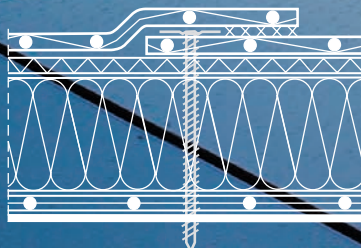


■ Roofing Membrane System Rhenofol®

Edition:  
January 2011

Technical Manual  
**Rhenofol®**





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*Ravenhurst School,  
Hadley/United Kingdom*

## In line with architectural ideas: Rhenofol®

*Atatürk Stadium  
Istanbul/Turkey*

*Stade de France  
Paris/France*

*Evesham Micros,  
United Kingdom*

*Housing Estate  
Maasbommel/Netherlands*





## Rhenofol® – advantages



*Central warehouse of the REWE AG in Stille, securely waterproofed with Rhenofol.*

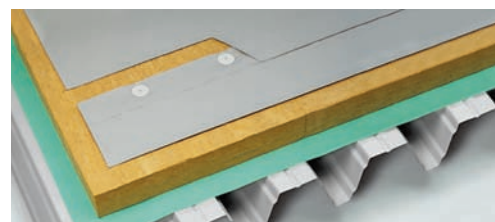
### The roofing membrane with widespread advantages

- Particularly efficient and economic application
- Resistant to UV radiation and weathering
- Proven long-term durability all over the world
- Especially designed for the demands of new industrial buildings
- Single-ply with reliable sealing of seams
- Applied without naked flame
- Completely recyclable

### Tailor-made solutions

Depending on the specific requirements of the project the specific roof structure, and the various methods for ensuring secure installation, the roofing membrane system Rhenofol always provides the optimum possible solution.

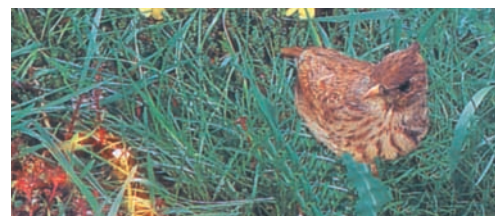
- For mechanically fastened roof build-ups without ballast:  
**Rhenofol CV**, the roofing membrane with polyester fibre reinforcement.



- For loose laid roof build-ups with ballast (gravel, paving slabs and vegetation):  
**Rhenofol CG**, the roofing membrane with glass fleece reinforcement.



- Roof Gardens with **Rhenofol CG** have been tested in a four-year-test (FLL testing) for resistance to root and rhizome penetration. Thus, the roofing membrane Rhenofol CG has a double function: Waterproofing and protection against root and rhizome penetration.





## Rhenofol® – advantages

### Proven quality

The application of Rhenofol not only offers the immediate benefit of fast and efficient installation. The quality is both regularly tested by a schedule of in-house material controls and also neutral and independent institutes carry out tests of our roofing membranes when newly laid. Furthermore, the State Material Testing Institute in Darmstadt, Germany, regularly confirms that even after several years of weather exposure, Rhenofol still shows product qualities that surpass the requirements for synthetic roofing membranes as they leave the production line.

### Examples

Testing the roof in an industrial environment. Rhenofol CV 1.2 mm, mechanically fastened, **no leaks** even after decades.



Warehouse and assembly halls of Pfalzmöbel Büroeinrichtungsfabrik GmbH in Bad Schönborn. Rhenofol CV 1.2 mm, mechanically fastened, **unimpaired performance** after twenty years.





## Rhenofol® – advantages PVC and the environment

**Rhenofol is a roofing membrane made of non-rigid polyvinyl chloride (PVC-P), because PVC has many advantages:**

- Versatile
- Post forming
- Flexible
- Durable
- Economical
- Weather-proof
- Robust
- Maintenance-free
- Recyclable

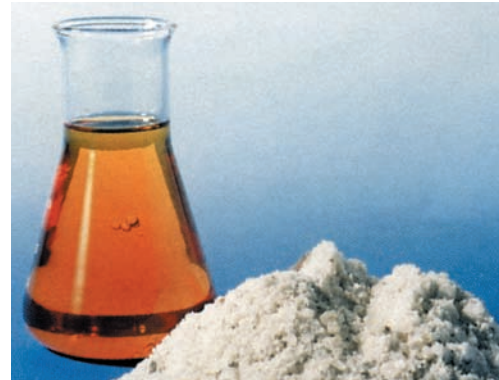
**PVC stands up even to critical questions:**

### ■ Production

The basic ingredients for the production of PVC powder are mineral salt (57 %) and petroleum (43 %). The producers have committed themselves to using ecological production techniques and technologies. Additives, such as colouring pigments, are part of all PVC recipes. The colouring pigments are inorganic additives, such as titanium dioxide, that are not detrimental to health and are used, amongst others, for cosmetics and food products.

### ■ Processing

Rhenofol seams can be sealed without the use of naked flame, by hot air or solvent-welding agent. Neither during processing nor during subsequent use of the roofing membrane are significant amounts of hazardous substances released.



*The raw materials for PVC powder production: Petroleum and mineral salt.*

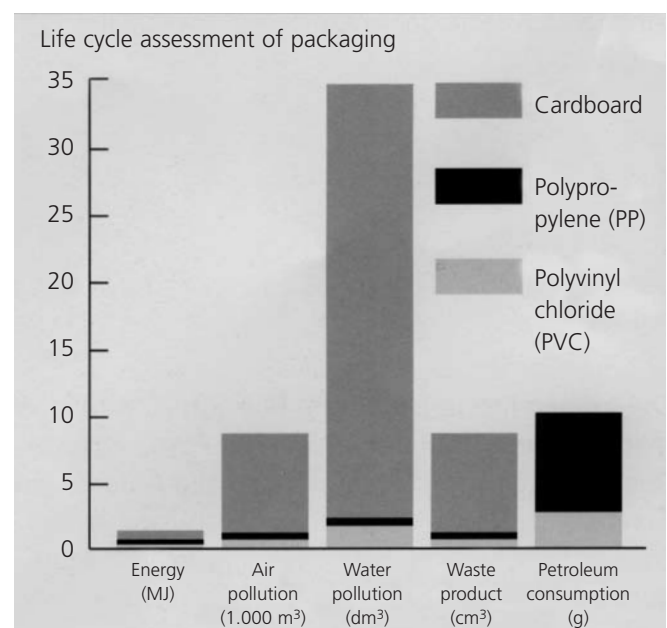
### ■ Fire performance

PVC products are extremely hard to ignite and are self-extinguishing. The ignition temperature of Rhenofol is 330 – 400 °C and thus almost twice as high as that of timber which catches fire at temperatures as low as 210 – 270 °C. Also the heat build-up of burning PVC is two thirds less than that of timber.

### ■ Energy and resource profile analysis

PVC uses less energy and resources than other materials used for similar purposes. The air and water consumption for production is also relatively small. In order to preserve landfill sites and resources, old PVC-P roofing membranes are recycled.

*Example: Life cycle assessment of PVC compared to other materials.*



*Life cycle assessment of packaging.*

*Source:  
Arbeitsgemeinschaft  
PVC und Umwelt e. V.*



## Roofcollect® – Recycling system for synthetic roofing and waterproofing membranes

### Europe is in to it - for the environment's sake

The trend-setting German recycling solution for post-consumer PVC roofing membranes has become the overall European solution, lead-managed by the EWSA, the European Single ply Waterproofing Association.

Synthetic roofing and waterproofing membranes are perfectly suited for recycling even after years of service on a roof. Throughout Europe, ESWA offers today a future-oriented recycling system of synthetic roofing and waterproofing membranes of any manufacturer. Increasing quantities of post-consumer materials can now be processed.

Comparative environment relevance studies have revealed that synthetic materials make an indispensable contribution to waste avoidance and reduction.

### A second life for synthetic materials

Single-material thermoplastic synthetic products are perfectly suited for recycling. The final products of this process, i. e. the recycled material, show various characteristics which differ only slightly from those of the original material.

Material recycling makes sense, if the post-consumer materials are largely unmixed, clean and available in relatively large quantities.



Recycling System for Thermoplastic Membranes

For further information on the topic of recycling of synthetic roofing and waterproofing membranes, please refer to [www.roofcollect.com](http://www.roofcollect.com) or call +49 6151 21180 / send a fax to +49 6151 23856.



## Quality control

### Rhenofol under formal quality control

Because of their practical experience, installers and designers become ever more demanding with regard to the quality of the roofing membranes.

FDT meets these high quality requirements in an exemplary manner, through accurate production methods, permanent production control and monitoring measures in cooperation with official material testing institutes.

The following features, amongst others, are tested during production:

- No blisters or cracks
- Thickness and width consistency
- Flatness
- Weight per square metre
- Tensile strength, elongation at break
- Dimensional stability after storage at + 80 °C

Furthermore, the roofing membranes Rhenofol CV and Rhenofol CG are tested at the State Material Testing Institute Darmstadt - polymeric materials department – in the framework of a quality control agreement. These regular control measures include the production, external storage and the application on building sites.

The in-house FDT quality control and the quality control carried out by a neutral testing authority provide the certainty that Rhenofol is a reliable and long-term solution to flat roof problems.

All our roofing membranes are in accordance to CE marking and meet the European requirements.

### Warranty on materials

Warranty certificates are available for all roofing membranes supplied by FDT. FDT offers comprehensive warranty, including warranty on materials and additional agreements in line with NFRC initiatives which deal with the reimbursement of application costs and resulting expenses. A range of options are available to meet the clients requirements.

### Quality assurance

Testing according to ISO 9001.

We would be glad to send you a copy of our TÜV certificate on request.



FM Global - the world leader in industrial risk management - was commissioned by FDT to monitor compliance of the roofing membrane system Rhenofol with international construction and application standards.

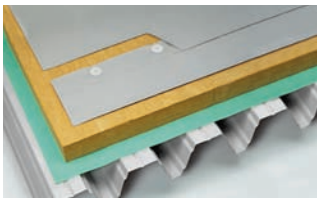
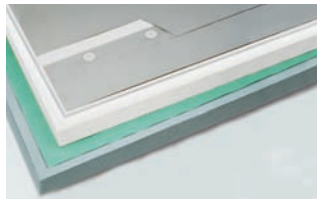
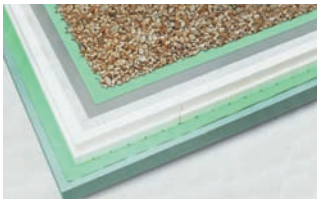

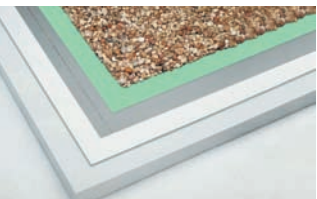

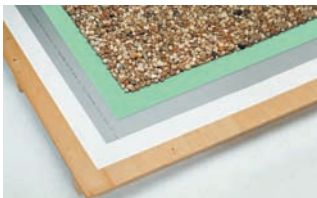







## Rhenofol® – overview

### Application methods and Roof build-ups

| Non-traffic roof areas             |   |   |  |  |
|------------------------------------|---|---|--|--|
| Roof-type                          | Supporting deck                                   | Roof slope up to 20°  |  | up to 3°   |
| Non-ventilated roof<br>(warm roof) | Profiled steel decking                            | Rhenofol CV,<br>mechanically fastened   |  |  |
|                                    |   |    |  |  |
|                                    | Reinforced concrete                               | Rhenofol CV,<br>mechanically fastened   |  | Rhenofol CG,<br>loose laid with ballast  |
|                                    |   |  |  |  |
|                                    | Lightweight concrete                              | Rhenofol CV,<br>mechanically fastened   |  | Rhenofol CG,<br>loose laid with ballast  |
|                                    |   |  |  |  |
| Ventilated roof<br>(cold roof)     | Timber board cladding/<br>derived timber products | Rhenofol CV,<br>mechanically fastened   |  | Rhenofol CG,<br>loose laid with ballast  |
|                                    |   |  |  |  |
| Inverted roof                      | Reinforced concrete                               |   |  | Rhenofol CG,<br>loose laid with ballast  |
|                                    |   |   |  |  |



## Rhenofol® – overview

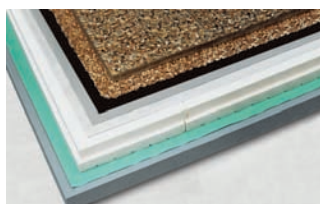
### Application methods and Roof build-ups

#### Decks and terrace roof areas

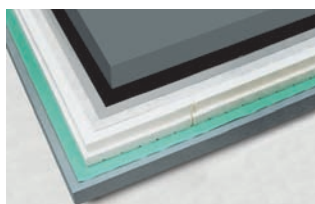
##### Terraces

##### Parking decks

Rhenofol CG,  
loose laid with ballast\*



Rhenofol CG,  
loose laid with ballast\*



Rhenofol CG,  
loose laid with ballast\*

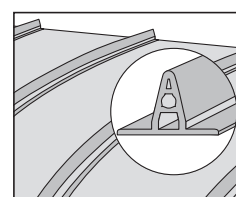


#### Special request

##### Coloured membrane



##### Standing seam profile



\* only for slopes up to 3°.





# Rhenofol® CV

## mechanically fastened



*Jaguar,  
Castle Bromwich/  
United Kingdom*



*Ravenhurst School,  
Hadley/  
United Kingdom*



*Housing Estate  
Maasbommel/  
Netherlands*



*Stade de France,  
Paris/France*



*Atatürk Stadium  
Istanbul/Turkey*





## Safety and functional efficiency, supporting construction

*Automated  
working  
processes, for  
example with  
automatic  
fastening tools,  
for economical  
application.*



### Safety and functional efficiency

With mechanical fastening, the waterproofing is independent of the other elements in the roof build-up. Movements of these layers and components can therefore not transfer stresses to the membrane, which is significant for the prevention of damage, especially on light-weight roofs.

Every installation has a specific wind uplift calculation.

- National standards and regulations must be observed.

### Application instructions

#### Supporting construction

- The supporting deck structure has to meet the requirements with regard to load-bearing capacity, deflection, anchorage and drainage.
- Joints that may impede the functional efficiency of the waterproofing layer due to their width or movements, have to be formed according to specific design requirements.
- For compatibility reasons, timber board planking, chipboards and the like may be treated only with salt-based wood preservatives. Oil or solvent based impregnation agents must not be used.
- Rapid intrusion of air underneath the waterproofing layer at the roof perimeter and at roof penetrations must be prevented. Therefore these areas have to be made wind tight, in the case of profiled steel decking, for example, by closing the corrugations with suitable material.
- Roofing membranes Rhenofol CV must not come into contact with bitumen or tar.
- National standards and regulations must be observed.



## Vapour control layer, thermal insulation layer

### Vapour control layer

As vapour control layers, in the case of non-ventilated roofs, we recommend:

- For non air-conditioned rooms (e.g. living rooms and offices or similar rooms without suspended ceiling):
  - Vapour control layer PE (polyethylene) with  $s_d (\mu \times s) \geq 100 \text{ m}$ .

The vapour barrier PE is applied with a seam overlap of 100 mm, with the seams being sealed with connection or seam tape. The vapour control layer must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must be flashed.

- For rooms with high air condition loads (e.g. swimming pools and air-conditioned rooms): In case of air-conditioned rooms and rooms with high air condition loads, as well as high pressure rooms, the right layer build-up and application method must be agreed with the FDT experts.
- National standards and regulations must be observed.

### Thermal insulation layer

Besides thermal protection requirements, you must also bear in mind resistance to foot traffic when designing the thermal insulation layer on steel profile supporting decks. As materials for thermal insulation layers we recommend:

- Large-sized insulation boards made of expanded polystyrene foam EPS with rebated edges, according to EN 13163, size 1.25 x 1.25 m or 1.25 x 1.00 m.
- Large-sized non-flammable mineral fibre boards according to EN 13162.
- Large-sized insulation boards made of quality assured rigid foam PUR / PIR according to EN 13165.

Small-sized insulation boards can be used, provided they can be properly fastened. Insulation boards or board sections that are not sufficiently fixed by linear fastening must be secured in a stable position with additional fasteners (at least 2 fasteners/m<sup>2</sup>) prior to applying the roofing membrane or in accordance with the insulation manufacturers requirements. With membrane widths over 1.03 m, the separation layer (if required) should be also fastened with these additional fasteners.

Insulation materials that are not dimensionally stable and which buckle or bulge must not be installed. The insulation elements must be laid with lightly butted joints in a brick bond pattern (with the long side perpendicular to the application direction of the roofing membrane).

- National standards and regulations must be observed.
- The guidelines of the insulation board manufacturer must be observed.



## Separation layer, Rhenofol® CV, mechanically fastened at the overlapped membrane edge

### Separation layer

When polystyrene insulation is used with Rhenofol CV a separation layer is obligatory.

On top of inflammable thermal insulation materials for fire protection reasons a glass fleece 120 g/m<sup>2</sup> must be installed as a separation layer, also preventing interaction (e.g. with rigid polystyrene foam).

On top of hard substrates with distinctive edges (e.g. timber boarding, lightweight concrete), the FDT synthetic fleece 300 g/m<sup>2</sup> must be installed as a separation and protection layer.

For the separation against bituminous layers, e.g. in case of old roof refurbishment, a FDT synthetic fleece 300 g/m<sup>2</sup> must be installed, if necessary combined with an underlying polyethylene foil.

■ National standards and regulations must be observed.

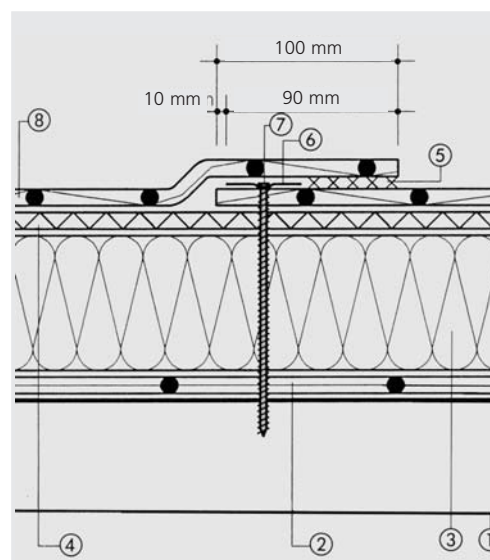
### Rhenofol CV mechanically fastened at the overlapped membrane edge

Roofing membranes Rhenofol CV are loosely laid and mechanically fastened at the overlapped membrane edge. The seam overlap is 100 mm. Depending on the substrate, different fastening elements are used. The membrane seams are securely joined through solvent or hot air welding.

On profiled steel decking and timber board planking the Rhenofol CV membranes must be orientated perpendicularly to the corrugations or boards to achieve the most regular wind load distribution possible into the supporting deck.

Rhenofol CV can be mechanically fastened on roofs with any slope. With roof slopes over 10°, we recommend agreeing the application with the FDT experts.

- ① Profiled steel decking
- ② Vapour control layer
- ③ Thermal insulation layer
- ④ FDT glass fleece 120 g/m<sup>2</sup>  
(if polystyrene insulation)
- ⑤ Welded seam
- ⑥ Washer
- ⑦ Self-tapping screw
- ⑧ Rhenofol CV



*Economic laying  
without naked flame:  
the mechanically  
fastening at the over-  
lapped membrane  
edge.*





## Fasteners/fastener spacing

### Amount and arrangement of fasteners

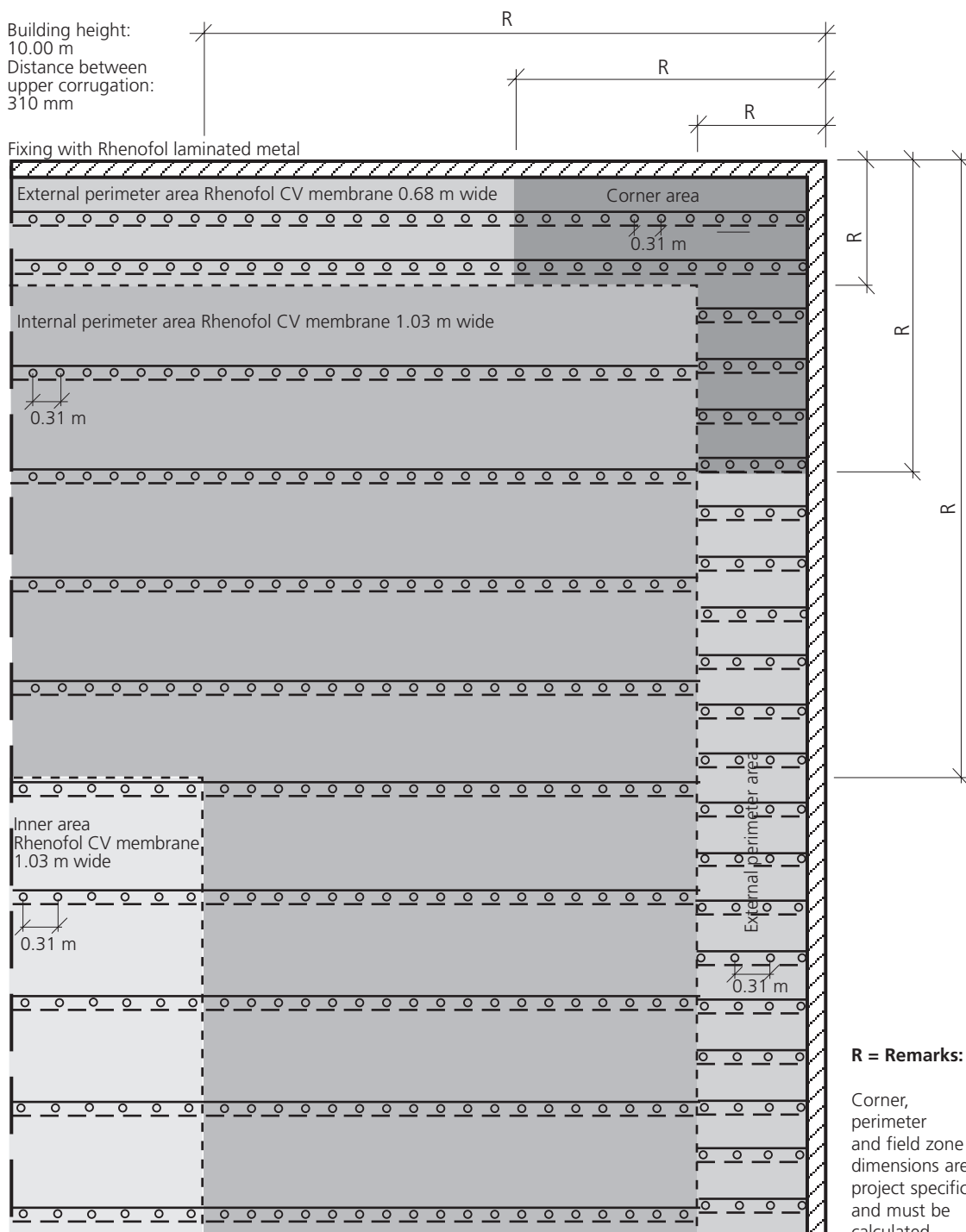
The amount and arrangement of fasteners is designed in accordance with the wind uplift forces and the corresponding design load of the applied fasteners.

On request, computer-based project related calculations of the necessary quantity of fasteners are carried out.

#### **Note:**

- In-line fastening spacing min. 150 mm, max. 600 mm.
  - Fastener spacing on the same corrugation with profiled steel deckings must not be less than 200 mm.
- National standards and regulations must be observed.

## Fastening example: profiled steel decking



R = Remarks:

Corner, perimeter and field zone dimensions are project specific and must be calculated.

**Building height:**  
7.00 m

**Fixing with Rhenofol laminated metal**

**External perimeter area Rhenofol CV membrane 0.68 m wide**

**Internal perimeter area Rhenofol CV membrane 1.03 m wide**

**Inner area Rhenofol CV membrane 1.03 m wide**

**Corner area**

**External perimeter area**

**R = Remarks:**

Corner, perimeter and field zone dimensions are project specific and must be calculated

Corner, perimeter and field zone dimensions are project specific and must be calculated.



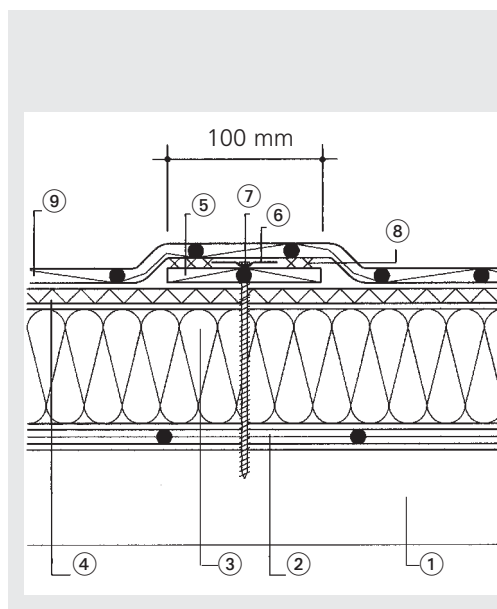


## Rhenofol® CV, mechanically fastened with strip and paste system

As an alternative to fastening at the overlapped membrane edge, Rhenofol CV may also be applied with the strip and paste system. Initially, Rhenofol CV strips or Rhenofol CV sets (discs with a diameter of 180 mm) are mechanically fastened. Then the roofing membrane Rhenofol CV is laid. The homogenous connection between roofing membrane and strip is achieved with the Rhenofol welding paste SB that has been specially developed for this application method.

With profiled steel decking and timber planks, the Rhenofol CV strips are arranged perpendicularly to the installation direction of the steel sheets or timber planks, to achieve a regular wind load distribution into the supporting deck.

*Sketch  
Roof build-up  
with mechanical  
fastening of  
Rhenofol CV with  
the welding paste  
system.*



### Advantages of the strip and paste system:

- The field fastening arrangement provides best possible load distribution, so that, compared to seam fastening, higher design loads are possible. This also means fewer fasteners.
- The strip spacing can be continuously adjusted, which means best possible use of the design load.
- Uniform membrane width of 2.05 m over the complete roof area.
- The seam overlap is only 50 mm, as no fasteners have to be covered.

The welding paste system has proven itself on many roofs since 1993.

The strip spacing and the amount of fasteners are always designed by the FDT experts according to each project.

The application with the strip and paste system requires special professional knowledge. It should therefore be carried out only by specially trained applicators.

- ① Profiled steel decking
- ② Vapour control layer
- ③ Thermal insulation layer
- ④ FDT glass fleece 120 g/m<sup>2</sup> (if polystyrene insulation)
- ⑤ Rhenofol CV strip
- ⑥ Washer
- ⑦ Self-tapping screw
- ⑧ Rhenofol welding paste
- ⑨ Rhenofol CV



## Perimeter fixing

### Fastening materials

#### Perimeter fixing

Due to wind uplift forces, roofing membranes Rhenofol CV must be fixed at all perimeters, penetrations and valleys with a deviation of more than 3° from the horizontal, by welding onto Rhenofol laminated metal sheets. The fixing is carried out with angles or strips of Rhenofol laminated metal which are fixed to the substrate.

The roofing membrane Rhenofol CV is then secured to the laminated metal by welding. The laminated metal strips should be cut to a width of at least 80 mm.

If the thermal insulation layers does not have sufficient bearing capacity, e.g. mineral wool, a suitable support must be installed directly below the laminated metal.

Suitable supports for the laminated metal strips are:

- Insulation materials with a compressible strength of at least 0.15 N/mm<sup>2</sup> at max. 10 % compression (e. g. extruded polystyrene).
- Timber profiles, at least 30 mm thick, and underlying insulation material with a compression strength of at least 0.1 N/mm<sup>2</sup> at max. 10 % compression.
- Single- or multi-part timber profiles.

It is permissible under the following conditions to use single fasteners for perimeter fixing, instead of Rhenofol laminated metal strips:

- Building not located in an exposed position
- Building height max. 20 m
- layer build-up thickness above the upper edge of the supporting deck not more than 160 mm.

The necessary amount of fasteners per metre is identical to the amount of fasteners in the external perimeter zone, but not less than 4 fasteners/m.

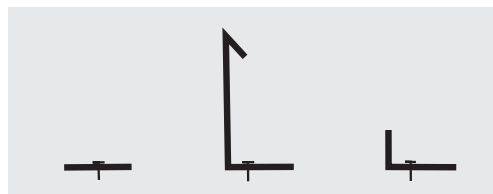
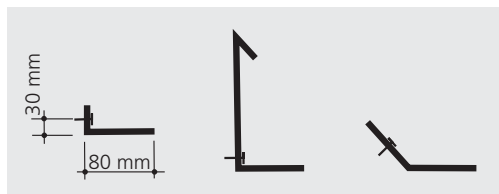
- National standards and regulations must be observed.

#### Fastening elements and spacing for fixings

| Supporting construction  | Item to be fastened<br>timber profile*)<br>$d \geq 30$ mm<br>$b \geq 80$ mm<br>$w \geq 1.5 d$                                 | Rhenofol laminated metal sheet  |
|--|---|---|
|  |   |   |
| <b>Reinforced concrete</b>   | screw Ø 8 mm with plug<br>Ø 10 mm, type SDF-S<br>Ø 10 by Ejot, spacing<br>500 mm, or type<br>Spike, by SFS,<br>spacing 300 mm | body-bound rivet<br>4.8/26 mm spacing 200 mm<br>type DSD-K8 x 40 by Ejot,<br>spacing 200 mm or type<br>Spike, by SFS,<br>spacing 200 mm |
| <b>Lightweight concrete</b>  | lightweight concrete nail<br>anchor Ø 8 mm,<br>spacing 300 mm   | lightweight concrete nail<br>anchor Ø 5 mm,<br>spacing 200 mm   |
| <b>Timber beams,<br/>timber board<br/>cladding/<br/>chipboards</b> | wood screw Ø 8 mm spacing<br>300 mm or type JA3 Ø 6.5 mm<br>by Ejot spacing 500 mm  | wood screws Ø 4.8/25<br>spacing 200 mm or type<br>JA3-LT- 4.9 x 25 mm by Ejot,<br>spacing 500 mm  |
| <b>Profiled steel decking</b>                                      | self-tapping screw Ø 4.5 mm,<br>spacing 200 mm or type<br>JT3-ST Ø 6.0 by Ejot<br>spacing 200 mm                              | steel blind rivet Ø 5 mm,<br>spacing 200 mm   |

\*) Countersink the fastening elements in the timber profiles. If necessary, pilot-drill and use washer Ø 10 mm. The fixing manufacturer's application instructions must be observed.

Examples of  
metal angles  
for fastening on  
vertical or sloped  
surfaces.

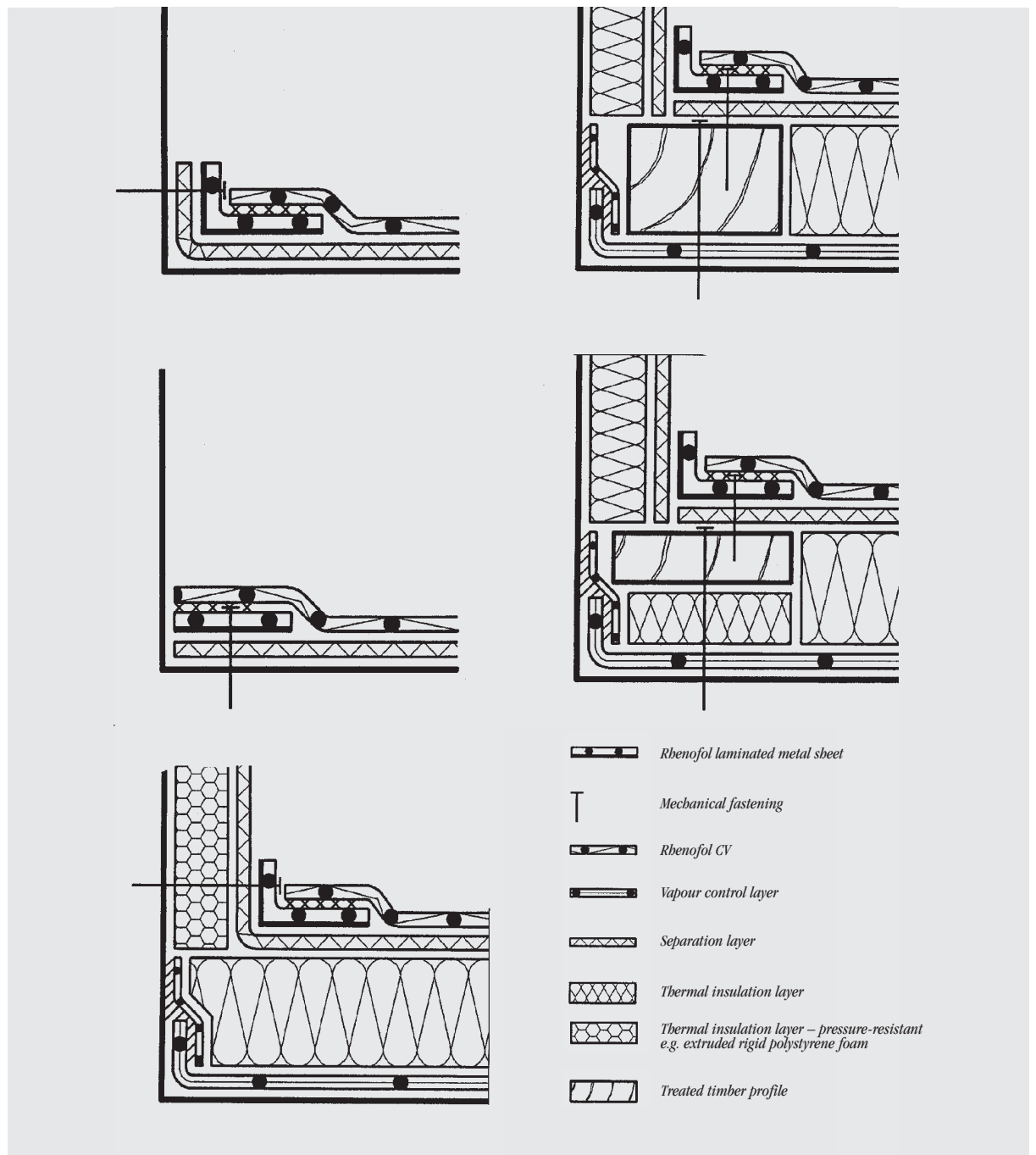


Examples of  
strips or metal  
angles for  
fastening on  
horizontal  
surfaces.



## Perimeter fixing application examples

Examples of perimeter fixing with Rhenofol laminated metal strips and angles





## Flashings and cappings, application examples

### Flashings and cappings

All flashings and cappings are also carried out with Rhenofol CV flashing strips. The flashing strips must be sufficiently fixed.

If the flashing membrane is bonded, then at flashing heights over 200 mm fully bonding is necessary, the first 200 mm being left un-bonded.

With mechanical fastening of the flashing membrane - with Rhenofol laminated metal strips or by clamping with the mounting rail of the FDT roof edge trim - the spacing between the lines of fasteners must be not more than 500 mm.

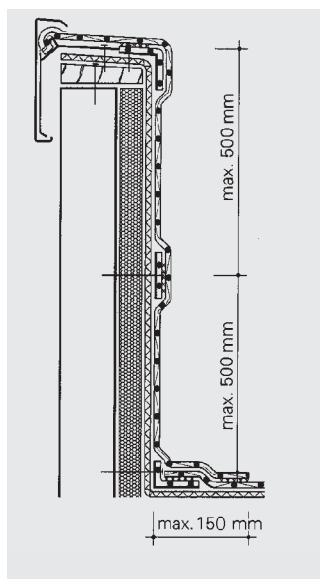
In this case the whole girth dimension must be taken into consideration. The width of the Rhenofol laminated metal strips for intermediate fixing must be at least 50 mm.

You may leave out separation layers in the flashing area, provided the substrate is smooth and even and the edges have a special protection (e.g. with angles made of Rhenofol laminated metal sheets or synthetic fleece).

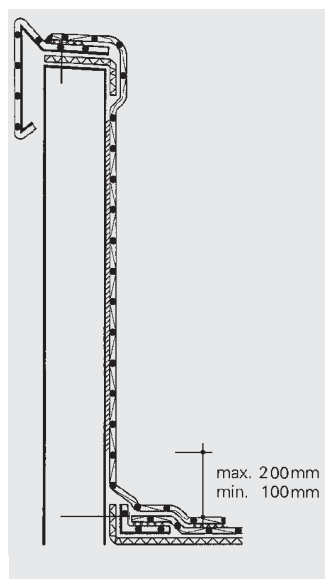
With non-compatible materials you must always install suitable separation layers.

You will find further examples on this topic in the drawings "Technical details".

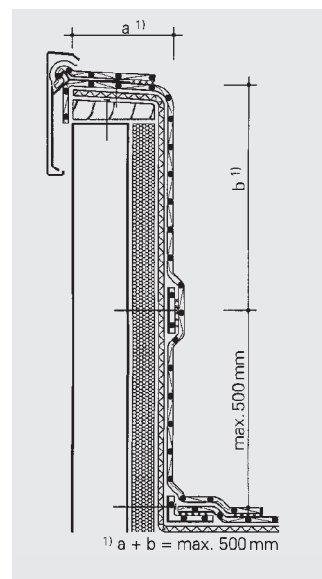
### Application examples for flashings and cappings



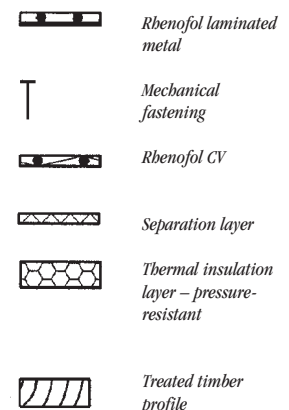
*Flashing membrane fastened through the middle with Rhenofol laminated metal strip and angle.*



*Bonded application.*



*The roofing membrane is laid under the roof edge trim.*





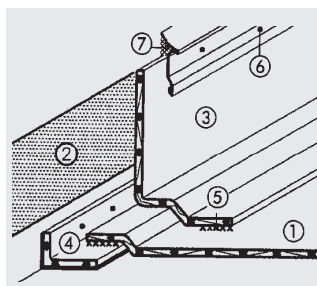


## Wall connections, roof light connections, application examples

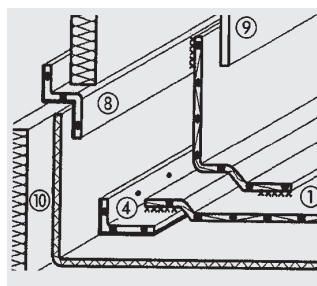
### Wall connections

The upper edge of the Rhenofol roofing membrane is clamped to the substrate with rigid FDT aluminium wall connection profiles and additionally weather proofed with FDT sealant A.

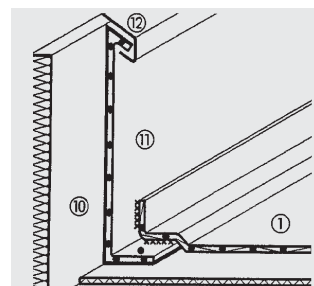
### Application examples



*Rhenofol laminated metal  
angle with aluminium  
wall connection profile.*



*Connection with  
non-bearing facade.*



*Wall connection with  
overhang.*

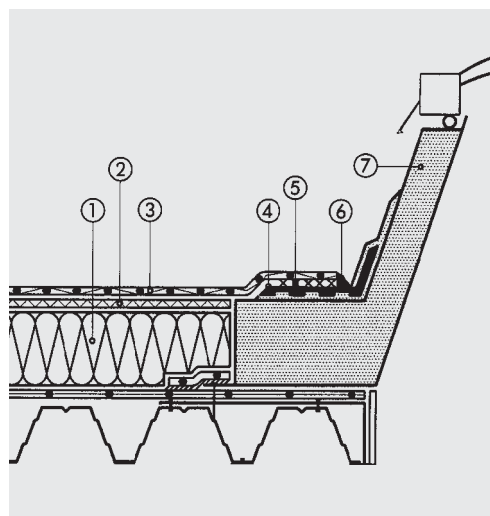
- ① Rhenofol CV
- ② Rhenofol contact adhesive 20
- ③ Rhenofol flashing strip
- ④ Fixing with angle fillet of Rhenofol laminated metal
- ⑤ Welding
- ⑥ FDT aluminium wall connection profile, e.g. Classic or Economy
- ⑦ FDT sealant A
- ⑧ Fixing with Z-profile made of Rhenofol laminated metal
- ⑨ Cladding
- ⑩ Pressure-resistant thermal insulation
- ⑪ Fixing with angle fillet made of Rhenofol laminated metal, also achieves wall connection
- ⑫ Overhang

### Roof light connections

Roof light upstands are waterproofed to the upper edge with Rhenofol CV strips. The flashing membrane is bonded to the upstand with the upper end being secured with Rhenofol paste. Particularly advantageous are upstands that are factory prepared for connection with PVC membranes:

- Upstands with Rhenofol roofing membrane factory applied.
- Rigid PVC upstands or upstands with laminate embedded rigid PVC strips, against which the roofing membrane Rhenofol CV is flashed in the roof level by welding. The upstands have to be approved by the roof light manufacturer for this method of attachment, otherwise separate fixing with Rhenofol laminated metal sheet is necessary.

### Application example

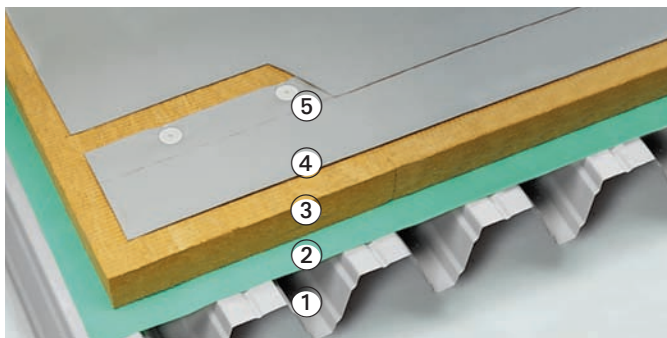


*Roof light connection at upstands with laminate  
embedded rigid PVC strips*

- ① Thermal insulation layer of expanded polystyrene EPS
- ② FDT glass fleece 120 g/m<sup>2</sup>
- ③ Roofing membrane Rhenofol CV
- ④ Laminate embedded rigid PVC strip
- ⑤ Welded seam
- ⑥ Rhenofol paste
- ⑦ Roof light upstand

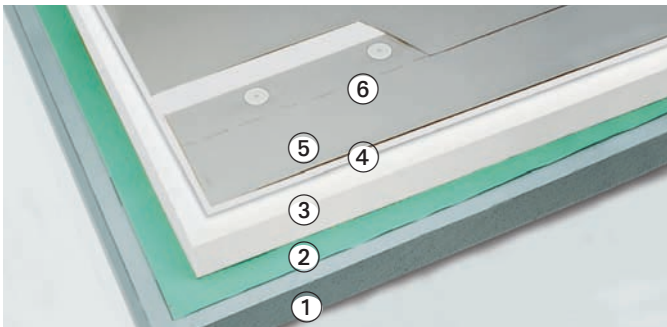


## Layer build-ups

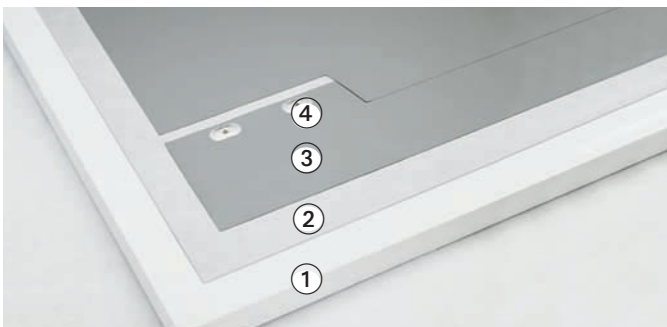


### Examples of typical roof build-ups Non-ventilated roof (warm roof)

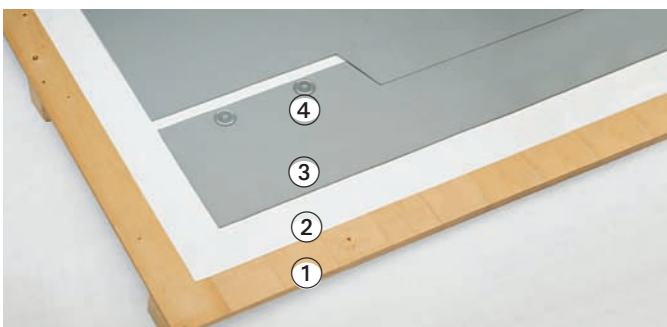
- ① Corrosion protected profiled steel decking
- ② FDT vapour control layer PE
- ③ Mineral fibre thermal insulation layer, if necessary with additional fasteners under the membrane
- ④ Roofing membrane Rhenofol CV, laid perpendicularly to the corrugations
- ⑤ Mechanical fastening within overlapped membrane edge with tread-fast fasteners



- ① Reinforced concrete
- ② FDT vapour control layer PE
- ③ EPS thermal insulation layer
- ④ Separation layer FDT glass fleece 120g/m²
- ⑤ Roofing membrane Rhenofol CV
- ⑥ Mechanical fastening within overlapped membrane edge



- ① Lightweight concrete
- ② Separation layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CV
- ④ Mechanical fastening within overlapped membrane edge



### Examples of layer build-ups Ventilated roof (cold roof)

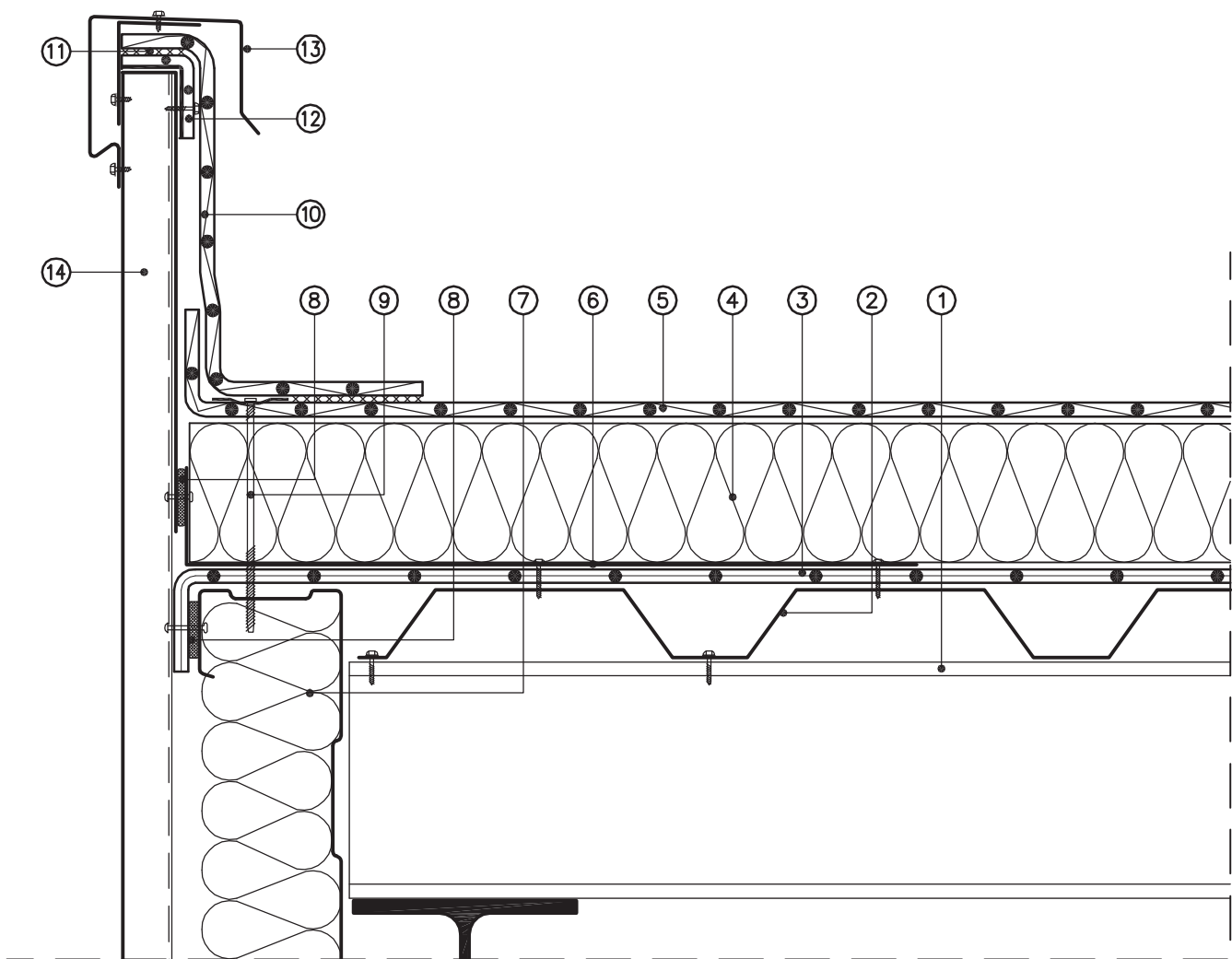
- ① Timber board cladding/derived timber products
- ② Separation layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CV
- ④ Mechanical fastening within overlapped membrane edge



## Parapet Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)



- ① Steel structure
- ② Corrosion-protected profiled steel decking
- ③ FDT vapour control layer PE
- ④ Thermal insulation to specification
- ⑤ Roofing membrane Rhenofol CV
- ⑥ Steel closure flashing
- ⑦ Thermal insulation

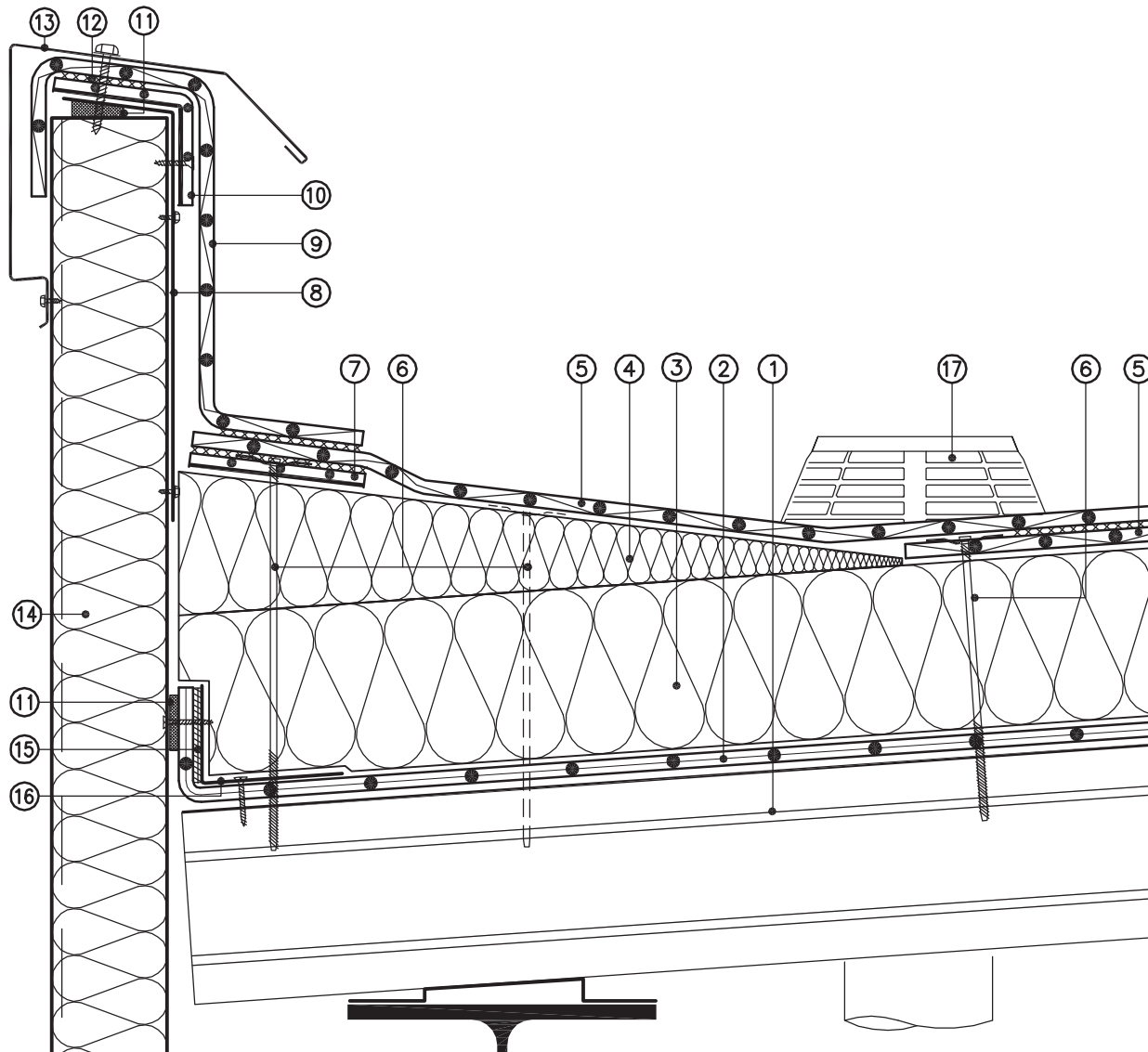
- ⑧ Airtight sealing tape
- ⑨ Perimeter fixing
- ⑩ Flashing strip Rhenofol CV
- ⑪ Welding
- ⑫ Rhenofol laminated metal angle
- ⑬ Capping
- ⑭ Cladding



## Parapet with insulation fillet Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)



- |   |   |
|---|---|
| ① Corrosion-protected profiled steel decking            | ⑩ Rhenofole laminated metal angle   |
| ② FDT vapour control layer PE                           | ⑪ Permanently elastic, pre-compressed, single-sided self adhesive airtight sealing tape |
| ③ Insulation to specification                           | ⑫ Welding   |
| ④ Insulation fillet                                     | ⑬ Parapet capping   |
| ⑤ Roofing membrane Rhenofole CV                         | ⑭ Cladding  |
| ⑥ Fasteners   | ⑮ Double-sided adhesive tape  |
| ⑦ Perimeter fixing with Rhenofole laminated metal angle | ⑯ Corrosion-protected steel angle   |
| ⑧ Corrosion-protected steel angle                       | ⑰ FDT VarioGully roof outlet  |
| ⑨ Flashing strip Rhenofole CV                           |   |

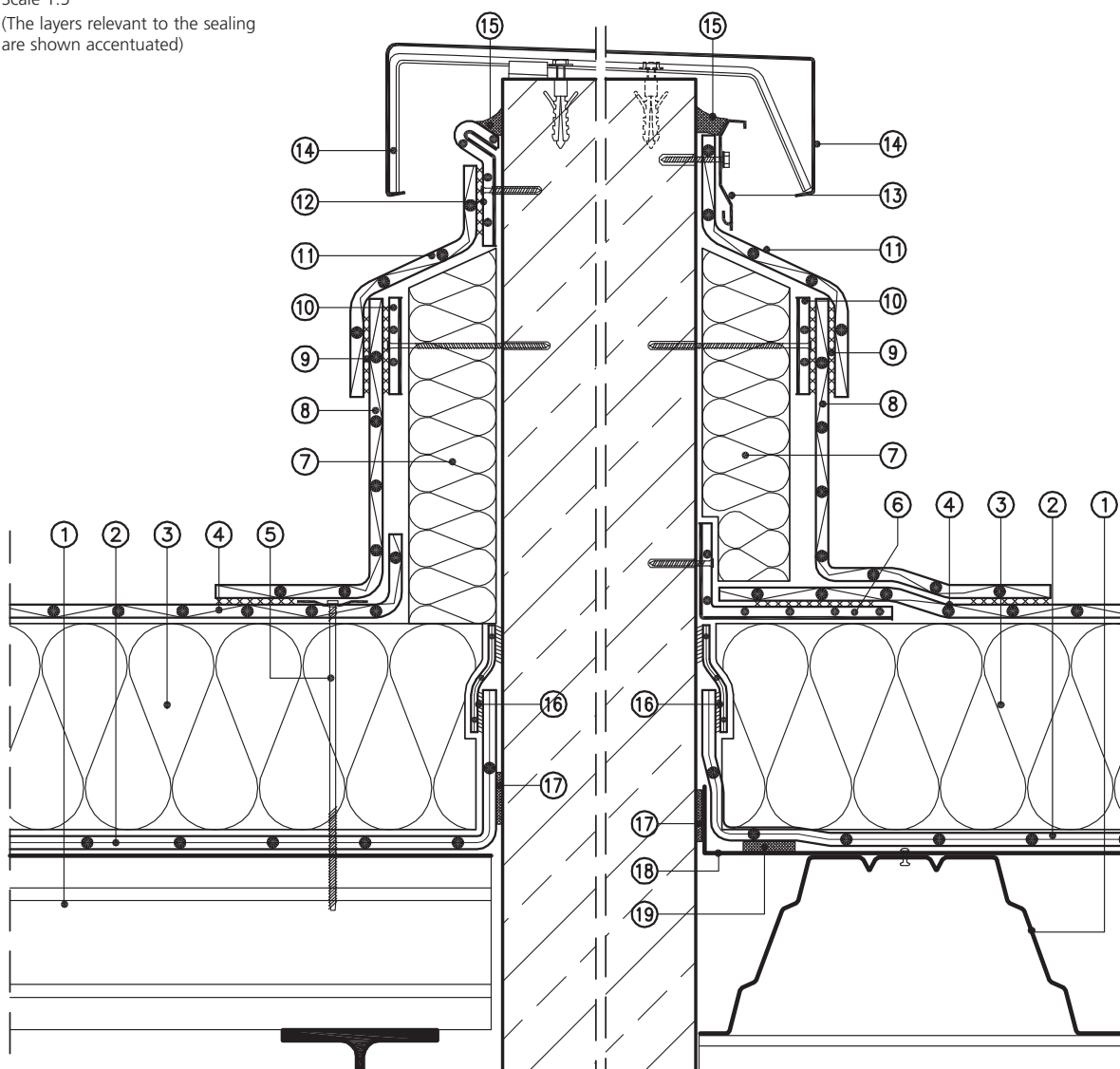




## Fire wall connection Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing  
are shown accentuated)



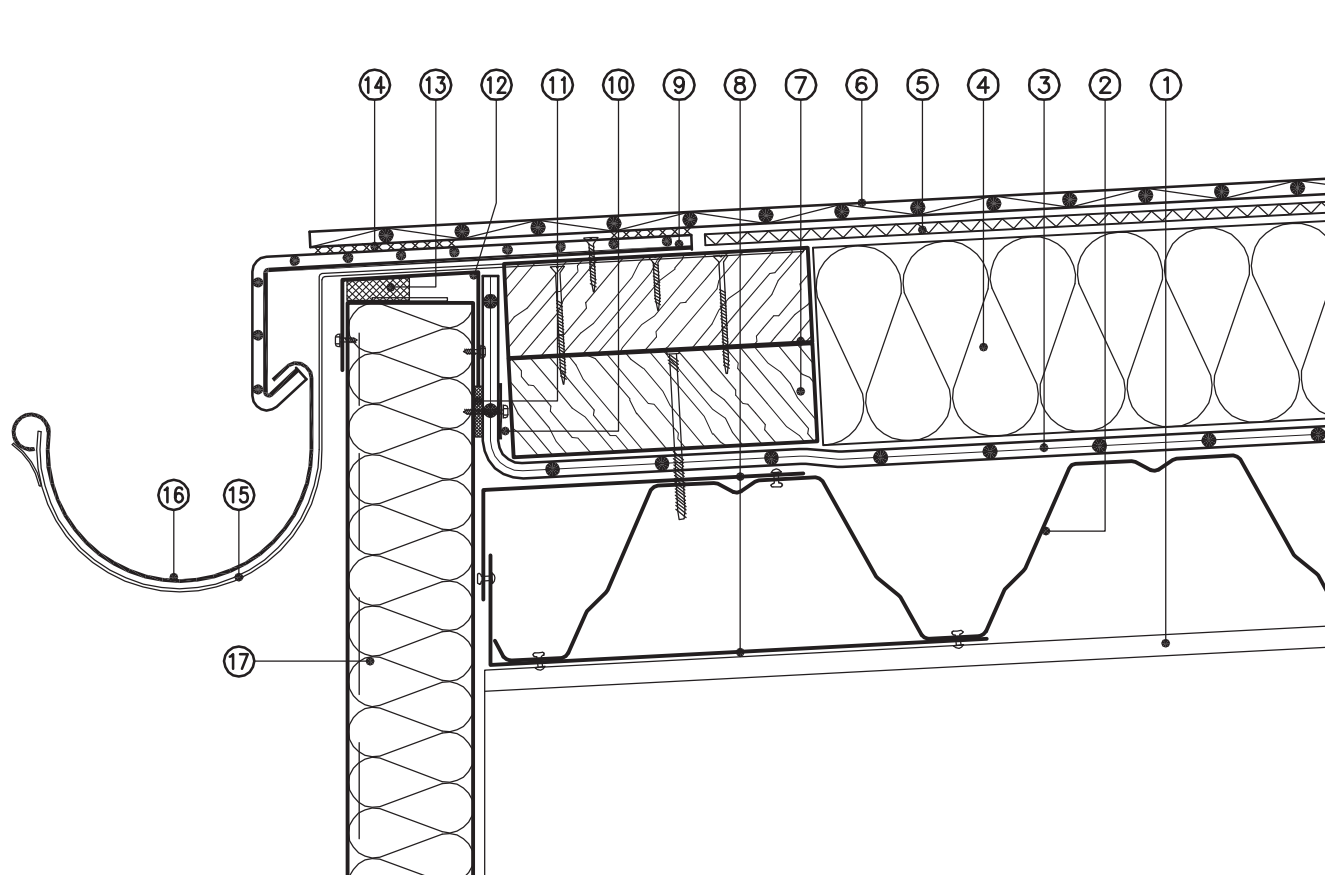
- |  |   |
|--|---|
| ① Corrosion-protected profiled steel decking         | ⑪ Rhenofol CV flashing strip                          |
| ② FDT vapour control layer PE                        | ⑫ Rhenofol laminated metal angle                      |
| ③ Thermal insulation to specification                | ⑬ FDT aluminium wall connection profile               |
| ④ Roofing membrane Rhenofol CV                       | ⑭ Fire wall capping                                   |
| ⑤ Alternative perimeter fixing with single fasteners | ⑮ FDT sealant A or sealant S                          |
| ⑥ Rhenofol laminated metal angle                     | ⑯ FDT connection tape for FDT vapour control layer PE |
| ⑦ Vertical mineral wool insulation                   | ⑰ Airtight sealing tape                               |
| ⑧ Rhenofol CV flashing strip                         | ⑱ Steel angle   |
| ⑨ Welding  | ⑲ FDT connection tape for FDT vapour control layer PE |
| ⑩ Rhenofol laminated metal strip                     |   |



## Gutter

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



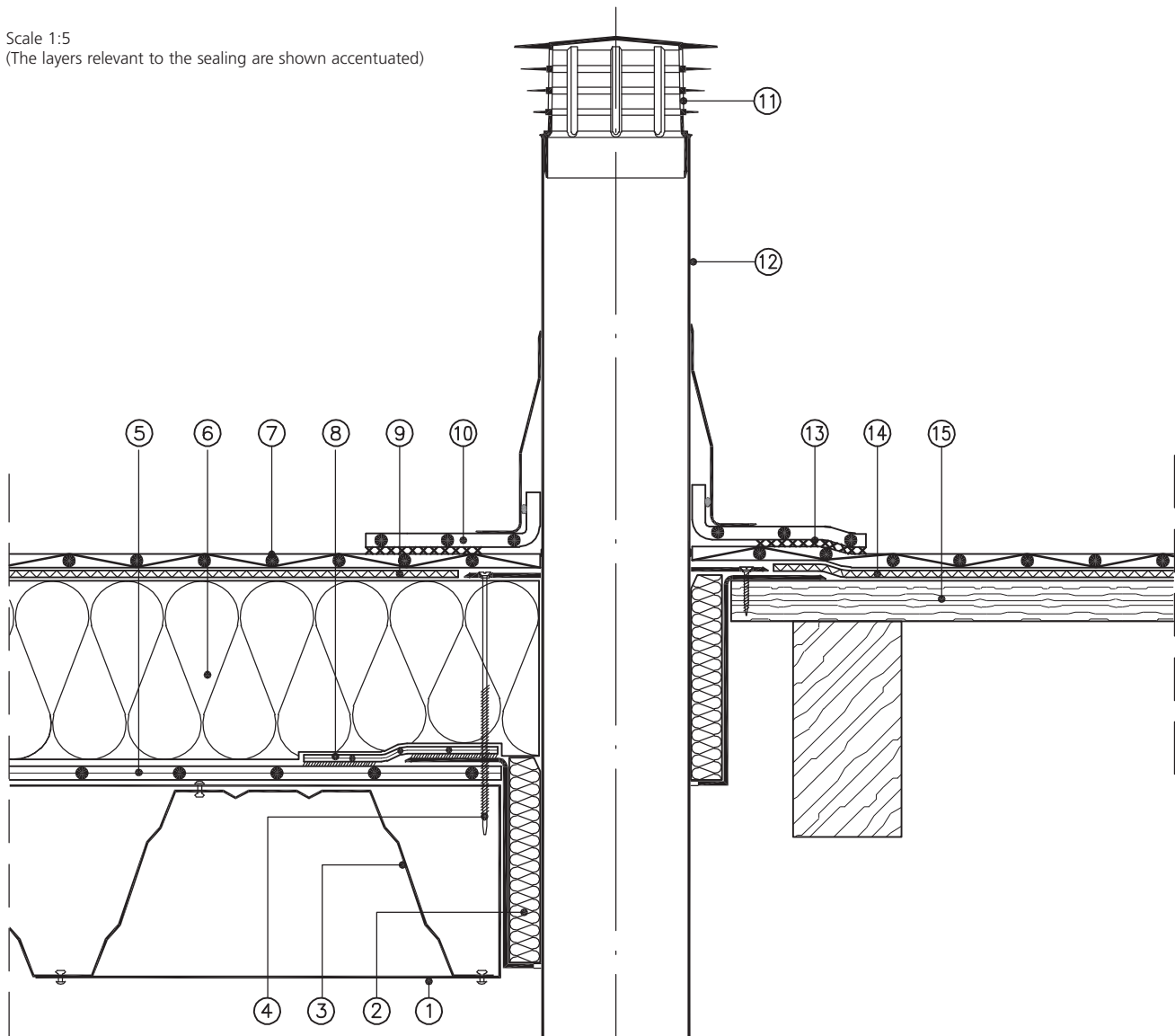
- |   |                                  |
|---|----------------------------------|
| ① Steel structure   | ⑨ Rhenofol laminated metal angle |
| ② Corrosion-protected profiled steel decking  | ⑩ Termination bar                |
| ③ FDT vapour control layer PE   | ⑪ Airtight sealing tape          |
| ④ Thermal insulation to specification   | ⑫ Metal cladding closer          |
| ⑤ Separation layer FDT glass fleece 120 g/m <sup>2</sup><br>(if polystyrene insulation) | ⑬ Sealing tape                   |
| ⑥ Roofing membrane Rhenofol CV  | ⑭ Welding                        |
| ⑦ Treated timber profile  | ⑮ Bracket                        |
| ⑧ Metal closure   | ⑯ Gutter                         |
|   | ⑰ Cladding                       |



# Vent pipe

## Non ventilated roof/ventilated roof (warm roof/cold roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |   |   |
|---|---|
| ① Internal metal closure                              | ⑨ FDT glass fleece 120 g/m <sup>2</sup>     |
| ② Penetration kerb insulation sleeve                  | ⑩ Rhenofol C collar                         |
| ③ Corrosion-protected profiled steel decking          | ⑪ Vent pipe hood - removable                |
| ④ Fixing  | ⑫ FDT vent pipe                             |
| ⑤ FDT vapour control layer PE                         | ⑬ Welding                                   |
| ⑥ EPS insulation                                      | ⑭ FDT synthetic fleece 300 g/m <sup>2</sup> |
| ⑦ Roofing membrane Rhenofol CV, mechanically fastened | ⑮ Timber deck                               |
| ⑧ FDT connection tape for FDT vapour control layer PE |   |



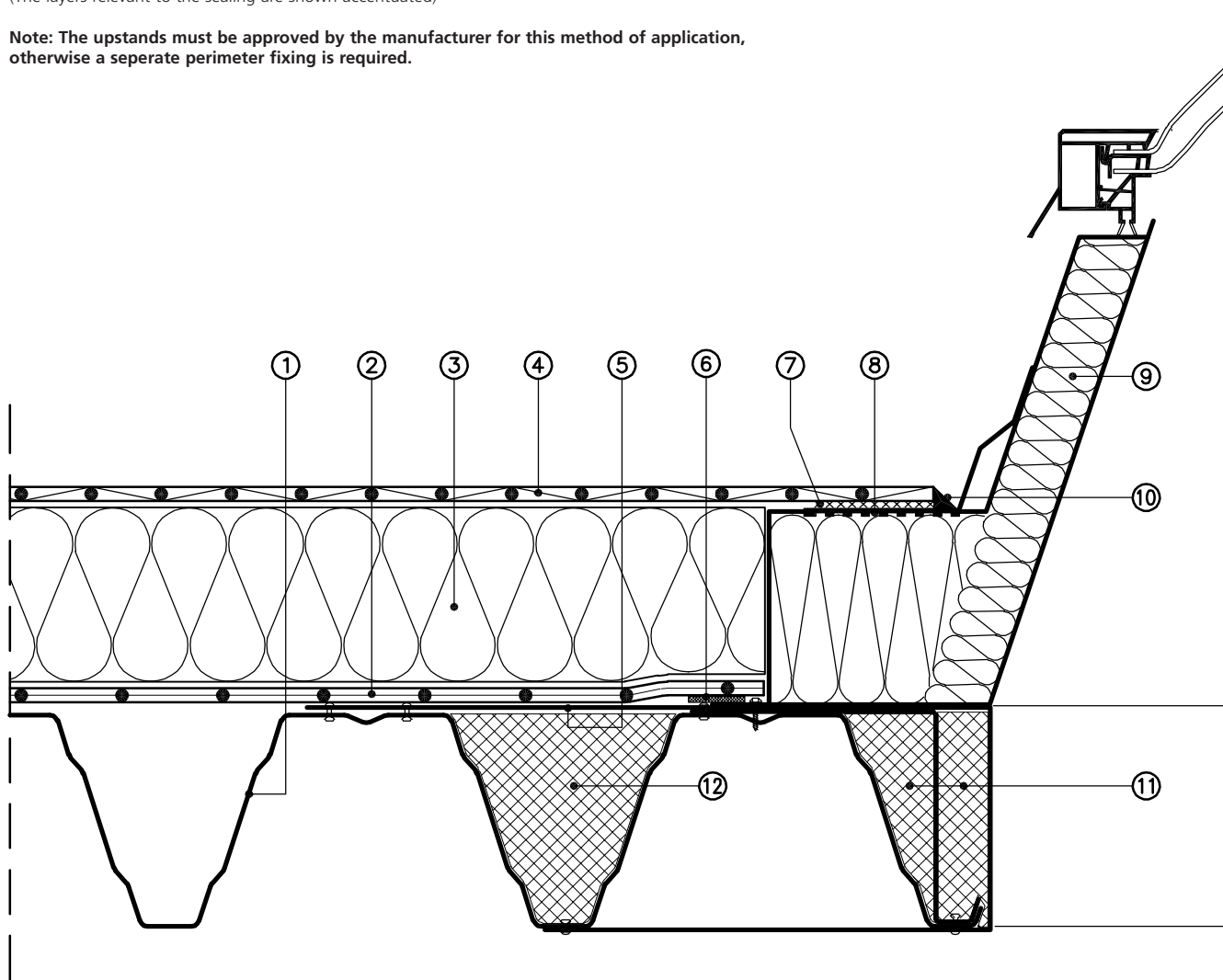
## Roof light connection

### Roof light with integrated upstand

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)

**Note:** The upstands must be approved by the manufacturer for this method of application, otherwise a separate perimeter fixing is required.



- ① Corrosion-protected profiled steel decking
- ② FDT vapour control layer PE
- ③ Thermal insulation to specification
- ④ Roofing membrane Rhenofol CV
- ⑤ Corrosion-protected steel angle
- ⑥ FDT connection tape for FDT vapour control layer PE

- ⑦ Welding
- ⑧ Integrated rigid PVC strip
- ⑨ Insulated roof light
- ⑩ Rhenofol paste
- ⑪ Non-flammable thermal insulation fillet
- ⑫ Thermal insulation fillet, alternative to item 11



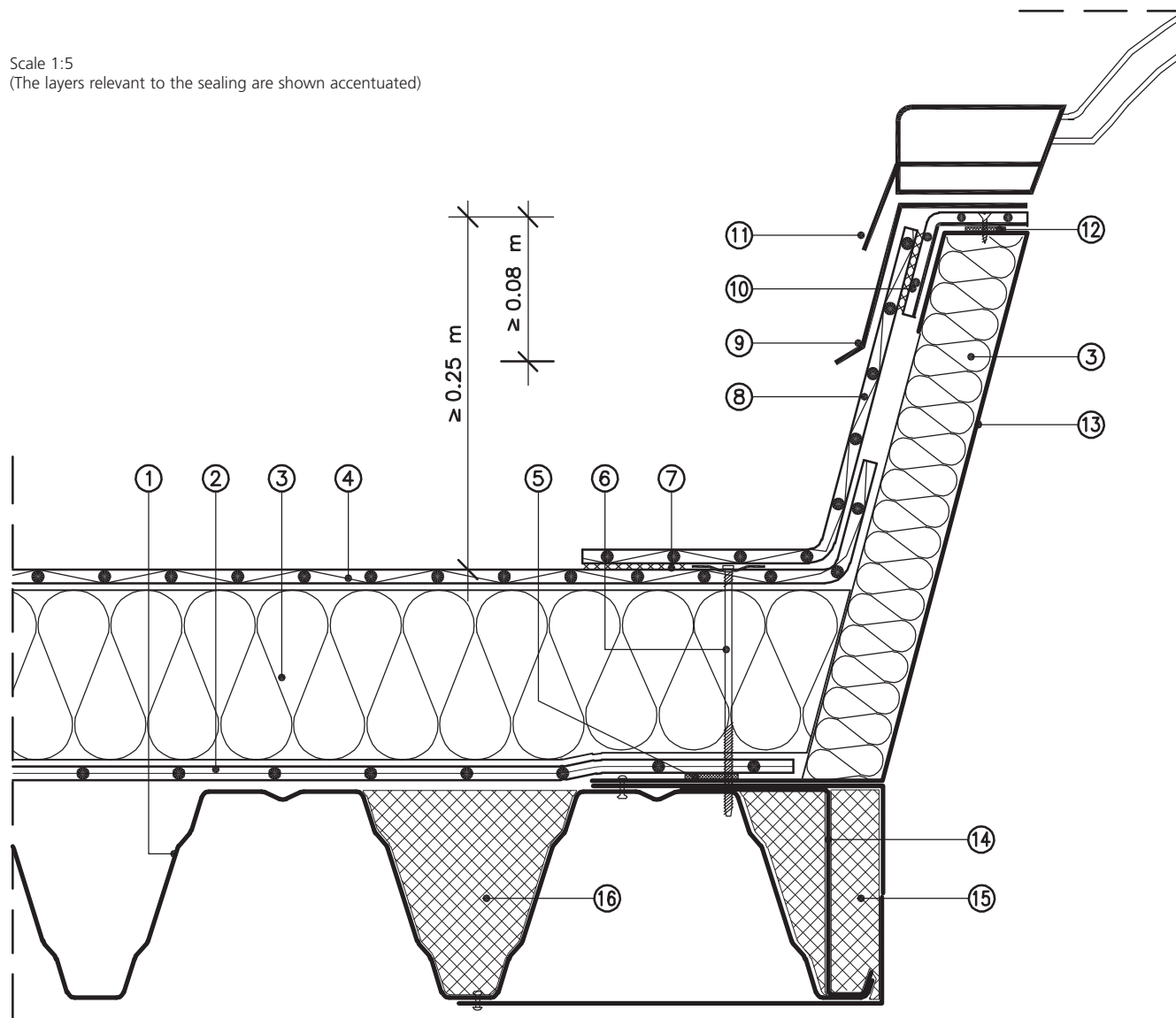


# Rooflight connection

## Steel upstand

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |   |   |
|---|---|
| ① Corrosion-protected profiled steel decking          | ⑨ Capping   |
| ② FDT vapour control layer PE                         | ⑩ Rhenofol laminated metal angle                    |
| ③ Thermal insulation to specification                 | ⑪ Roof light frame                                  |
| ④ Roofing membrane Rhenofol CV                        | ⑫ Airtight sealing tape                             |
| ⑤ FDT connection tape for FDT vapour control layer PE | ⑬ Insulated roof light kerb                         |
| ⑥ Rhenofol laminated metal angle                      | ⑭ Roof light support                                |
| ⑦ Welding   | ⑮ Non-flamable thermal insulation fillet            |
| ⑧ Rhenofol CV flashing strip                          | ⑯ Thermal insulation fillet, alternative to item 15 |

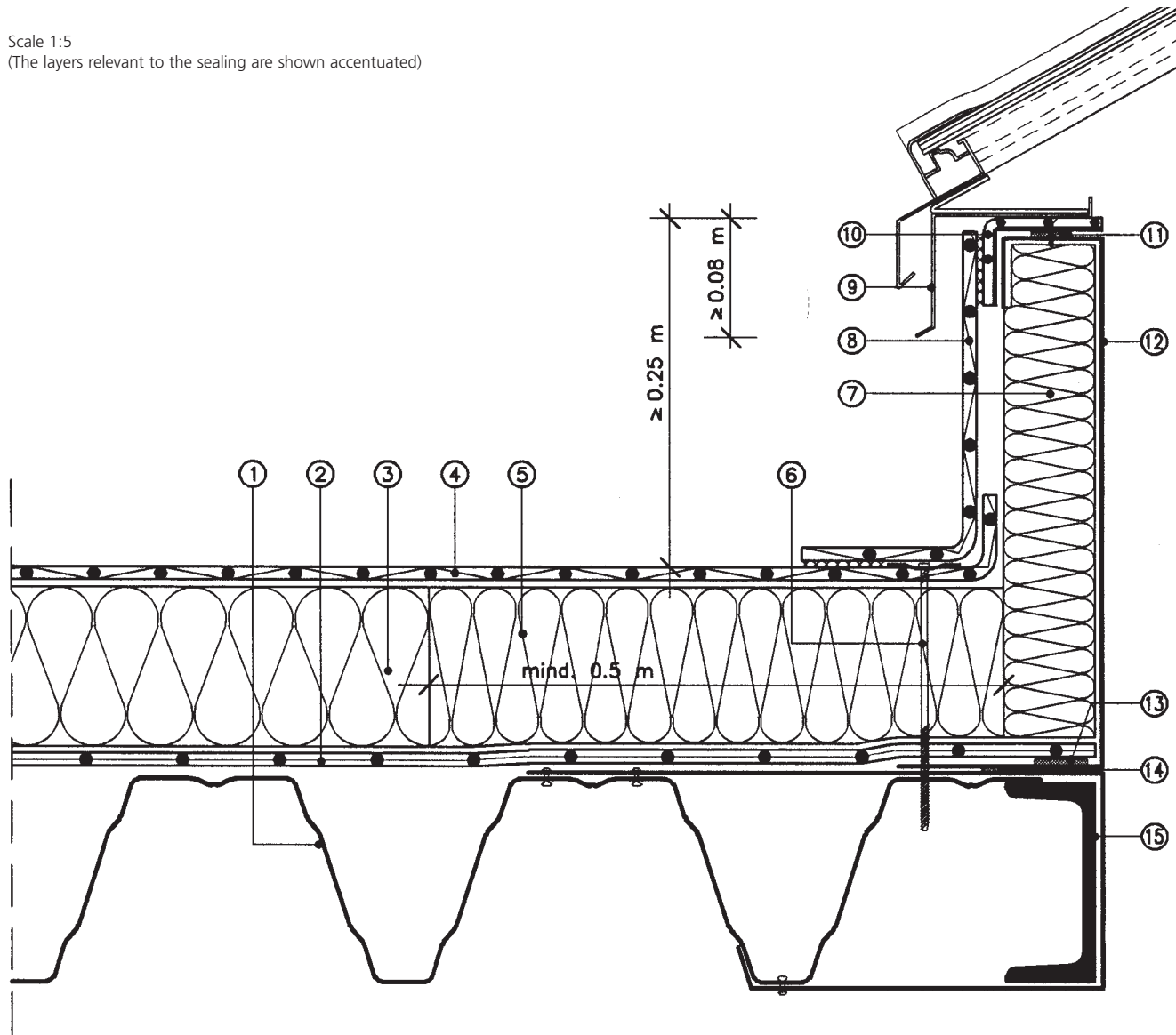


## Roof light connection

### Free standing roof light kerb

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)

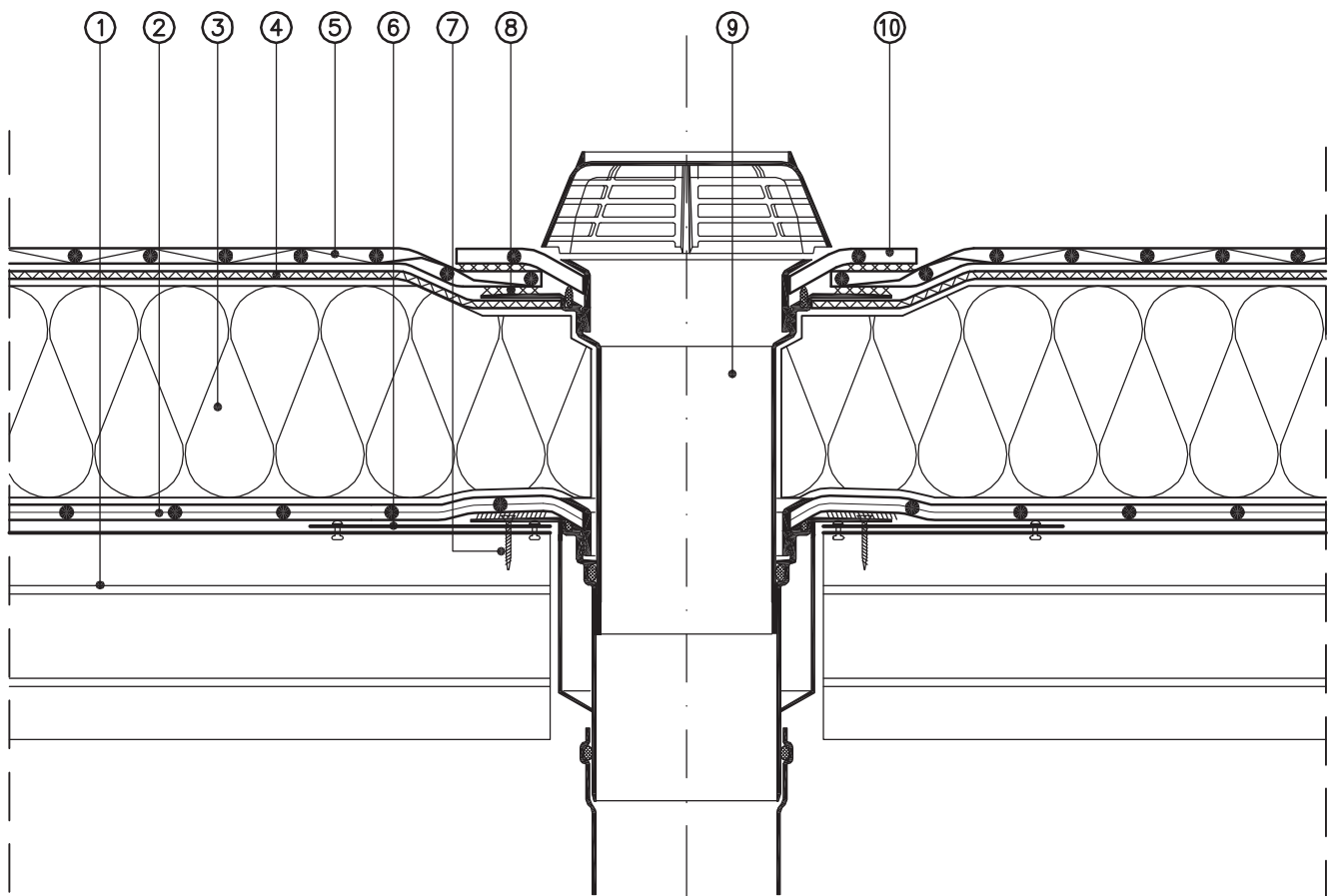


- |  |   |
|--|---|
| ① Corrosion-protected profiled steel decking | ⑨ Capping   |
| ② FDT vapour control layer PE                | ⑩ Rhenofol laminated metal angle                      |
| ③ Thermal insulation to specification        | ⑪ Airtight sealing tape                               |
| ④ Roofing membrane Rhenofol CV               | ⑫ Metal kerb  |
| ⑤ Thermal insulation to specification        | ⑬ FDT connection tape for FDT vapour control layer PE |
| ⑥ Fastener                                   | ⑭ Airtight sealing tape                               |
| ⑦ Thermal insulation to specification        | ⑮ Steel structure                                     |
| ⑧ Rhenofol CV flashing strip                 |   |

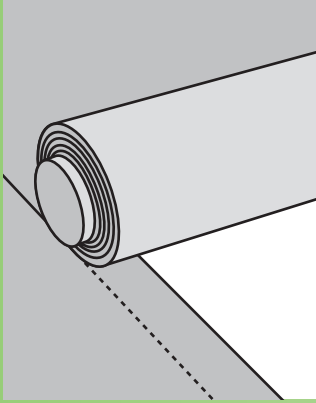


## FDT VarioGully roof outlet Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |  |                              |
|--|------------------------------|
| ① Corrosion-protected profiled steel decking                           | ⑥ Stiffening metal plate     |
| ② FDT vapour control layer PE  | ⑦ Rainwater outlet fixings   |
| ③ Thermal insulation to specification                                  | ⑧ Welding                    |
| ④ Separation layer FDT glass fleece 120 g/m <sup>2</sup> (see page 15) | ⑨ FDT VarioGully roof outlet |
| ⑤ Roofing membrane Rhenofol CV   | ⑩ Rhenofol C collar          |



# Rhenofol® CG

## loose laid with ballast



ZCE administrative centre,  
Pilsen/Czech Republic



Concert Hall  
Alfredo Kraus,  
Las Palmas/Spain



Winery González Byass,  
Toledo/Spain



Office Center,  
Halle/Germany



Palacio de  
Comunicaciones,  
Madrid/Spain





## Safety and functional efficiency, supporting construction, vapour control layer

### Safety and functional efficiency

Because of loose laying, the membrane is not attached to the other layers of the build-up across the complete area. Movements and cracks in the supporting construction are not transferred into the waterproofing layer.

The ballast ensures the membrane remains secure against wind uplift forces. The non-shrinking roofing membrane Rhenofol CG with glass fleece reinforcement is loosely laid. Linear perimeter fixing with single fasteners is only necessary with flashings and cappings.

### Application instructions

#### Supporting construction

- The supporting deck structure has to meet the requirements with regard to load-bearing capacity, deflection, anchorage and drainage.
- Clean, dry and even roof surfaces.
- Suitable substrates must be free from open cracks, rough concrete, sharp projections and stones.
- Joints that may impede the functional efficiency of the roof membrane due to their width or movements have to be formed according to constructional requirements.
- The roof slope should not exceed 3° to prevent the ballast slipping off.

- For compatibility reasons, timber board cladding, chipboards and the like may be treated only with salt-based wood preservatives. Oil or solvent based impregnation agents must not be used.
- Rapid intrusion of air underneath the roof sealing at the roof perimeter and at roof penetrations must be prevented. Therefore these areas have to be made wind tight.
- Roofing membrane Rhenofol CG must not come into contact with bitumen or tar.
- National standards and regulations must be observed.

### Vapour control layer

As vapour control layers, in the case of non-ventilated roofs, we recommend:

- For non air-conditioned rooms (e.g. living rooms and offices or similar rooms without suspended ceiling):
  - FDT vapour control layer PE (polyethylene) 0.25 mm.

In the case of lightweight concrete supporting decks with correctly calculated thermal insulation, you may leave out a vapour control layer, only if the room temperature stays below 20 °C and the relative air humidity inside the room will not exceed 65 %.



## Vapour control layer, thermal insulation layer, separation layer

The vapour control layer PE is applied with a seam overlap of 100 mm, with the seams being sealed with connection or seam tape. The vapour control layer must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must also be flashed.

- For rooms with high air condition loads (e.g. swimming pools, air-conditioned rooms):
  - Aluminium compound foils
  - Vapour control membrane with metal tape reinforcement.

In case of doubt, we recommend a calculation of the building physics in order to identify the diffusion characteristics of the roof build-up.

With lightweight steel decking, we also recommend in principle the installation of a separate vapour control layer, which should be formed as an air barrier.

The vapour barrier must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must be flashed with connection or seam tape.

- National standards and regulations must be observed.

### Thermal insulation layer

Besides thermal protection requirements, you must also bear in mind tread-fastness when designing the thermal insulation layer on steel profile supporting decks.

Expanded polystyrene boards EPS with rebated edge are especially suitable materials for thermal insulation layers.

Insulation materials that are not dimensionally stable and which buckle or bulge must not be installed.

The insulation elements must be laid with pressed joints in bond.

- National standards and regulations must be observed.
- For inverted roofs, the guidelines of the insulation board manufacturer must be observed.

### Separation layer

Between the roofing membrane Rhenofol CG and the substrate or insulation except for building class A fibre insulation material, a separation layer is obligatory.

On top of inflammable thermal insulation materials, a glass fleece 120 g/m<sup>2</sup> must be installed as a separation layer, preventing interaction (e. g. with rigid polystyrene foam) and serving as a fire retarding layer in exposed upstand / flashing areas.

On top of hard substrates with distinctive edges (e.g. timber board cladding, lightweight concrete) the FDT synthetic fleece 300 g/m<sup>2</sup> must be installed as a separation and protection layer.

For the separation against bituminous layers, e.g. in case of old roof refurbishment, a synthetic fleece 300 g/m<sup>2</sup> must be installed, if necessary combined with an underlying polyethylene foil.

- National standards and regulations must be observed.



## Rhenofol CG loose laid, upper separation layer/perimeter fixing, ballast

### Rhenofol CG, loose laid

Roofing membrane Rhenofol CG is loose laid with a seam overlap of 50 mm. The membrane seams are securely joined through solvent or hot air welding.

### Upper separation layer/perimeter fixing

Between the roofing membrane Rhenofol CG and the gravel ballast, a separation layer of 0.2 mm to 0.25 mm thick, normally inflammable PE foil (e. g. vapour control layer PE) should preferably be installed.

You may leave out the PE foil separation layer if the thickness of the membrane is not less than 1.5 mm.

In principle, you will need perimeter fixing (at least 4 single fasteners/m or fixing with Rhenofol laminated metal angles) at all flashings and cappings, built-in details etc.

### Ballast

Place ballast immediately onto loose laid roofing membranes to secure it against wind uplift. Suitable materials are:

- Bulk gravel layers, min. 50 mm thick, natural uncrushed stones, fraction 20/40 river washed.
- Paving slabs on paving pad supports. Below the supports, the FDT protection layer must be installed.
- Paving slabs in a fine gravel bed. Below the gravel bed, the FDT protection layer must be installed.

If appropriate gravel is not available or the gravel is applied pneumatically, then, as under paving slabs, you will need an additional protection layer (e.g. synthetic fleece 300 g/m<sup>2</sup> or FDT protection layer). For compatibility reasons, coarse rubber protective sheets must be laid on a separation layer (e.g. synthetic fleece).

- National standards and regulations must be observed.



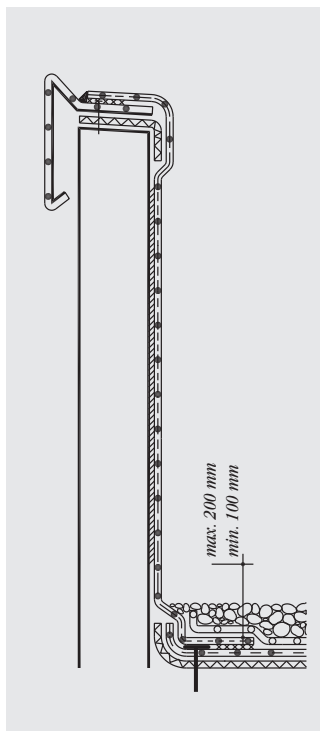
## Flashings and cappings

### Flashings and cappings

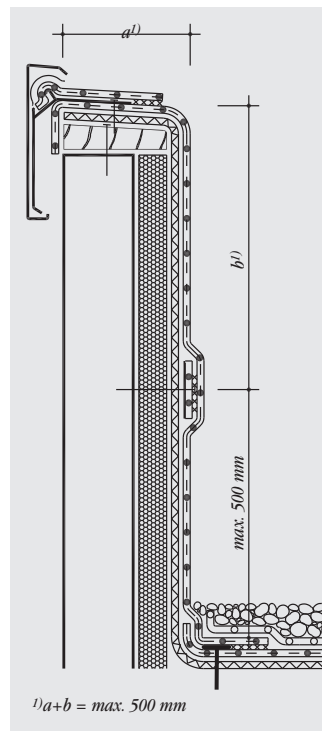
All flashings and cappings are also carried out with Rhenofol CG flashing strips. The flashing strips must be sufficiently fixed.

If the flashing membrane is bonded, then at flashing heights over 200 mm fully bonding is necessary, the first 200 mm being left un-bonded.

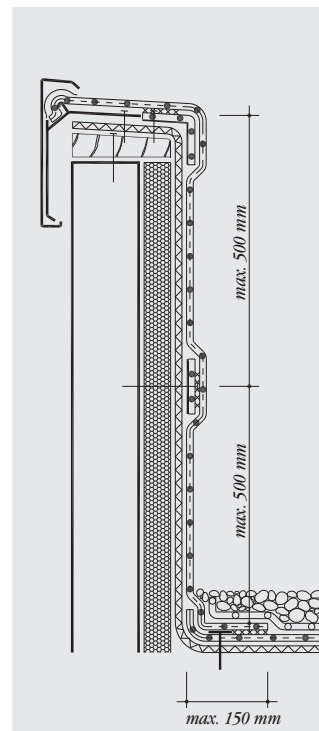
With mechanical fastening of the flashing membrane - with Rhenofol laminated metal sheets or by clamping with the mounting rail of the roof edge trim profile - the spacing between the in-line fasteners must be not more than 500 mm. In this case the whole girth dimension must be taken into consideration. The width of the Rhenofol laminated metal sheets for intermediate fixing must be at least 50 mm.



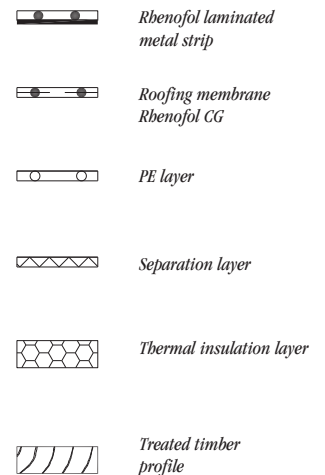
Bonded roof capping.



The roofing membrane is laid under the roof edge trim.



Roofing membrane fastened through the middle with Rhenofol laminated metal strip and angles.



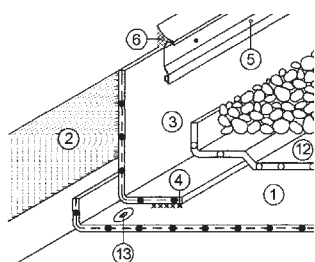




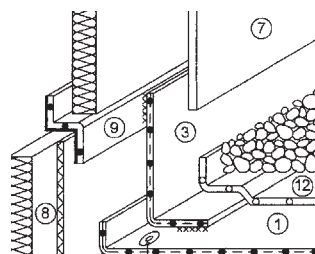
## Wall connections, roof light connections

### Wall connections Rhenofol CG

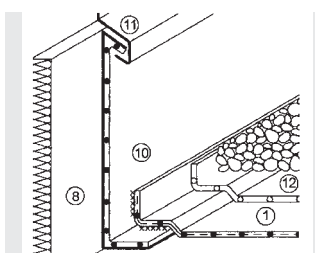
The upper edge of the Rhenofol roofing membrane is clamped to the substrate with rigid wall connection profiles and additionally secured with sealant A.



*Flashing with wall connection profile.*



*Flashing against non-bearing facade.*

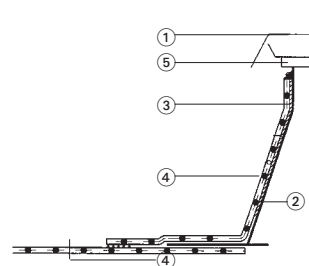


*Wall connection with overhang.*

- ① Roofing membrane Rhenofol CG
- ② Rhenofol-contact adhesive 20
- ③ Rhenofol flashing strip
- ④ Welding
- ⑤ FDT aluminium wall connection profile Classic
- ⑥ Sealant A
- ⑦ Cladding
- ⑧ Thermal insulation layer
- ⑨ Fixing with Z-profile made of Rhenofol laminated metal sheet
- ⑩ Angle fillet made of Rhenofol laminated metal sheet, also achieves wall connection
- ⑪ Overhang
- ⑫ PE layer 0.2 mm – 0.25 mm thick (e.g. FDT vapour control layer PE)
- ⑬ Perimeter fixing with single fasteners

### Roof light connection Rhenofol CG

Roof light upstands are waterproofed to the upper edge with Rhenofol CG strips. The flashing membrane is bonded to the upstand with the upper end being sealed with Rhenofol paste.

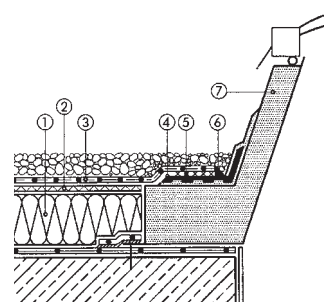


- ① Roof light
- ② Upstand
- ③ Rhenofol-contact adhesive 20
- ④ Roofing membrane Rhenofol CG
- ⑤ Rhenofol paste

*Rhenofol CG under and on the upstand.*

Particularly advantageous are upstands that are factory prepared for connection with PVC membranes:

- Upstands with Rhenofol roofing membrane factory applied.
- Rigid PVC upstands or upstands with laminate embedded rigid PVC strips, against which the roofing membrane Rhenofol CG is flashed at roof level by welding. The upstands have to be approved by the manufacturer for this method of attachment, otherwise separate perimeter fixing is necessary.

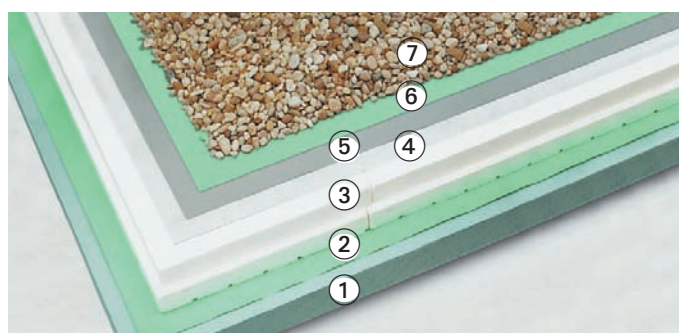


*Roof light with laminate embedded rigid PVC strips.*

- ① Thermal insulation layer
- ② FDT glass fleece
- ③ Roofing membrane Rhenofol CG 1.5 mm
- ④ Laminate embedded rigid PVC strip
- ⑤ Welding
- ⑥ Rhenofol paste
- ⑦ Roof light



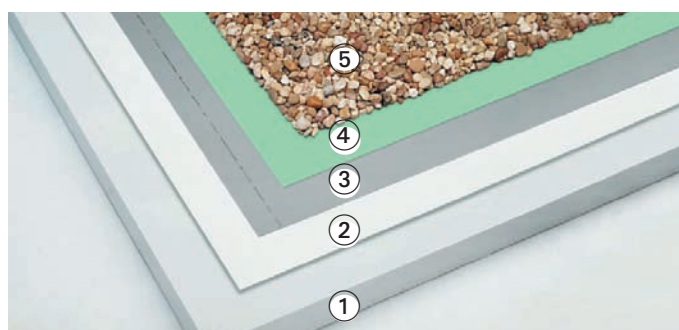
## Layer build-ups



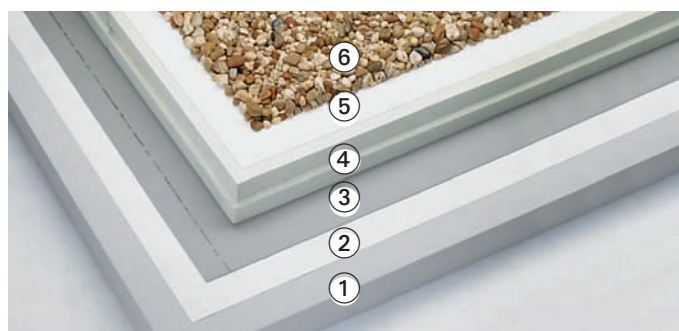
### Examples of layer build-ups

#### Non-ventilated roof (warm roof)

- ① Reinforced concrete
- ② FDT vapour control layer PE 0.25 mm thick
- ③ Thermal insulation layer
- ④ Separation layer FDT glass fleece 120g/m²
- ⑤ Roofing membrane Rhenofol CG
- ⑥ PE separation layer 0.25 mm thick
- ⑦ Bulk gravel, fraction 20/40 mm

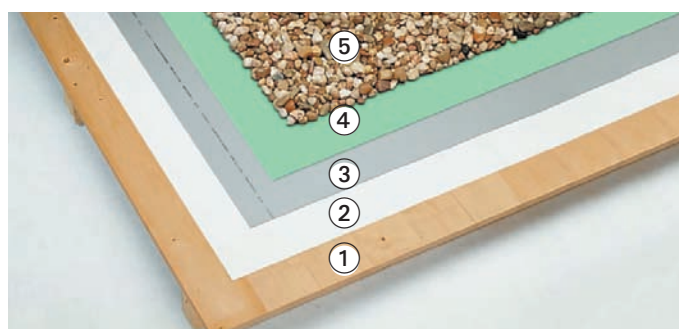


- ① Lightweight concrete
- ② Separation layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CG
- ④ PE separation layer 0.25 mm thick
- ⑤ Bulk gravel, fraction 20/40 mm



#### Inverted roof

- ① Reinforced concrete
- ② Protection layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CG
- ④ Thermal insulation layer of extruded rigid polystyrene foam (XPS)
- ⑤ Synthetic fleece gravel stop
- ⑥ Bulk gravel, fraction 20/40 mm



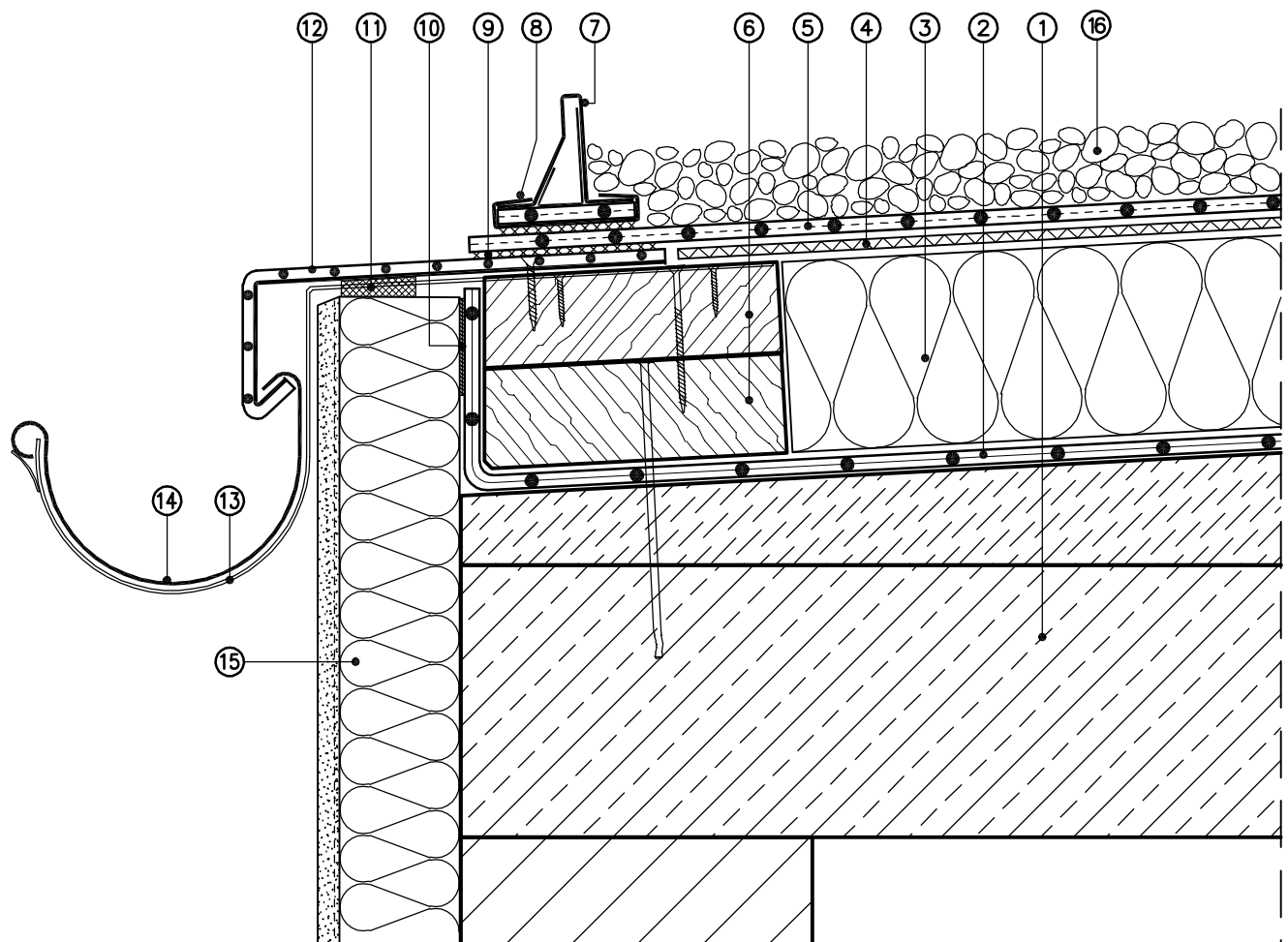
#### Ventilated roof (cold roof)

- ① Timber board cladding/derived timber products
- ② Separation layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CG
- ④ PE separation layer 0.25 mm thick
- ⑤ Bulk gravel, fraction 20/40 mm



## Parapet Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)

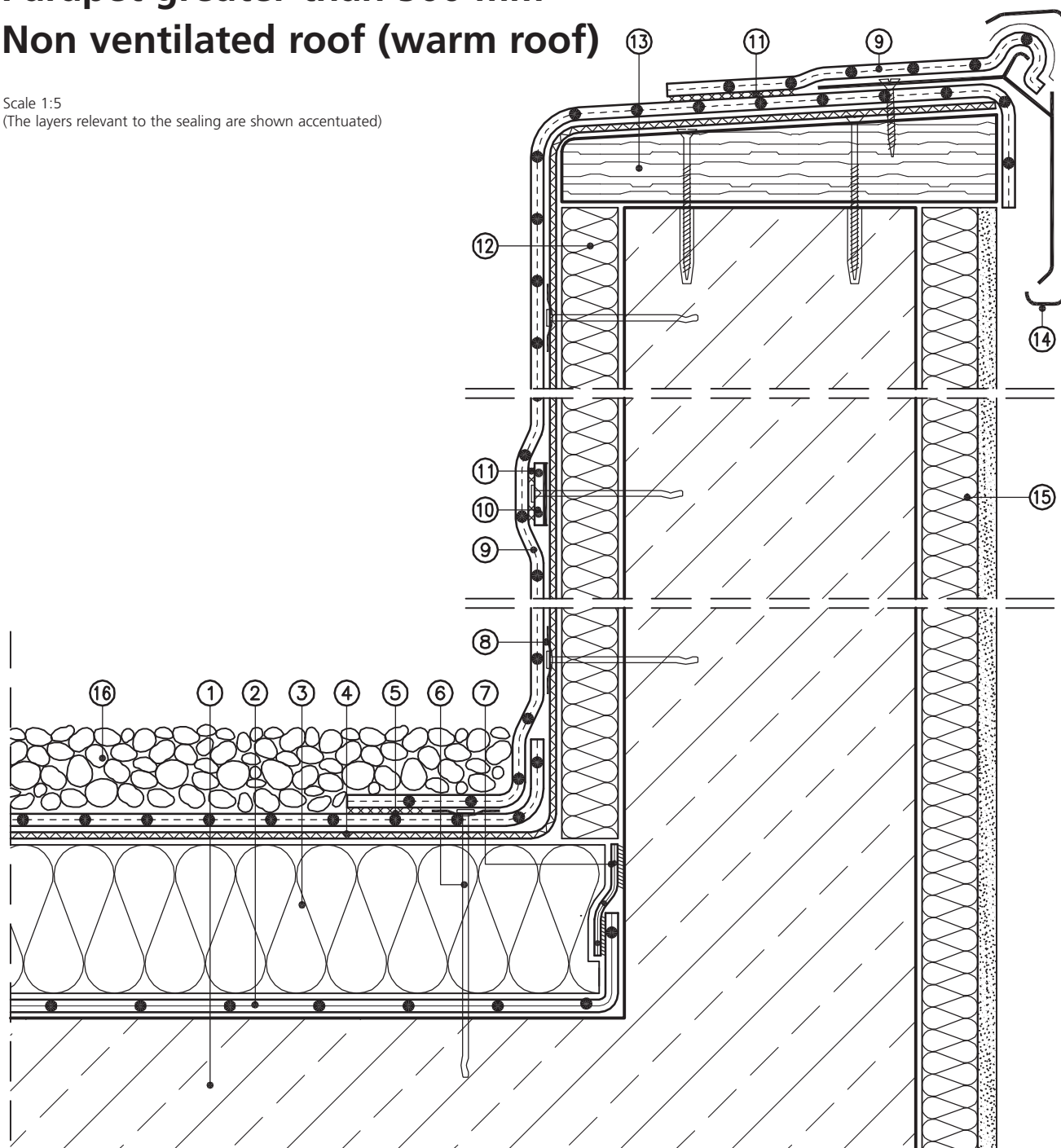


- |   |  |
|---|--|
| ① Concrete to falls                                       | ⑨ Welding                              |
| ② FDT vapour control layer PE                             | ⑩ Airtight sealing tape as air barrier |
| ③ Thermal insulation to specification                     | ⑪ Sealing tape                         |
| ④ Separation layer, FDT glass fleece 120 g/m <sup>2</sup> | ⑫ Rhenofol laminated metal angle       |
| ⑤ Roofing membrane Rhenofol CG                            | ⑬ Bracket                              |
| ⑥ Treated timber profile                                  | ⑭ Gutter                               |
| ⑦ FDT gravel stop profile 100 mm high                     | ⑮ Cladding                             |
| ⑧ Holder and clip for FDT gravel stop profile             | ⑯ Gravel                               |



## Parapet greater than 500 mm Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



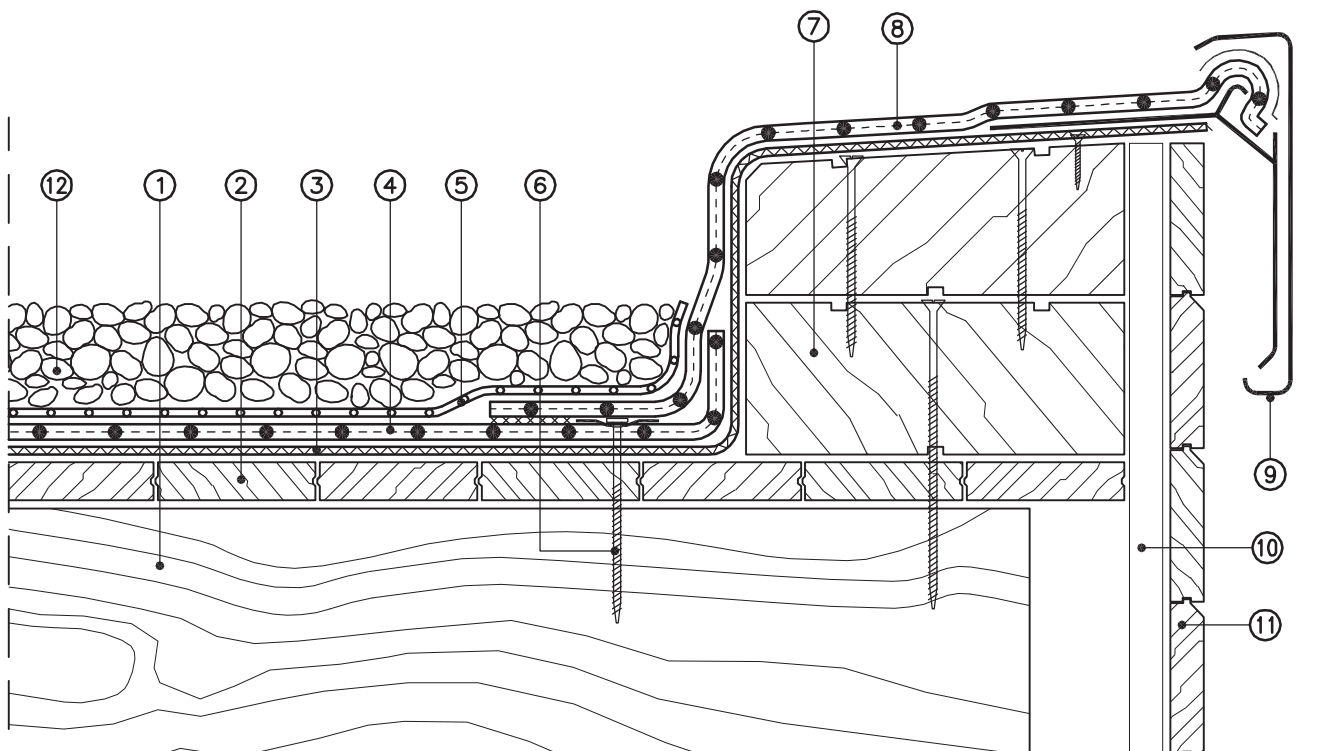
- |   |   |
|---|---|
| ① Reinforced concrete   | ⑨ Rhenofol CG flashing strip                            |
| ② FDT vapour control layer PE   | ⑩ Rhenofol laminated metal strip (Minimum width: 50 mm) |
| ③ Thermal insulation to specification                                   | ⑪ Welding   |
| ④ Separation layer, FDT glass fleece 120 g/m <sup>2</sup> (see page 36) | ⑫ Thermal insulation                                    |
| ⑤ Roofing membrane Rhenofol CG 1.5 mm thick (see page 37)               | ⑬ Treated timber profile                                |
| ⑥ Perimeter fixing  | ⑭ FDT edge trim profile                                 |
| ⑦ FDT connection tape for FDT vapour control layer PE                   | ⑮ Thermal insulation                                    |
| ⑧ Mechanical fixing   | ⑯ Min. 50 mm round washed gravel (20 mm - 40 mm diam.)  |





## Parapet Ventilated roof (cold roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



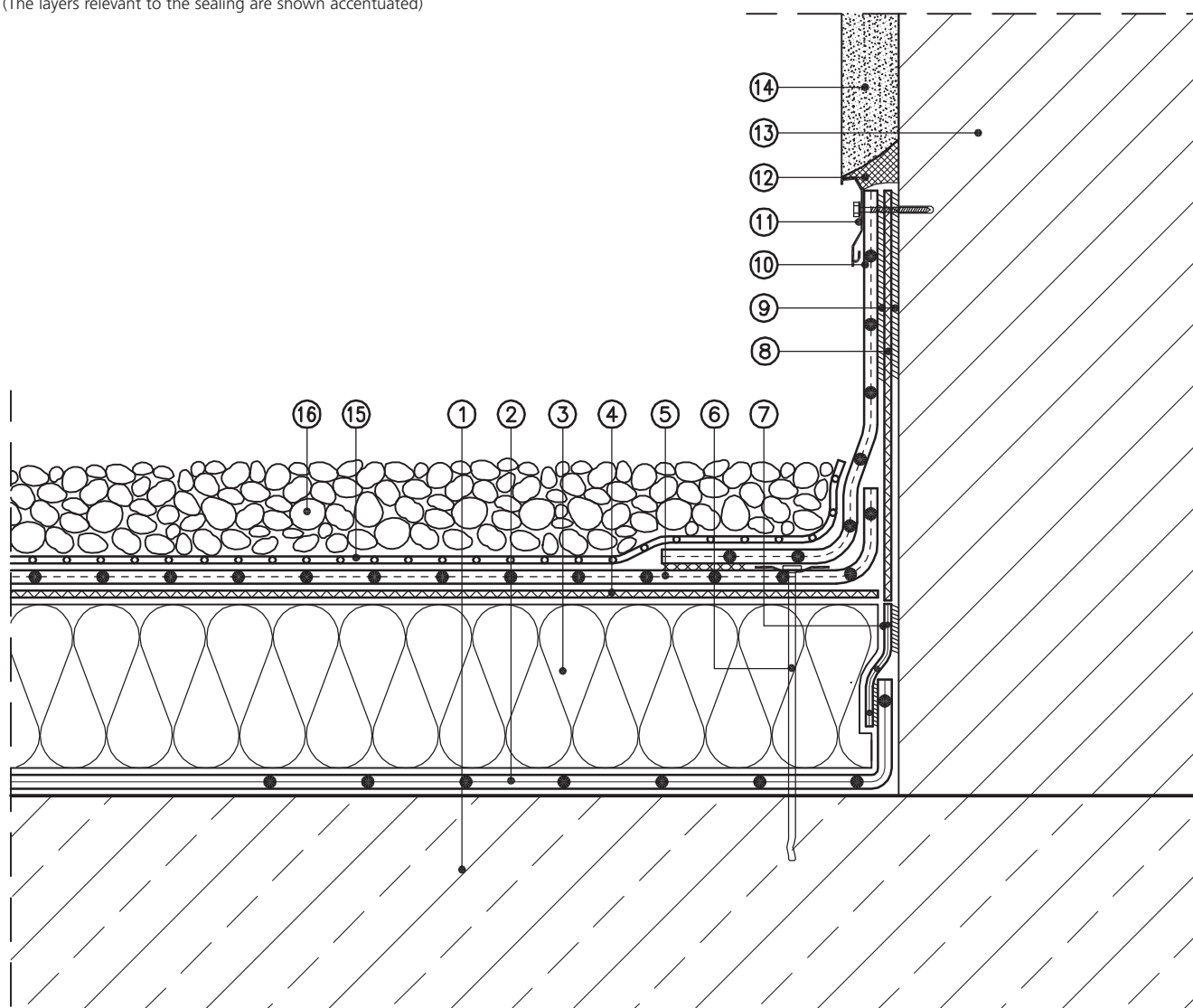
- |   |  |
|---|--|
| ① Joist   | ⑦ Treated timber profile                               |
| ② Close boarded timber                                | ⑧ Rhenofol CG flashing strip                           |
| ③ Separation layer FDT synthetic fleece (see page 36) | ⑨ FDT roof edge trim                                   |
| ④ Roofing membrane Rhenofol CG                        | ⑩ Counter batten                                       |
| ⑤ PE separation layer, 0.2 mm thick (see page 37)     | ⑪ Close boarded cladding                               |
| ⑥ Perimeter fixing                                    | ⑫ Min. 50 mm round washed gravel (20 mm - 40 mm diam.) |



## Wall connection Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)



- |   |  |
|---|--|
| ① Reinforced concrete   | ⑨ Rhenofol contact adhesive 20                         |
| ② FDT vapour control layer PE   | ⑩ Rhenofol CG flashing strip                           |
| ③ Thermal insulation to specification                                   | ⑪ FDT wall connection profile                          |
| ④ Separation layer, FDT glass fleece 120 g/m <sup>2</sup> (see page 36) | ⑫ FDT acrylic sealant                                  |
| ⑤ Roofing membrane Rhenofol CG  | ⑬ Blockwork  |
| ⑥ Perimeter fixing  | ⑭ Render finish  |
| ⑦ FDT connection tape for FDT vapour control layer PE                   | ⑮ PE separation layer, 0.2 mm thick                    |
| ⑧ Separation layer as required  | ⑯ Min. 50 mm round washed gravel (20 mm - 40 mm diam.) |

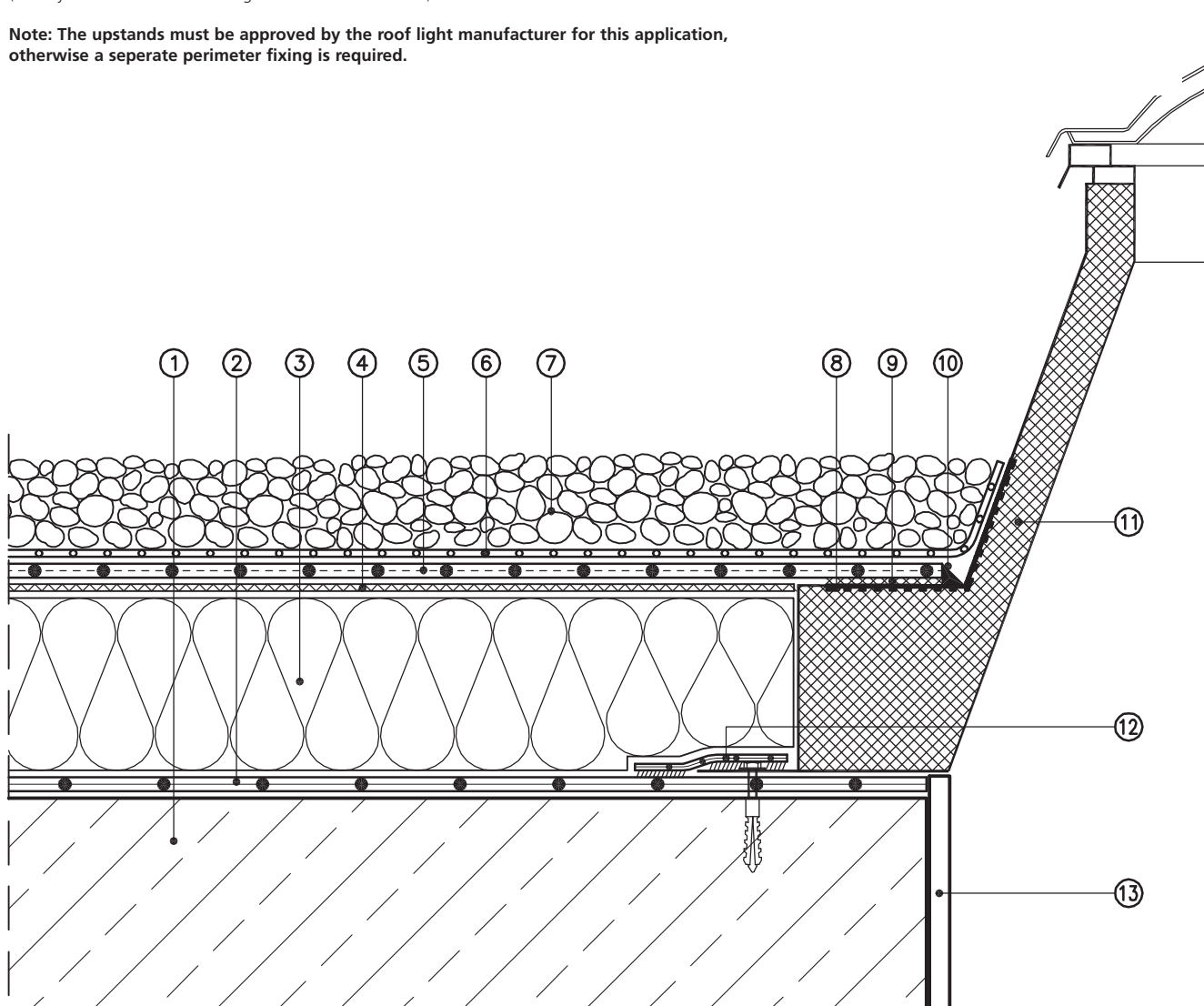


## Rooflight connection Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)

**Note:** The upstands must be approved by the roof light manufacturer for this application, otherwise a separate perimeter fixing is required.



- |   |   |
|---|---|
| ① Reinforced concrete   | ⑧ Integrated rigid PVC strip                      |
| ② FDT vapour control layer  | ⑨ Welding   |
| ③ Thermal insulation to specification                                   | ⑩ Rhenofol paste                                  |
| ④ Separation layer, FDT glass fleece 120 g/m <sup>2</sup> (see page 36) | ⑪ Insulation roof light kerb                      |
| ⑤ Roofing membrane Rhenofol CG  | ⑫ FDT connection tape for vapour control layer PE |
| ⑥ PE separation layer, 0.2 mm thick (see page 37)                       | ⑬ Plaster   |
| ⑦ Min. 50 mm round washed gravel (20 mm - 40 mm diam.)                  |   |



## Rhenofol CG for decks and terraced areas: Safety and functional efficiency, supporting construction



*Parking deck of a housing estate in Frankfurt am Main, waterproofed with Rhenofol CG.*

### Safety and functional efficiency

Roofing and waterproofing membrane  
Rhenofol CG meets all the requirements set up for reliable waterproofing of terrace deck roof areas. Being loose laid, the roof membrane is not attached to the other layers of the build-up across the complete area, ensuring that shrinkage and tension cracks in adjoining layers will not impair the waterproofing.

The membrane is loose laid between two protection layers and thus meets the requirements of a "sealing against non-pressurised water".

The ballast ensures the membrane remains secure against wind uplift forces.

The membrane is rot-proof and permanently tight even without being compressed. Solutions containing natural chemicals, humic acid and de-icing salts do not impair its long term efficiency.

- National standards and regulations must be observed.

### Application instructions

#### Supporting construction

- The supporting deck structure has to meet the requirements with regard to load-bearing capacity, deflection, anchorage and drainage.
- Clean, dry and even roof surfaces.
- Substrates for application must be free of open cracks, rough concrete, sharp projections and stones.
- National standards and regulations must be observed.



## Rhenofol CG for deck areas: Supporting construction, vapour control layer

### Supporting construction

- Joints that may impede the functional efficiency of the roof membrane due to their width or movements have to be formed according to constructional requirements. With precast concrete supporting decks, joints must be completely pointed, open joints must be covered, e. g. with metal strips fixed on one side
- The waterproofing level and the covering surface of parking decks and roof terraces must be sloped. The designed slope should be 1.5 % or more. Slope layers have to consist of gravel concrete.
- For compatibility reasons, timber board cladding and derived timber products may be treated only with salt-based wood preservatives. Oil or solvent based impregnation agents must not be used.
- On roof terraces immediately above residential storeys, appropriate acoustic insulation must be installed.
- The membrane may only be exposed to pressure forces perpendicular to its surface, not to tensile or shearing forces (e. g. when driving off or braking). If necessary, abutments, anchors or similar must be installed to prevent solid coverings slipping off or buckling.
- An intrusion of air underneath the roof sealing at the roof perimeter and at roof penetrations must be prevented. Therefore these areas have to be made wind tight.
- Rhenofol CG must not come into contact with bitumen or tar.
- National standards and regulations must be observed.

### Vapour control layer

As vapour control layers, in the case of non-ventilated roofs, we recommend:

- For non air-conditioned rooms (e.g. living rooms and offices or similar rooms without suspended ceiling):
  - Vapour barrier PE (polyethylene).
- The vapour control layer PE is applied with a seam overlap of 100 mm, with the seams being sealed with connection or seam tape. The vapour control layer must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must be flashed.
- For rooms with high air condition loads (e.g. swimming pools, air-conditioned rooms):
  - FDT vapour barrier alu-gv-sk
  - Aluminium compound foils
  - Vapour control membrane with metal tape reinforcement.

In case of doubt, we recommend a calculation of the building physics in order to identify the diffusion characteristics of the roof build-up.

The vapour control layer must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must be flashed with connection or seam tape.

- National standards and regulations must be observed.





## Rhenofol CG for decks and terraced areas: thermal insulation layer lower protection layer sealing upper protection layer

### Thermal insulation layer

The thermal insulation layer is to be designed in accordance with the thermal and humidity protection requirements.

In order to avoid deformation damage, you must use insulation materials that will resist the static and dynamic loads. Expanded polystyrene foam boards EPS are especially suitable materials.

The boards must have a rebated edge.

Compressive strain or strength reference values at 10 % compression set:

- Roof terrace:  
Min. 150 kPa (0.15 N/mm<sup>2</sup>)
- Parking deck:  
Min. 200 kPa (0.20 N/mm<sup>2</sup>).

As permissible pressure load on insulation layers, we recommend using only 20% of the indicated measured values.

Insulation materials that are not dimensionally stable and which buckle or bulge must not be installed. The insulation elements must be laid with pressed joints in bond.

If designed as inverted roof the instructions of the insulation material manufacturer must be observed.

- National standards and regulations must be observed.
- The guidelines of the insulation board manufacturer must be observed.

### Lower protection layer

Under the membrane a FDT synthetic fleece protection 300 g/m<sup>2</sup> is applied.

The protection layer provides reliable protection of the sealing against mechanical impact originating from the substrate and prevents interaction e.g. with rigid polystyrene foam.

- National standards and regulations must be observed.

### Sealing

Waterproofing is carried out with at least 1.5 mm thick, loose laid roofing membranes Rhenofol CG.

Note:

Place ballast immediately onto loose laid roofing membranes to secure its position against wind uplift.

- National standards and regulations must be observed.

### Upper protection layer

As an upper protection layer, 1.8 mm thick FDT protection layers (PIB with polyester fleece backing) are installed with a seam overlap of 50 mm, hot-air welded or connected using Rhepanol sealing tape.

At flashings and cappings a separate flashing strip is used, loosely overlapping the protection layer at roof level by 250 mm.

FDT protection layer provide protection against mechanical damage, prevent screed or concrete from sticking and allow for the careful compensation of possible movement in solid wear and protection layers.

For compatibility reasons coarse rubber protective sheets must be laid on a separation layer (e.g. synthetic fleece).

- National standards and regulations must be observed.



## Rhenofol CG for decks and terraced areas: protective layer/ballast perimeter fixing flashings and cappings/built-in details

### Protective layer/ballast

Vehicular traffic or heavy load roof areas will be equipped with a statically determined reinforced concrete panel, which serves as a protective layer at the same time.

In order to prevent damaging the waterproofing by movements and deformations of the solid protective layer, concrete layers must be partitioned by joints. After inserting back-fill material the panel joints are pointed with joint sealant.

- National standards and regulations must be observed.

### Perimeter fixing

In principle, you will need linear perimeter fixing (at least 4 single fasteners/m or fixing with Rhenofol laminated metal sheet) at all flashings and cappings, built-in details etc.

### Flashings and cappings/built-in details

All flashings and cappings are also carried out with Rhenofol CG flashing strips. The flashing strips must be sufficiently fixed.

If the flashing membrane is bonded, then at flashing heights over 200 mm fully bonding is necessary, the first 200 mm being left un-bonded.

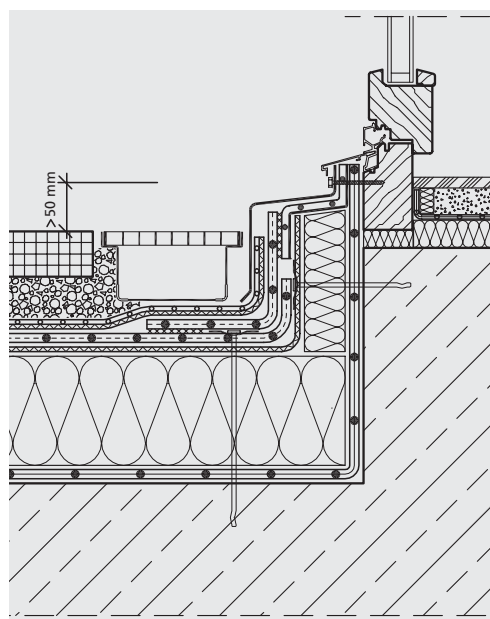
With mechanical fastening of the flashing membrane - with Rhenofol laminated metal sheets or by clamping with the mounting rail of the roof edge trim - the spacing between the in-line fasteners must be not more than 500 mm. In this case the whole girth dimension must be taken into consideration.

The width of the Rhenofol laminated metal sheets for intermediate fixing must be at least 50 mm. See also the sketches on page 38.

At all flashings the sealing must be taken up at least 150 mm over the surface of the protective or wear layer, fixed with mounting rails and made rain-proof.

When sealing roofs of soil-covered buildings, the waterproofing must be taken down at least by 200 mm under the joint between ceiling and walls.

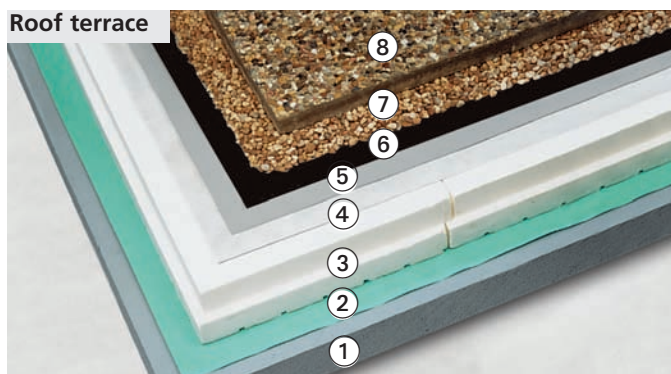
### Example: Flashing built-in detail door



*At door flashings the membrane is protected against mechanical damage by a metal overhang.*

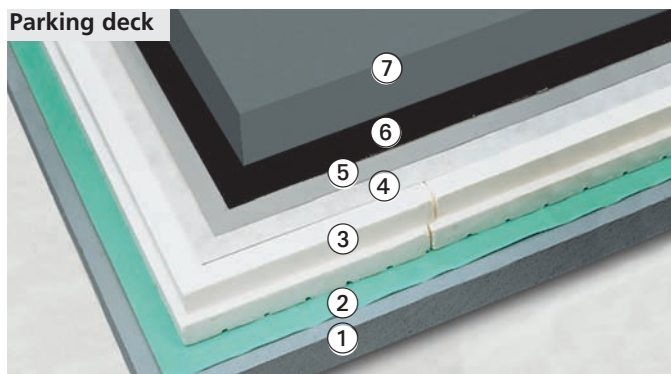


## Roof build-ups for terraced areas

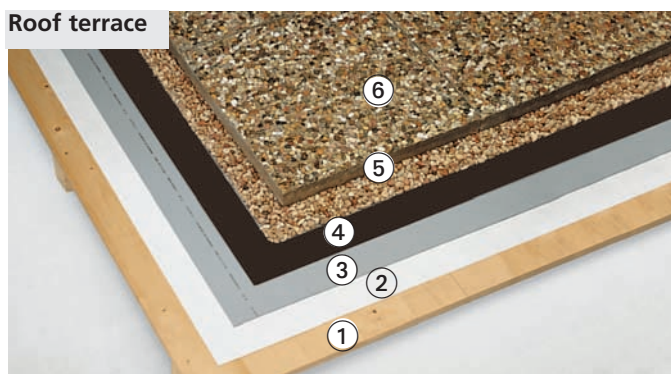


### Examples of roof build-ups Non-ventilated roof (warm roof)

- ① Reinforced concrete
- ② FDT vapour control layer PE 0.25 mm thick
- ③ Thermal insulation layer, pressure-resistant
- ④ Separation layer FDT synthetic fleece 300 g/m²
- ⑤ Roofing membrane Rhenofol CG, 1.5 mm thickness
- ⑥ FDT protection layer
- ⑦ Gravel bed 8/16
- ⑧ Paving slabs



- ① Reinforced concrete
- ② FDT vapour control layer PE 0.25 mm thick
- ③ Thermal insulation layer, pressure-resistant
- ④ Separation layer FDT synthetic fleece 300 g/m²
- ⑤ Roofing membrane Rhenofol CG, 1.5 mm thickness
- ⑥ FDT protection layer
- ⑦ Concrete road surface



### Ventilated roof (cold roof)

- ① Timber board cladding/derived timber products
- ② Separation layer FDT synthetic fleece 300 g/m²
- ③ Roofing membrane Rhenofol CG, 1.5 mm thickness
- ④ FDT protection layer
- ⑤ Gravel bed 8/16
- ⑥ Paving slabs



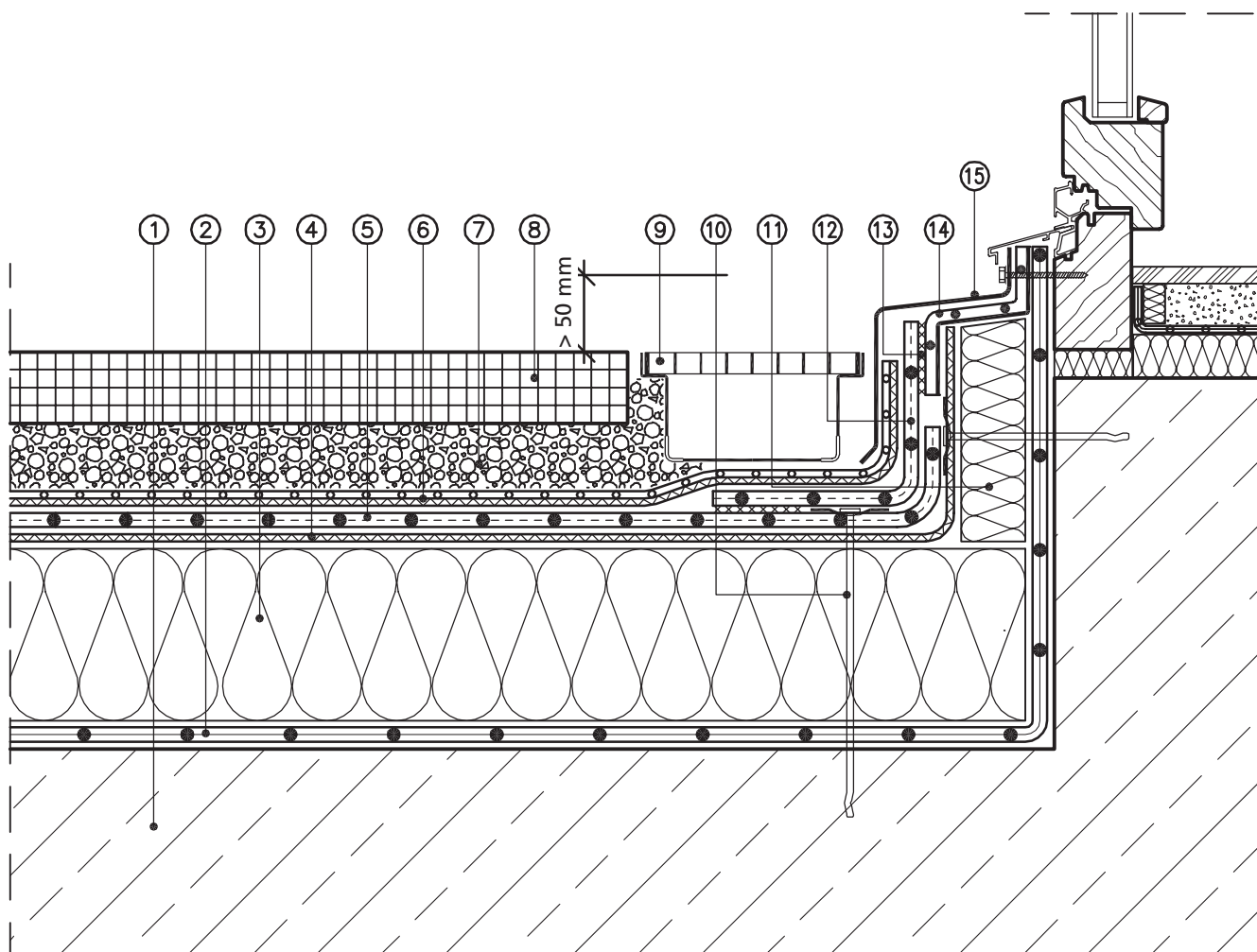
## Terraced Areas

### Flashing against door sill with gutter

### Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)

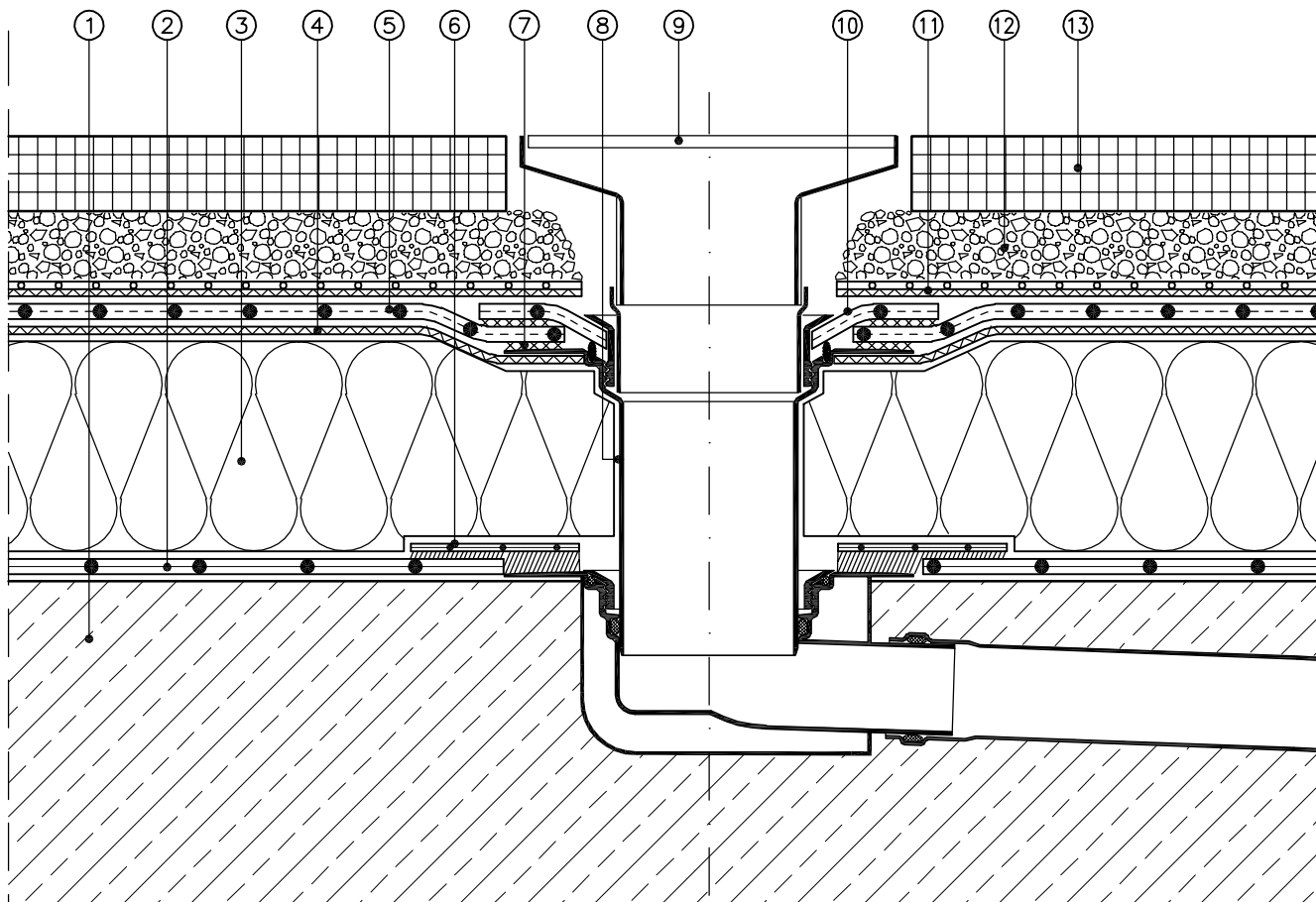


- |  |                                  |
|--|----------------------------------|
| ① Reinforced concrete  | ⑨ Gutter with grid               |
| ② FDT vapour control layer PE  | ⑩ Perimeter fixing               |
| ③ Thermal insulation to specification                                  | ⑪ Thermal insulation             |
| ④ Separation layer FDT glass fleece 120 g/m <sup>2</sup> (see page 48) | ⑫ Rhenofol CG flashing strip     |
| ⑤ Roofing membrane Rhenofol CG, min. 1.5 mm thick (see page 48)        | ⑬ Welding                        |
| ⑥ FDT protection layer   | ⑭ Rhenofol laminated metal angle |
| ⑦ Soft sand  | ⑮ Metal flashing                 |
| ⑧ Paving slabs   |                                  |



## Flashing against roof outlet Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |  |  |
|--|--|
| ① Reinforced concrete  | ⑧ FDT VarioGully roof outlet, low profile side |
| ② FDT vapour control layer PE  | ⑨ Leaf guard with lifting ring                 |
| ③ Thermal insulation to specification                                      | ⑩ Rhenofole C collar                           |
| ④ Separation layer FDT synthetic fleece 300 g/m <sup>2</sup> (see page 48) | ⑪ FDT protection layer                         |
| ⑤ Roofing membrane Rhenofole CG, min. 1.5 mm thick<br>(see page 48)        | ⑫ Soft sand                                    |
| ⑥ FDT connection tape for FDT vapour control layer PE                      | ⑬ Paving slabs                                 |
| ⑦ Welding  |  |



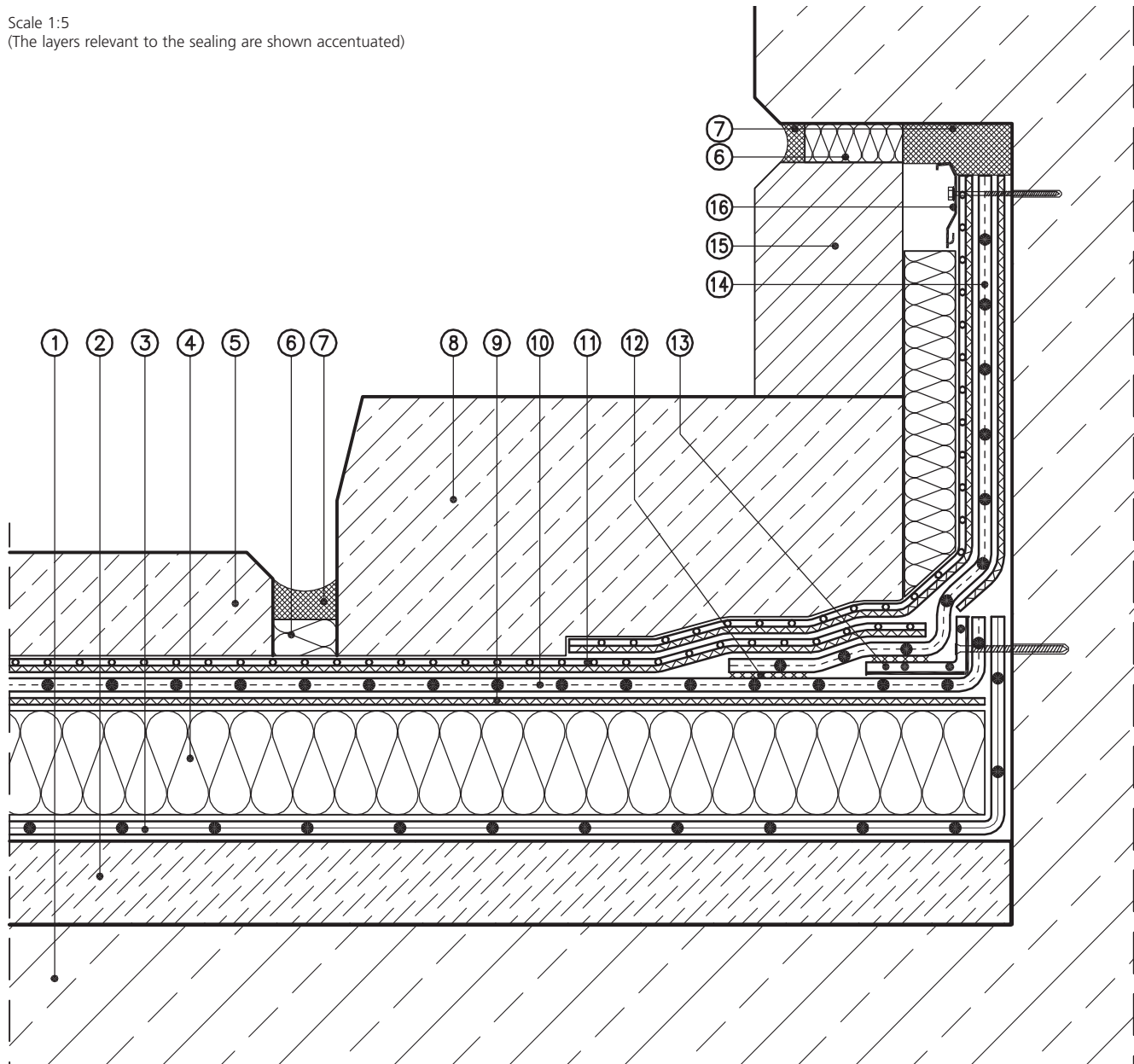


# Terraced areas and parking decks

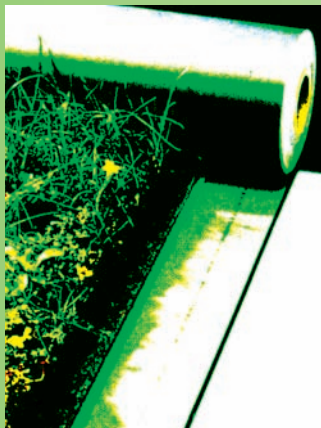
## Wall connection

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



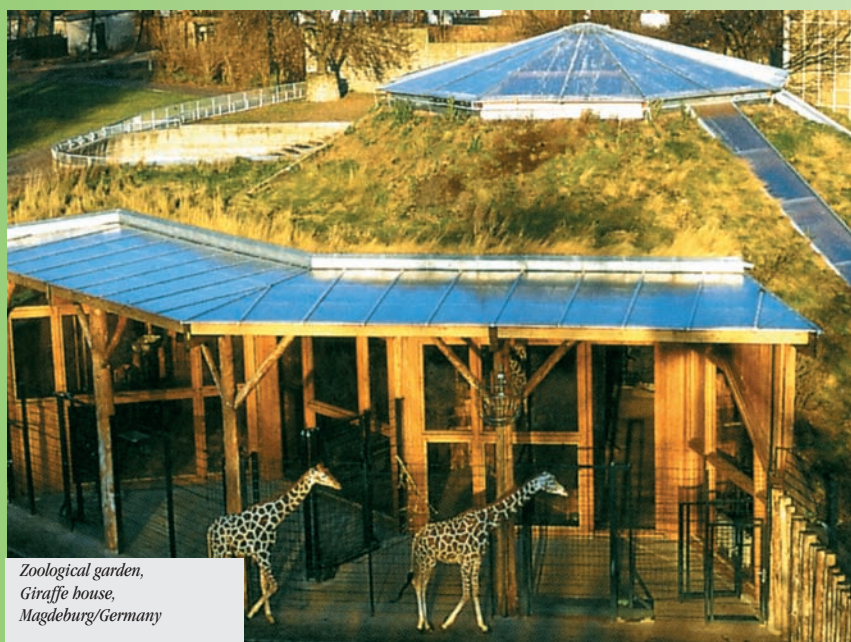
- |                                       |  |
|---------------------------------------|--|
| ① Reinforced concrete                 | ⑨ Separation layer FDT synthetic fleece 300 g/m <sup>2</sup> |
| ② Screed to falls                     | ⑩ Roofing membrane Rhenofol CG, 1.8 mm thick                 |
| ③ FDT vapour control layer PE         | ⑪ FDT protection layer                                       |
| ④ Thermal insulation to specification | ⑫ Welding  |
| ⑤ Concrete screed                     | ⑬ Rhenofol laminated metal angle                             |
| ⑥ Mineral wool                        | ⑭ Rhenofol CG flashing strip                                 |
| ⑦ Mastic                              | ⑮ Concrete   |
| ⑧ Kerb                                | ⑯ FDT wall connection profile                                |



## Roof gardens with Rhenofol® CG loose laid with ballast



*Residential building,  
Toledo/Spain*



*Zoological garden,  
Giraffe bouse,  
Magdeburg/Germany*



*Office and business centre,  
Hamburg/Germany*





## Safety and functional efficiency



### Safety and functional efficiency

Roofing membranes Rhenofol CG meet all requirements set up for reliable waterproofing of green roofs.

In terms of resistance to root/rhizome penetration, Rhenofol CG meets the test requirements of the FLL testing method. That means that the roofing membranes Rhenofol CG serve as both waterproofing and as a protection against root penetration at the same time. There is no need for a separate root protection layer.

Because of loose laying between the two protection layers, the roof membrane is not attached to the other layers of the build-up across the complete area, ensuring that shrinkage and tension cracks in adjoining layers will not impair the performance of the membrane.

In most cases the ballast in form of a vegetation mat is sufficient for ensuring stability against wind uplift.

The membrane is rot resistant. Solutions containing natural chemicals and humic acid do not impair the functional efficiency.

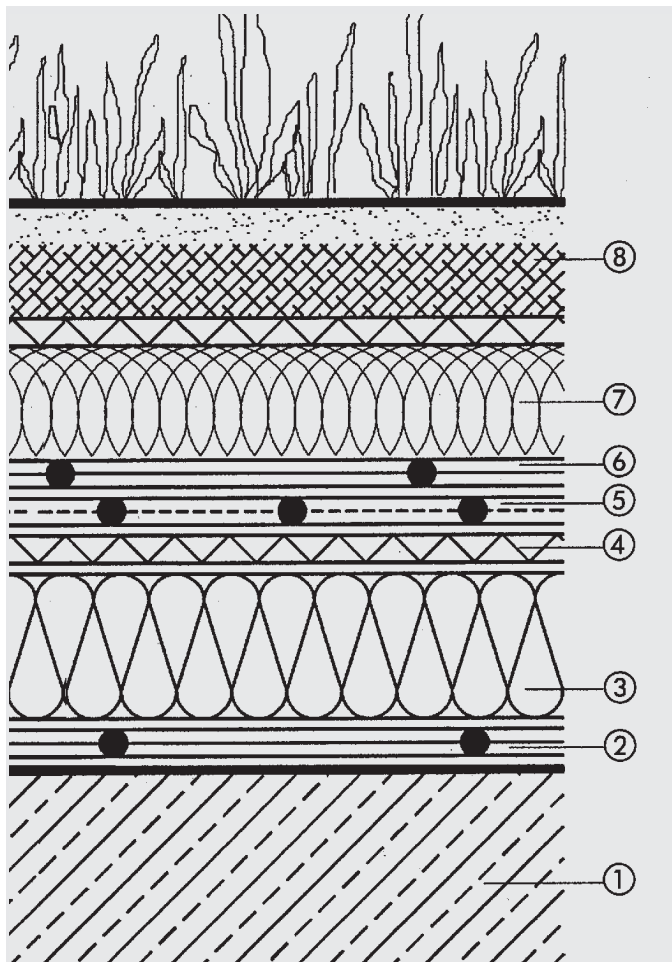


## Layer build-ups

### Extensive roof gardens

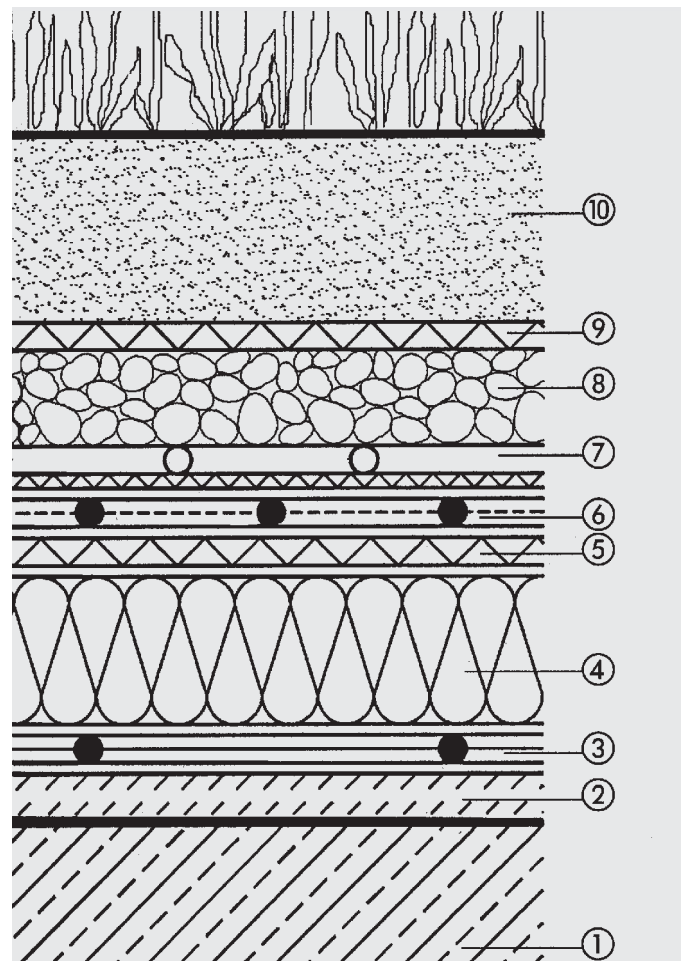
### Intensive roof gardens

Example for layer build-up:  
Extensive roof garden



- ① Reinforced concrete
- ② FDT vapour control layer PE
- ③ Thermal insulation to specification
- ④ Separation layer, FDT synthetic fleece 300 g/m<sup>2</sup>,  
alternatively FDT glass fleece 120 g/m<sup>2</sup>
- ⑤ Roofing membrane Rhenofol CG 1.5 mm
- ⑥ PE separation layer, 0.2 mm thick
- ⑦ Combined drainage, filter and protection layer
- ⑧ Vegetation mat

Example for layer build-up:  
Intensive roof garden



- ① Reinforced concrete
- ② Screed to falls
- ③ FDT vapour control layer PE
- ④ Thermal insulation to specification
- ⑤ Separation layer FDT synthetic fleece 300 g/m<sup>2</sup>
- ⑥ Roofing membrane Rhenofol CG 1.5 mm
- ⑦ FDT protection layer sheet as upper protection layer
- ⑧ Drainage layer
- ⑨ Filter layer
- ⑩ Vegetation layer, without storage irrigation



## Supporting construction, vapour control layer

### Application instructions

#### Supporting construction

- The supporting deck structure has to meet the requirements with regard to load-bearing capacity, deflection, anchorage and drainage.
- Clean, dry and even roof surfaces.
- Suitable substrates must be free of open cracks, rough concrete, sharp projections and stones.
- Joints that may impede the functional efficiency of the roof sealing due to their width or movements, have to be formed according to constructional requirements.
- Green roofs should be designed with a slope. The designed slope should be 2% or more.
- With steeper roof slopes (from approx. 7°) special shearing protection measures are necessary, which must be agreed with the manufacturer of the green roof system, depending on the project. In this respect, the instruction of the manufacturer of the green roof system must be observed.
- For compatibility reasons, timber board cladding or chipboards may be treated only with salt-based wood preservatives. Oil or solvent based impregnation agents must not be used.
- An intrusion of air underneath the roof sealing at the roof perimeter and at roof penetrations must be prevented. Therefore these areas have to be made windtight.

- Rhenofol roofing membranes must not come into contact with bitumen or tar.

- National standards and regulations must be observed.

#### Vapour control layer

As vapour control layers, in the case of non-ventilated roofs, we recommend:

- For non air-conditioned rooms (e.g. living rooms and offices or similar rooms without suspended ceiling):
  - FDT vapour control layer PE (polyethylene).

The FDT vapour control layer PE is applied with a 100 mm seam overlap. The seams are sealed with seam or connection tape.

- For rooms with high air condition loads (e.g. swimming pools, air-conditioned rooms):
  - FDT vapour barrier alu-gv-sk
  - Aluminium compound foils
  - Vapour control layer with metal tape reinforcement

In case of doubt, we recommend a calculation of the building physics in order to identify the diffusion characteristics of the roof build-up.

The vapour control layer must be taken up and flashed at connections and cappings with connection tape; at roof penetrations it must be flashed.

- National standards and regulations must be observed.





# Thermal insulation layer

## lower protection layer

## sealing

## upper protection layer

### Thermal insulation layer

You must bear in mind tread-fastness when designing the thermal insulation layer on steel profile supporting decks.

As materials for thermal insulation layers we recommend:

- Insulation boards made of expanded polystyrene, with rebated edge, according to EN 13163.
- Non-flammable mineral fibre boards, according to EN 13162.
- Large-sized insulation boards made of quality assured rigid foam PUR / PIR according to EN 13165.

Insulation materials that are not dimensionally stable and which buckle or bulge must not be installed. The insulation boards must be laid with lightly buttet joints in brick bond.

- National standards and regulations must be observed.
- The guidelines of the insulation board manufacturer must be observed.

### Lower protection layer

Under the membrane a FDT synthetic fleece protection 300 g/m<sup>2</sup> is applied. In case of extensive green roofs and polystyrene thermal insulation layers you may also use FDT glass fleece 120g/m<sup>2</sup>. The protection layer provides reliable protection of the membrane against mechanical impact originating from the substrate and prevents interaction e.g. with rigid polystyrene foam.

- National standards and regulations must be observed.

### Sealing

Green roof areas are sealed with loose laid roofing membranes Rhenofol CG, at least 1.5 mm thick. Place ballast immediately onto loose laid roofing membranes to secure its position against wind uplift.

- National standards and regulations must be observed.

### Perimeter fixing

In principle, you will need perimeter fixing (at least 4 single fasteners/m or fixing with Rhenofol laminated metal sheet) at all flashings and cappings, built-in details etc.

### Upper protection layer

As an upper protection layer, 1.8 mm thick FDT protection layer (PIB with polyester fleece backing) are installed with a seam overlap of 5 cm, hot-air welded or connected using Rhepanol sealing tape.

At flashings and cappings a separate flashing strip is used loosely overlapping the protection layer at roof level by 250 mm (see page 64/ item 12).

With extensive green roof systems instead of FDT protection layer a min. 0.2 mm thick PE foil can be applied as an upper separation layer, provided that on top of the PE foil a drainage layer is installed serving as upper protection layer at the same time.

For compatibility reasons coarse rubber protective sheets must be laid on a separation layer (e. g. synthetic fleece).

- National standards and regulations must be observed.



## Roof garden system/position stability

### Roof gardens system/position stability

Greening of the roof is done with standard roof garden systems.

You must use only drained green roof systems, since the described roof build-ups are not designed for storage irrigation.

#### Note:

- As regards green roof layers (drainage, filter and vegetation layer), the instruction of the manufacturer of the green roof system must be observed.

The green roof build-up in many cases also provides adequate ballast against wind uplift.

The calculated wind loads must be observed. Only the dry weight of the green roof build-up will be taken into consideration.

If the green roof system does not provide sufficient ballast, e.g. in case of lightweight extensive green roofs at the perimeter and corner areas of the roof, the roofing membrane must be mechanically fastened in these areas, e.g. at the overlapped membrane edge. Spacing of the mechanical fastening is normally done with respect to the overall wind load. In this case, the weight of the green roof layers should not be taken into consideration.

- National standards and regulations must be observed.



## Flashings and cappings/built-in details

### Flashings and cappings/built-in details

All flashings and cappings are also carried out with Rhenofol CG flashing strips.

The flashing strips must be sufficiently fixed. If the flashing membrane is bonded, then at flashing heights over 200 mm fully bonding is necessary, the first 200 mm being left un-bonded.

With mechanical fastening of the flashing membrane - with Rhenofol laminated metal sheets or by clamping with the mounting rail of the roof edge trim - the spacing between the in-line fasteners must be not more than 500 mm. In this case the whole girth dimension must be taken into consideration. The width of the Rhenofol laminated metal sheets for intermediate fixing must be at least 50 mm.

All flashings and cappings, roof penetrations etc. must be kept free of vegetation. Paving slabs in a fine gravel bed are most suitable for these purposes.

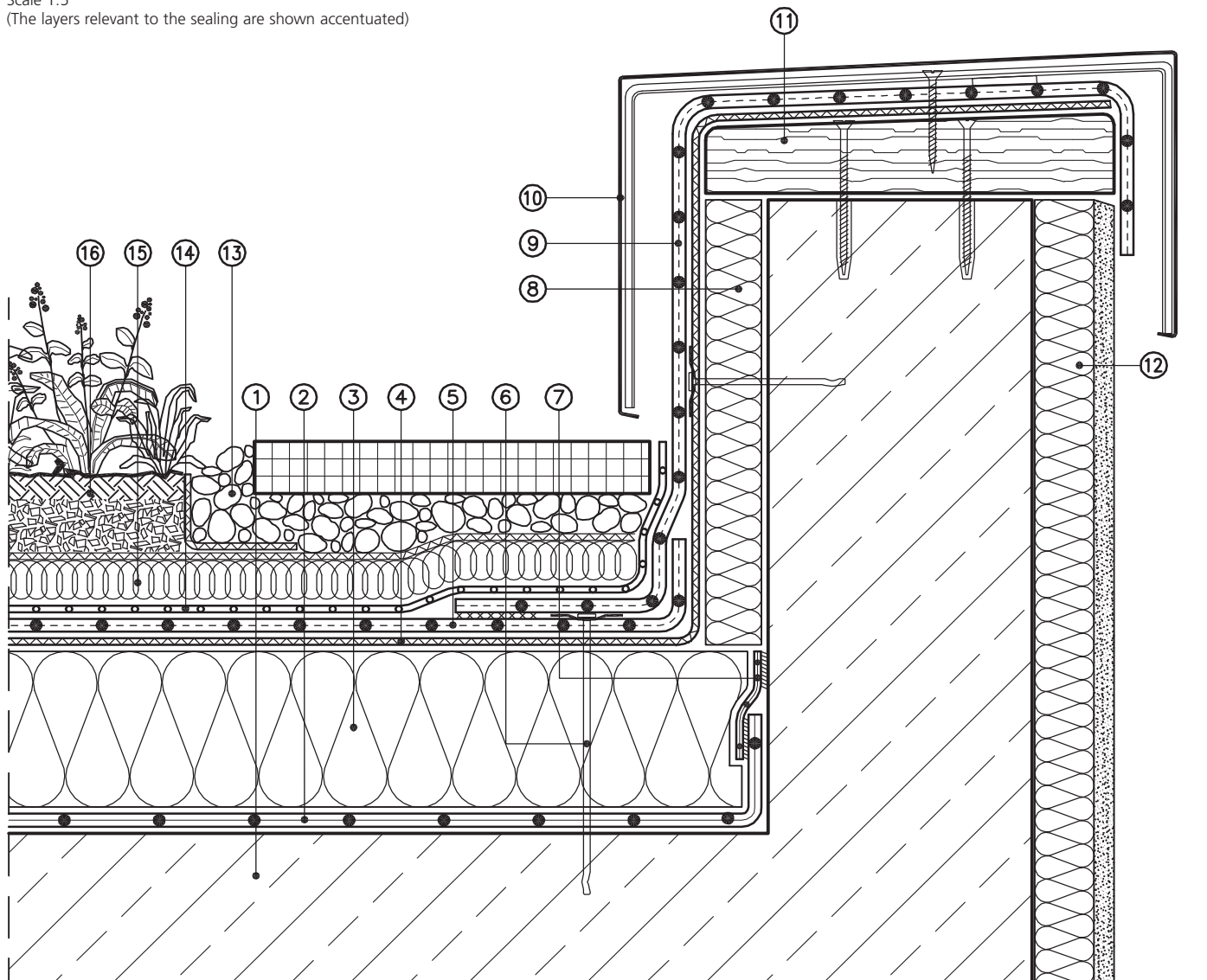
Roof outlets should be at least 500 mm away from all edges of the building as well as from joints and penetrations. Besides this, they must be designed to be accessible at any time.

At all flashings the sealing must be taken up at least 150 mm over the surface of the green roof, fixed with mounting rails and made rain-proof.



## Parapet Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |  |                                     |
|--|-------------------------------------|
| ① Reinforced concrete  | ⑨ Rhenofol CG flashing strip        |
| ② FDT vapour control layer PE                                | ⑩ Capping                           |
| ③ Thermal insulation to specification                        | ⑪ Treated timber profile            |
| ④ Separation layer FDT synthetic fleece 300 g/m <sup>2</sup> | ⑫ Thermal insulation                |
| ⑤ Roofing membrane Rhenofol CG 1.5 mm thick                  | ⑬ Paving slabs in gravel bed        |
| ⑥ Perimeter fixing   | ⑭ PE separation layer, 0.2 mm thick |
| ⑦ FDT connection tape for vapour control layer PE            | ⑮ Drainage and filter mat           |
| ⑧ Thermal insulation   | ⑯ Vegetation mat                    |

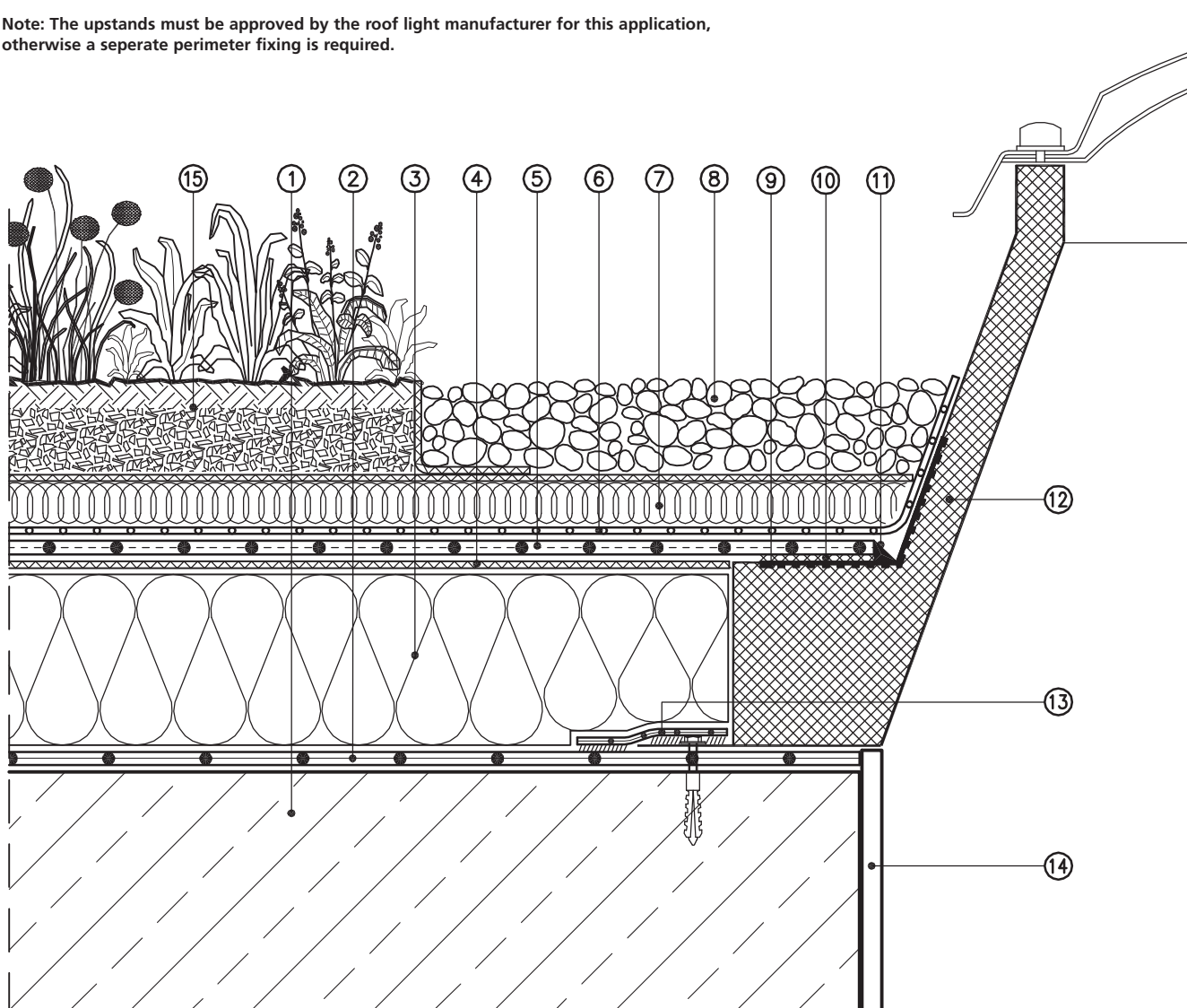


## Rooflight connection Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)

**Note:** The upstands must be approved by the roof light manufacturer for this application, otherwise a separate perimeter fixing is required.



- |  |   |
|--|---|
| ① Reinforced concrete                                    | ⑨ Integrated rigid PVC strip                |
| ② FDT vapour control layer PE                            | ⑩ Welding                                   |
| ③ Thermal insulation to specification                    | ⑪ Rhenofol paste                            |
| ④ Separation layer FDT glass fleece 120 g/m <sup>2</sup> | ⑫ Insulated roof light kerb                 |
| ⑤ Roofing membrane Rhenofol CG, 1.5 mm thick             | ⑬ FDT connection tape for vapour barrier PE |
| ⑥ PE separation layer, 0.2 mm thick                      | ⑭ Plaster                                   |
| ⑦ Drainage and filter mat                                | ⑮ Vegetation mat                            |
| ⑧ Min. 50 mm round washed gravel (20 mm - 40 mm diam.)   |   |

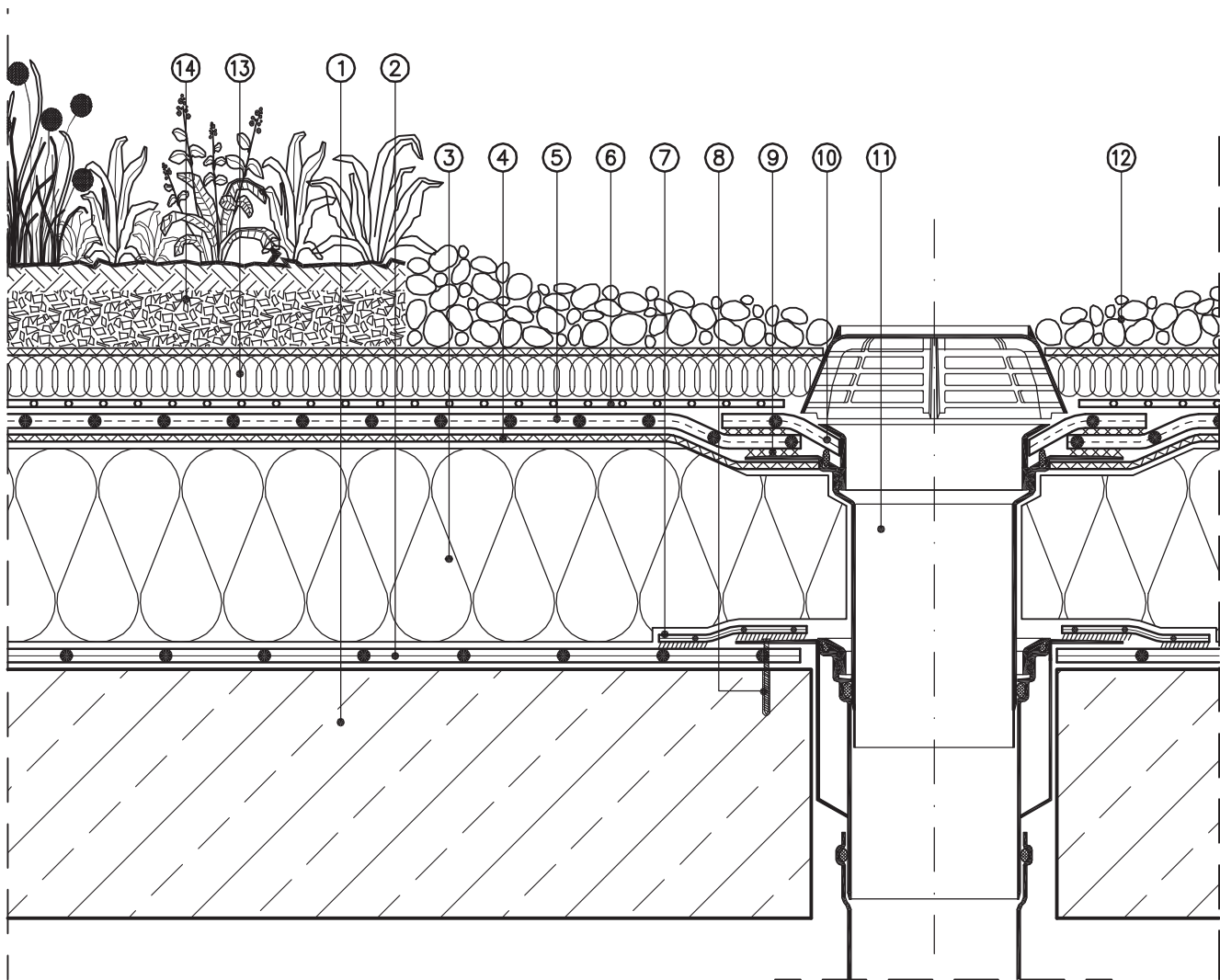




## Roof outlet

### Non ventilated roof (warm roof)

Scale 1:5  
(The layers relevant to the sealing are shown accentuated)



- |  |  |
|--|--|
| ① Reinforced concrete  | ⑨ Welding  |
| ② FDT vapour control layer PE  | ⑩ Rhenofol collar                                      |
| ③ Thermal insulation to specification                                      | ⑪ FDT VarioGully roof outlet with warm roof attachment |
| ④ Separation layer FDT synthetic fleece 300 g/m <sup>2</sup> (see page 58) | ⑫ Round washed gravel (20 mm - 40 mm diam.)            |
| ⑤ Roofing membrane Rhenofol CG, 1.5 mm thick (see page 58)                 | ⑬ Drainage and filter mat                              |
| ⑥ PE separation layer, 0.2 mm thick  | ⑭ Vegetation mat                                       |
| ⑦ FDT connection tape for FDT vapour control layer PE                      |  |
| ⑧ Rainwater outlet fixings   |  |



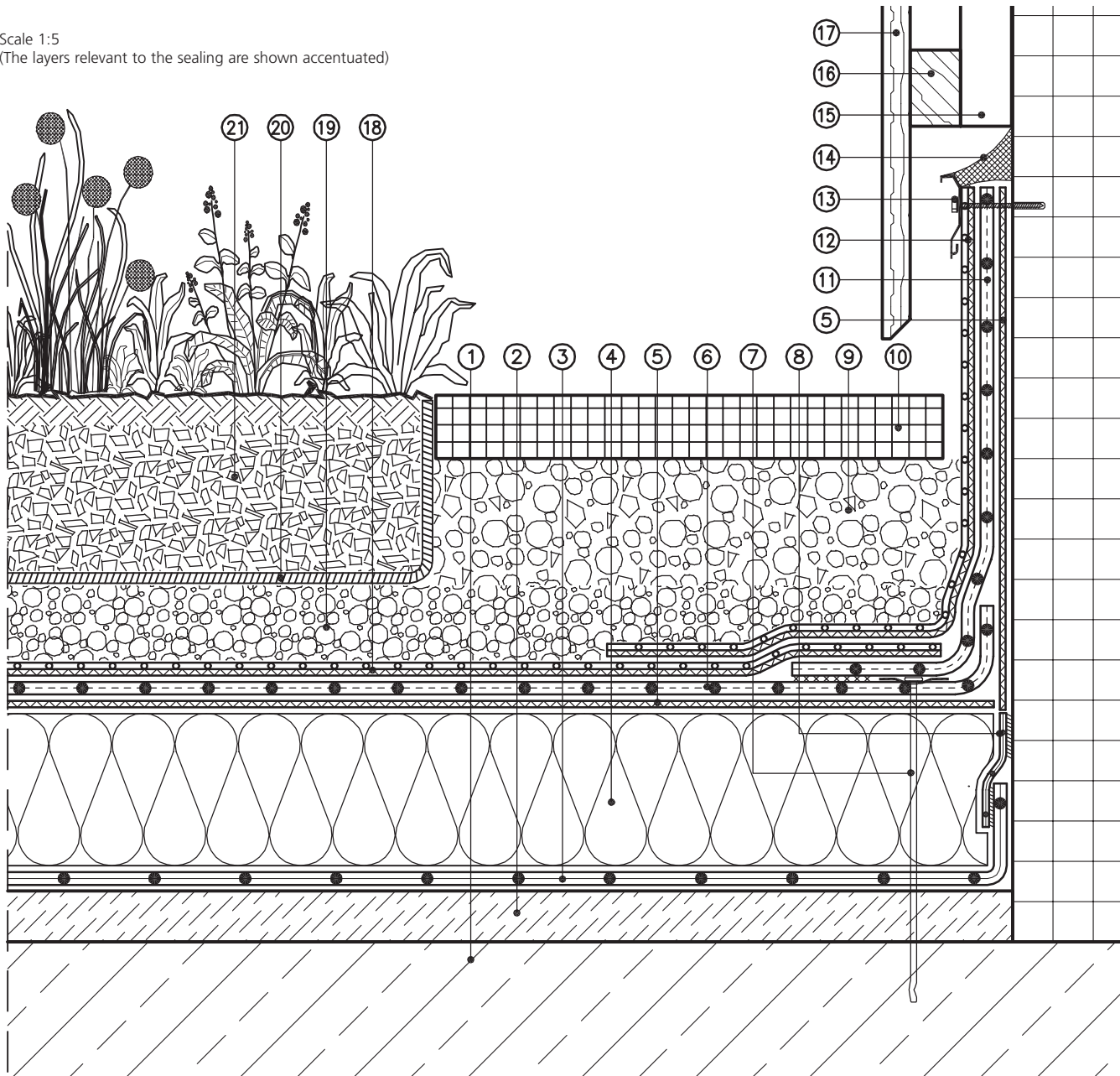
# Intensive roof garden with Rhenofol® CG

## Parapet

### Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)



- |  |   |                        |
|--|---|------------------------|
| ① Reinforced concrete  | ⑦ Perimeter fixing                                    | ⑭ FDT sealant A        |
| ② Screed to falls  | ⑧ FDT connection tape for FDT vapour control layer PE | ⑮ Timber batten        |
| ③ FDT vapour control layer PE  | ⑨ Gravel bed  | ⑯ Counter batten       |
| ④ Thermal insulation to specification                                      | ⑩ Paving slabs  | ⑰ Cladding             |
| ⑤ Separation layer FDT synthetic fleece 300 g/m <sup>2</sup> (see page 58) | ⑪ Rhenofol CG flashing strip                          | ⑱ FDT protection layer |
| ⑥ Roofing membrane Rhenofol CG, 1.5 mm thick (see page 58)                 | ⑫ FDT protection strip                                | ⑳ Filter layer         |
|  | ⑬ FDT aluminium wall connection profile Classic       | ㉑ Vegetation layer     |



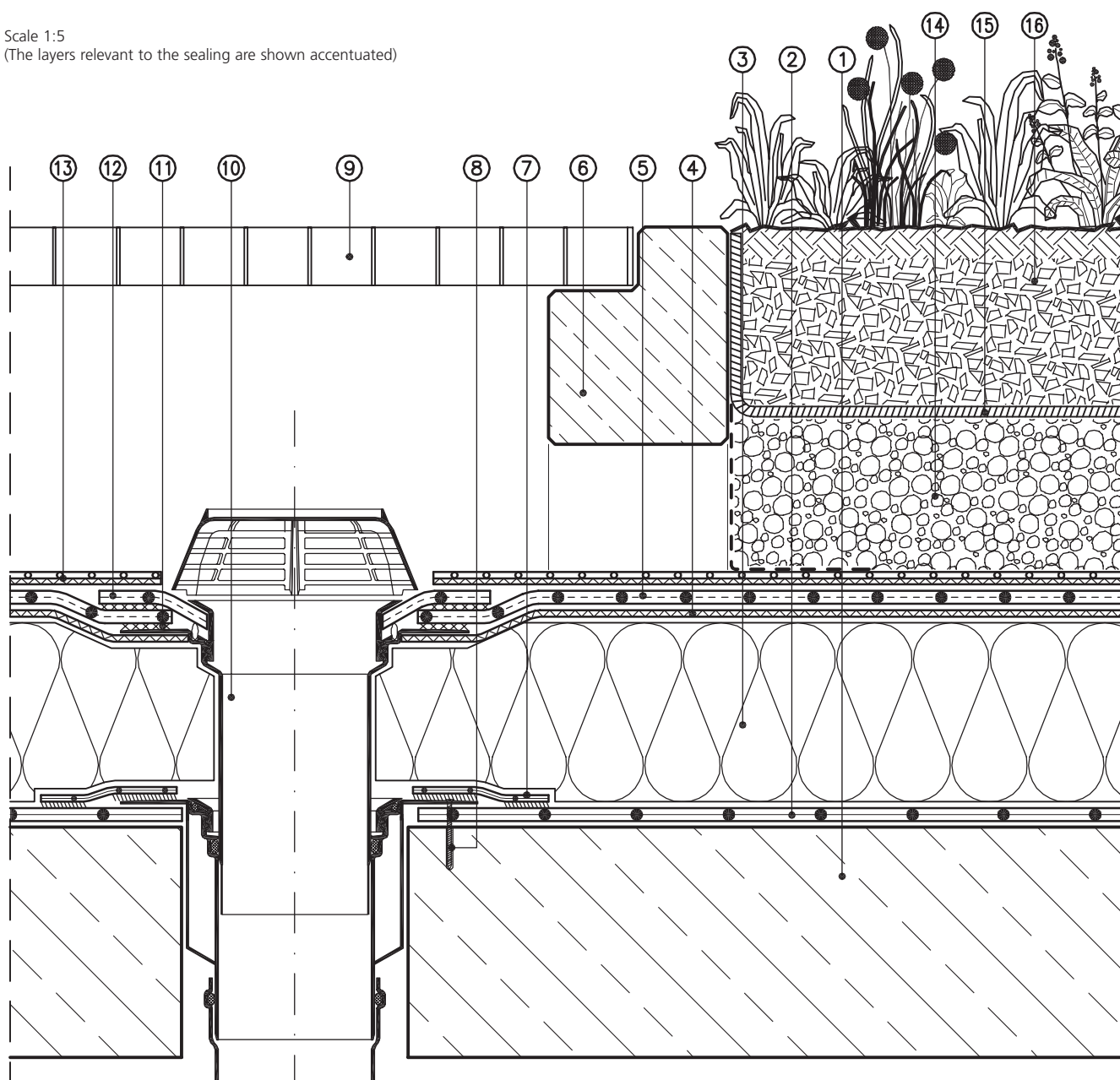
# Intensive roof garden with Rhenofol CG

## Roof outlet with concrete ring

### Non ventilated roof (warm roof)

Scale 1:5

(The layers relevant to the sealing are shown accentuated)



- |  |  |
|--|--|
| ① Reinforced concrete  | ⑨ Grating  |
| ② FDT vapour control layer PE                                  | ⑩ FDT VarioGully roof outlet with warm roof attachment |
| ③ Thermal insulation to specification                          | ⑪ Welding  |
| ④ Separation layer FDT synthetic fleece 300 g/m² (see page 58) | ⑫ Rhenofol collar                                      |
| ⑤ Roofing membrane Rhenofol CG, 1.5 mm thick (see page 58)     | ⑬ FDT protection layer                                 |
| ⑥ Concrete ring  | ⑭ Drainage layer                                       |
| ⑦ FDT connection tape for FDT vapour control layer PE          | ⑮ Filter layer   |
| ⑧ Rainwater outlet fixings                                     | ⑯ Vegetation mat                                       |

**Data sheets**

**Product information**

**Accessories**



## Roofing membrane Rhenofol® CV

### Rhenofol CV

#### The roofing membrane for mechanically fixed roof build ups.

Rhenofol CV is a product made of non-rigid polyvinyl chloride (PVC-P), a synthetic fibre reinforced roofing membrane.

Owing to the outstanding material characteristics, roofing membranes Rhenofol CV are suitable for single-ply application.

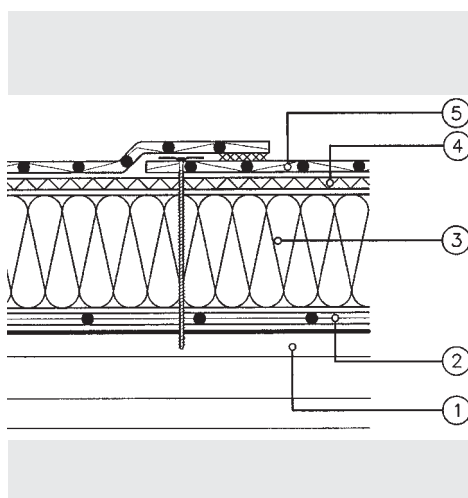
Seam overlaps can be practically sealed with solvent or hot air welding.

### Quality assurance

Rhenofol CV is subject to constant in-house and external quality control. The in-house quality assurance system for the whole company has been certified according to DIN ISO 9001, the world's most strict quality standard, and is constantly monitored by TÜV CERT.

### Range of application

Rhenofol CV is used for waterproofing in mechanically fixed build ups without ballast, especially for lightweight roofs. Used in conjunction with FDT standing seam profiles a simulated metal welted-seam roof can easily and economically be produced.



*Rhenofol CV, mechanically fastened*

- ① Corrosion-protected profiled steel decking
- ② FDT vapour control layer PE
- ③ Thermal insulation to specification
- ④ FDT glass fleece 120 g/m<sup>2</sup>
- ⑤ Rhenofol CV, mechanically fastened

### Material properties

- Roofing membrane according to EN 13956.
- Weather resistant.
- Resistant to UV-radiation.
- Resistant to flying sparks and radiant heat according to ENV 1187, confirmed by official test certificates.
- Building materials class E, EN 13501-1.
- Resistant to standard exhaust gas from industrial and heating plants.
- Outstanding resistance to natural ageing.
- Not resistant to bitumen and tar containing materials; organic solvents such as benzene, toluene, hydrogen chlorides; fats, oils, such as oily cements and forming oils. Not compatible with rigid polystyrene foam.
- Hail resistant acc. to SIA 280/EN 13583.





## Roofing membrane Rhenofol® CV

| Properties                      | EN standard    | Value                   | Unit    |
|---------------------------------|----------------|-------------------------|---------|
| Tensile strength                | EN 12311-2 (A) | ≥ 1000                  | N/50 mm |
| Elongation                      | EN 12311-2 (A) | ≥ 15                    | %       |
| Tear resistance                 | EN 12310-2     | ≥ 200                   | N       |
| Joint peel resistance           | EN 12316-2     | ≥ 150                   | N/50 mm |
| Joint shear resistance          | EN 12317-2     | ≥ 250                   | N/50 mm |
| Resistance to impact ø 10 mm    | EN 12691       | ≥ 500                   | mm      |
| Resistance to static load       | EN 12730 (B)   | 20                      | kg      |
| Hail resistance; SIA 280        | EN 13583       | passed                  |         |
| Dimensional stability           | EN 1107-2      | ≤ 0.2                   | %       |
| Water tightness                 | EN 1928 (B)    | ≥ 400                   | kPa     |
| Foldability at low temperatures | EN 495-5       | - 30                    | °C      |
| UV exposure                     | EN 1297        | 5000                    | h       |
| Water vapour properties; μ      | EN 1931        | 18000                   |         |
| Reaction to fire                | EN 13501-1     | class E                 |         |
| External fire performance       | ENV 1187       | B <sub>roof</sub> (t1)* |         |
| Thermal conductivity            | DIN 52612      | 0.16                    | W/mK    |

\*) Testing with various roof build-ups. Thus the German requirement is met. Further requirements can be obtained from the manufacturer on request.

### Forms of supply

| Colour                               | Thickness | Width | Length | Weight            |
|--------------------------------------|-----------|-------|--------|-------------------|
|                                      | mm        | m     | m      | kg/m <sup>2</sup> |
| light-grey                           | 1.2       | 2.05  | 20     | 1.47              |
| light-grey                           | 1.2       | 1.50  | 20     | 1.47              |
| light-grey, anthracite <sup>1)</sup> | 1.2       | 1.03  | 20     | 1.47              |
| light-grey                           | 1.2       | 0.68  | 20     | 1.47              |
| light-grey                           | 1.5       | 2.05  | 15     | 1.85              |
| light-grey, anthracite <sup>1)</sup> | 1.5       | 1.50  | 20     | 1.85              |
| light-grey                           | 1.5       | 1.03  | 20     | 1.85              |
| light-grey                           | 1.5       | 0.68  | 20     | 1.85              |
| light-grey                           | 1.5       | 0.50  | 20     | 1.85              |
| light-grey                           | 1.8       | 2.05  | 15     | 2.25              |
| light-grey                           | 1.8       | 1.50  | 15     | 2.25              |
| light-grey                           | 1.8       | 1.03  | 15     | 2.25              |
| light-grey                           | 2.0       | 1.50  | 15     | 2.48              |

<sup>1)</sup> Other colours on request



## Roofing membrane Rhenofol® CG

### Rhenofol CG

**The roofing membrane for loose laid application under ballast, e. g. gravel or paving slabs on terraces, concrete on parking decks or with green roof system.**

Rhenofol CG is a product made of non-rigid polyvinyl chloride (PVC-P), a roofing membrane with glass reinforcement.

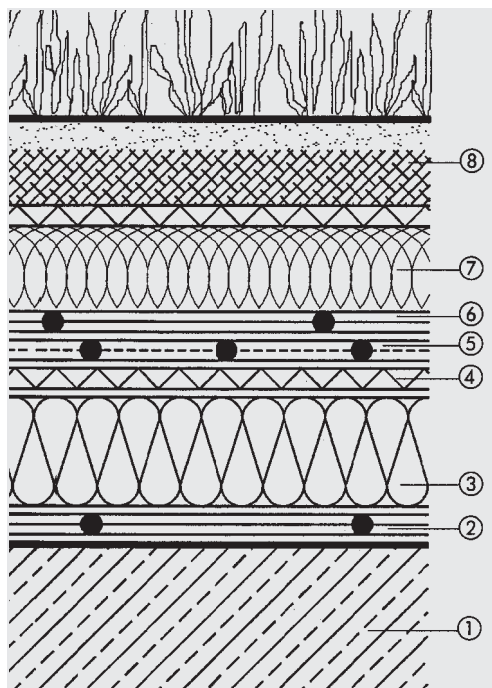
Due to the outstanding material characteristics, Rhenofol CG roofing membranes are ideal for single-ply application. Seam overlaps can be easily sealed with solvent or hot air welding.

### Quality assurance

Rhenofol CG is subject to constant in-house and external quality control. The in-house quality assurance system for the whole company has been certified according to DIN ISO 9001, the world's most strict quality standard, and is constantly monitored by TÜV CERT.

### Range of application

Rhenofol CG is used for waterproofing in loose laid applications under ballast with gravel or paving slabs, e. g. on terraces or parking decks or under green roof systems.



*Example:*

*Green roof, sealed with Rhenofol CG, loose laid with ballast.*

- ① Reinforced concrete
- ② FDT vapour control layer PE
- ③ Thermal insulation to specification
- ④ Separation layer FDT synthetic fleece 300 g/m²
- ⑤ Rhenofol CG 1.5 mm/1.8 mm
- ⑥ PE separation layer 0.2 mm thick
- ⑦ Combined drainage, filter and protection layer
- ⑧ Vegetation mat

### Material properties

- Roofing membrane according to EN 13956.
- Non shrinking according to EN 1107-2 testing.
- Weather resistant.
- Resistant to UV-radiation.
- Resistant to root and rhizome penetration according to FLL testing, tested at 1.5 mm and 1.2 mm thick roofing membranes.
- Building materials class E, EN 13501-1.
- Resistant to standard exhaust gas from industrial and heating plants.
- Outstanding resistance to natural ageing.
- Not resistant to bitumen and tar containing materials; organic solvents such as benzene, toluene, hydrogen chlorides; fats, oils, such as oily cements and forming oils. Not compatible with rigid polystyrene foam.
- Hail resistance acc. to SIA 280/EN 13583.



## Roofing membrane Rhenofol® CG

| Properties                                  | EN standard        | Value   | Unit    |
|---|--------------------|---------|---------|
| Tensile strength                            | EN 12311-2 (A)     | ≥ 600   | N/50 mm |
| Elongation                                  | EN 12311-2 (A)     | ≥ 200   | %       |
| Tear resistance                             | EN 12310-1         | ≥ 300   | N       |
| Joint peel resistance                       | EN 12316-2         | ≥ 150   | N/50 mm |
| Joint shear resistance                      | EN 12317-2         | ≥ 250   | N/50 mm |
| Resistance to impact                        | EN 12691           | ≥ 500   | mm      |
| Resistance to static load                   | EN 12730 (B)       | 20      | kg      |
| Resistance to root penetration; FLL-testing | EN 13948           | passed  |         |
| Hail resistance; SIA 280                    | EN 13583           | passed  |         |
| Dimensional stability                       | EN 1107-2          | ≤ 0.05  | %       |
| Water tightness                             | EN 1928            | ≥ 400   | kPa     |
| Foldability at low temperatures             | EN 495-5           | - 30    | °C      |
| UV exposure                                 | EN 1297            | 5000    | h       |
| Water vapour properties; μ                  | EN 1931            | 18000   |         |
| Reaction to fire                            | EN 13501-1         | class E |         |
| Durability of water tightness to weathering | EN 1296<br>EN 1928 | passed  |         |
| Thermal conductivity                        | DIN 52612          | 0.16    | W/mK    |

### Forms of supply

| Material    | Colour     | Thickness | Width | Length | Weight            |
|-------------|------------|-----------|-------|--------|-------------------|
|             |            | mm        | m     | m      | kg/m <sup>2</sup> |
| Rhenofol CG | light-grey | 1.2       | 2.05  | 20     | 1.54              |
|             |            | 1.5       | 2.05  | 15     | 1.88              |
|             |            | 1.8       | 2.05  | 15     | 2.28              |
|             |            | 2.0       | 2.05  | 15     | 2.53              |



# Waterproofing membrane Rhenofol® C

## Rhenofol C

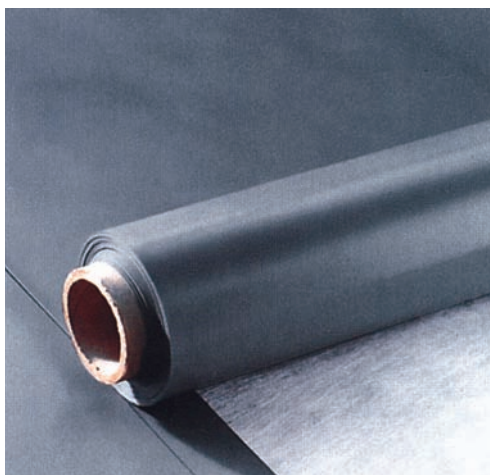
Rhenofol C is a product made of non-rigid polyvinyl chloride (PVC-P), un-reinforced waterproofing membrane. Due to the outstanding material characteristics, Rhenofol C waterproofing membranes are ideal for single-ply application. Seam overlaps can be easily sealed with solvent or hot air welding.

## Quality assurance

Rhenofol C is subject to constant in-house and external quality control. The in-house quality assurance system for the whole company has been certified according to DIN ISO 9001, the world's most strict quality standard, and is constantly monitored by TÜV CERT.

## Range of application

For detail works with Rhenofol CV/CG roofing membranes and for waterproofing foundations according to DIN 18195



## Material properties

- Waterproofing membrane according to DIN EN 13967.
- Weather-resistant, even without additional surface protection.
- Resistant to UV-radiation.
- Resistant to root penetration according to FLL testing, tested at 1.5 mm thick roofing membranes.
- Building materials class E, EN 13501-1.
- Resistant to standard exhaust gas from industrial and heating plants.
- Not resistant to bitumen and tar containing materials, organic solvents such as benzene, toluene, hydrogen chloride, fats, oils such as oily cement and forming oils.  
Not compatible with rigid polystyrene foam.
- Outstanding resistance to natural ageing.



## Waterproofing membrane Rhenofol® C

| Properties                                  | EN standard        | Value                       | Unit              |
|---|--------------------|-----------------------------|-------------------|
| Tensile strength                            | EN 12311-2 (B)     | ≥ 17                        | N/mm <sup>2</sup> |
| Elongation                                  | EN 12311-2 (B)     | ≥ 350                       | %                 |
| Tear resistance                             | EN 12310-1         | ≥ 300                       | N                 |
| Joint shear resistance                      | EN 12317-2         | ≥ 200                       | N/50 mm           |
| Resistance to impact                        | EN 12691           | ≥ 500                       | mm                |
| Resistance to static load                   | EN 12730 (B)       | 20                          | kg                |
| Resistance to root penetration; FLL testing | EN 13948           | passed                      |                   |
| Dimensional stability                       | EN 1107-2          | ≤ 2.0 along<br>≤ 0.5 across | %<br>%            |
| Water tightness                             | EN 1928            | ≥ 400                       | kPa               |
| Foldability at low temperatures             | EN 495-5           | - 40                        | °C                |
| Water vapour properties; μ                  | EN 1931            | 18000                       |                   |
| Reaction to fire                            | EN 13501-1         | Class E                     |                   |
| Durability of water tightness to weathering | EN 1296<br>EN 1928 | passed                      |                   |
| Thermal conductivity                        | DIN 52612          | 0.16                        | W/mK              |
| Linear coefficient of thermal expansion     |                    | 1.6 x 10 <sup>-4</sup>      | K <sup>-1</sup>   |

### Forms of supply

| Material                                     | Colour                   | Thickness<br>mm | Width<br>m | Length<br>m | Weight<br>kg/m <sup>2</sup> |
|--|--------------------------|-----------------|------------|-------------|-----------------------------|
| Rhenofol C for pre-cut parts ( e.g. collars) | light-grey               | 1.2             | 2.05       | 15          | 1.52                        |
|  | anthracite <sup>1)</sup> | 1.2             | 2.05       | 15          | 1.52                        |
|  | light-grey               | 1.5             | 2.05       | 15          | 1.88                        |
|  | light-grey               | 1.5             | 1.03       | 15          | 1.88                        |

<sup>1)</sup> Other colours on request





## FDT vapour control layer PE

### FDT vapour control layer PE

Made of polyethylene foil (PE).  
Works as diffusion retarding layer.

### Material properties

- Highly vapour-retardant.
- Good stability characteristics.
- Building materials class E, EN 13501-1.
- Compatible with bitumen.
- Not resistant to UV-radiation.



### Range of application

- For non air-conditioned rooms (e.g. living rooms and offices or similar rooms without suspended ceiling).
- In loose laid or mechanically fastened layer build-ups with roofing membranes Rhenofol.

### Physical data

| Properties  | Testing according to DIN | Value     | Unit              |
|---|--------------------------|-----------|-------------------|
| Tensile strength  | 53455                    | 17        | N/mm <sup>2</sup> |
| Elongation at break   | 53455                    | 450 – 550 | %                 |
| Thermal conductivity  | 52612                    | 0.35      | W/m x K           |
| Water vapour diffusion resistance coefficient $\mu$                           | 53122                    | 400 000   | (air = 1)         |
| Air space width equivalent to water vapour diffusion ( $s_d = \mu \times s$ ) |                          | 100       | m                 |

### Forms of supply

| Material  | Colour | Nominal | Width | Length |
|---|--------|---------|-------|--------|
| FDT vapour control layer PE                         |        | 0.25 mm | 4 m   | 25 m   |
| FDT connection tape for FDT vapour control layer PE |        |         | 80 mm | 12 m   |
| FDT seam tape, fibre reinforced                     | grey   | 1 mm    | 15 mm | 25 m   |



## FDT vapour control layer alu-gv-sk

### FDT vapour control layer alu-gv-sk

Aluminium foil with polyester fabric reinforcement and adhesive coating. The reinforcement prevents foot traffic damage and other damage of the vapour control layer over corrugation valleys of lightweight steel decks during installation works.

Meets the requirements of DIN 18234 for layer build-ups with low fire load.

#### Range of application

- On buildings with particular indoor climate conditions, such as swimming pools.
- On lightweight steel decks according to the Industrial Building Guideline (IndBauRL).
- In loosely laid or mechanically fastened layer build-ups with Rhepanol fk/hg and Rhenofol CV/CG.

#### Properties

- Practically vapour-proof,  $s_d$  value > 1500 m
- Low fire load according to DIN 18234
- Resistant to foot traffic damage
- Self-adhesive
- Fire class E
- No additional seam tape required
- 8 cm seam overlap, self-adhesive

#### Physical properties

| Properties   | EN standard | Value   | Unit              |
|--|-------------|---------|-------------------|
| Joint shear resistance                               | 12317-1     | > 300   | N/50 mm           |
| Fire class   | 13501-1     | class E |                   |
| Thermal stability                                    | 1110        | + 100   | °C                |
| Cold bending behaviour                               | 1109        | - 30    | °C                |
| Calorific value                                      |             | < 10500 | kJ/m <sup>2</sup> |
| Air space width equivalent to water vapour diffusion |             | > 1500  | m                 |

#### Forms of supply

| Material                           | Colour | Nominal thickness | Width | Length |
|------------------------------------|--------|-------------------|-------|--------|
| FDT vapour control layer alu-gv-sk | silver | 0.3 mm            | 1.2 m | 100 m  |



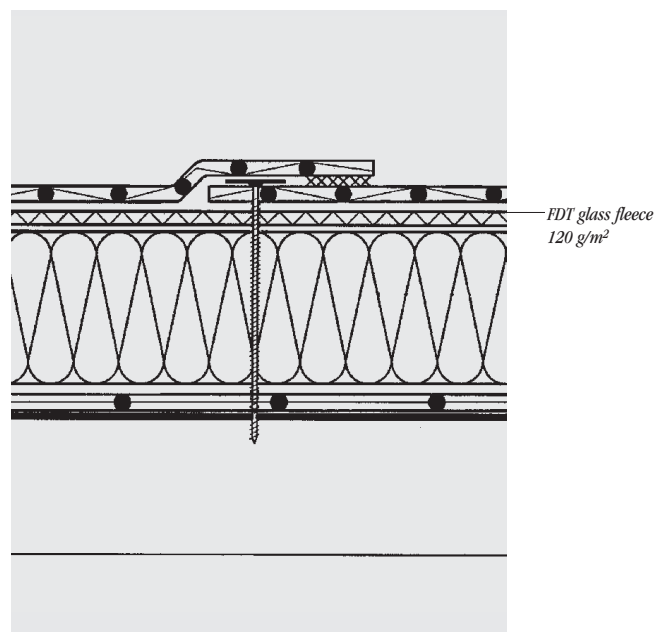
## FDT glass fleece 120 g/m<sup>2</sup>

### Material properties

- Building materials class E, EN 13501-1.
- Resistant to rotting
- Not alkali-proof and not resistant to UV radiation

### Range of application

- As a separation layer against interaction between roofing membranes Rhenofol and incompatible materials such as rigid polystyrene foam boards.
- As a fire retardant layer in mechanically fastened layer build-ups with roofing membranes Rhenofol, to meet the fire protection requirements with regard to flying sparks and radiant heat.



*FDT glass fleece in mechanical fastening on rigid polystyrene foam.*

### Physical data

| Properties          | Value                   | Unit             |
|---------------------|-------------------------|------------------|
| Nominal thickness   | 0.7                     | mm               |
| Nominal weight      | 120                     | g/m <sup>2</sup> |
| Tensile strength    | along 400<br>across 260 | N/50 mm          |
| Elongation at break | < 2                     | %                |

### Forms of supply

| Material         | Colour | Width m | Length m | Weight kg/roll |
|------------------|--------|---------|----------|----------------|
| FDT glass fleece | white  | 2.00    | 100      | approx. 26     |



## FDT synthetic fleece 300 g/m<sup>2</sup>

### FDT synthetic fleece 300 g/m<sup>2</sup>

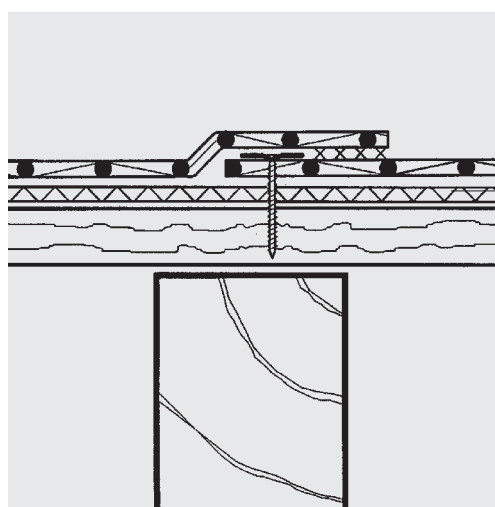
Is a highly tear-resistant laminated synthetic fleece made of 70 % polypropylene and 30 % polyethylene.

#### Material properties

- Building materials class E, EN 13501-1.
- Resistant to rotting.
- Not resistant to UV-radiation.
- Resistant to all natural acid and alkaline solutions that can be found in the soil.
- Resistant to drilling.

#### Range of application

- As a protection layer against uneven substrates.
- As a protection layer against non-standard gravel.
- As a separation layer, to prevent interaction between incompatible materials such as Rhenofol roofing membranes and rigid polystyrene foam boards.



*FDT synthetic fleece  
300 g/m<sup>2</sup>*

*FDT synthetic  
fleece as a  
protection layer  
on timber board  
cladding.*

#### Physical data

| Properties          | Value | Unit             |
|---------------------|-------|------------------|
| Nominal thickness   | 1.6   | mm               |
| Nominal weight      | 300   | g/m <sup>2</sup> |
| Tensile strength    | 650   | N/50 mm          |
| Elongation at break | 20    | %                |

#### Forms of supply

| Material                                     | Colour | Width<br>m | Length<br>m | Weight<br>kg/roll |
|--|--------|------------|-------------|-------------------|
| FDT synthetic fleece<br>300 g/m <sup>2</sup> | white  | 2.25       | 50          | approx. 36        |



# FDT protection layer

## FDT protection layer

protects the roof membrane against mechanical damage. The membrane is a 1.8 mm thick, highly perforation-resistant protection layer, made of PIB, with polyester fleece backing.

## Range of application

With roof build-ups with synthetic roofing membranes:

- As a separation layer with non-standard gravel.
- As a protection layer terraced areas such as roof terraces with paving slabs, green roofs and parking decks.

## Properties

- Protection of the membrane against mechanical damage.
- The fleece backing provides reliable cushioning separation from the waterproofing layer.
- Membrane width of 2.05 m means economical application.

## Application instructions

The FDT protection layer is loose laid with the fleece side down.

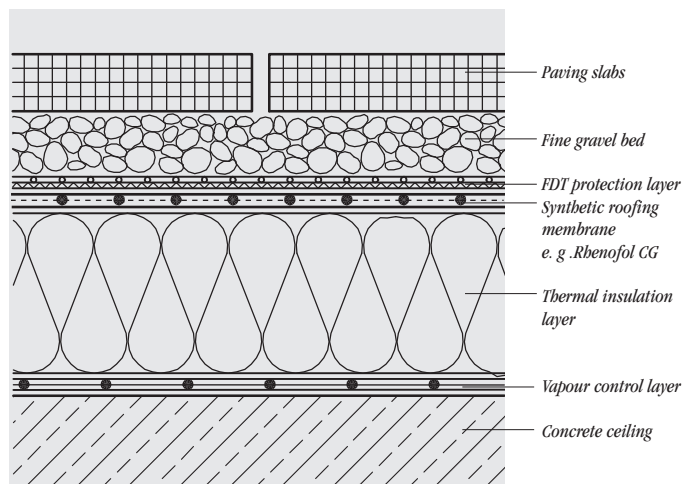
Depending on the specific application, the seams can be connected in different ways:

- With 80 mm seam overlap without sealing.
- For easy sealing of the seams, the FDT protection layer has no fleece backing along the whole length of one edge.

- With 50 mm seam overlap and sealing by hot-air welding or connected using Rhepanol sealing tape. The seams must be sealed if used as protection layer under screed or slabs in a bed of mortar.

**The FDT protection layer is not designed for weather exposure and must always be covered.**

At the perimeters of the roof FDT protection layer is applied to the upstand where ballast (gravel or pavements) may butt up against the vertical membrane. The protection layer should extend at least 250 mm over the field membrane.



## Forms of supply

| Colour                     | Width<br>m | Length<br>m | Thickness<br>mm   | Weight<br>kg/m <sup>2</sup> |
|----------------------------|------------|-------------|-------------------|-----------------------------|
| black,<br>lower side white | 2.05       | 20          | 1.8 <sup>1)</sup> | 1.0                         |

<sup>1)</sup> including fleece backing





## Rhenofol® paving tile

### Rhenofol paving tile

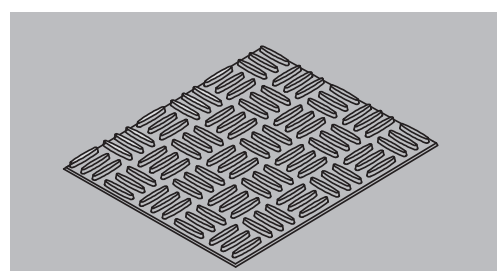
The Rhenofol paving tile is a product made of non-rigid polyvinyl chloride (PVC-P). The structured surface ensures a safe grip, even on sloped and wet areas. Furthermore, the tile provides for good load distribution.

### Range of application

Rhenofol paving tiles are used for protecting the waterproofing and for marking the maintenance walkways on roofs covered with Rhenofol.

### Application instructions

- Direct installation on new, clean and dry Rhenofol roof areas.
- Fixing with Rhenofol paste, to be applied on the roof area in approx. 20 mm beads around the tile approx. 30 mm from the edge. Then the Rhenofol paving tile is put into place and its outer edges are waterproofed with Rhenofol paste.
- The distance between the tiles must be min. 30 mm.
- Alternatively, hot-air welding is also possible. The welding must be watertight around the whole slab to prevent forming of water pockets.
- In the case of old and soiled roof areas, the seam areas must be cleaned with Rhenofol thinner D.
- No additional measures required to keep the slabs in place.



### Material properties

- Material as for Rhenofol roofing membranes (PVC-P).
- Resistant to UV radiation and weathering.
- Fire performance: building material class E, EN 13501-1.
- Dimensional stability after warm storage (6 h, 80 °C): < 0.2 %.
- Slide prevention and load distribution.
- Meets the requirements of DIN 4426 "Safety requirements for workplaces and accesses" on sloped flat roofs up to 20°.

### Product information

|                         |  |
|-------------------------|--|
| Colour:                 | grey; slight deviations in colour are possible |
| Surface:                | structured, rib height 4 mm                    |
| Lower side:             | plain  |
| Length/Width/Thickness: | 800/600/9 mm                                   |
| Tolerance:              | ± 5 mm   |
| Weight:                 | approx. 7.9 kg/m <sup>2</sup> or 3.8 kg/tile   |
| Forms of supply:        | 100 units/pallet or 48 m <sup>2</sup> /pallet  |



## Rhenofol® standing seam profile



The **Rhenofol standing seam profile** is a hollow profile made of the same raw material as the roofing membrane, for installation on Rhenofol CV.

Length 4 m.

### Range of application

For aesthetic standing seam replicas on sloped roofs with Rhenofol.

### Properties

- Flexible standing seam profile for perfect fitting to the building geometry.
- Cutting with standard tools.
- Simple installation with handheld hot-air welder and special hand roller with guide for Leister Triac/PID.

### Application instructions

- The application direction is always from the ridge to the eaves.
- Do not install through valley areas, as this may impede rainwater drainage.
- The positioning is done along the seam or in the middle of the membrane

### Forms of supply

| Product name                   | Farbe      | Forms of supply |
|--------------------------------|------------|-----------------|
| Rhenofol standing seam profile | light-grey | 180 m/box*      |
| Rhenofol standing seam profile | anthracite | 180 m/box*      |
| Rhenofol standing seam profile | red-brown  | 180 m/box*      |

\*the box contains special plugs for butt joints



## FDT gravel stop profile



### Application

The FDT gravel stop profiles are high-quality stainless steel elements with an attractive design. The gravel stop profiles consist of 60 mm and 100 mm high and 2 m long sections - with cut-outs for unhindered rain-water drainage. Compensation of thermal elongation is provided for. The Rhenofol holders are fixed to the roof finishes with a piece of roofing membrane. The stainless steel clamp serves as a joint connection and for stiffening the FDT gravel stop profile above the holder.

### Range of application

Eaves side trim for gravel-ballasted roofs or terraces with paving slabs in a fine gravel bed.

### Properties

Outstanding static properties due to special holders

### Application instructions

The holders are installed after laying of the membranes. The holders must only be positioned on membrane which is fully welded to laminated metal strips or drips which must be mechanically fastened to the substrate.

### Processing

Processing (cutting) of the gravel stop profiles can be done with standard cutting tools such as sheet shears.

### Transportation and storage

The FDT gravel stop profiles are factory-packed in cardboard boxes, with 10 profiles of 2 m length each, including the necessary holders and clamps. The boxes must be stored horizontally in a dry place.

### Forms of supply

| Product name  | Forms of supply                               |
|---|---|
| Package of Rhenofol gravel stop profiles, grey or black | 10 units at 2 m each incl. holders and clamps |

### Additional items as required:

|   |
|---|
| Rhenofol holders and clamps                                     |
| Gravel stop profile 2 m, stainless steel silver                 |
| Internal corner for gravel stop profile, stainless steel silver |
| External corner for gravel stop profile, stainless steel silver |



## Connection and seam tape, solvent-welding agent, contact adhesive, thinner, paste, preformed corners, collar/framing ring, laminated metal sheet

| Product name                                    | Properties   | Range of application  |
|---|--|---|
| <b>FDT connection tape</b>                      | Special adhesive on backing film.  | Connection of FDT vapour control layer PE seams and flashing to various substrates.                                 |
| <b>FDT seam tape</b>                            | Butyl adhesive, fibre reinforced.  | For sealing the FDT vapour control layer PE, in the overlap.  |
| <b>Rhenofol solvent-welding agent THF</b>       | Solvent Tetrahydrofuran (THF).   | For connecting Rhenofol roofing membrane seams and as thinner for Rhenofol paste.                                   |
| <b>Rhenofol contact adhesive 20</b>             | Transparent synthetic rubber based contact adhesive.   | For bonding Rhenofol roofing membranes to concrete, timber, steel etc.  |
| <b>Rhenofol thinner D</b>                       | Colourless solvent.  | Thinner for Rhenofol contact adhesive 20 and to be used as cleaning agent.  |
| <b>FDT sealant A/S</b>                          | Acrylate or synthetic rubber base.   | For flashings with wall connection profile and against roof lights.   |
| <b>Rhenofol paste</b>                           | Stabilised non-rigid PVC solution.   | For securing seam edges at Rhenofol roofing membranes.  |
| <b>Rhenofol internal corner 90°</b>             | Preformed Rhenofol C detail.   | For sealing internal corners at Rhenofol roofing membranes.   |
| <b>Rhenofol external corner 90°</b>             | Preformed Rhenofol C detail.   | For sealing external corners at Rhenofol roofing membranes.   |
| <b>Rhenofol external corner for roof lights</b> | Preformed Rhenofol C detail.   | For sealing roof light corners at Rhenofol roofing membranes.   |
| <b>Rhenofol collar loose/fixed flange</b>       | Preformed Rhenofol CV detail.  | For all standard rainwater outlets with screw connections.  |
| <b>Rhenofol C framing ring</b>                  | Preformed Rhenofol C detail.   | For flashing against loose/fixed flange rainwater outlets at Rhenofol sealings.                                     |
| <b>Rhenofol standing seam profile</b>           | PVC-P profile.   | For decorative imitation of standing seam profiles on Rhenofol CV.  |
| <b>Rhenofol laminated metal sheet</b>           | Hot-dip galvanised metal sheet with Rhenofol C backing and lower protective lacquer coating. | For forming profiles for flashings and cappings and for fixation. May be cut and bent like galvanised metal sheets. |



## Welding paste system: Welding paste SB, Rhenofol CV strips, Rhenofol CV sets, Welding paste system accessories

| Product name                             | Properties   | Range of application  |
|--|--|---|
| <b>Rhenofol welding paste SB</b>         | Paste-like solvent mixture consisting of THF and non-rigid PVC.  | For a position-stable connection of roofing membranes Rhenofol CV with mechanically fastened Rhenofol CV sets or strips.                          |
| <b>Rhenofol CV strip</b>                 | Rhenofol CV strip material, 100 mm or 150 mm wide and 50 m long. | For linear fastening of Rhenofol CV with welding paste system. Amount and arrangement of the strips according to the FDT wind uplift calculation. |
| <b>Rhenofol CV sets</b>                  | Disc made of Rhenofol CV with a diameter of 180 mm.              | For point fastening of Rhenofol CV with welding paste system. Amount and arrangement of the sets according to the FDT wind uplift calculation.    |
| <b>Welding paste system accessories:</b> |  |   |
| <b>FDT PE container cover</b>            |  | For installing the stirring mechanism, for covering the container and preventing sparks falling into it from possible electrostatic charge.       |
| <b>FDT stirrer</b>                       |  | For connecting to a drilling machine for stirring the welding paste.  |
| <b>FDT plastic funnel</b>                |  | For easy discharge of the stirred welding paste into the PE bottle.   |
| <b>FDT PE bottle</b>                     |  | For easy application of the welding paste onto the sets or strips.  |





## Tools

| Product name                            | Properties          | Range of application  |
|---|---------------------|---|
| <b>Rhenofol membrane cutter</b>         | With 4 spare blades | For easy and safe cutting of Rhenofol.  |
| <b>Rhenofol silicon pressure roller</b> | 4 cm wide           | For pressing on the Rhenofol roofing membranes to be connected during hot-air welding.            |
| <b>FDT metal pressure roller, small</b> | 1 cm wide           | For rolling on Rhenofol preformed details during hot-air welding, also at difficult access areas. |
| <b>FDT teflon pressure roller,</b>      | 3 cm wide           | For rolling on Rhenofol preformed details and membrane seams during hot-air welding.              |
| <b>FDT PE bottle</b>                    | Contents 0.5 l      | For Rhenofol paste.   |
| <b>FDT scissors</b>                     | 25 cm               | High-quality reinforced solid metal scissors. For easy cutting of Rhenofol.                       |
| <b>FDT brush</b>                        | 5 cm                |   |



## FDT VarioGully roof outlet

- FDT VarioGully is a proven flat roof rainwater outlet according to EN 1253 and DIN 19599, which is regularly tested by the external testing institute LGA Bavaria.

### Properties

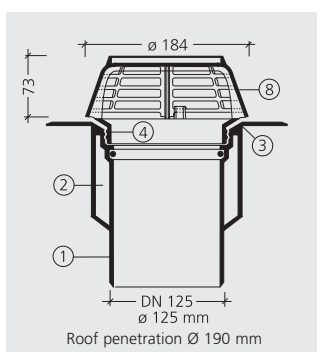
- Made of rigid PVC, with increased impact strength, including gravel and leaf guard and can be used without additional elements with any layer thickness from 35 to 240 mm.
- In case of heatable FDT VarioGully options, the heater unit is doubly protected by the two integrated safety systems (heat monitoring relay and fuse). Connection via safety transformer 230/24 V (10 W per outlet).

### Range of application

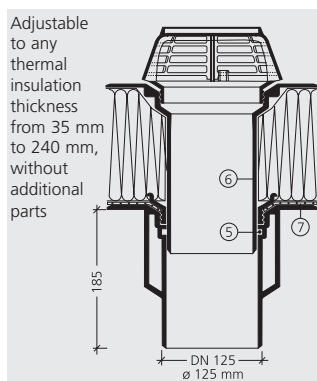
- In warm and cold roof structures in vertical and angled version.
- Corresponding warm roof upstands are available for insulation material thicknesses from 35 to 160 mm and 150 to 240 mm and 230 to 320 mm<sup>1)</sup>. Direct connection to all vapour control membranes or roofing membranes, or with separately preformed collar.
- If used as an emergency outlet for draining off 100-year rainfall, instead of the screw ring the emergency outlet socket is installed at the FDT VarioGully or the warm roof upstand.

<sup>1)</sup> Other insulation material thicknesses on request.

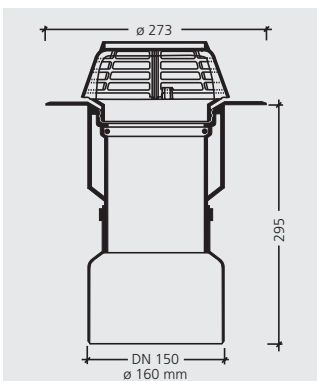
- ① Discharge socket DN 125
- ② Insulating sleeve
- ③ Sealing ring
- ④ Screw ring
- ⑤ Roll ring
- ⑥ Warm roof upstand
- ⑦ Vapour control layer connection
- ⑧ Leaf guard
- ⑨ Roll ring DN 125
- ⑩ Reducer DN 125/100
- ⑪ Transition piece DN 70/100



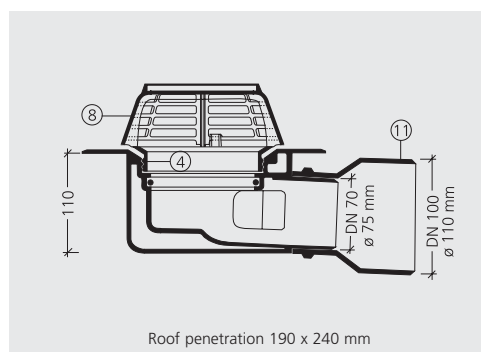
**FDT VarioGully vertical, DN 125**  
without reducer  
Roof penetration Ø 190 mm



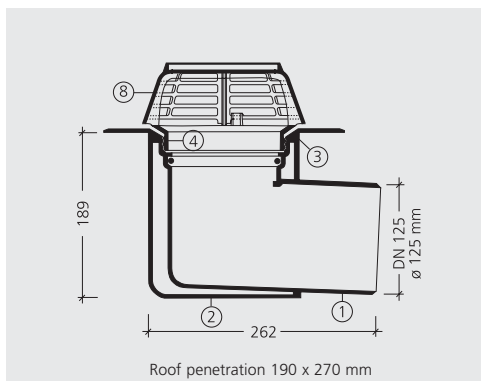
**FDT VarioGully vertical, DN 125**  
with warm roof upstand,  
without reducer



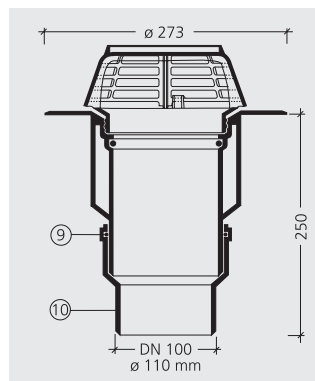
**FDT VarioGully vertical, DN 150**  
DN 150 (160)



**FDT VarioGully angled, DN 100**  
extremely flat, overall height 110 mm,  
with transition piece DN 70/100  
Roof penetration 190 x 240 mm



**FDT VarioGully angled, DN 125**  
overall height 189 mm  
Roof penetration 190 x 270 mm



**FDT VarioGully vertical, DN 100**  
with reducer DN 125/100



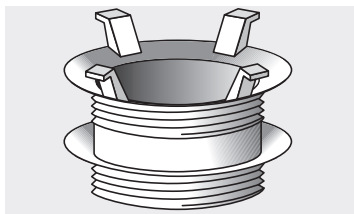
## FDT VarioGully refurbishment, accessories for FDT VarioGully roof outlet: FDT emergency overflow socket, FDT leaf guard

### FDT VarioGully refurbishment

- Ensures installation in the existing old roof without backflow.
- Supplied complete with screws and sealing cord.
- To be used with old roof outlets up to DN 150, depending on the diameter of the run-in area.

### Accessories for FDT VarioGully roof outlet:

### FDT emergency overflow socket

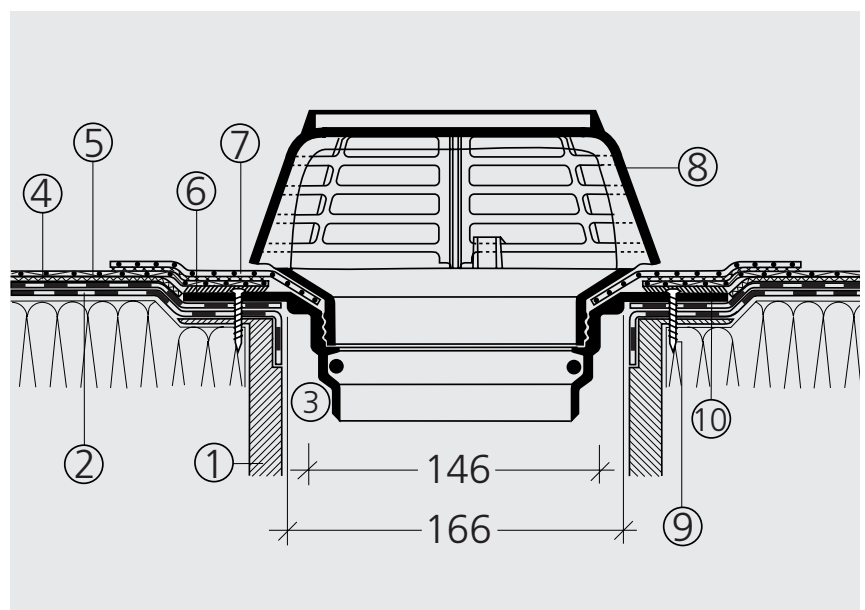


- Ensure simple conversion of the FDT VarioGully into an emergency overflow
- Socket is 40 mm high

### FDT leaf guard

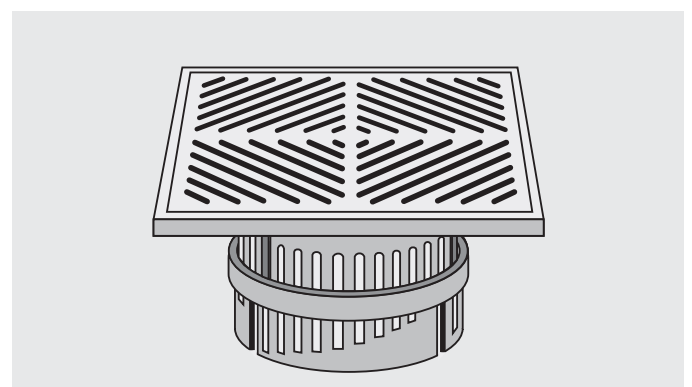
Made of aluminium with lift ring. For application on flat roofs with paving slabs or on inverted roofs. The installation height of 67 to 90 mm can be adapted to the terrace structure in steps of 3 mm. With a slab height of 90 mm or more, additional lift rings will be necessary. Every additional lift ring gives 36 mm more height.

Grid size: approx. 200 x 200 mm.




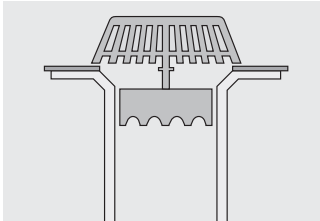
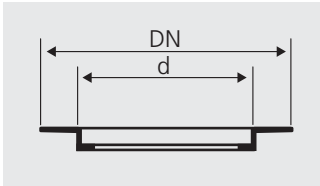
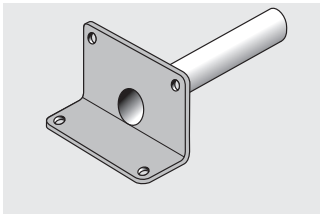
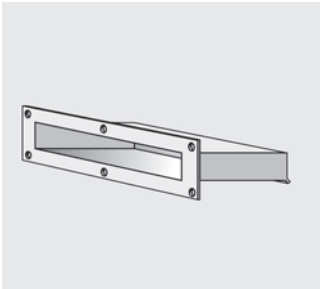
- |  |   |
|--|---|
| ① Existing old roof rainwater outlet         | ⑥ Rhenofol solvent welding agent (THF)            |
| ② Existing layer build-up                    | ⑦ Rhenofol collar                                 |
| ③ FDT VarioGully refurbishment               | ⑧ FDT leaf guard                                  |
| ④ FDT synthetic fleece 300 g/ m <sup>2</sup> | ⑨ Mechanical fastening (4 fast./rainwater outlet) |
| ⑤ Roofing membrane Rhenofol CV               | ⑩ Sealing cord                                    |

Can also be used in combination with FDT warm roof upstand if additional thermal insulation is installed.





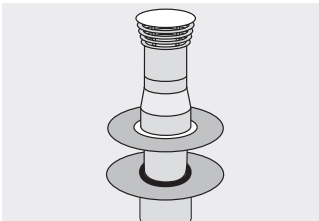
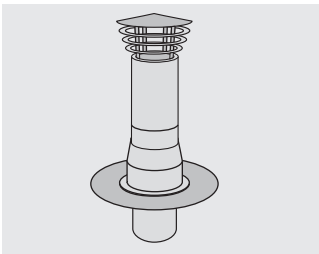
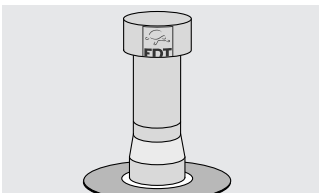
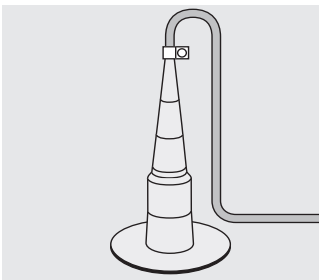
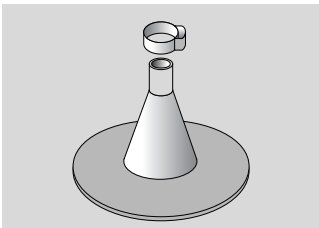
## FDT rainwater outlet and accessories, FDT water spout, FDT emergency overflow

| Product name  | Dimensions in mm |   | Properties/application  |
|---|------------------|---|---|
| <b>FDT rainwater outlet (RWE)</b>                   | Outer diameter d |   | <p>The true advantage of this build-in element is its simple installation.<br/>An ideal solution e. g. when it comes to upgrading a roof during refurbishment.<br/>The FDT rainwater outlet can be installed in the existing opening in no time at all.<br/>Length: 315 mm<br/>Flange diameter for RWE 50 – 75 = 300 mm<br/>Flange diameter for RWE 95 – 160 = 380 mm</p> |
| Rhenofol-RWE 50                                     | 50               |   |   |
| Rhenofol-RWE 56                                     | 56               |   |   |
| Rhenofol-RWE 63                                     | 63               |   |   |
| Rhenofol-RWE 75                                     | 75               |   |   |
| Rhenofol-RWE 95                                     | 95               |   |   |
| Rhenofol-RWE 110                                    | 110              |   |   |
| Rhenofol-RWE 125                                    | 125              |   |   |
| Rhenofol-RWE 140                                    | 140              |  | <p>The leaf guard is compatible with all rainwater outlets (RWE) and can be cut to size to fit the corresponding diameter.</p>  |
| <b>FDT leaf guard</b>                               |                  |   |   |
|   |                  |   |   |
|   |                  |   |   |
|   |                  |   |   |
|   |                  |   |   |
|   |                  |   |   |
|   |                  |   |   |
| <b>FDT lip seals for:</b>                           | Pipe diameter    |  | <p>The FDT lip seals are used for safe installation of RWEs preventing backflow directly into the downpipe or old rainwater outlets.</p>  |
| Rhenofol-RWE 95                                     | DN 100           |   |   |
| Rhenofol-RWE 95                                     | DN 125           |   |   |
| Rhenofol-RWE 125                                    | DN 150           |   |   |
| Rhenofol-RWE 160                                    | DN 200           |   |   |
| <b>FDT water spout</b>                              | Outer diameter d |  | <p>When waterproofing e. g. terraces, canopies and garages, the FDT water spout can be installed for collecting and draining heavy precipitation.<br/>Length: 480 mm</p>  |
| Rhenofol water spout 50                             | 50               |   |   |
| Rhenofol water spout 75                             | 75               |   |   |
| Rhenofol water spout 110                            | 110              |   |   |
| <b>FDT emergency overflow</b>                       | Outer diameter d |  | <p>When installed in a sufficient number, FDT emergency overflows provide complete drainage of the rainwater from the whole roof or individual roof areas.<br/>Two types are available:<br/>A sink-type (see fig.) for larger roof areas or with a pipe for smaller roof areas (no fig.)</p>  |
| Rhenofol emergency overflow 75                      | 75               |   |   |
| Rhenofol emergency overflow 110                     | 110              |   |   |
| Rhenofol emergency overflow 600 x 100 <sup>1)</sup> |                  |   |   |
| Rhenofol emergency overflow "tailor made"           |                  |   |   |

<sup>1)</sup> Inner diameter



## FDT flat roof vent pipe, FDT refurbishment vent pipe, FDT cold roof vent, FDT lightning conductor, FDT support covering

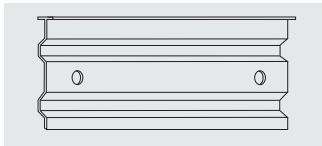
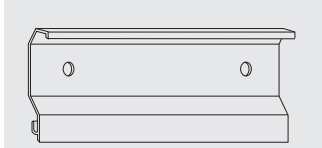
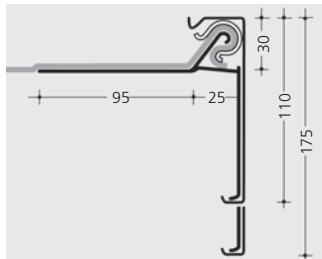
| Product name                            |  | Properties/application   |
|---|--|--|
| FDT flat roof vent pipe DN 100          |    | Made of rigid PVC with increased impact strength. With removable cap and bearing ring. Ready for installation with integrated Rhenofol collar.   |
| FDT refurbishment vent pipe for DN 100  |  | Made of rigid PVC with increased impact strength. With removable cap and ready-to-install integrated collar. For connection with vents (pipe diameter DN 100) at roof refurbishment with Rhenofol. |
| FDT cold roof vent DN 100               |  | Made of rigid PVC with increased impact strength. Vent cross section of 880 mm <sup>2</sup> . Weather cap can be removed for maintenance. Ready for installation with integrated Rhenofol collar.  |
| FDT lightning conductor sleeve Rhenofol |  | For flashing against lightning protectors and for penetrations from Ø 8 mm up to Ø 53 mm. Height 250 mm.   |
| FDT support covering                    |  | With Rhenofol collar. For flashing against penetrations from 14 mm up to 50 mm. With stainless steel clamp for safety holders with Ø 14 - 16 mm. Height 150 mm.                                    |





## FDT wall connection profiles

### FDT edge trim profile

| Product name   | Properties/application  |
|--|---|
| <b>FDT aluminium wall connection profile Economy</b> |  <p>Rigid aluminium profile in punched 3 m sections. For fixing Rhenofol and Rhepanol roofing membranes at vertical surfaces. Fastening with 5 fasteners per metre, hole diameter 8 mm.</p>  |
| <b>FDT aluminium wall connection profile Classic</b> |  <p>Highly rigid aluminium profile in punched 4 m sections with slot for hooking up metal sheets. For fixing Rhenofol and Rhepanol roofing membranes at vertical surfaces. Fastening with 5 fasteners per metre, long hole 6.2 x 8 mm.</p>   |
| <b>FDT edge trim profile 110/175</b>                 |  <p>Consisting of an extruded aluminium mounting rail and roll-formed stove enamel cover (colour: silver metal grey, similar to RAL 9006/9007, other RAL colours on request), as well as plastic clamps for fixing roofing membranes up to 5 mm thickness. Roofing membranes <math>\geq 1.5</math> mm thick must be folded back once in the clamping area.</p> |



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website: www.fdt.de



Agrément Certificate  
**98/3491**  
Product Sheet 1

## RHENOFOL PVC ROOF COVERING SYSTEMS

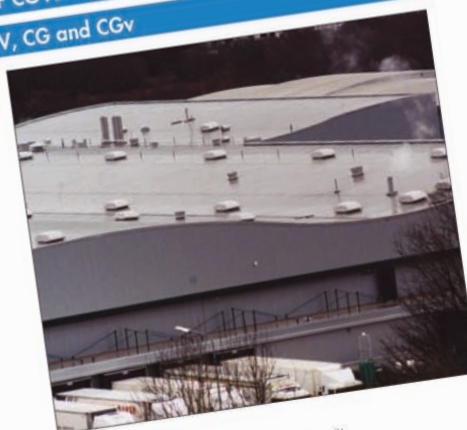
### RHENOFOL CV, CG and CGv

#### PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Rhenofol CV, CG and CGv, a range of PVC roof waterproofing membranes reinforced with either a glass or polyester mat.

#### AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Weathertightness** — the systems will resist the passage of moisture into the building (see section 5).  
**Properties in relation to fire** — the use of the systems can enable a roof to be unrestricted under the current Building Regulations (see the Regulations section and section 6).

**Resistance to wind uplift** — the systems will resist the effects of any likely wind suction acting on the roof (see section 7).  
**Resistance to foot traffic** — the systems will accept the limited foot traffic and loads associated with the installation and maintenance of the system and the effects of thermal or other minor movement likely to occur in practice without damage (see section 8).

**Durability** — under normal service conditions the systems should provide a durable waterproof covering with a service life of at least 35 years (see section 10).

The BBA has awarded this Agrément Certificate to the company named above for the systems described herein. These systems have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe  
Head of Approvals — Materials

Greg Cooper  
Chief Executive

Date of Fifth issue: 12 October 2010  
Originally certificated on 27 April 1998

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

British Board of Agrément  
Bucknalls Lane  
Carston, Watford  
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European Single ply  
Waterproofing Association



### FDT - Legal notice

We refer emphatically to the fact, that all details mentioned, especially the application and utilization recommendation for the roofing membranes and their system accessories, have been developed under normal conditions, and based on our knowledge and experience. Appropriate storage and usage of the products are assumed.

A warranty or reliability of a finished project cannot be deduced because of varying materials, substrates and differing work conditions, neither by any indications nor from verbal statements, irrespective of any legal positions.

For the possible accusation, FDT acted intentionally or grossly negligent, the applicator has to supply evidence, that he provided FDT with all information and details, necessary for an appropriate and correct evaluation through FDT in written form, immediately available and complete. The applicator himself is responsible to control that the products are suitable for the given application.

It is FDT's right to change product specifications without notice.

Property rights of third parties are to be considered. In addition our particular sales- and delivery terms are valid.

Obligatory is the latest version of our product data sheet, which can be requested directly through FDT.

### General Information

#### Roofing membrane system Rhenofol Technical manual

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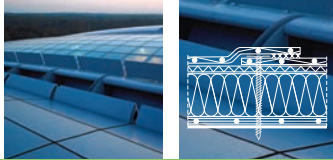
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This manual corresponds with the FDT manufacturer application instructions for designers and applicators in the Federal Republic of Germany. It cannot, however, replace professional knowledge. Every user is obliged to keep his knowledge up to date!

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Technical changes reserved.



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