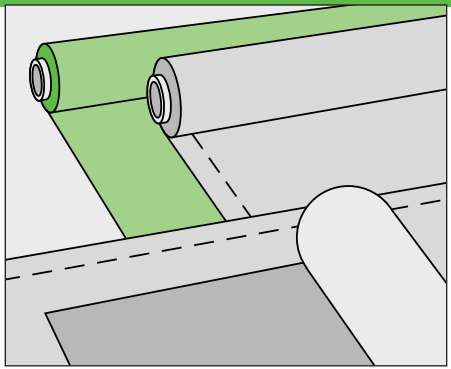
FDT TECHNOLOGIE
FLACHDACH

Application manual
Rhenofol®



Contents

Introduction Application manual for Rhenofol® roofing membranes

This application manual contains the basic rules for working with the Rhenofol roofing membranes. The Instructions for Flat Roofs of the German Central Association of Roofing Contractors (Zentralverband des Deutschen Dachdeckerhandwerks e.V.) are included. Project-related detailed solutions are provided by our technical departement.

Requirements for correct application:

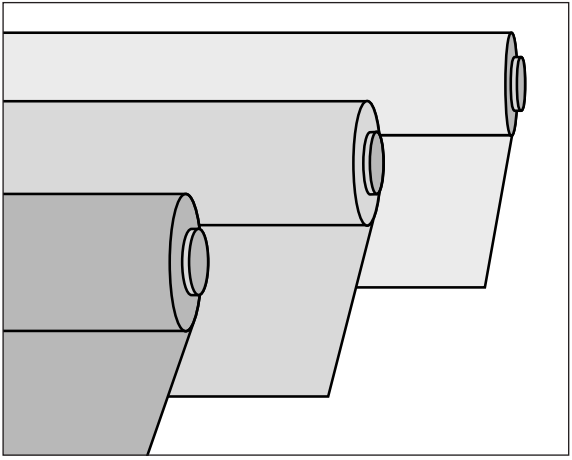
- Clean, dry and even roof surfaces.
- Substrates must be smooth, free from con crete nibs and sharp pro jections (e. g. chippings).
- Joints that may impede the performance of the roof covering due to their width or movements, have to be formed according to constructional requirements.
- Materials containing bitumen, tar or solvents must not come in contact with Rhenofol roofing membranes.
- Labour standards and safety regulations must be adhered to, if necessary, ask for our safety data sheets.

Manufacturer's application instructions as of June 2004. Technical changes reserved.

Rhenofol® CV, Rhenofol® CG and Rhenofol® C

are products based on plasticized polyvinyl chloride (PVC-P).

All membranes have a width of 2.05 m, thus ensuring effective application. Rhenofol CV for mechanical fastening is also available in widths of 0.68 m, 1.03 m and 1.50 m.



Installations options for Rhenofol®

- **Rhenofol CV**, the synthetic fibre-reinforced roofing membrane, according to DIN 16734, for waterproofing in mechanically fastened roof build-ups without ballast.

- **Rhenofol CG**, the non-shrinking roofing membrane with glass fleece reinforcement, according to DIN 16735, for roof waterproofing in loosely laid roof build-ups with ballast (gravel/paving slabs/green roof).

- **Rhenofol C**, the non-reinforced waterproofing membrane, according to DIN 16730, as well as DIN 16938, for flashings and forming of details with Rhenofol CV/CG and for special application requirements.

Material properties/storage

Material properties

- Weather-resistant, even without additional surface protection.
- Resistant to flying sparks and radiant heat, confirmed by official test certificates.
- Resistant to standard exhaust gas from industrial and heating plants.
- Outstanding resistance to natural ageing.
- Rhenofol CG is root-resistant according to the FLL test.
- **Not resistant to:** materials containing bitumen and tar; organic solvents such as benzene, toluene, chlorinated hydrocarbons; fats, oils, such as oily cements and forming oils, in concentrated quantities.

Storage

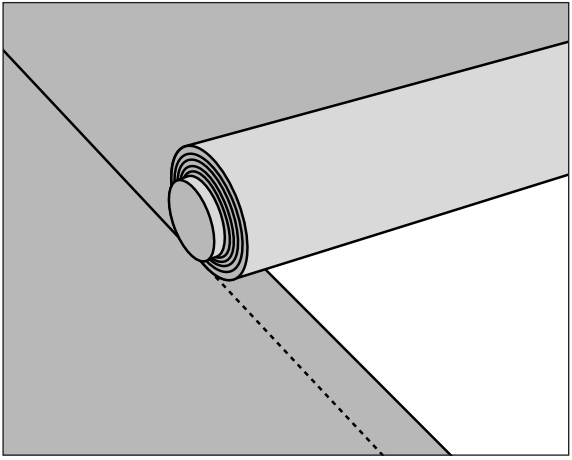
- Rolls should be stored horizontally.
- Leave the material in its original packing until used and protect from moisture.
- Unsealed packing units must be carefully closed, if stored in the open for a longer period.
- Single rolls, Rhenofol coated metal sheets and accessories should be covered with tarpaulin.

A

Part A
Covering the roof area with Rhenofol®

Application of the roofing membranes

- Unroll the roofing membrane Rhenofol CV/CG.
- The edge markings make adjusting the following membrane with a seam overlap of 50 mm easier (in case of mechanically fastened Rhenofol CV with edge overlap, the seam overlap should be 100 mm).
- Cross joints must be staggered and also overlap by 50 mm.
- During work breaks, the applied roof layers must be secured against wind uplift.

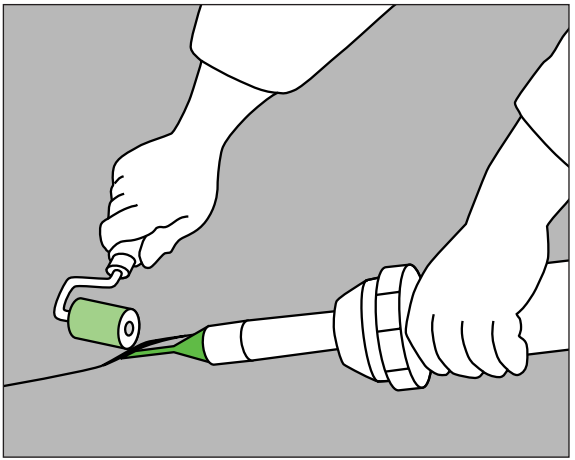


Sealing the seams by hot-air welding

... with the handheld welder and hand roller or with the welding machine.

With the continuously adjustable, handheld, hot-air welder with a 40 mm nozzle (industrial hot-air welder) the seam areas are evenly heated and immediately closed with the silicon hand roller. To produce a secure weld, the following points should be observed:

- The seam areas must be clean and dry.
- Heat up the welder for approx. 4 min.
- Select the correct welding temperature and speed, which should be checked by performing test welds before starting to work. In peeling tests, at welding level, the cooled-down weld seam must not peel. Either the mem-



brane material must tear or the lamination joint must unravel.

- The welder must be held under the seam so that the edge of the nozzle projects approx. 3 mm from the edge of the seam.

- The seam must be formed with a welding width of min. 30 mm. To keep the roofing membranes in place, the membrane seams should be tacked with slight pressure (not welded!) at the back of the overlap.

- T-joints should be secured by slightly melting and chamfering the centre membrane edge, thus preventing capillary action.

- In case of ash build-up, the metal nozzle should be cleaned with a wire brush or with scissors.

If Rhenofol roofing membranes are to be flashed against built-in rigid PVC details, the reliability of such connections must be agreed with the manufacturer of the built-in details!

The hot-air welding machines, which are manually operated, are mainly used for sealing membrane seams of larger roof areas.

As for reliable sealing of the seams, the same requirements as for manual welding apply, tacking is not necessary. A consistent level of power is essential.
For most standard automatic welding machines a generator with output of 10 kva must be used.

Additional requirements:

- When starting the machine, a function test must be carried out!

- **Permanently monitor the welding process! Do not inhale fumes that are emitted during welding!**

- In case of uneven substrates, the machine must be guided on rigid compensation strips (e.g. aluminium sheets), which are alternately placed along the seam. Thus perpendicular bulges are avoided and a smooth weld without beads is ensured.

If flashings are carried out by hot-air welding to Rhenofol roofing membranes or coated metal sheets and during repairs of old Rhenofol roofs, the welding areas must be cleaned prior to further processing.

Clean them with a cloth that has been moistened with Rhenofol solvent-welding agent. Allow the solvent-welding agent to evaporate (at least 1/2 hr) before hot-air welding.

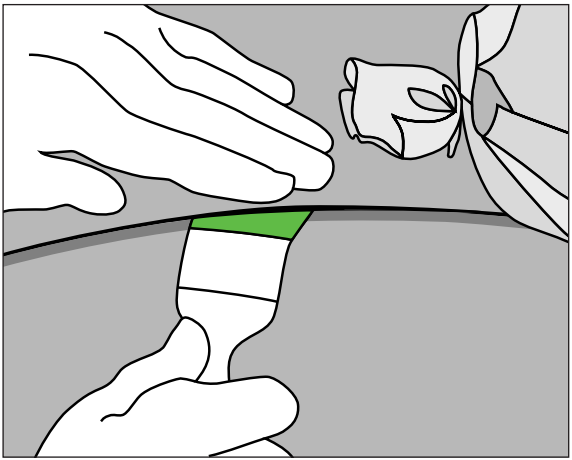
- Check all seam edges.

Sealing the seams by solvent welding

... with the welding brush, Rhenofol solvent-welding agent (THF) and a sandbag.

With the Rhenofol solvent-welding agent, you can produce homogenous connections between Rhenofol roofing membranes, with Rhenofol coated metal sheets and built-in rigid PVC details.

Solvent-welding agent is simultaneously applied to both sides at an area of 300-400 mm of the seam area, using a non-glued flat brush, and the areas then pressed on by hand. After this, pressure is immediately applied to the seam by means of a PE sandbag.



To produce a secure weld, the following points should be observed:

- The seam areas must be clean and dry.
- At temperatures below 5 °C the seam area must be preheated with the handheld hot-air welder.
- Damage to rigid foam board caused by solvent-welding agent is prevented by a larger seam overlap and correct dosing of the solvent-welding agent.
- T-joints can be secured by slightly melting and chamfering the centre membrane edge with the handheld hot-air welder, thus preventing capillary action.
- In case of low outside temperatures combined with high air humidity, hot-air welding is recommended.

Solvent-welding agent must not come into contact with the skin or the eyes!

Use adequate skin protection lotion before and after welding. You must **not** use solvent-welding agent **to clean your skin!**

No smoking, no open fire, avoid sparks!

Use solvent-welding agent only in properly ventilated areas! Do not inhale fumes!

- Avoid excessive application.
- Defective spots should only be repaired with the hot-air welder not by additional application of solvent.
- Check all seam edges.

Handling instructions for solvents and flammable fluids are to be observed!

Part B
Application techniques for Rhenofol®

Rhenofol® CV mechanically fastened

- With profiled steel decking or timber boarding, loosely lay Rhenofol CV perpendicularly to the corrugations or the boards.
- Mechanical fastening can be carried out in the form of seam fastening in the membrane edge overlap (seam overlap min. 100 mm), in the form of field fastening through the roofing membrane or with the welding paste system underneath the roofing membrane.
- In case of seam fastening, the distance between the membrane edge and the washer must be at least 10 mm.
- The washers must lay flat and press the roof sealing onto the substrate, however, they must not sink into any insulating material.
- The parameters for fastener spacing and membrane width are predefined by the wind uplift calculation (FDT service - please ask our Technical department).

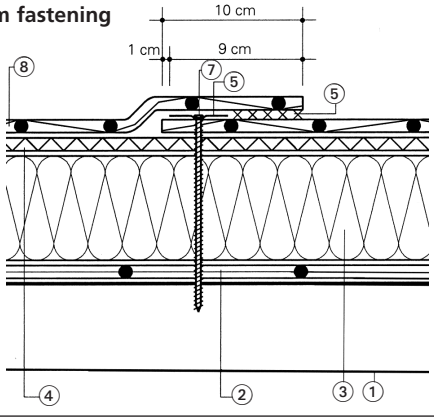
Fastening example

- Place rectangular thermal insulation boards with their long side perpendicular to the roofing membranes.
- Insulation boards or sections of boards, which are not sufficiently secured to the substrate, should be fixed with additional fasteners (min. 2 fasteners/m²) prior to laying the roof membrane.

If 1.50 m or 2.05 m wide Rhenofol CV is applied, these supplementary fasteners should also fix the separation layer (if applicable).

① Profiled steel decking
② Vapour control layer
③ Thermal insulation layer
④ FDT glass fleece 120 g/m² as required (only for Polystyrene insulation)
⑤ Welded seam
⑥ Washer
⑦ Self-tapping screw
⑧ Rhenofol CV

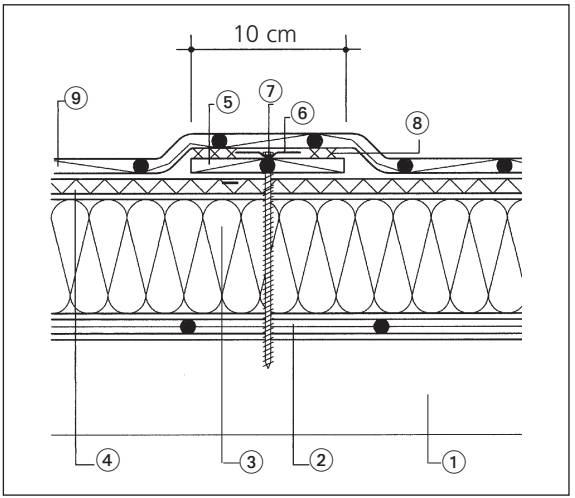
Seam fastening



Measuring and fastening with Rhenofol welding paste system

- The spacing of strips/sets is measured according to the wind uplift calculation.
- The strips run perpendicularly to the corrugations of the profiled steel decking.

① Profiled steel decking
② Vapour control layer
③ Thermal insulation layer
④ FDT glass fleece 120 g/m²
⑤ Rhenofol CV strip
⑥ Washer
⑦ Self-tapping screw
⑧ Rhenofol welding paste
⑨ Rhenofol CV

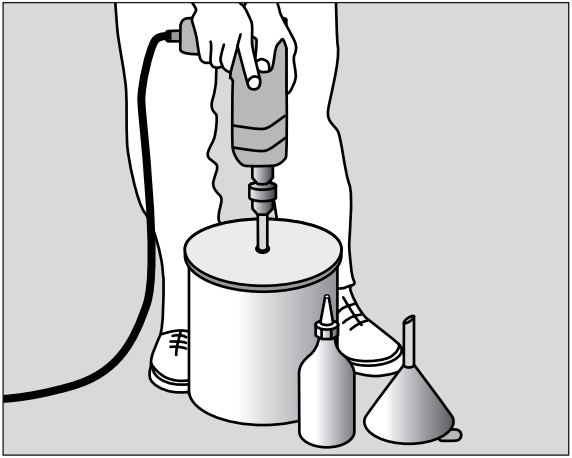


Application requirements for safe laying with the welding paste system:

- The roofing membrane and the sets/strips must be dry. Labour standards and safety regulations must be adhered to.

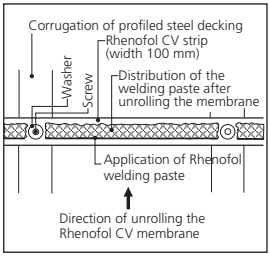
- Before usage, the Rhenofol welding paste SB should be stirred with a power drill with an appropriate stirrer attachment. The stirring time depends on the outside temperature: at low temperatures (< 20 °C) approx. 10-15 min., at higher temperatures (> 20 °C) approx. 5-10 min.

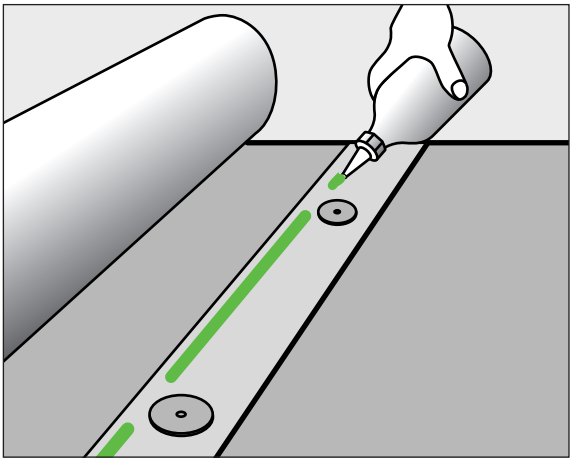
Do **not** stir the welding paste in closed rooms. Safety instructions on the container must be adhered to. After stirring, the welding paste is decanted into 1 litre PE bottles, using a funnel.



Applying the welding paste

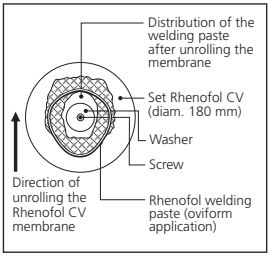
- After installing the strips, the Rhenofol welding paste SB is applied onto the strip between the washers in straight lines. Consumption is approx. 50 g/m. Do not apply to the washer.

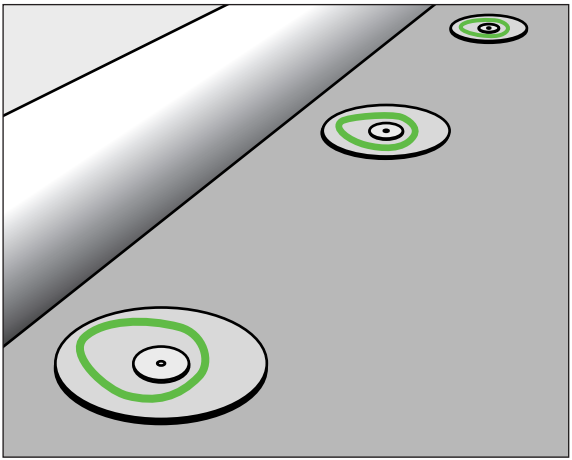




In the case of sets, the Rhenofol welding paste SB is applied in 10 mm thick oviform beads onto the sets.

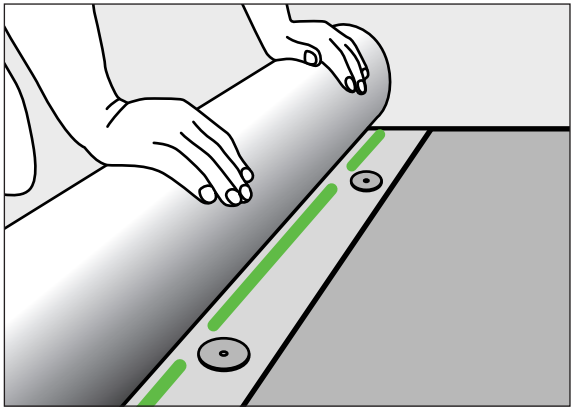
Consumption is approx. 25 g/set. If EPS insulation material is used, make sure no Rhenofol welding paste SB comes into contact with the insulation material. The open time for optimum welding of the sets or strips to the roofing membrane also depends on the outside temperature: at 5-30 °C approx. 30 sec., over 30 °C approx. 15 sec.





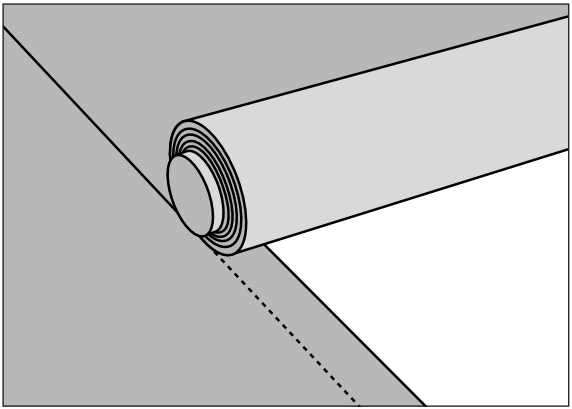
Applying the roofing membrane with the solvent paste system

- The 2.05 m wide Rhenofol CV roofing membranes are rolled onto the strips/sets immediately after application of the welding paste. The seam overlap is 50 mm. Then the membrane is pressed onto the strips/sets, thus ensuring an even spreading of the paste.
- The roofing membrane must be rolled on within the open time.
- **After rolling the membrane onto the Rhenofol welding paste, its position must not be changed.**
- **Do not apply the welding paste system in strong wind** (the newly rolled on roofing membrane must not undergo wind uplift until the welding paste is sufficiently cured).



Rhenofol® CG, loosely laid with ballast

- Loosely lay Rhenofol CG and secure it against wind uplift with ballast.
- Ballast in form of min. 50 mm bulk gravel, consisting of natural uncrushed pebbles 20 - 40 mm round washed river gravel, or paving slabs on paving support pads. Preferably on a PE separation layer or on Rhenofol TS, if required (see also page 76).



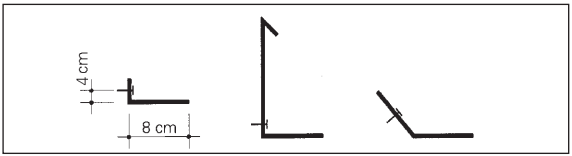
C

Part C
Flashings and trims with Rhenofol®

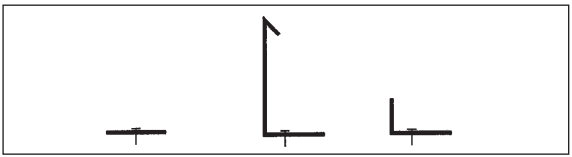
Fixings for Rhenofol® roofing membranes

Perimeter fixing of Rhenofol CV

- For wind uplift reasons roofing membranes Rhenofol CV must be fixed by welding to Rhenofol coated metal sheets at all roof perimeters, penetrations and valleys, which deviate from the horizontal by more than 3°.
- Fixing is carried out with angles or strips of Rhenofol coated metal sheet that are firmly fastened to the substrate and against which the roofing membrane Rhenofol CV is flashed at roof level by welding.
- The cut width of the coated metal sheets should be at least 80 mm.
- If direct fastening in the substrate is prevented by thermal insulation layers, the support for the coated metal sheet must be accordingly pressure-resistant.



Angle fillets for fastening at vertical or sloped surfaces.

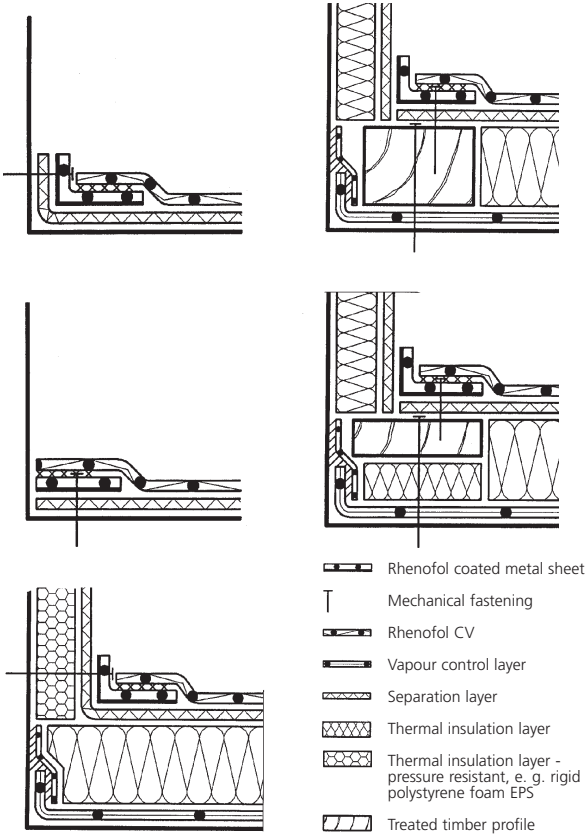


Strips or angle fillets for fastening at horizontal surfaces.

Suitable supports are:

- Insulation materials with a pressure resistance of at least 0.15 N/mm² at a maximum compression set of 10 % (e. g. extruded polystyrene).
- Min. 30 mm thick timber profiles and underlying insulation material with a pressure resistance of at least 0.1 N/mm² at a maximum compression set of 10 % (e. g. EPS).
- Single or multipart timber profiles.
- You can also use single fasteners instead of Rhenofol coated metal sheets for perimeter fixing, under the following conditions:
  - no exposed position
  - height of building max. 20 m
  - layer build-up thickness from the upper edge of the supporting deck max. 150 mm.
- The required number of fasteners per metre is equal to the number of fasteners in the first fastening row along the flashing, but there must be at least 4 fasteners/m.

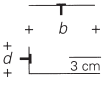
Examples of perimeter fixing with Rhenofol coated metal sheets



Perimeter fixing of Rhenofol CG

At all flashings and trims, built-in details etc., perimeter fixing is obligatory (min. 4 single fasteners per m or fixing with Rhenofol coated metal sheet, applied as with Rhenofol CV).

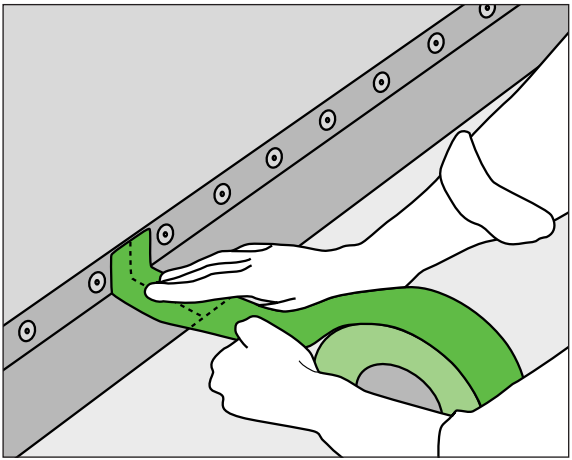
Fastening elements and spacing for fixings

	item to be fastened	
Supporting construction	timber profile*) d ≥ 3cm b ≥ 8 cm ≥ 1.5 d 	Rhenofol-coated metal sheet d ≥ 4.5 cm b ≥ 8 cm 
Reinforced concrete	screw Ø 8 mm with plug Ø 10 mm, type SDF-S Ø 10 by Ejot, spacing 500 mm or type Spike by SFS, spacing 300 mm.	body-bound rivet 4.8/26 mm spacing 100 mm type DSD-K-8 x 40 by Ejot, spacing 200 mm or type Spike by SFS, spacing 200 mm.
Lightweight concrete	nail anchor Ø 8 mm, spacing 300 mm	nail anchor Ø 5 mm, spacing 125 mm
Timber profiles, timber boarding/chipboards	wood screw Ø 8 mm spacing 300 mm or type JA3 Ø 6.5 mm by Ejot, spacing 500 mm	wood screw Ø 4.8/25 mm spacing 100 mm or type JA3-LT Ø 4.9 x 25 mm by Ejot, spacing 500 mm
Profiled steel decking	self-tapping screw Ø 4.8 mm, spacing 150 mm or type JT3-ST Ø 6.0 by Ejot, spacing 200 mm	steel blind rivet Ø 5 mm, spacing 100 mm

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

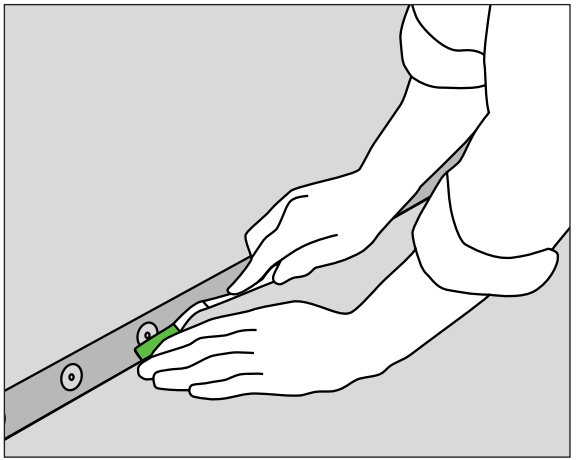
Fixing with Rhenofol® coated metal angle at upstands

- Rhenofol coated metal sheet (de-burred cut edges) are butted against each other with a clearance of 4 mm and mechanically fastened in a straight line to the upstands.
- Cover joints with 50 mm wide crêpe-paper strips.



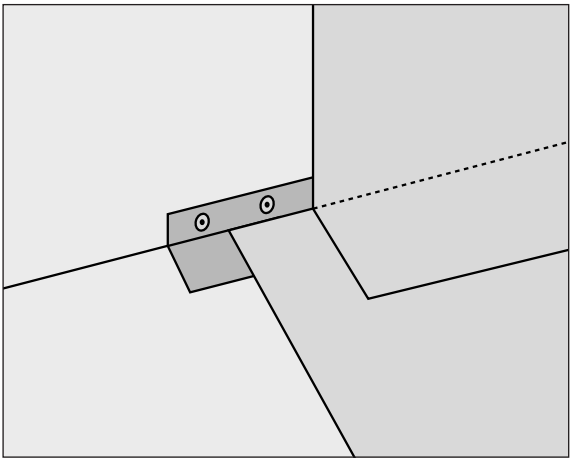
Fixing with Rhenofol® coated metal angle at upstands

- Weld the roofing membrane to the coated metal sheet.



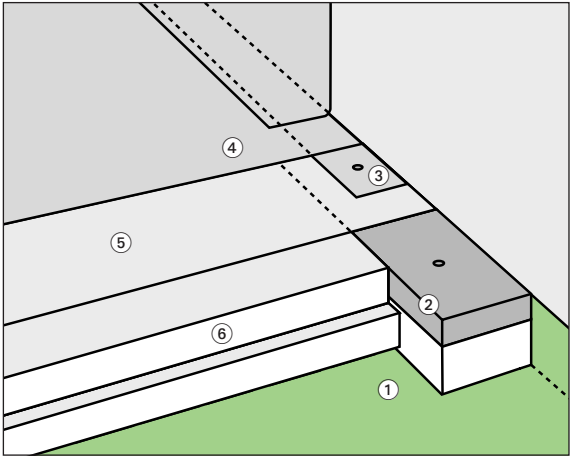
Fixing with Rhenofol® coated metal angle at upstands

- The flashing and trim with Rhenofol flashing strip is carried out as shown on pages 33 to 39.



Fixing with Rhenofol® coated metal sheet strips at upstands

① Vapour control layer PE, laid up to the top edge of the thermal insulation layer and flashed with connection tape.
② Timber profile, mechanically fastened, with pressure-resistant base.
③ Strips of Rhenofol coated metal sheet, screwed to the timber profile.
④ Rhenofol CV roofing membrane welded to the coated metal sheet.
⑤ FDT glass fleece 120 g/m².
⑥ EPS thermal insulation layer.



General information on flashings and trims

The performance of flat roofs depends to a large degree on the functional reliability of flashings and trims.

Special attention has to be paid to the following points:

- Rhenofol roofing membranes must always be fixed at all roof perimeters, flashings, roof penetrations and valleys (see page 25 ff.).

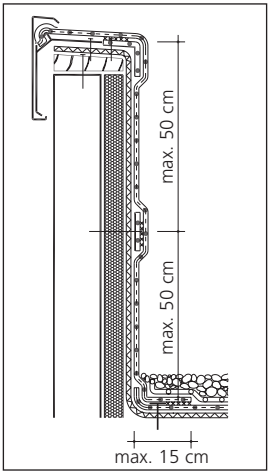
- **Sealings of flashings and trims must be secured against wind intrusion by bonding, clamping or full-size fastening.**

- The flashing strips must be properly fixed. If the flashing membrane is bonded, then at flashing heights over 200 mm, a full-size adhesive bonding is necessary. Valley areas are left unbonded at a width of 200 mm to allow movement compensation.

In case of mechanical fastening of the flashing membrane (with Rhenofol coated metal sheets or by clamping with the mounting rail of the roof edge trim), the spacing between the linear fastenings must not exceed 500 mm (the whole roll out length is considered). Rhenofol coated metal sheets for intermediate fixing should be at least 50 mm wide.

- You can leave out separation layers at the flashing area, if the substrate is smooth and even and edges are specially protected (e. g. with angles of Rhenofol coated metal sheets or with synthetic fleece 300 g/m^2).

- **In case materials are incompatible, suitable separation layers are obligatory.**



Rhenofol coated metal sheet

Rhenofol CG

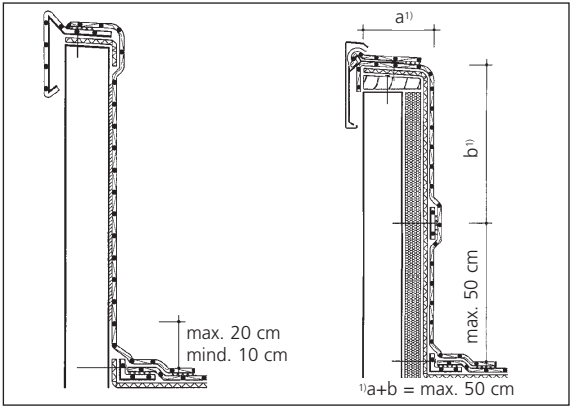
Mechanical fastening

Rhenofol CV

Separation layer

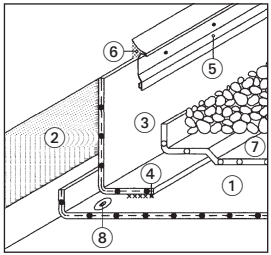
Thermal insulation layer, pressure resistant

Treated timber profile

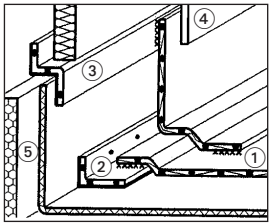


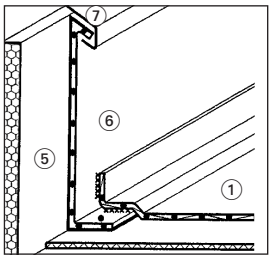
Wall flashing

① **Rhenofol CG**
② Rhenofol-contact adhesive 20
③ Rhenofol flashing strip
④ Welded seam
⑤ Wall connection profile Classic
⑥ Sealant A
⑦ PE layer 0.2 mm-0.25 mm thick (e. g. vapour control layer PE)
⑧ Perimeter fixing with single fasteners



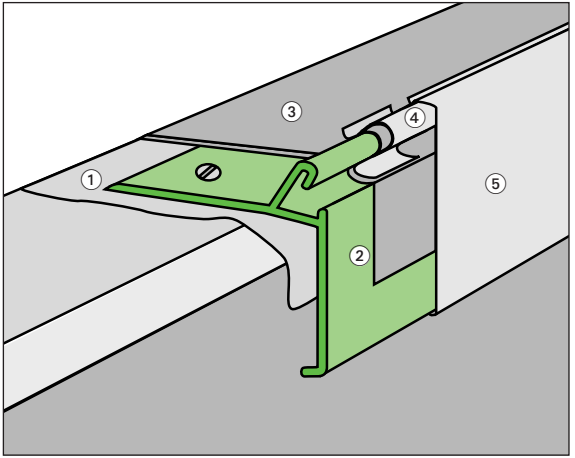
① **Rhenofol CV**
② Fixing with angle fillet of Rhenofol coated metal sheet
③ Fixing with Z-profile of Rhenofol coated metal sheet
④ Facade lining
⑤ Pressure-resistant thermal insulation
⑥ Fixing with angle fillet of Rhenofol coated metal sheet, at the same time wall flashing
⑦ Overhang



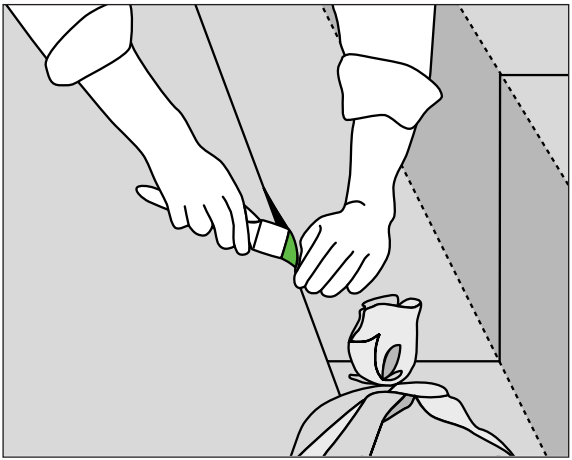


Roof edge trim

① Separation layer
② Mounting rail, fastened every 300 mm
③ Rhenofol flashing strip CV/CG, clamped in the FDT roof edge trim
④ Plastic clamps every 150 mm
⑤ Fascia panel

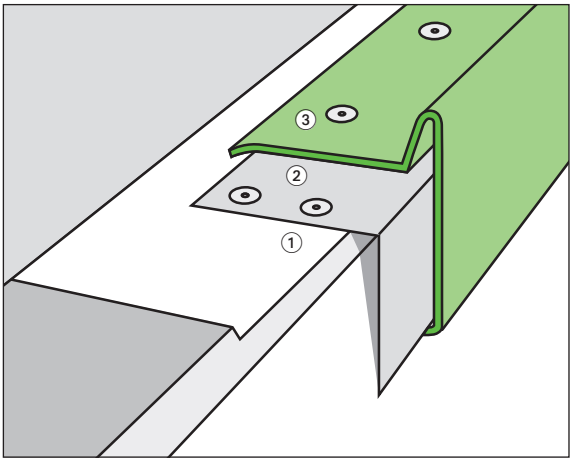


Welding the Rhenofol flashing strip to the roofing membrane.

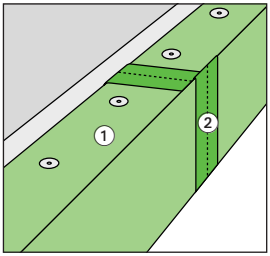


① Synthetic fleece 300 g/m²
② Galvanized steel stiffeners, 1.2 mm thick, at the joint area of the sheets, applied with a 4 mm clearance.
③ Fasten the bent and de-burred Rhenofol coated metal sheets with body-bound rivets 4.8/26 mm at a spacing of 150 mm in a staggered pattern.

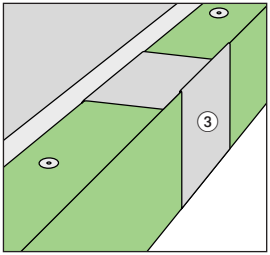
For wind uplift or stiffness reasons, additional stiffeners or continuous stiffening profiles should be installed.

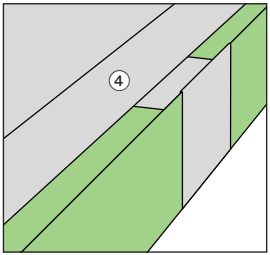


- Cover joints with 50 mm wide crêpe-paper strips.
- Apply a 150 mm wide Rhenofol C strip over the joint (see page 29), welding both sides to the coated metal sheets and weld on the 150 mm wide jointing strip.



① Rhenofol coated metal sheet
② Crêpe paper
③ Rhenofol C strips for joint forming
④ Rhenofol trim strip

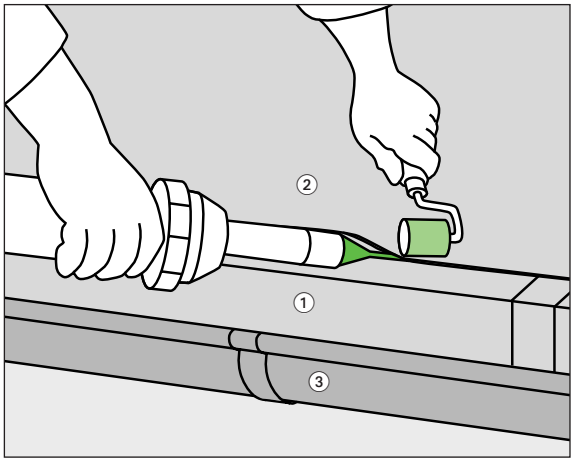




Eaves gutter flashing

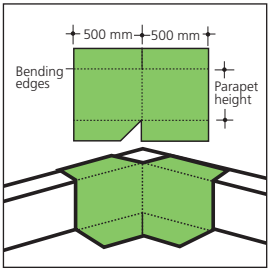
① Rhenofol coated metal sheet as drip angle
② Roofing membrane Rhenofol CV
③ Bracket-mounted gutter

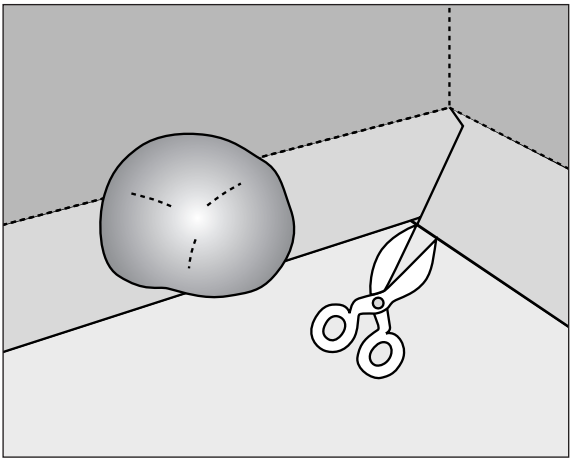
■ Steel drip angle joint see page 39.



Internal corners

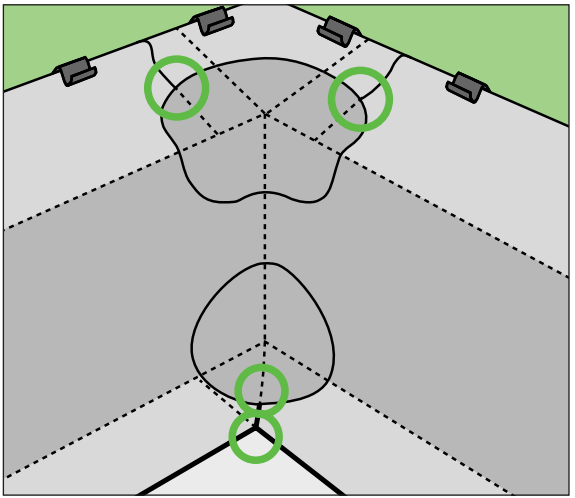
- Cut the trim strip Rhenofol at right angles and cut off the overlap to the corner.
- Weld the seams.
- Weld in the internal corners.





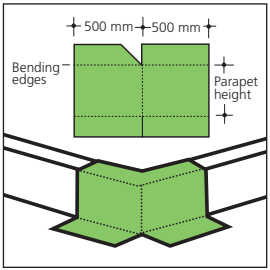
Upper trim of the parapet completed with cut-to-size Rhenofol and 90° external corner.

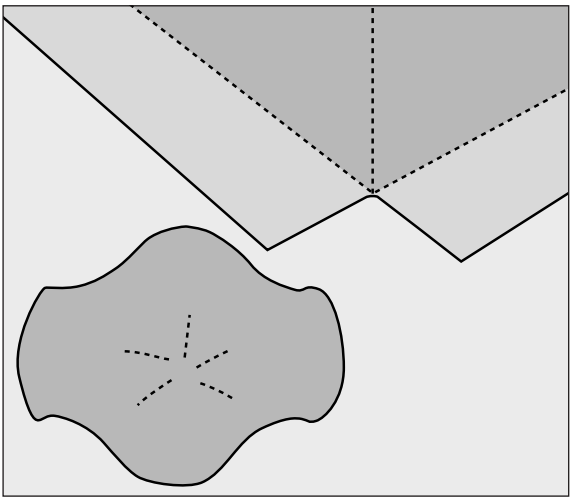
Check all seams and chamfer T-joints (green circles on sketch) (see pages 10 ff.).



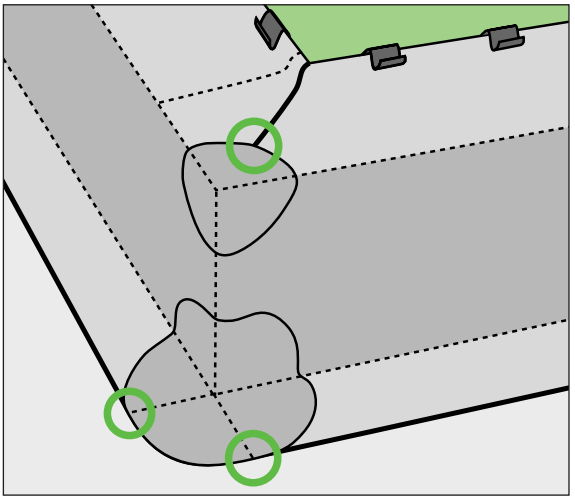
External corners

- Cut the Rhenofol CV/CG trim strip to size.
- Weld all seams.
- Weld in external corner.





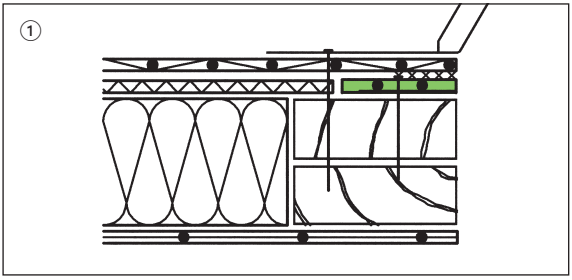
Upper trim of the parapet completed with prefabricated internal corner, reversed.
Check all seams and chamfer T-joints (green circles on sketch) (see page 10 ff.).

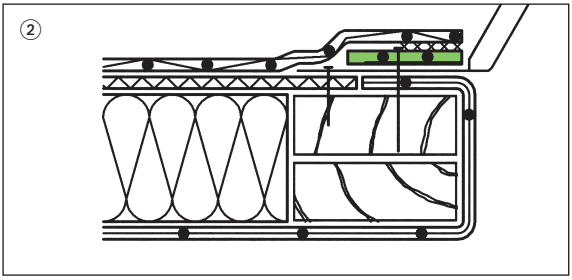


Roof light flashing

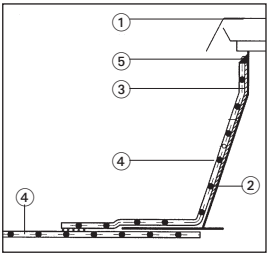
- Fix the Rhenofol CV/CG roofing membranes at roof level on strips of Rhenofol coated metal sheet. Alternatively, fixing can also be carried out with single fasteners, see page 25 ff.

The coated metal sheet can be fastened on the supporting structure, when sealing over thermal insulation layers on the timber profile frame ① or through the adhesive flange ②.

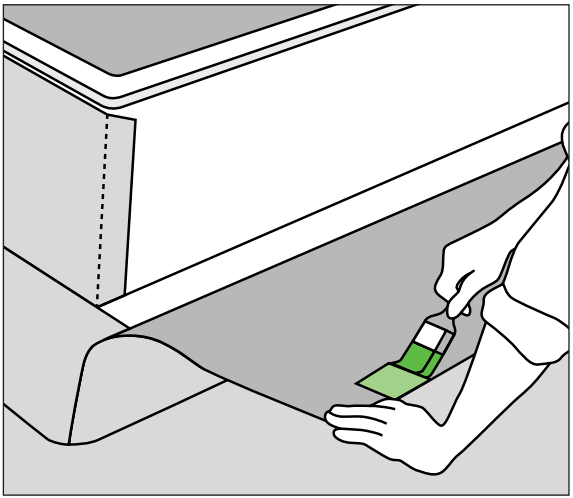




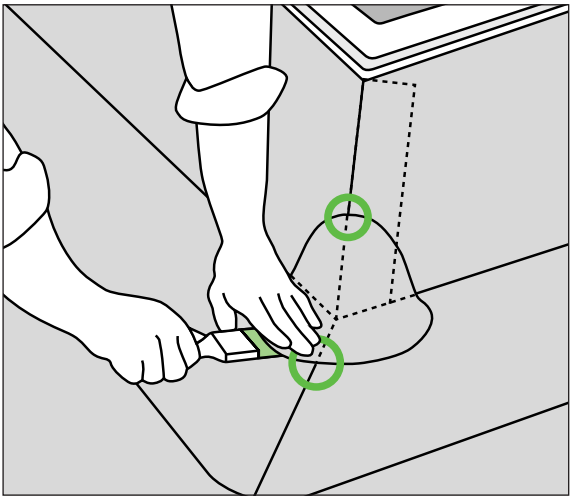
- Bond the Rhenofol flashing strip CV/CG with Rhenofol contact adhesive 20 to the rooflight upstand.



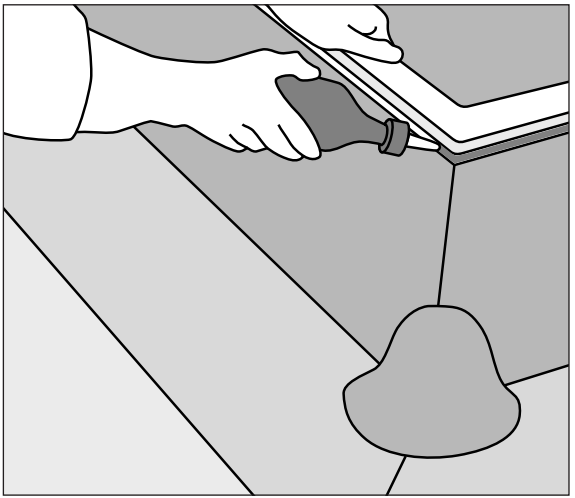
① Rooflight
② Upstand
③ Rhenofol contact adhesive 20
④ Rhenofol CG
⑤ Rhenofol paste



- Weld the overlapping seams of the flashing strips and weld on external corner.
- Weld the Rhenofol flashing strip to the roofing membrane.



- Seal the upper edge with Rhenofol paste



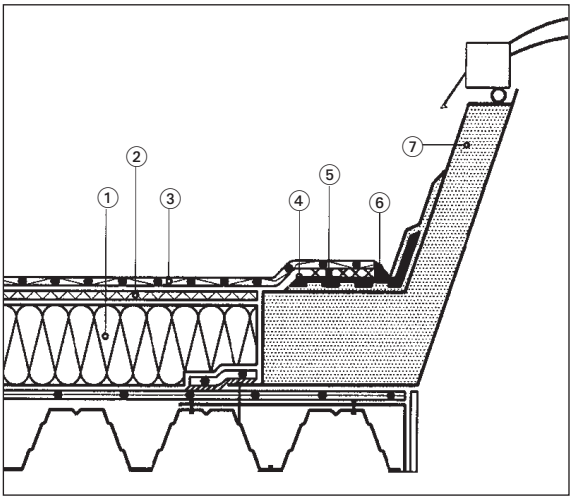
It is especially advantageous to use upstands that are compatible with flashing with PVC roofing membranes, by the rooflight manufacturer, e. g.

- upstands with a complete covering of roofing membranes Rhenofol and covered top flashing edge.
- Rigid PVC upstands, or with laminate-embedded rigid PVC strips against which the roofing membranes Rhenofol are flashed at roof level by welding.

For hot-air welding, clean with Rhenofol solvent-welding agent before welding.

In case of flashing Rhenofol roofing membranes , the upstand must be approved for fixings by the rooflight manufacturer, otherwise separate fixing of the membranes with Rhenofol coated metal sheets or single fasteners is necessary. (see page 29 ff.).

① Thermal insulation layer made of rigid polystyrene foam board EPS
② FDT glass fleece 120 g/m²
③ Rhenofol CV
④ Laminate-embedded rigid PVC strip
⑤ Welded seam
⑥ Rhenofol paste
⑦ Rooflight upstand

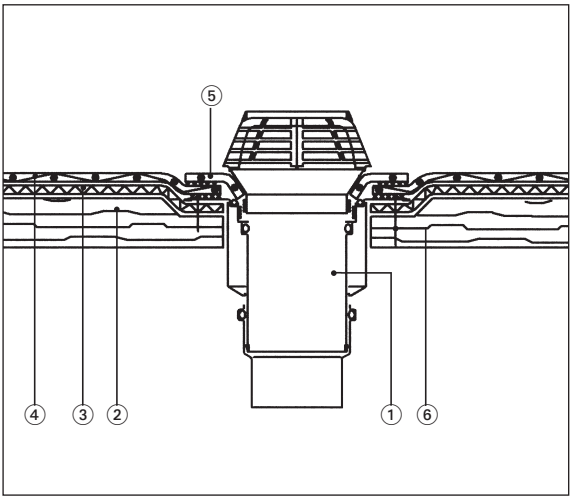


Flat roof elements with collars

Rhenofol roofing membranes are fixed on all FDT prefabricated details by welding onto rigid PVC flanges.

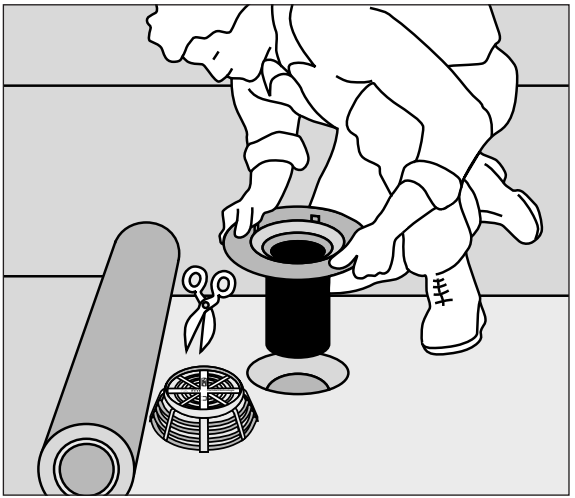
If standard details of alternative products do not allow fixing of Rhenofol by welding or clamping, fixing has to be done with Rhenofol coated metal sheets.

① VarioGully
② Supporting deck
③ Separation layer
④ Roofing membrane Rhenofol CV/CG, welded to outlet flange
⑤ Outlet collar welded to Rhenofol CV/CG
⑥ Outlet fastening (4 or 3 fasteners/outlet)



- Fasten the VarioGully in the supporting deck (4 or 3 fastener/outlet).

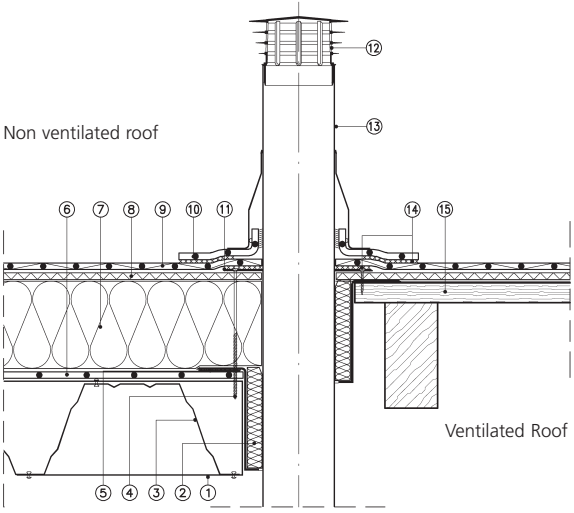
- Roof penetration:
  – vertical VarioGully: Ø 190 m
  – angled VarioGully: 190 x 270 mm
  – angled VarioGully, extremely flat: 190 x 240 mm.



Flat roof vent pipe DN 100

Flat roof vent pipe DN 100
Roof penetration: Ø 190 mm

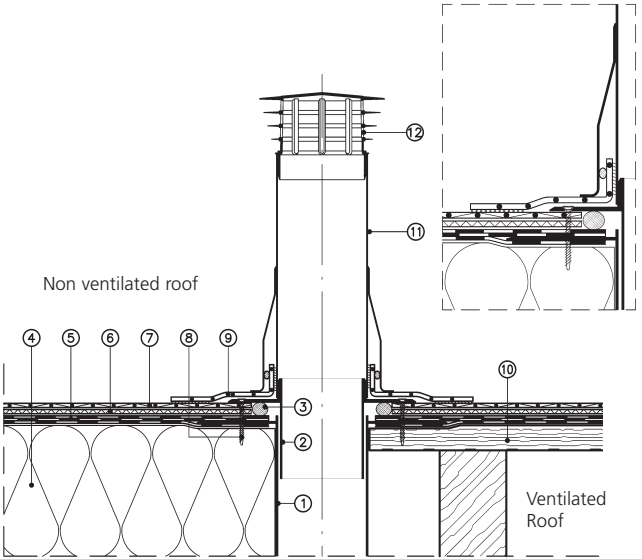
① Edge angle
② Penetration curb with insulation sleeve
③ Profiled steel decking, corrosion protected
④ Mechanical fastening
⑤ Sealing tape
⑥ PE air and vapour control layer
⑦ Thermal insulation layer EPS
⑧ FDT glass fleece separation layer
⑨ Roofing membrane Rhenofol
⑩ Rhenofol C collar
⑪ Bearing ring
⑫ Vent pipe cowl, removable
⑬ FDT vent pipe
⑭ Welded seam
⑮ Roof boarding



Refurbishment roof vent pipe for DN 100

Refurbishment roof vent pipe for DN 100
for flashing against existing vents

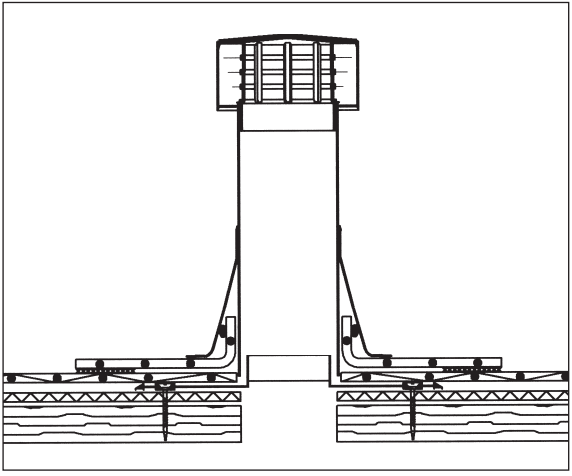
① Old vent pipe, cut flush at the old roof area
② Pipe socket at refurbishment vent pipe
③ Sealant S
④ Thermal insulation layer
⑤ Old roof covering
⑥ FDT synthetic fleece 300 g/m²
⑦ Rhenofol CV mechanically fastened
⑧ Mechanical fastening of the pipe socket
⑨ Rhenofol collar
⑩ Roof boarding
⑪ FDT refurbishment vent pipe
⑫ Vent pipe cowl, removable



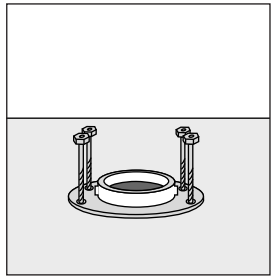
Cold roof vent DN 100

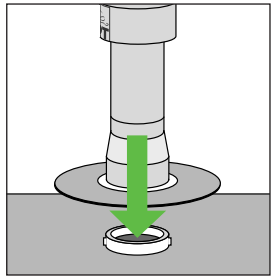
Cold roof vent with collar Rhenofol (watertight under heavy rain)

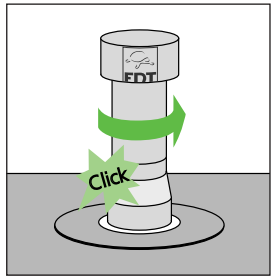
Fix cold roof vent with at least 3 fasteners in the supporting deck.
Roof penetration:
Ø 100 mm.



- Install the flange with 4 fastenings.
- Then apply the roofing membrane Rhenofol and weld to the flange.
- Put on the cold roof vent.
- Turn the cold roof vent until it clicks into place.
- Weld the collar to the roofing membrane.



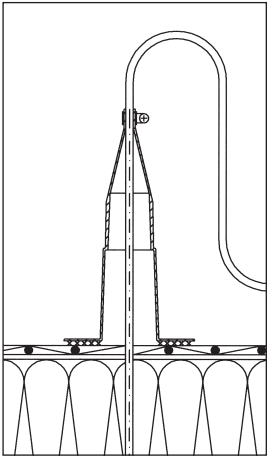




Lightning conductor socket Rhenofol®

Flashing to the roofing membrane
The lightning conductor socket is directly flashed to the Rhenofol roofing membrane with the collar.

Flashing to lightning protection wire, cable, pipes with 8 mm diameter
Seal the socket with the supplied jubilee clip by squeezing the squeeze point with pincers.

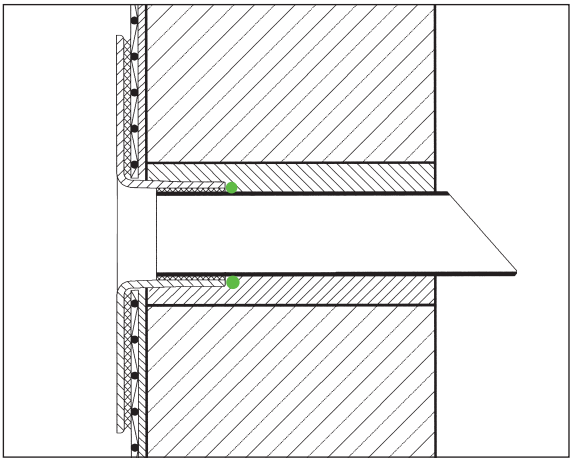


Flashings with wider passages up to max. 53 mm diameter
For wider diameters simply cut off the lightning conductor socket. The inner diameter at the cut point should be at least 2 mm narrower than the component to be passed through. For passing through, the end is heated up with a hot-air blower and stretched while putting it on. At the forming cylindrical shaft, carry out the connection with a suitable stainless steel clamp.
Note:
Check flashing height.

Use as emergency outlet or water spout

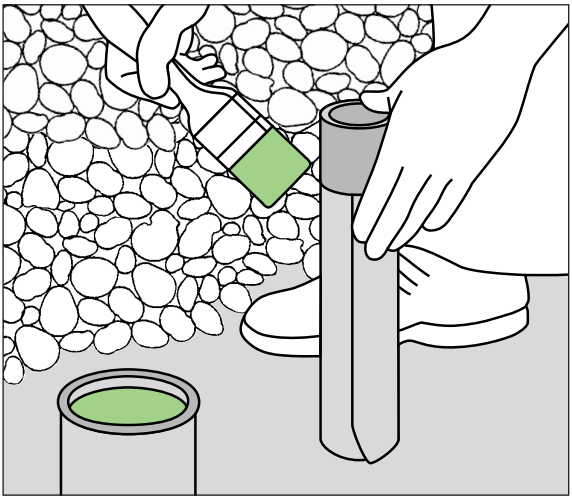
This is possible in connection with a rigid PVC pipe Ø 53 mm. To do this, cut the lightning conductor socket at the cut edge for pipe connection, put on the pipe and weld with Rhenofol solvent-welding agent (THF).

Seal the pipe edge with Rhenofol paste.



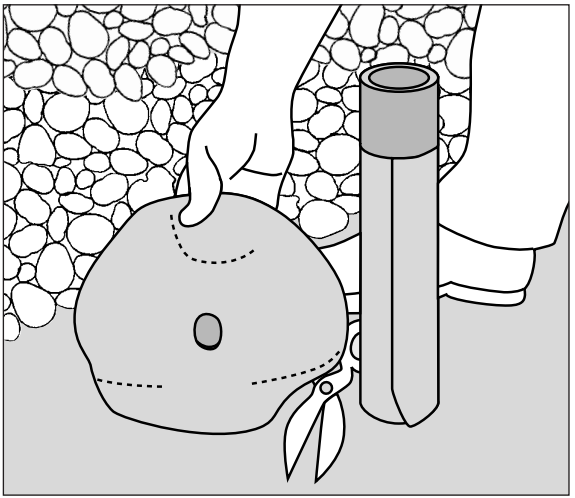
Forming of collars

- Bond Rhenofol C strips to the metal pipe with Rhenofol contact adhesive 20 and weld the 50 mm wide seam overlap.

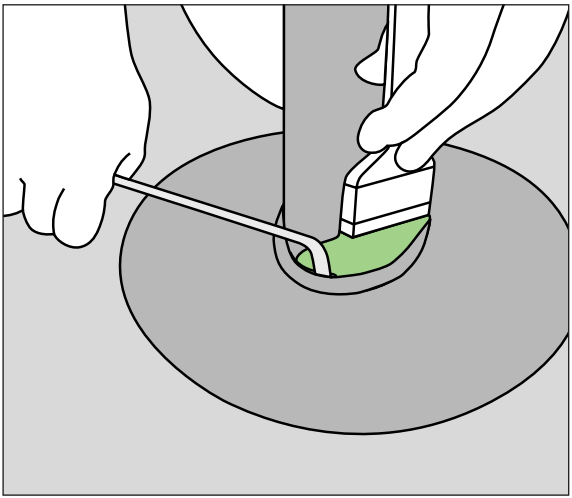


Flashing against pipe sockets

- Cut Rhenofol C collars to size. The cut out hole equals approx. 2/3 of the pipe diameter.

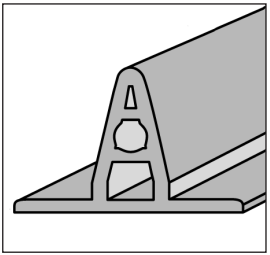


- Pull over Rhenofol C collars, weld to the sheathed pipe and roofing membrane and seal the seam edges at the pipe with Rhenofol paste.
- Top flashing is carried out with jubilee clip and Rhenofol paste.



Standing seam profile

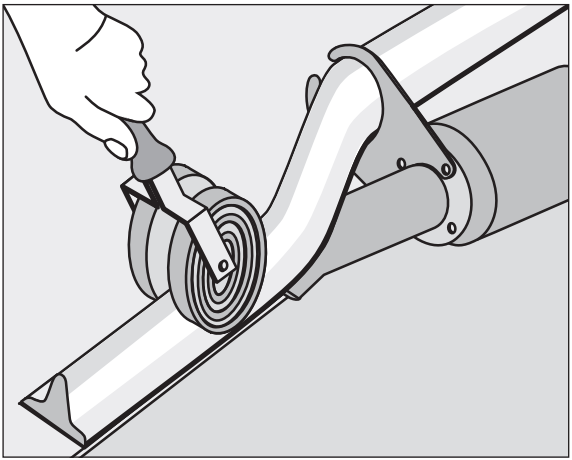
- Weld the standing seam profile only when Rhenofol CV roofing membranes are clean and dry.
- Thoroughly clean dirty surfaces.
- Prior to applying the standing seam profile, carefully check the seams.



We recommend welding the standing seam profile lengthwise to the roofing membrane. It is thus possible to use the seam as a positioning aid. **Weld the profile on the seam, but not directly over the seam edge!**
Place additional positioning markers as required.
Do not place the standing seam profile in the rainwater run-off area or near rainwater outlets.
For safety reasons, do not install standing seam profiles on roof areas, which are regularly walked on.

Application with hot-air welding

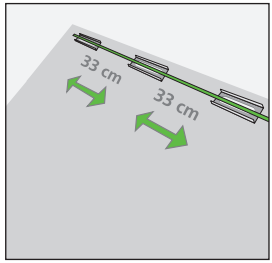
- For easier handling, fasten the guide to the welder. To do this, remove the three bolts by the heating pipe and put back into place together with the guide. Individually adjust the nozzle (approx. 45° against the guide).
- Weld the standing seam profile with hot-air welder at a length of approx. 100 mm. Then put the profile through the guide and weld it to the roofing membrane using the special hand roller.
- The joint connection is carried out with the corresponding plug and THF or Rhenofol paste.



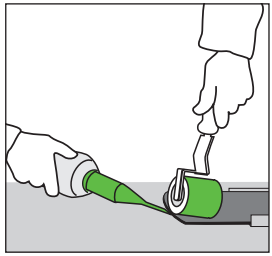
Installation of gravel stop profile

The holders are installed after laying of the membranes. When laying the membranes please take care that in the holder areas a Rhenofol coated metal sheet is fastened in the substrate. In these areas the membrane must be fully welded (see sketch on page 66).

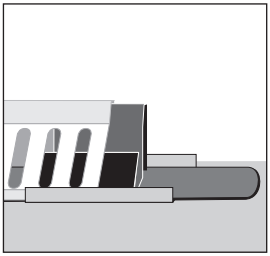
- Mark the position of the holders. The holders must be in alignment with each other. **Holder spacing 330 mm!** At joints of the gravel stop profiles the holders must be installed in a way that the profiles are equally positioned on the holder. If there is no joint at the last holder, the gravel stop profile may project over it by 150 mm.



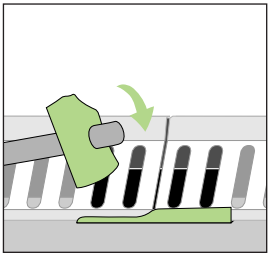
- Place the holder and completely weld a 40 mm x 120 mm membrane strip onto it with hot air (thermal welding).
  Note: Weld also in the cut-out for the holder.



- Insert the gravel stop profiles into the holders and push in clamp at the holder area. **The gravel stop profiles must not be butt joined, but left with a clearance of 2 mm at the joint!**

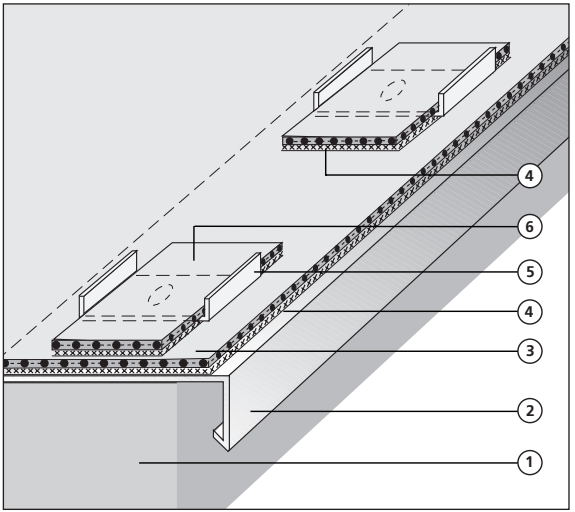


- Bend the holder flange with a hammer.

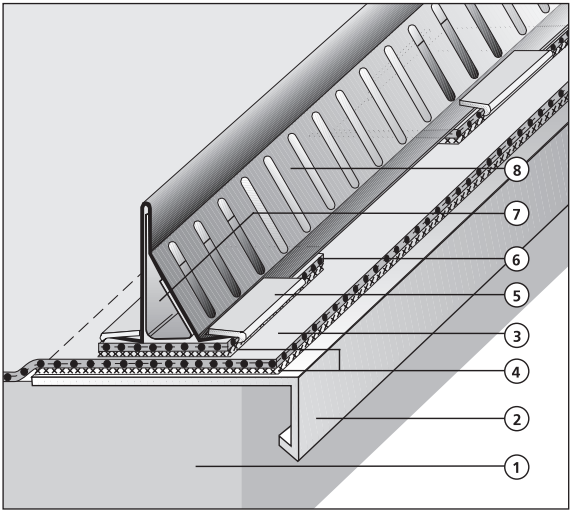


- **Forming corners**
  The preformed details for corner connections provided with the system allow for easy installation. Place the holders each at 150 mm from the corner. Simply push in the gravel stop profiles into the corners, then place them into the holders, align them and bend the holder flanges.

Installation of gravel stop profile



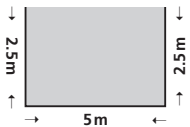
① Supporting structure
② Rhenofol coated metal sheet
③ Roofing membrane Rhenofol CG
④ Welded seam
⑤ Holder
⑥ Rhenofol strip



① Supporting structure
② Rhenofol coated metal sheet
③ Roofing membrane Rhenofol CG
④ Welded seam
⑤ Holder
⑥ Rhenofol strip
⑦ Clamp
⑧ Gravel stop profile

Calculation of the amount of required Rhenofol holders:
Divide the actual length in meters by 0.334 and round up the result, this number + 1 is the required amount of holders. In case of disconnected lengths, each partial section is to be considered separately.

Example:



2.5 m + 5 m + 2.5 m
= 10 m gravel stop profile

Amount of Rhenofol holders:

2.5 : 0.334 =	7.4	rounded =	8 + 1 = 9
5.0 : 0.334 =	14.9	rounded =	15 + 1 = 16
2.5 : 0.334 =	7.4	rounded =	8 + 1 = 9
		Total	**= 34 holders**

Part D
Product range, forms of supply, tools and accessories

Roofing membrane Rhenofol CV for mechanically fastened layer build-up

Item No.	Colour	Thickness mm	Forms of supply Rolls Lenght x width (m)
12 84 690	light grey	1.2	20 x 2.05
12 83 090	light grey	1.2	20 x 1.50
12 82 670	light grey	1.2	20 x 1.03
12 80 420	light grey	1.2	20 x 0.68
12 84 740	light grey	1.5	15 x 2.05
12 84 450	light grey	1.5	20 x 1.50
12 82 680	light grey	1.5	15 x 1.03
12 80 530	light grey	1.5	15 x 0.68
12 80 520	light grey	1.5	15 x 0.50
12 83 160	light grey	1.8	15 x 2.05
12 84 420	light grey	1.8	15 x 1.50
12 83 460	light grey	1.8	15 x 1.03
12 86 690	light grey	2.0	15 x 1.50
12 83 700	white[1)]	1.2	20 x 1.03
12 85 050	anthracite[1)]	1.2	20 x 1.03
12 88 420	anthracite[1)]	1.5	20 x 1.50

Roofing membrane Rhenofol CG for loosely laid layer build-up with ballast

12 83 410	light grey	1.2	20 x 2.05
12 83 470	light grey	1.5	15 x 2.05
12 83 730	light grey	1.8	15 x 2.05
12 86 600	light grey	2.0	15 x 2.05

[1)] Production of other colours possible. Prices and delivery time on request.

Waterproofing membrane Rhenofol C for waterproofing for foundations and detail forming

Item No.	Colour	Thickness[1] mm	Forms of supply Rolls Length x width (m)
12 83 810	light grey	1.5	15 x 2.05
12 83 550	light grey	1.5	15 x 1.03
12 84 810	light grey	1.2	15 x 2.05
12 84 820	white[2]	1.2	15 x 2.05
12 88 230	anthracite[2]	1.2	15 x 2.05

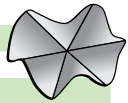
[1] Strip material 0.8 mm thick in different colours on request.
[2] Other colours on request.

Internal corner 90°

Item No.	Colour	Forms of supply
12 80 880	light grey	
12 80 890	white[1)]	
12 88 240	anthracite[1)]	

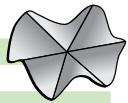
External corner 90°

12 80 960	light grey	
12 80 970	white[1)]	
12 88 250	anthracite[1)]	



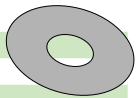
External corner for roof lights

12 61 100	light grey	45°
12 80 990	light grey	60°
12 81 010	light grey	73°



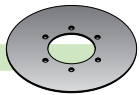
Collar Rhenofol for VarioGully

14 18 800	light grey	
14 18 820	white[1)]	
14 18 940	anthracite[1)]	



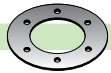
Collar loose/fixed flange

14 18 920	light grey	



Framing rings made of Rhenofol C

14 18 930	light grey	



Standing seam profile

12 87 280	light grey	4 m
12 87 260	anthracite	4 m
12 87 720	red-brown	4 m

[1)] Other colours on request.

Rhenofol coated metal sheet
For forming profiles for flashings, trims and fixings (1.4 mm thick).

Item No.	Colour	Forms of supply
12 61 500	light grey	30 units stack 2 x 1 m
12 87 760	light grey	60 units stack 2 x 1 m
12 61 900	light grey	30 units stack 2 x 1 m
12 87 770	light grey	60 units stack 2 x 1 m
12 82 560	light grey	30 x 1 m coil
12 61 600	anthracite	30 units stack 3 x 1 m
12 61 800	white	30 units stack 2 x 1 m
12 85 510	red-brown	30 units stack 3 x 1 m

Rhenofol welding paste SB
For a stable connection of Rhenofol CV roofing membranes with mechanically fastened Rhenofol CV sets or strips.

12 86 300	white	10 kg container

Rhenofol CV strip
For linear fastening of Rhenofol CV with welding paste system.

12 86 180	light grey	0.15 to 50 m
12 86 190	light grey	0.10 to 50 m

Rhenofol CV sets
For point fastening of Rhenofol CV with welding paste system.

12 83 870	light grey	punched
12 84 170	light grey	unpunched

PE container lid
For carrying the stirring mechanism and covering the container, as well as for preventing flying sparks caused by possible static charges.

Item No.
12 84 150

Stirrer attachment
For fitting to a power drill.
For stirring the welding paste.

12 84 110

Plastic funnel
For easy decanting the stirred welding paste into PE bottles.

12 84 130

PE bottle 1 litre
For easy application of the welding paste on the sets or strips.

12 84 120

Sealant A
For flashings with wall connection profile and against roof lights. Consumption: approx. 50 ml/m.

Item No.	Colour	Forms of supply
12 65 200	grey	300 ml cartridge

Sealant S
For flashings with wall connection profile.
Consumption: approx. 50 ml/m.

10 14 300	grey	300 ml cartridge

Rhenofol solvent-welding agent (THF)
For seam sealing of roofing membranes Rhenofol and as thinner for Rhenofol paste. Consumption: approx. 15 g/m.

12 62 900		4.5 kg container

Rhenofol contact adhesive 20
For bonding roofing membranes Rhenofol to concrete, timber, polyester, steel etc. (but not polystyrene).

12 84 180		12 kg container

Note: Always apply Rhenofol contact adhesive 20 on both the substrate and the underside of Rhenofol.
Note the drying time!
Check: During the finger check the adhesive must not produce threads. Consumption: approx. 600 g/m^2.

Thinner D
Solvent for contact adhesive 20 and as cleaning agent.

12 65 000	colourless	5 kg container

Rhenofol paste

For sealing seam edges at roofing membranes Rhenofol.
Consumption: approx. 10 g/m.

Item No.	Colour	Forms of supply
12 81 060	light grey	2 kg container
12 81 090	white	2 kg container

Rhenofol TS

For layer build-ups with Rhenofol CG as a highly perforation-resistant separation and protection layer with non-standard gravel as well as with terraced areas, such as roof terraces with paving slabs, green roofs and park decks.

Range of applications	**loosely overlapping with 80 mm seam overlap**	**50 mm overlap, bondet with Rhenofol paste** (paste consumption: 30 g/m)	**butt joint, overwelded, with 100 mm wide Rhenofol C strip**
As a separation layer if non-standard gravel is used	X	(X)	(X)
As a protection layer for roof terraces with paving slabs		X	(X)
As a protection layer on screed		X	(X)
As a protection layer on green roofs in combination with roofing membranes Rhenofol			X

X = recommended seam connection; (X) = also possible seam connection..

Item No.	Colour	Thickness mm	Forms of supply Rolls
12 83 690	light grey/white	1.1[1)]	10 x 2.05 m

[1)] including fleece backing.

Rhenofol CS
Synthetic membrane with top non-slip embossing. As a protection layer for maintenance and walk ways on Rhenofol roofs. The substrate must be pressure-resistant. Must be connected to the roofing membrane by a circumferential seam.

Item No.	Colour	Thickness mm	Forms of Supply Rolls
12 86 970	anthracite	1.5	15 x 1.03 m

Synthetic fleece 300 g/m²
As a protection layer on rough substrates. As a separation layer to prevent interaction between incompatible materials such as roofing membrane Rhenofol and old bitumen covering.

12 60 000	white	50 x 2.25 m

Synthetic fleece 180 g/m²
As a separation layer to prevent interaction between incompatible materials such as roofing membrane Rhenofol and polystyrene rigid foam boards

12 60 200	white	100 x 2.25 m

Glass fleece 120 g/m²
As a separation layer to prevent interaction between roofing membranes Rhenofol and incompatible materials such as polystyrene rigid foam boards, and as a fire retarding layer in mechanically fastened layer build-ups with roofing membranes Rhenofol.

12 60 400	white	100 x 2.00 m

Vapour control layer PE
In loosely laid or mechanically fastened layer build-ups with roofing membrane Rhenofol, for non air-conditioned rooms according to DIN 4108, part 3. As a separation layer for Rhenofol CG under gravel and in case of extensive vegetation.

Item No.	Colour	Thickness	Forms of supply
12 60 700		0.25 mm	25 x 4.00 m

Connection tape
Seam connection between PE vapour control layers as well as for flashings and trims of PE vapour control layers on different substrates

12 60 800	black		12 x 0.08 m

Seam tape
Seam connection between PE vapour control layers, in the overlap.
According to the requirements of DIN 18234-1.

12 87 900	grey	1 mm	25 x 1.5 mm

Membrane cutter
For easy and safe cutting of Rhenofol.

12 65 500

Hand roller
For pressing on the Rhenofol roofing membranes while hot-air welding.

Item No.

12 66 000

Teflon hand roller
For rolling on Rhenofol prefabricated details and membrane seams while hot-air welding.

17 50 000

Metal hand roller small
For rolling on Rhenofol prefabricated details while hot-air welding, also for areas which are difficult to reach.

15 01 100

PE sand bag
For weighing down solvent-welding seams.Without contents.

12 63 900

PE bottle 0.5 litre
For Rhenofol paste.

12 62 600

Scissors 250 mm
For easy cutting of Rhenofol.

12 66 100

Welding brush 50 mm and precoating brush.

12 63 000

Hand roller for standing seam profiles
with guide for Leister Triac/PID

12 88 980

VarioGully programme

Item No.	Application	Dimension
14 30 000	vertical	DN 125 and DN 100
14 30 100	vertical, heatable*)	DN 125 and DN 100
14 30 200	angled	DN 125
14 30 300	angled, heatable*)	DN 125
14 30 250	angled, extremely flat	DN 70 and DN 100
14 30 350	angled, extremely flat, heatable*)	DN 70 and DN 100
14 30 500	refurbishment	
	VarioGully warm-roof upstand	
14 30 400	for insulation material thicknesses from 35 to 160 mm[1)]	
14 30 410	for insulation material thicknesses from 160 to 240 mm[1)]	
14 17 100	eccentric reducer	DN 125/70
14 17 300	aluminium leaf guard with lift ring	
14 17 200	lift ring	
14 30 800	emergency outlet socket	40 mm banking height

[1)] Special lengths for larger insulation material thicknesses on request.

Flashing collar see page 72.

***) Note on heating:**
The splash-proof installed - not foamed-in - heater unit is doubly protected by the two integrated safety systems (heat monitoring relay and fuse).
The installation of the heating system must be carried out by a professional electrician, using a safety transformer 220/24 V. Control of the heating system is carried out by the client. The power of the heating system is 10 W. According to the regulations of VDE 0700, special section 233, § 7.12, in the area of heatable outlets only non-combustible insulation materials, class A according to DIN 4102, part 1, must be used.

Screw-driving aid
Tool for simple and reliable installation of the screwed ring for the VarioGully and the warm roof upstand.

14 18 010			

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 collar.

Item No.	For flashing against …	Colour	for insulation material thickness (mm)
14 03 300	Rhenofol	light grey[1)]	160
14 03 350	Rhenofol	light grey[1)]	240

Refurbishment roof vent for DN 100
For flashing against vents (pipe diameter DN 100) in the case of roof refurbishment with integrated Rhenofol collar.

14 03 580	Rhenofol	light grey[1)]

Hose connection

14 13 300	Vent pipe DN 100

Cold roof vent DN 100
Made of rigid PVC with increased impact strength. Vent cross section of 88 cm². Weather cap can be removed for maintenance. Ready for installation with integrated collar.

14 10 500	Rhenofol	light grey[1)]

Lightning conductor collar Rhenofol
For flashing against lightning protectors and for penetrations up to Ø 53 mm. By welding to PVC pipes up to Ø 53 mm, also usable as water spout and emergency outlet.

14 40 000	light grey

[1)] Other colours on request.

Wall connection profiles/roof edge trims

Irem No.		Length
14 09 930	Aluminium wall connection profile Economy	3 m
14 09 900	Aluminium wall connection profile Classic	4 m
14 11 500	Aluminium roof edge trim 110 silver metal grey, fascia board height 110 mm	4 m
14 12 200	Corner 110	
14 12 100	Joint connection 110	
14 11 501	Aluminium roof edge trim 175 silver metal grey, fascia board height 175 mm	4 m
14 12 201	Corner 175	
14 12 101	Joint connection 175	

Gravel stop profile

As a roof edge trim in the case of gravel roofs and terrace paving, stainless steel 60 mm high.

Item No.	.	Colour
14 40 110	10 units at 2 m each incl. 61 holders and clamps	
Supplementary package of gravel stop profiles as required:		
14 40 170	holder and clamp	silver
14 40 140	gravel stop profile 2 m	silver
14 40 120	internal corner for gravel stop profile	silver
14 40 130	external corner for gravel stop profile	silver

Fastening material

Item No.	max. thickness of layer build-up (mm)	length of fastening elements (mm)
Type SS, self-tapping screw[1] for steel profiles and derived timber products Ø 4.8		
14 15 000	10	35[3]
14 15 010	20	45[3]
14 16 000	100	120[2]
14 16 010	120	140[2]
14 16 020	140	160[2]
Washer D51 for self-tapping screw		
14 16 500	bore Ø 5.1 mm	
Washer D65 for impact plug		
14 16 510	bore Ø 6.5 mm	

[1] Setting the fastening elements with a bit holder for screwdriver drills is recommended. With crosstip bit Ph2 (Phillips size 2).
[2] Other lengths on request.
[3] Screws Ø 5.0 mm. Only for derived timber products.

Note:
As for application possibilities, please see our current manufacturer's application instructions.

Recycling of PVC roofing membranes

As a founding member of the Association for PVC Roofing Membrane Recycling (AfDR) we have been providing ecological closed recycling of valuable materials for many years. The cycle starts with the resource-saving production and ends with with the recycling of PVC. The following procedure for returning the monomeric plasticized old PVC membranes was established within the AfDR recycling:

Acceptance criteria

The recycling system accepts only membranes made of homogeneous PVC-P and fabric or scrim reinforced PVC-P. The old roofing membranes must be free of adhered foreign matter, i. e. clean swept, when delivered for recycling. To achieve this, the roof cover must be thoroughly swept with a broom to remove any gravel stones or other debris.

The membranes then must be cut into approx. 1 m wide strips and rolled up (approx. 15 m rolls).

Roll the membranes up tightly to reduce transport volume. The membranes are collected in Big-Bags, i. e. synthetic fabric bags with a capacity of approx. 300 to 400 m^2 of old roofing membranes and a maximum total weight of 1,000 kg.

For further information please contact:

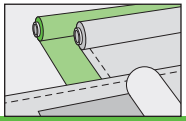
FlachdachTechnologie
GmbH & Co. KG
Technical department
Eisenbahnstraße 6 - 8
D-68199 Mannheim
Germany
Tel +49 621-8504-372
Fax +49 621-8504-378
E-Mail:
export@fdt.de

Basic and advanced training

Top performance of a roofing membrane is always a question of professional application!

In order to ensure this, we offer special practical training, supervised by our experienced Technical Department staff.

Rhepanol and Rhenofol training for apprentices, journeymen and foremen provide knowledge for the installation of synthetic roof sealing membranes. Advanced Rhepanol courses for foremen and masters of the roofing craft are designed to provide wider and more comprehensive knowledge for the installation of synthetic roof sealing membranes.



Export department:

Phone +49 6 21-85 04-3 72

Fax +49 6 21-85 04-3 78

E-Mail export@fdt.de

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FlachdachTechnologie GmbH & Co. KG

Eisenbahnstraße 6-8
68199 Mannheim
Germany

Tel +49-6 21-85 04-0
Fax +49-6 21-85 04-2 05
www.fdt.de