Germany*

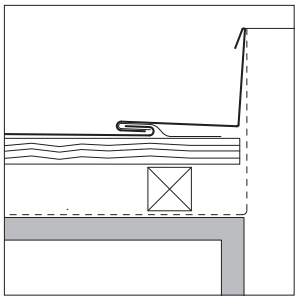
**2.13 Roofing Design with Flat-lock Tiles**



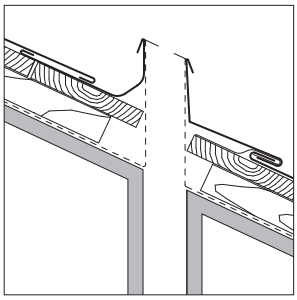
Ridge detail: gable roof
page 52



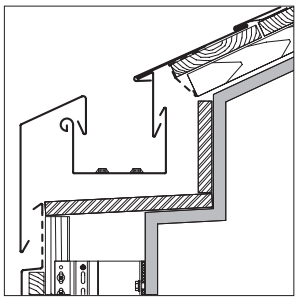
Ridge detail: monopitch roof
page 52



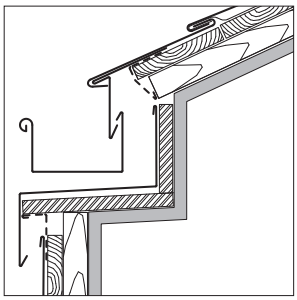
Penetration detail:
Lateral connection, page 53



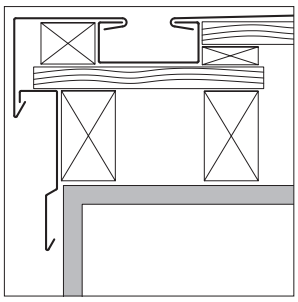
Penetration detail:
Front flashing/back gutter, page 53



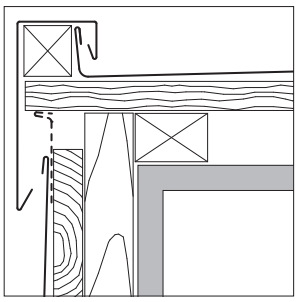
Eaves detail:
Roof-integrated gutter, page 54



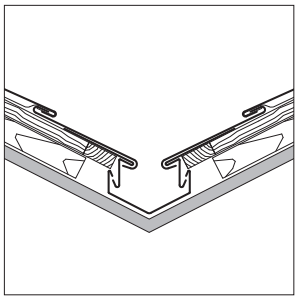
Eaves detail:
Bracket-mounted gutter, page 54



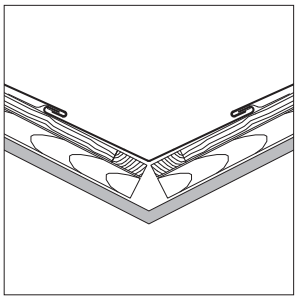
Verge detail: with verge gutter, page 55



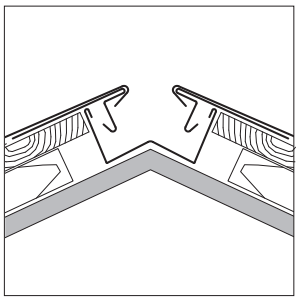
Verge detail: with flashing, page 55



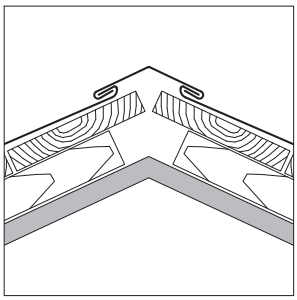
Valley detail: recessed, page 56



Valley detail: flush, page 56

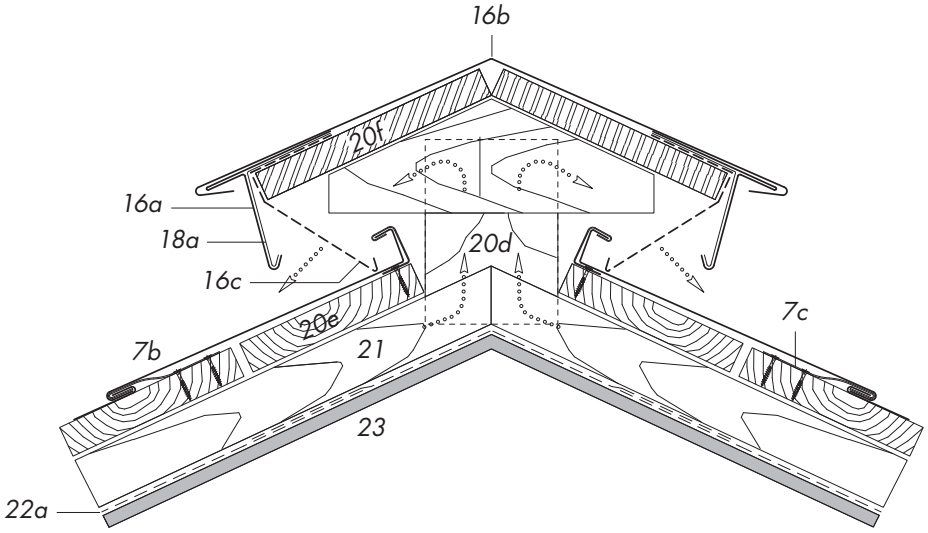


Hip detail flush, page 57



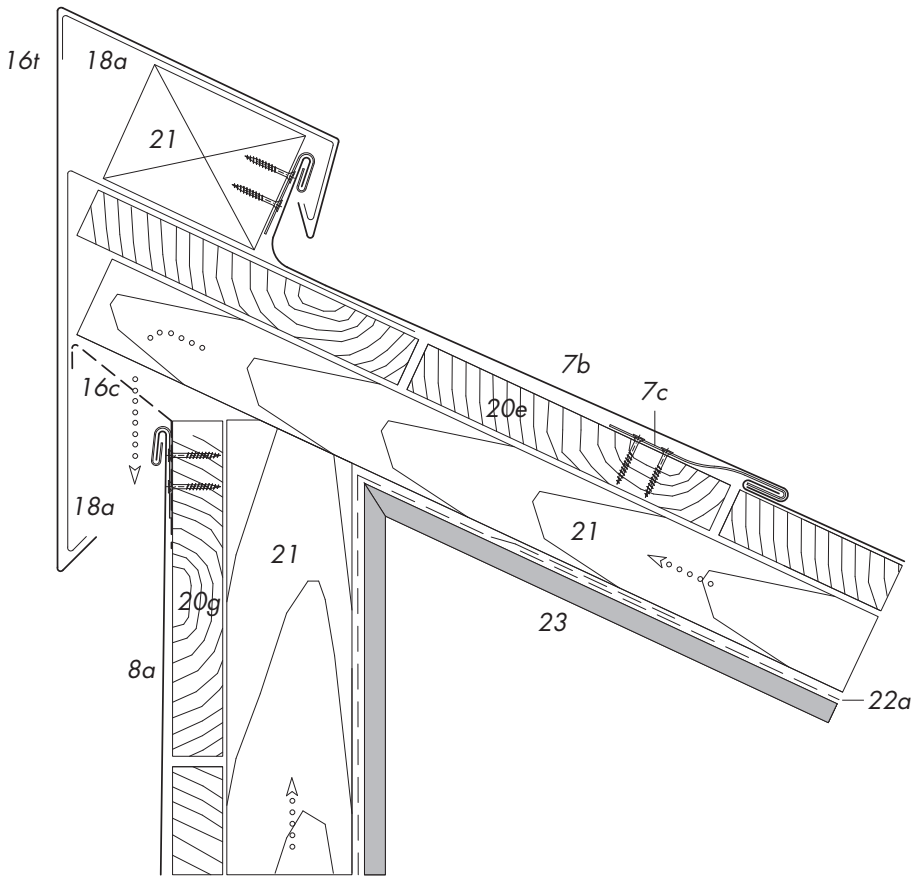
Hip detail with cap, page 57

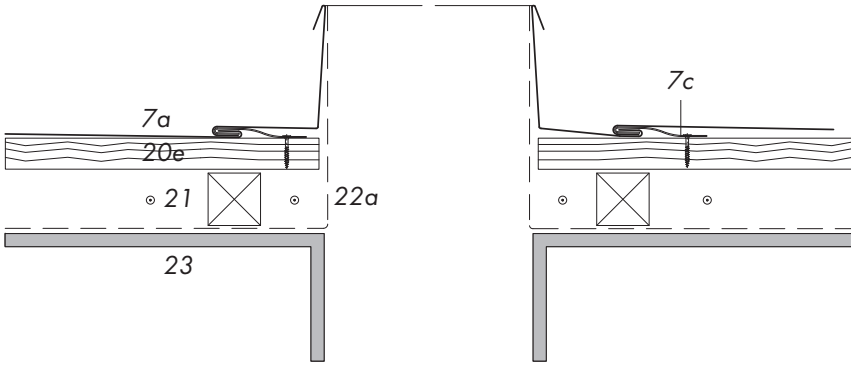
ROOFING APPLICATION DESIGN
RIDGE DETAIL

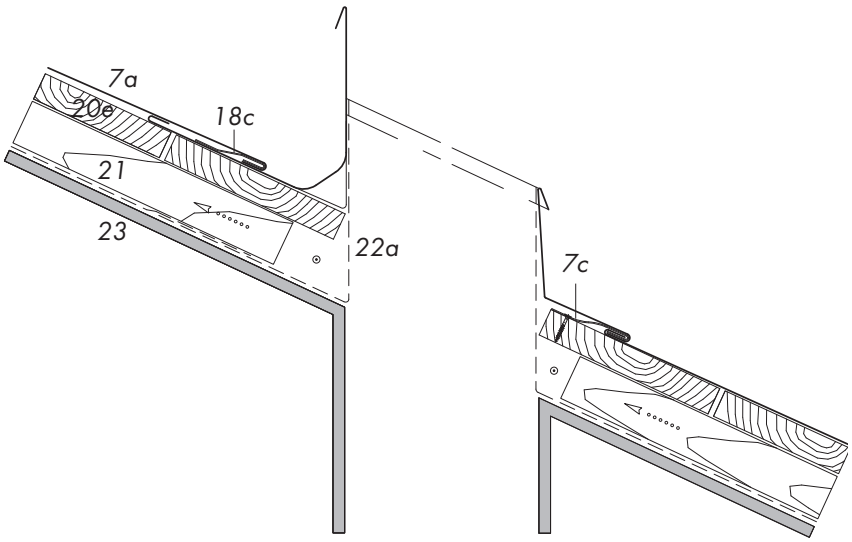



**2.13.1 Detail: Ridge**

- 7 RHEINZINK-Tile, roof
  - b Fitting tile
  - c Short clip/clip rail
- 8 RHEINZINK-Tile, facade
  - a Standard tile
- 16 RHEINZINK-Building Profile
  - a Eaves flashing
  - b Ridge flashing, double pitch roof/hipped roof
  - c Perforated strip
  - t Ridge flashing, mono pitch roof
- 18 Support Profile
  - a Galvanised steel
- 20 Substructure
  - d Wood, stud with cleat
  - e Softwood boarding, thickness min. 24 mm, width max. 160 mm
  - f OSB/veneer plywood sheathing, thickness min. 22 mm
  - g Softwood boarding, thickness min. 24 mm, width max. 100 mm
- 21 Batten/Squared Timber
- 22 Functional Layer
  - a Underlay covering
- 23 Supporting Structure






**2.13.2 Detail: Penetration**

7 RHEINZINK-Tile
- a Standard tile
- c Short clip/clip rail

18 Support Profile
- c Soldered continuous cleat

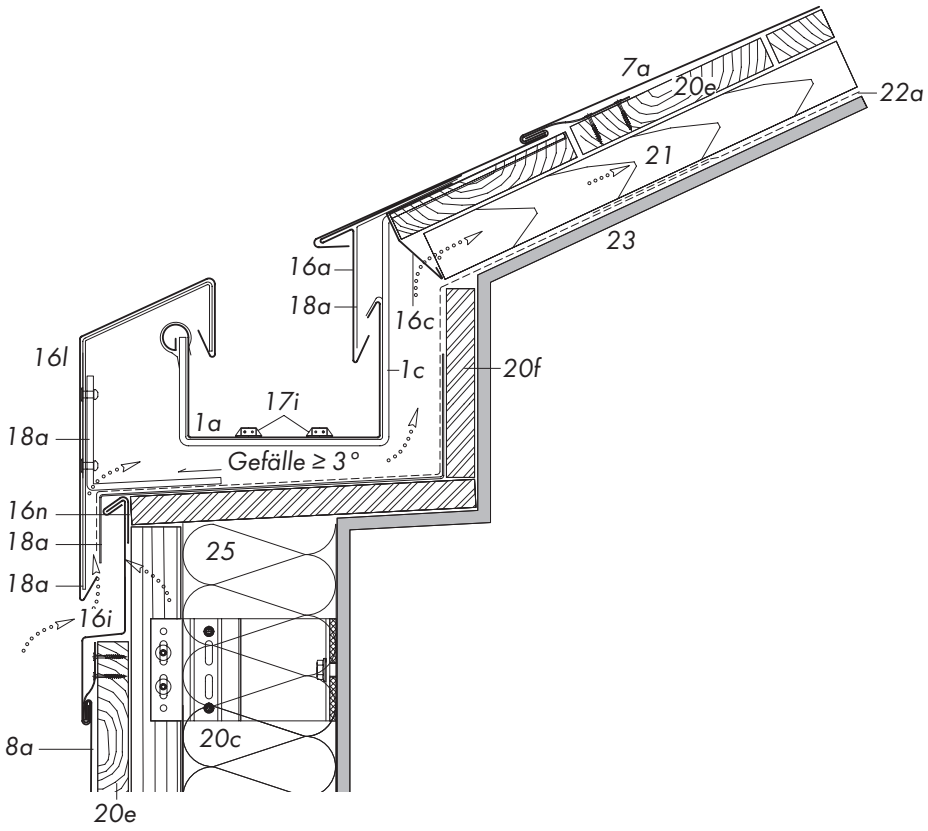
20 Substructure
- e Softwood boarding, thickness min. 24 mm, width max. 160 mm

21 Batten/Squared Timber

22 Functional Layer
- a Underlay covering

23 Supporting Structure

⊙ Air flow in main flow direction respectively cross ventilation




### 2.13.3 Detail: Eaves

1 RHEINZINK-Roof Drainage
- a Gutter
- c Gutter bracket, cladded

7 RHEINZINK-Tile, roof
- a Standard tile
- c Short clip/clip rail

8 RHEINZINK-Tile, facade
- a Standard tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- a Eaves flashing
- c Perforated strip
- i Termination profile, partially perforated
- l Cornice coping
- n Continuous clip

17 RHEINZINK-Accessories
- i Gutter heating

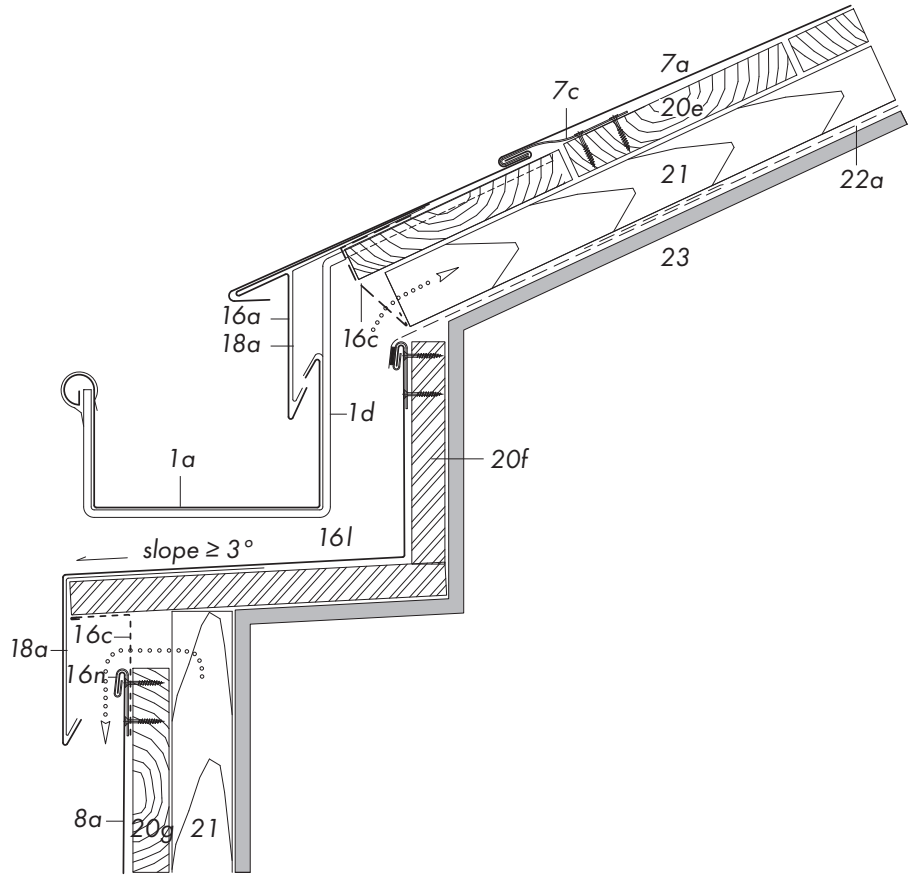
18 Support Profile
- a Galvanised steel

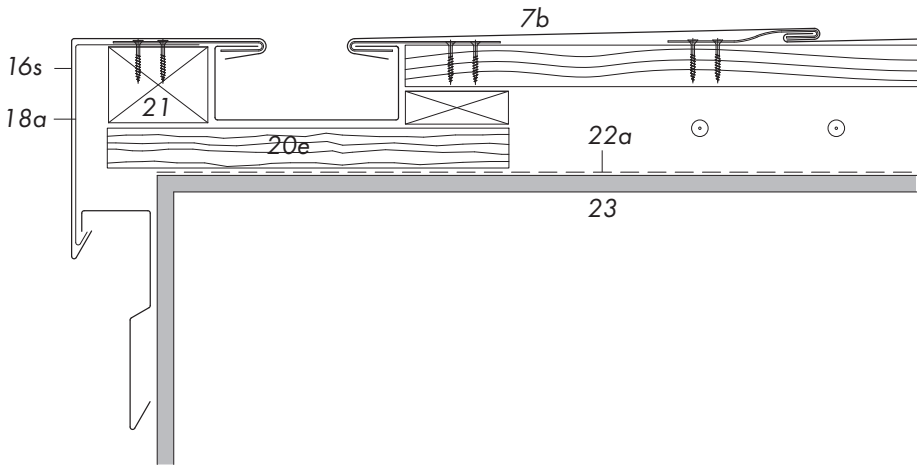
20 Substructure
- e Softwood boarding, thickness min. 24 mm, width max. 160 mm
- f OSB/veneer plywood sheathing, thickness min. 22 mm
- g Softwood boarding, thickness min. 24 mm, width max. 100 mm

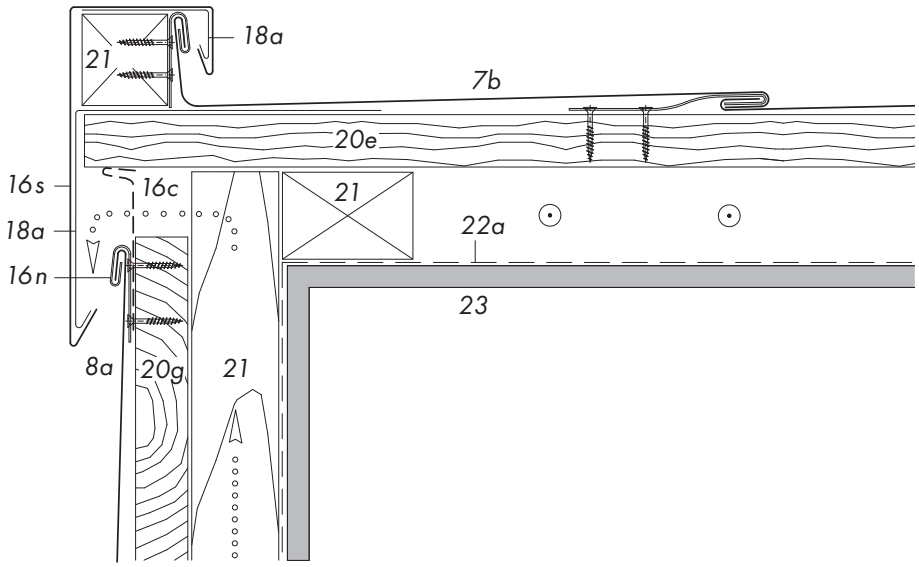
21 Batten/Squared Timber

22 Functional Layer
- a Underlay covering

23 Supporting Structure





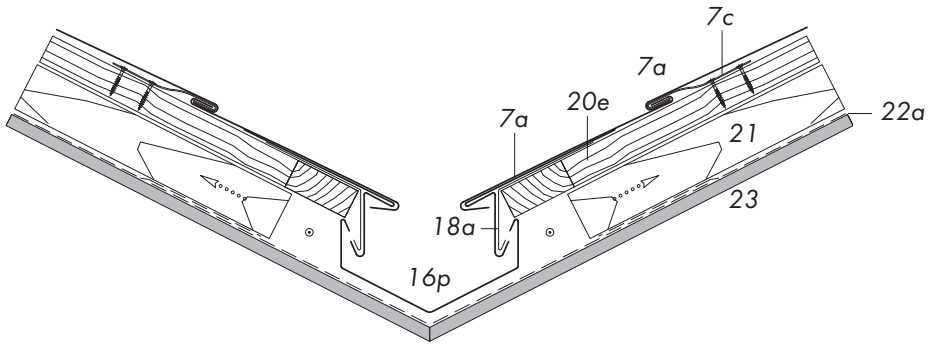




**2.13.4 Detail: Verge**

- 7 RHEINZINK-Tile, roof
  - b Fitting tile
  - c Short clip/clip rail
- 8 RHEINZINK-Tile, facade
- 16 RHEINZINK-Building Profile
  - c Perforated strip
  - n Continuous clip
  - s Verge flashing, two-part with gutter profile
- 18 Support Profile
  - a Galvanised steel
- 20 Substructure
  - e Softwood boarding, thickness min. 24 mm, width max. 160 mm
  - g Softwood boarding, thickness min. 24 mm, width max. 100 mm
- 21 Batten/Squared Timber
- 22 Functional Layer
  - a Underlay covering
- 23 Supporting Structure

⊙ Air flow

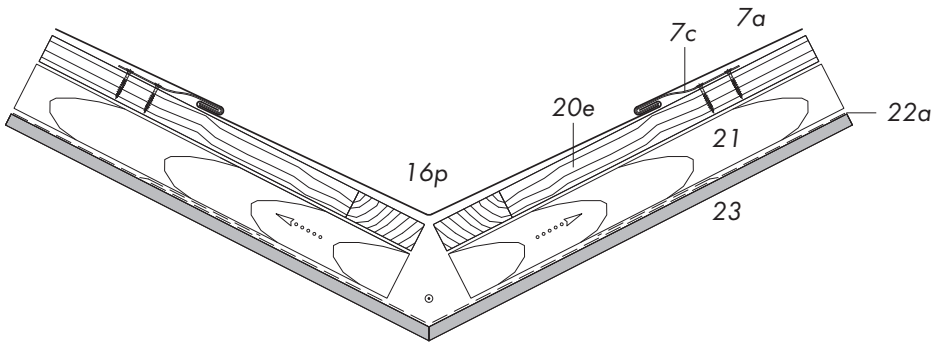
ROOFING APPLICATION DESIGN
VALLEY DETAIL

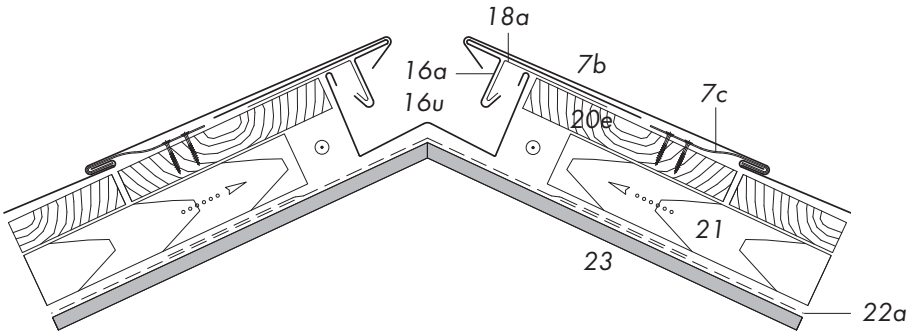


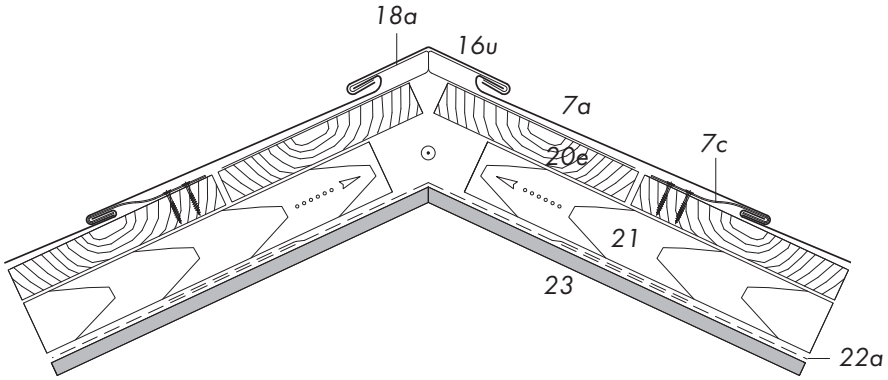

**2.13.5 Detail: Valley**

*7* RHEINZINK-Tile, roof
a Standard tile
c Short clip/clip rail
16 RHEINZINK-Building Profile
p Valley profile
18 Support Profile
a Galvanised steel
20 Substructure
e Softwood boarding, thickness min. 24 mm, width max. 160 mm
21 Batten/Squared Timber
22 Functional Layer
a Underlay covering
23 Supporting Structure

⊙ Direction of air flow as cross ventilation






**2.13.6 Detail: Hip**

7 RHEINZINK-Tile, roof
- a Standard tile
- b Fitting tile
- c Short clip/clip rail

16 RHEINZINK-Building Profile
- a Eaves flashing
- u Hip flashing

18 Support Profile
- a Galvanised steel

20 Substructure
- e Softwood boarding, thickness min. 24 mm, width max. 160 mm

21 Batten/Squared Timber

22 Functional Layer
- a Underlay covering

23 Supporting Structure

⊙ Direction of air flow as cross ventilation

## CONTACT

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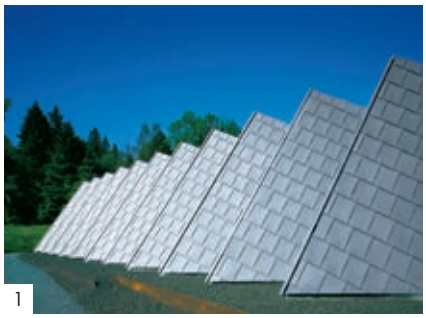
## REFERENCE PROJECTS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Additional project references can be found on the Internet at www.rheinzink.com

ILLUSTRATIONS

Title:
**TRUMPF Sachsen GmbH, Neukirch, Germany**
Architect: Barkow + Leibinger Architekten, Berlin, Germany
RHEINZINK-work done by:
Dachdeckerei Bauklempnerei A. Gabriel, Grübschütz, Germany

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

2. **Apartment Building, Linz, Austria**
Architect: Projektgruppe Arkade, 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. **Factory Building Bora, Montegranaro, Italy**
Architect: Constantino Grilli, Montegranaro, Italy
RHEINZINK-work done by: Di Leonardo Enio, Capelle sul Tavo, Italy

8. **Bishop Challoner Catholic Collegiate School, London, Great Britain**
Architect: Perkins Ogden, Alresford Hants, Great Britain
RHEINZINK-work done by:
All Metal Roofing Ltd., Tonbridge, Kent, Great Britain

9. **Sir Colin Campbell building, Nottingham University, Great Britain**
Architekt: Make, London, Great Britain
RHEINZINK-work done by: Varla UK, Chester, Great Britain

10. **O´Phel Golf Club, Yeongcheon, Korea**
Architekt: ITAMI JUN + ITM Architects Co., Ltd., Tokyo, Japan/Seoul, Korea
RHEINZINK-work done by: Mijie Industrial Co., Ltd., Seoul, Korea

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

12. **Apartment Building, Linz, Austria**
Architekt: Atelier Sturmberger-Moser, Leonding, Austria
RHEINZINK-work done by:
Spenglerei Horst Mayr jun., Leonding, Austria

13. **Friendship House, London, Great Britain**
Architekt: MacCormac Jamieson & Prichard, London, Great Britain
RHEINZINK-work done by: Boss Metals Ltd., Surrey, Great Britain

14. **Haus der Presse, Berlin, Germany**
Architekt: Jo. Franzke, Architekten BDA, Frankfurt, Germany
RHEINZINK-work done by:
Lummel GmbH & Co. KG, Karlstadt/Main, Germany
Bernd-R. Bahn GmbH, Berlin, Germany

15. **Friendship House, London, Great Britain**
Architekt: MacCormac Jamieson & Prichard, London, Great Britain
RHEINZINK-work done by: Boss Metals Ltd., Surrey, Great Britain

16. **Tirolia Spedition GmbH, Ebbs, Austria**
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