

POLYFIN AG

- Installation Guide Line -

Polyfin® (FPO/TPO)

Polyfin Duo® (FPO/TPO)

Synthetic roofing and sealing membranes



PRACTICAL

RELIABLE

SUSTAINABLE


POLYFIN AG
Flachdachtechnologie der Zukunft

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The laid precast concrete elements must form a continuous surface. Joints between the slabs should be closed. Trailing strips at least 0.2 m wide must be placed under the waterproofing on the support joints (head ends).	
For large-format slabs, this applies to all joints (TT slabs), unless other measures are taken.	
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Foreword

The installation guidelines are intended to provide guidance on the proper use of the products sold by POLYFIN AG. The focus of these guidelines is clearly on the use as flat roof waterproofing. In addition to the technical details, the various roofing membrane products each require different construction and installation methods.

In addition to technical/constructional aspects, fire protection (with particular attention to 'hard roofing') and positional safety (resistance to lifting due to wind suction) must also be taken into account. The designs are primarily based on the requirements of the German market. They are primarily to be understood as a manufacturer-specific supplement to the relevant regulations such as DIN 18531 ff. and the 'Technical Rules' of the DUD or the 'abc of roofing and waterproofing membranes' of the VDD.

Other countries may have different requirements for products and designs.

The individual topics are described in the following text to the best of our knowledge, which is based on decades of experience. However, the installation guidelines do not replace the specialised knowledge of each individual user and planner. The disclaimer must be observed and the installation guidelines are subject to change without notice.

1. Products

1.1 Polyfin® roofing- and sealing membranes (FPO/TPO)

Polyfin® membranes are synthetic single ply roofing and sealing membranes made of flexible polyolefins (FPO/TPO). This material is a thermoplastic. Polyfin® is easy to process and is suitable for use in both new buildings and the renovation of existing buildings. As Polyfin® is available in different variants with glass fleece reinforcement, with or without fleece lamination on the underside, we can cover all areas of application. Our Polyfin® membranes are available in thicknesses from 1.5 to 2.5 mm.



Product properties

Proven suitability confirmed by independent testing institutes

- PVC- and plasticiser-free, halogen-free
- Quality assurance in accordance with ISO 9001:2008
- CE certification in accordance with DIN EN 13956
- Resistance to flying sparks and radiant heat for tested roof structures within the framework of corresponding classification standards
- Highly resistant to UV radiation
- Highly resistant to hailstorms
- Ozone resistant Bitumen- und polystyrolverträglich
- Simple installation and processing
- Hot air welding is possible in a wide temperature range, creates homogeneous seam joints and requires no additional seam sealing.

Polyfin®-roofing and sealing membranes – possible installation methods

Products (FPO/TPO)	Polyfin® 3015 Glass fleece reinforcement	Polyfin® 3018 Glass fleece reinforcement	Polyfin® 3020 Glass fleece reinforcement	Polyfin® 3025 Glass fleece reinforcement
Application method				
Ballasted and under Slab floorings	✓	✓	✓	✓
Mechanically fastened	✓	✓	✓	✓
Bonded in strips	-	-	-	-
Fully bonded	-	-	-	-
Colour ¹⁾	Standard colour : light grey			
Dicke [mm]	1,5	1,8	2,0	2,5
Width [mm]	2100/1500/ 1050/750/ 500/350/250	2100/1500/ 1050/750/ 500/350/250	2100/1500/ 1050/750/ 500/350/250	2100/1500/ 1050/750/ 500/350/250
Length [m] ²⁾	See delivery programme			

1) Special colours on request

2) Special lengths on request

Polyfin®-roofing and sealing membranes for tested build up's

- Fleece backed Polyfin-membranes, fleece free welding edge on both sides -

Products (FPO/TPO)	Polyfin® 4015 v	Polyfin® 4018 v	Polyfin® 4020 v
Application method	Glass fleece reinforcement, fleece backing, fleece free welding edge on both sides	Glass fleece reinforcement, fleece backing, fleece free welding edge on both sides	Glass fleece reinforcement, fleece backing, fleece free welding edge on both sides
Ballasted and under Slab floorings	✓	✓	✓
Mechanically fastened	✓	✓	✓
Bonded in strips	✓	✓	✓
Fully bonded	✓	✓	✓
Colour ²⁾	Standard colour : light grey		
Thickness [mm] ¹⁾	1,5	1,8	2,0
Width [mm]	1500		
Length [m] ³⁾	See delivery programme		

1) Effective thickness of the sealing layer

2) Special colours on request

3) Special lengths on request

Homogenous Polyfin®-membrane for detailings

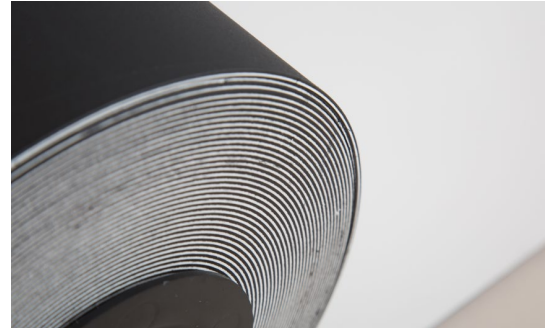
Produkt (FPO/TPO)	Application	Thickness [mm]	Width [mm]	Length [m]
Polyfin® 1020 Homogenous material	For detailings and roof light corners	2,0	500	15

1.2 Polyfin Duo® roofing and sealing membranes (FPO/TPO)

Membranes from the Polyfin Duo® product line are roofing and sealing membranes made of FPO.

The membranes have a white top side and a black underside. The products are available in different versions:

- Polyfin Duo® 30.. – membrane with central glass fleece reinforcement.
- Polyfin Duo® 30.. GS – membrane with a combination reinforcement of a polyester scrim and a glass fleece.



Polyfin Duo® membranes are easy to work with and are suitable for use in new buildings as well as for renovating existing properties. As Polyfin Duo® is available in different variants, we enable you to cover all areas of application. Our Polyfin Duo® membranes are available in thicknesses from 1.5 to 2.0 mm.

Product properties

Proven suitability confirmed by independent testing institutes

- PVC- and plasticiser-free, halogen-free
- Quality assurance in accordance with ISO 9001:2008
- CE certification in accordance with DIN EN 13956
- Resistance to flying sparks and radiant heat for tested roof structures within the framework of corresponding classification standards
- Highly resistant to UV radiation
- Highly resistant to hailstorms
- Ozone resistant
- Compatible with bitumen and polystyrene
- Simple installation and processing
- Hot air welding is possible in a wide temperature range, creates homogeneous seam joints and requires no additional seam sealing.
- Standard colour white, SRI > 90
- Optimised flame protection equipment opens up even more options in terms of possible roof structures and roof pitches

Polyfin Duo® – roofing and sealing membranes – possible application methods

Products (FPO/TPO)	Polyfin Duo® 3015 Glass fleece reinforcement	Polyfin Duo® 3018 / 3018 rd Glass fleece reinforcement	Polyfin Duo® 3020 / 3020rd Glass fleece reinforcement	Polyfin Duo® 5018 SK* Glass fleece reinforcement bottom side backed with a self adhering fleece
Application method				
Ballasted and under Slab floorings	✓	✓	✓	✓
Mecahnically fastened	✓	✓	✓	-
Bonded in strips	-	-	-	-
Fully bonding	-	-	-	✓ (self adhesive)
Colour	Standard colour: top side white, bottom side black			
Thickness [mm]	1,5	1,8	2,0	1,8
Width [mm]	750 / 1500	750 / 1500	750 / 1500	1500
Length [m]	20			15

*) Detailed information on processing Polyfin Duo 5018 SK can be found in the appendix of the technical data sheet (on the website, or on request)

Polyfin Duo® GS -roofing and sealing membranes– possible installation methods

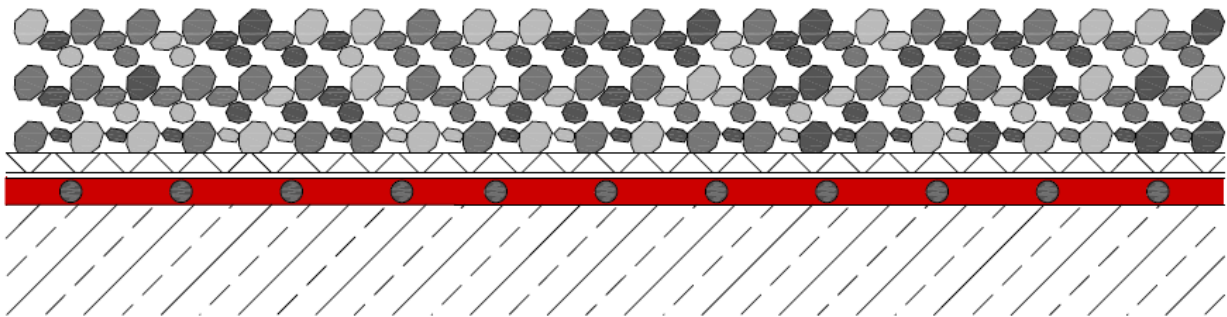
Products (FPO/TPO)	Polyfin Duo® 3015 GS Glass fleece + polyester reinforcement	Polyfin Duo® 3018 GS Glass fleece + polyester scrim reinforcement	Polyfin Duo® 3020 GS Glass fleece + polyester scrim reinforcement
Application method			
Ballasted and under Slab floorings	✓	✓	✓
Mecahnically fastened	✓	✓	✓
Mechanically fastened	-	-	-
Fully bonding	-	-	-
Colour	Standard colour: Top side white, bottom side black		

1.3 Application methods – Representation of exemplary build ups

a) *Lose laid with ballast, e.g. gravel, paving slabs, roof garden system build up*

Polyfin® 3015 - 3025 / 4015 v – 4020 v

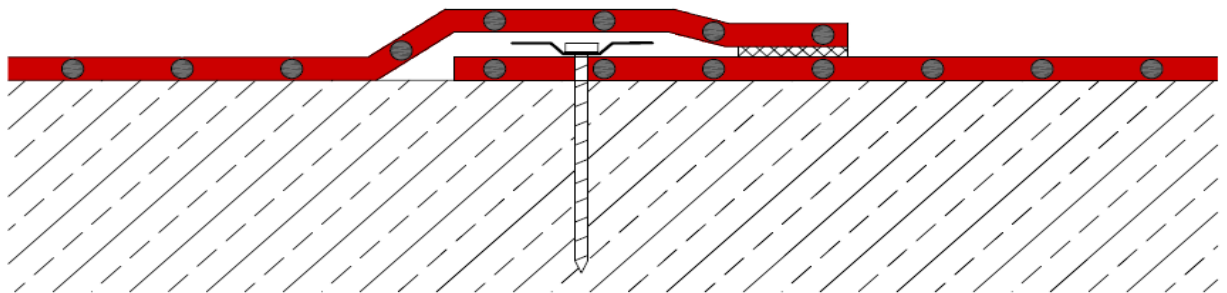
Polyfin Duo® 3015 – 3020 / Polyfin Duo® 3015 GS – 3020 GS



b) *Exposed and mechanically fastened*

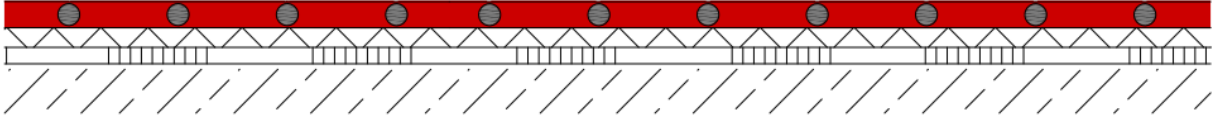
Polyfin® 3015 - 3025 / 4015 v – 4020 v

Polyfin Duo® 3015 – 3020 / Polyfin Duo® 3015 GS – 3020 GS

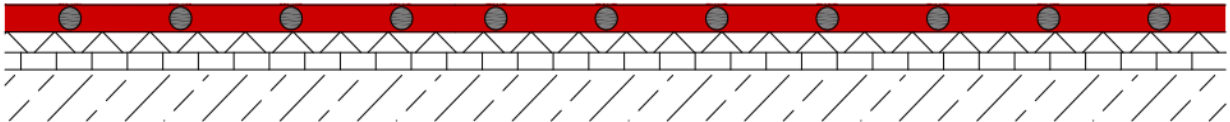


c) *Bonded in strips or fully*

Polyfin® 4015 v - 4020 v, bonded in strips on unfaced polystyrene insulation (EPS), with PUR adhesive



Polyfin® 4015 v - 4020 v, fully bonded on unfaced polystyrene insulation (EPS), bonded with PUR-adhesive (on concrete and wooden derivate boards)



2. Equipment and tools required

2.1 Hot air hand gun



- Hot air hand gun
- VDE-tested, 230 Volt, with infinitely variable temperature setting
- to + 620 °C with a **wide slot nozzle, width 40 mm**
- Heat output ≥ 1400 Watt

2.2 Automatic welding machine



- 200 V/4200 Watt, 230 V/4600 Watt and 400 V/5700 Watt
- VDE-tested, temperature up to + 620 °, with infinitely variable temperature setting
- Width of nozzle and width of the pressure roller approx. 40 to 45 mm („Prep-“ or „Grip“- nozzles have not proven themselves)

For cable lengths of ≥ 50 m at 230 V and ≥ 100 m at 400 V, the use of power generators is necessary to prevent a drop in power.

- **Testing the welding temperature**
- The hot air temperature should be approx. + 500 °C to + 620 °C at the nozzle end of the hand-held device or automatic machine
- A suitable temperature measuring device should always be available at the construction site.

2.3 Equipment for grinding the weathered roof membrane

The surface of weathered Polyfin®/Polyfin Duo® roofing and waterproofing membranes in the weld seam area must pre-treated with a burnishing machine, a one-hand angle grinder, a wire brush, or a cup brush attachment (see chapter 5.4)



A burnishing machine can be ordered from POLYFIN AG.

Seam joint welding

2.4 Tools - overview

The following tools are required to install Polyfin® / Polyfin Duo®:

- Hot air hand gun, automatic welding machine
- Silicone hand roller, width 40 mm
- Cutter knife with trapezoid and hook blade
- Scissors
- Wire brush
- Folding rule
- Temperature measuring device (Measuring range up to +750°C)
- Seam checker oder 5 mm wide screw driver with rounded corners



3. Welded seam joint connection

Welding parameters:

The welding parameters described here are basic or straightening settings.

Under site conditions, the individual settings must always be determined by means of test welds.

Influencing factors (exemplary):

- Weather conditions (outside temperature, solar radiation, precipitation)
- Material thickness of the membranes to be joined
- Wind
- Shaded areas, areas with direct sunlight
- Stability / compressive strength of the substrate

The influencing factors mentioned as examples can influence the welding result and welding parameters individually or in combination.

A parameter set that can be reliably used "universally" under construction site conditions can therefore not be determined.

For the reasons mentioned above, test welds, continuous monitoring of the welding process and repeated seam tests are essential.

Our roofing and sealing membranes are thermally welded together. The sheets are evenly plasticized in the overlap using hot air and joined together under pressure. Temperature, contact pressure and speed must be coordinated during the welding process depending on the ambient temperature. If the ambient conditions change, it may be necessary to adjust the welding parameters several times.

Seam welding of roofing and sealing membranes with glass fleece inlay is possible within a temperature range of + 500 °C to + 620 °C, depending on the nozzle width (manual or automatic welding machine).

With homogeneous molded parts (e.g. inner and outer corners) or homogeneous material (Polyfin 1020 / Polyfin Duo 1020), the weld seam can be welded within a

temperature range of + 350 °C to + 500 °C, depending on the nozzle width. A proper seam joint is achieved through professional hot air welding.

To check the quality of the weld seam and the leading edge of the seam, test welds must be

Seam preparation

No preparation of the joint areas is required for sheets as delivered.

- The surface must be sanded after a certain amount of time (in summer, possibly after just a few days) (see section 3.4)
- For Polyfin 30.. and Polyfin 40.. v membranes, a preparation with a cleaning agent is possible as alternative (see 3.4.2)

Seam areas must be clean.

- Contamination of the surface of the roofing membranes can impair the welding result.
- In the case of mineral wool as an insulating material, it may be necessary to remove mineral wool dust

carried out before starting work. For more information on evaluating the samples, see 3.2. A visual indicator is the "welding thread" (slight melt) on the leading edge of the seam.

To test the seam strength, the seam sample must be completely cold. The overlaps must be at least 5 cm for automatic and manual welding and must be

kept clean and dry. All roofing membranes with fleece lamination or adhesive coating on the underside have a fleece or adhesive-free edge of approx. 4 cm. Head joints are covered and welded with Polyfin® 3015-3025/ Polyfin Duo 3015 - 3020 strip material (≥ 12 cm wide).

The seam overlap of the roofing membranes may also be installed against the water course - this is unavoidable, e.g. for connections and terminations as well as built-in parts.

Cross joints must be avoided, e.g. by staggering roofing membranes.

POLYFIN AG offers practical training courses and seminars.

Seam joint welding

3.1 Seam joint welding

3.1.1 Welding by hot air hand gun

Set the manual welding unit to the recommended welding temperature of approx. + 500 °C to + 620 °C depending on the nozzle width.

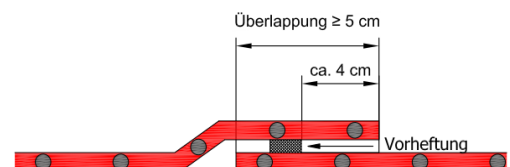
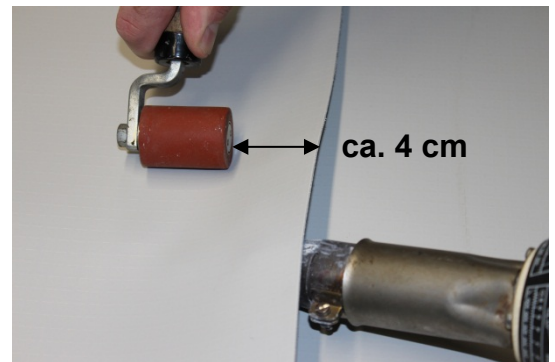
Basic setting of practical parameters - hand-held device:

Polyfin® : approx. 400°C to approx. 650°C with a 40 mm nozzle

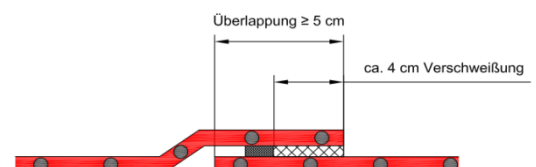
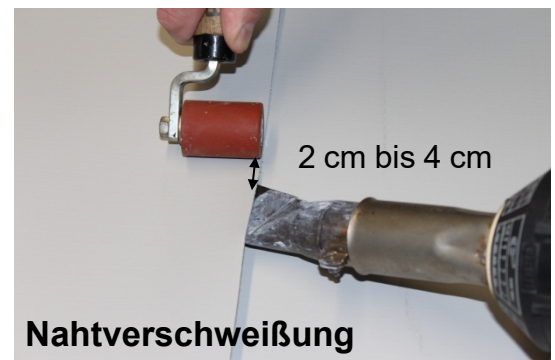
Polyfin Duo® : Approx. 350°C to 550°C with a 40 mm nozzle, approx. 340°C to 420°C with a 20 mm nozzle (recommended for detailed formations)

Welding is usually carried out in two steps:

- I. The top sheet is stapled to the bottom sheet in the overlap, ≥ 5 cm from the edge (see sketch: Pre-stapling). A linear pre-stitching is achieved by pressing the edge of the silicone pressure roller. This process ensures that the necessary temperature is maintained in the welding area during subsequent welding. It also ensures that the waterproofing membranes are perfectly positioned.



- II. Welding then takes place over the remaining width of approx. 4 cm. The welding device and silicone pressure roller are guided parallel to the edge of the sheet and continuously in the direction of welding (see seam welding diagram). After completion of the welding work, the heating of the welding device must first be switched off. For all sheets, a slightly larger distance between the pressure roller and nozzle (approx. 3 cm to 4 cm) tends to have a positive effect on the welding process.



In case of Polystyrene thermal insulation, the overlap must be increased accordingly to prevent damage to the insulation material from the hot air

Seam overlaps and width of the welded seam

- With mechanical fastening, the minimum overlap is determined by the arrangement and geometry of the fasteners..
- For bonded and loose-laid membranes, the seam overlap is determined by the required sealing at the rear edge of the seam and the required minimum width of the joint seam. The width of the overlap must be selected so that the pre-stitching can take place during manual welding and, in the case of automatic welding, both layers are pressed together by the running round belt.
- **The minimum width of the joint seam for FPO roofing membranes is 20 mm in accordance with DIN 18531**

Practical tip on welding with the hand-held tool

Weld straight sections - such as transitions from an automatic seam to a manual seam and seams on connecting strips - with a 4 cm nozzle. In this way, the 2 cm seam width is usually achieved in one work step. Using a 2 cm wide nozzle usually requires at least 2 work steps plus the pre-stitching.

Weld injection moulded prefabricated corners with a 2 cm wide nozzle.



POLYFIN application video [„Hot air welding by hand gun“](#)



Seam joint welding

3.1.2 Automatic welding

Set the welding temperature from approx. + 500 °C to + 620 °C at an outside temperature of approx. 20 °C.

When starting and stopping the automatic welder, we recommend placing a strip of sheet metal under the welding nozzle.

The automatic welding machine is welded in a single Operation. Thanks to an effective air seal on the machine (round belt), pre-stitching is not necessary. The welding speed is adjustable and is determined by the respective weather conditions.

In principle, it is possible to weld the seams with various automatic welding machines designed for this purpose.



Basisgrundeinstellung praxisgerechter Parameter – Schweißautomat (Leitgerät: Leister Varimat V2):

Polyfin®: ca. 620°, 2,7 m/min je nach Bahnendicke

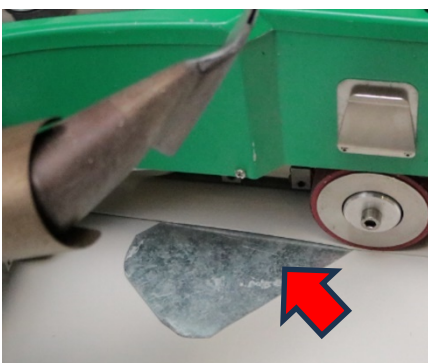
Polyfin Duo®: ca. 580°C, 2,7 m/min je nach Bahnendicke

Gewicht: Leister Varimat V und Varimat V2, zwei Zusatzgewichte verwenden

However, the parameters then deviate in part from the recommendations for the "control unit". Experience also shows that larger and heavier machines lead to a higher degree of process reliability on the construction site.

Practical experience has shown that larger, heavier and more stable automatic welding machines lead to more favorable process reliability on the construction site compared to machines in the entry-level segment.

It has also proven to be a good idea to insert a sheet of metal in the areas where it will be extended or retracted. This ensures that the weld seam later has a clearly defined start and end.



Start of the automatic welding seam.

The nozzle is inserted on a smooth plate, which is later removed

3.1.3 T-joints

Beveling the middle edge of the sheet in the T-joint area of a seam is not mandatory for Polyfin® / Polyfin Duo® sheets up to 2.0 mm thick, but is recommended in order to achieve maximum processing reliability.

For membranes with an effective nominal thickness of > 2.0 mm, however, beveling the middle edge of the membrane is a mandatory manufacturer specification.

3.2 Seam inspection

Before starting work, test welds must be carried out to determine the optimum welding parameters and to ensure the quality of the weld seams. If the ambient conditions change, it may be necessary to adjust the welding temperature several times and to carry out further weld tests.

The test of the joint seam can be carried out using a cranked test needle (blunt) or a 5 mm wide slotted screwdriver with rounded corners and a peel test. The seam inspection and the peel test can only be carried out after the weld seam has cooled down sufficiently (24 hours). To speed up the cooling process during the test welds, the peel samples can be cooled down to the temperature to be tested (approx. 20 °C) in a bucket filled with cold water.

Assessment of the quality of weld seams under construction site conditions by means of exemplary destructive tests on Polyfin and Polyfin Duo membranes

Destructive tests to assess the welding result are unambiguous if a fracture occurs outside the seam in the

peel test produces a fracture outside the weld. Beforehand, the corresponding weld

The corresponding weld samples must be cooled down to a temperature of around 20°C beforehand.

Seams that can be peeled open under force in the joining plane must be examined and evaluated using laboratory tests in accordance with DIN EN 12316-2 and the DUD Technical Rules. For the laboratory test, we recommend taking at least three 20 x 20 cm samples from seam areas. The size of the test specimens should be at least 15 cm in the overlapped seam area and at least 5 cm in front of the seam.

In order to assess the quality of construction site seams and seams made on material in the We reserve the right to continue to use the criteria of DIN 16726 and the technical rules of the DUD to assess the quality of on-site seams and seams made on material in the installed state.

Examples of clear, optimum fracture patterns in manual peel tests suitable for construction sites

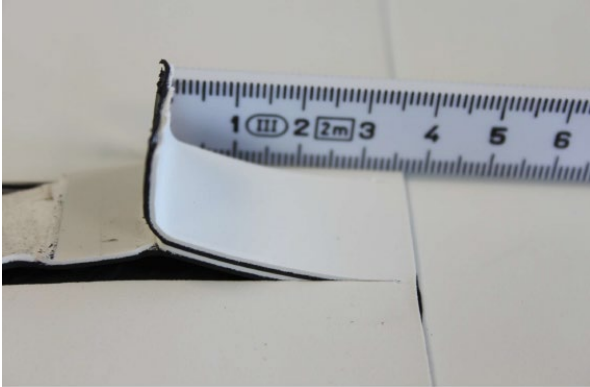


Figure 01: Ideal tear-off with a joint width of ≥ 2 cm using the example of a Polyfin Duo sheet

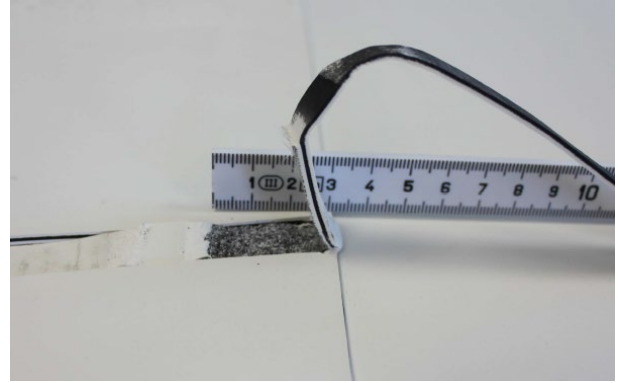


Figure 02: Ideal delamination within the sheet with a joint width of ≥ 2 cm using the example of a Polyfin Duo sheet

Also clearly practical: seams that can only be peeled open with so much force that plastic deformation of the material occurs. In the case of Polyfin Duo® membranes, this also applies to seams where separation occurs within the top or bottom film. Due to the 2-colour structure of the product, this type of separation is particularly easy to recognize.

Further reading in this context:

DIN 16726:2017-08 Plastic sheeting - Tests

DUD - Technical rule For waterproofing used and unused roofs with plastic and elastomer membranes

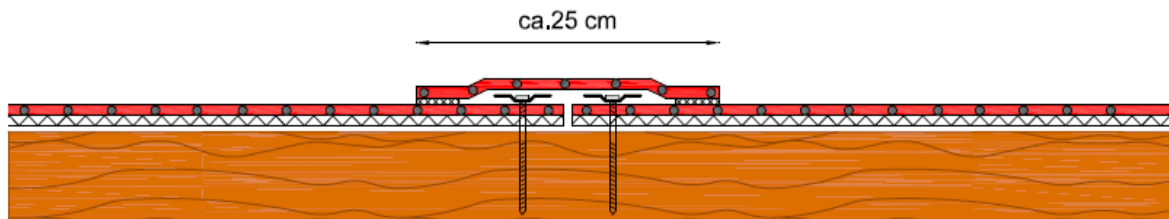
Edited by: Industrial Association of Producers of Plastic Roofing and Sealing Membranes DUD e.V.

1st edition 2019, Beuth Verlag GmbH, ISBN 978-3-410-28934-0

DIN EN 13416 Flexible sheets for waterproofing - Bitumen, plastic and elastomeric sheets for roof waterproofing - Rules for sampling; German version EN 13416:2023

3.3 Head joint formation with fleece-backed membranes

The head joints of fleece-backed Polyfin®/Polyfin Duo® roofing membranes should be mechanically fastened or glued on both sides in the area of the joints or in the overlap area. A Polyfin® 30./ Polyfin Duo® 30.. strip, approx. 25 cm wide, is then arranged overlapping and welded on both sides (see example sketch).



3.4 Connection of new and already weathered membranes

3.4.1 Mechanical seam pre-treatment

New membranes can be connected to membranes that are already weathered. For this purpose, it may be necessary to mechanically pre-treat the already weathered membranes. (The necessity of this must be determined by test welding and subsequent testing of the joint seam in accordance with section 3.2 and by a peel test).

The surface of the weathered sheets must be sanded with a satin sander or other sanding equipment (see chapter 2.4).

This measure removes patina and impurities. The new Polyfin® roofing and waterproofing membranes can then be welded to the weathered roofing membranes.



POLYFIN FPO TPO pre treatment weather exposed membranes

POLYFIN application video [„pre treatment weather exposed membranes“](#)

Advantage: Processing without the use of solvents protects the environment and simplifies occupational health and safety! 👍

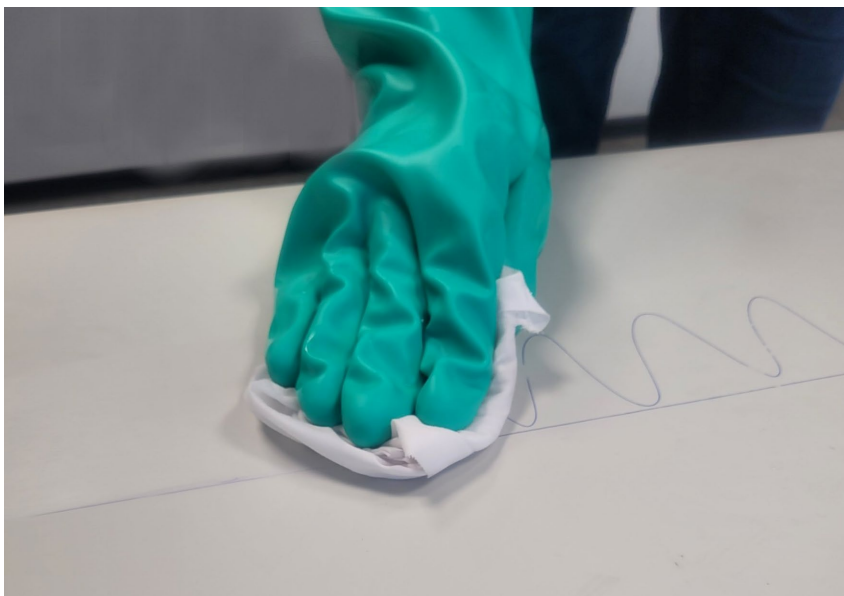
3.4.2 NEW Chemical pre-treatment as an alternative

(only for Polyfin 30.. and Polyfin 40.. v, NOT for Polyfin Duo membranes)

In addition to the preferred mechanical pre-treatment, it is also possible to prepare seam areas on already weathered Polyfin roofing membranes (Polyfin 30.., Polyfin 40.. and Polyfin 1020) using a seam cleaner.

In most cases, this variant is an alternative to mechanical seam pre-treatment of weathered Polyfin membranes.

No pre-treatment of the seam areas is required for new material.



When working with Polyfin Cleaner V103 (Remmers V 103), observe the instructions on the safety data sheet and on the container!

Weather conditions

- The cleaner may only be used at outside temperatures $\geq +5^{\circ}\text{C}$.
- In principle, the outside temperature has an influence on the evaporation behavior of the cleaner. Relatively cold temperatures may require a longer flash-off time than specified here.
- In relatively cold weather combined with relatively high humidity, the evaporative cooling on the surface of the cleaned sheet may cause the temperature to fall below the dew point, resulting in condensation.

Carrying out chemical seam cleaning

- Surface moisture must be completely removed before further treatment, dry if necessary
- Clean the seam area with a clean, lint-free cloth and POLYFIN seam cleaner. Work in one direction. Bei längere Zeit der Witterung ausgesetzten Bahnen so lange reinigen, bis jegliche Verunreinigungen restlos entfernt sind und die Oberfläche wieder in ursprünglicher Farbe zu sehen ist.
- Verbrauch: Ca. 20 g/lfm bis 50 g/lfm

- In principle, the cleaned area must always be slightly larger than the area on which the seam joining is to be carried out.
- A flash-off time of at least 30 minutes must be observed before hot-air welding.
- Cleaned areas should be welded on the same day.

Test welds must always be carried out!

If a successful welding result is not achieved despite pre-treatment of the seam areas with the POLYFIN seam cleaner, the seam areas must be prepared mechanically!

Further information, safety and the environment:

POLYFIN Seam Cleaner contains solvents. The instructions on the safety data sheet and container must be observed. Suitable personal protective equipment (PPE) must be used when working with POLYFIN Seam Cleaner. Information on suitable protective gloves can be found in the safety data sheet.

Used cloths and gloves must be disposed of properly.

3.5 Connection with other materials

Consultation with POLYFIN AG is absolutely necessary.

4. Substrate

4.1 General substrate properties

The substrate and especially its surface must be checked for suitability by the installer. Recognizable defects in preliminary work must be objected to in accordance with DIN 1961, VOB/B, insofar as they may impair the contractor's own performance.

The load-bearing structure must meet all technical requirements, in particular with regard to load-bearing capacity, deflection, anchoring, water drainage, etc. Structural expansion joints must also be formed in the roof layer package (see chapter 6).

According to the flat roof guidelines, roof surfaces should have a continuous slope down to the water drain. A minimum roof pitch of 2 % is recommended. Roof surfaces without a slope are possible as a special design. Drainage elements must be arranged at the lowest point..

4.2 Trapezoidal steel sheets as substrate

Only trapezoidal steel profiles with factory-applied corrosion protection in accordance with DIN 18807-1 may be used. The top chords of the trapezoidal steel profiles must be in one plane in accordance with the flat roof guideline.

Under full load, the deflection of the trapezoidal steel profiles must not exceed 1/300 of the span (between the trusses and purlins) in application category K1 and 1/500 in application category K2. Shear spans are statically effective plates on which the overall stability of a structure depends. No subsequent changes may be made to these without a structural analysis. Additional loads

attached to the underside of the trapezoidal steel profile must also be verified. Roof penetrations such as ventilators, gullies etc. must be stabilized with reinforcing plates. Replacement of skylight domes, chimneys, ventilation systems etc. must be statically verified.

4.3 Concrete slabs

Concrete slabs, including sloping layers, must be sufficiently hardened and surface-dry in accordance with the Flat Roof Guideline and DIN 18531. The surface should be rubbed, smooth, free of gravel pockets, cracks and ridges.

4.4 Precast concrete elements

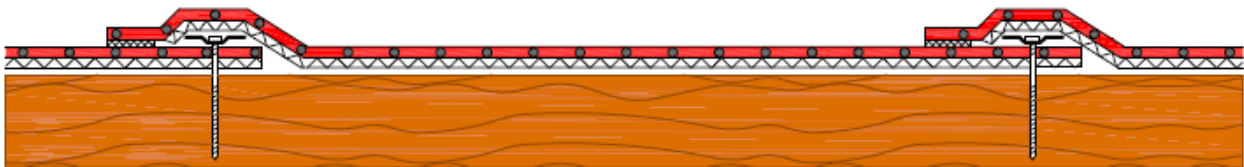
The laid precast concrete elements must form a continuous surface. Joints between the slabs should be closed. Trailing strips at least 0.2 m wide must be placed under the waterproofing on the support joints (head ends).

For large-format slabs, this applies to all joints (TT slabs), unless other measures are taken.

4.5 Timber boarding

The roof boarding must be protected from moisture. Joints must be formed taking into account the expected changes in length and width due to swelling. As a rule, these should be 2 mm/m for flat pressed boards and 1 mm/m for structural veneer plywood. If solid wood formwork is used, boards (tongue and groove) with a minimum grade of S 10 in accordance with DIN 4074-1 must be used.

The formwork thickness must be adapted to the expected loads and the support distance and must be at least 24 mm for timber and at least 22 mm for wood-based materials. For wood and wood-based materials, a protective layer (e.g. 300 g/m² plastic fleece) should be placed between the roofing membrane and the formwork. When laying Polyfin 4015 v - 4020 v (see example sketch), the separating layer between the roofing membrane and the timber formwork can be dispensed with, as the roofing membrane has a fleece lamination on the underside. Polyfin 4015 v - 4020 v can be laid loose (under ballast) or mechanically fastened (exposed to the weather).



Polyfin 4015 v – 4020 v on timber boarding, mechanically fastened

In the case of timber boarding, the bunged boards should not be wider than 16 cm. OSB boards must be tongue and groove and are always laid in a bond. The maximum edge length should not exceed 2.50 m.

Salt-based wood preservatives must be used to protect the wood. When using the wood preservative, DIN 68800 must be observed..

4.6 Old roof / refurbishment

Before any renovation, the functionality of the existing roof structure must be checked by opening it several times up to the supporting structure (function of the vapor barrier, thickness of the thermal insulation, moisture content of the thermal insulation, possibility of drying out the roof structure, etc.).

Bituminous substrate

Waves, bubbles and other unevenness must be cut open and leveled. A protective layer may be required.

Condensation protection

In the course of a planned renovation measure, the existing roof structure must be checked for its functionality in terms of building physics.

4.7 Refurbishment of old roofs with single-ply synthetic membranes

Individual advice from POLYFIN application technology is recommended.

4.8 Vapour control layers / vapour retarders

Due to unforeseeable changes in use, we also recommend installing a vapor barrier for thermally insulated

roof structures of unheated buildings. Depending on the water vapor load and use, vapor barriers made of aluminum composite films, PE films or bitumen (bitumen membranes) can be used.

For example, a low fire load vapor barrier from POLYFIN AG with an S_d value ≥ 1500 m is recommended. The vapor barrier meets the requirements of DIN 18234 "Structural fire protection of large-surface roofs" and is typically used on trapezoidal sheet metal support shells.

Vapor barriers must be raised up to the upper edge of the insulation layer/insulation wedge at connections and terminations as well as upstands and connected professionally. These must also be professionally connected at all penetrations.

PE foils must be laid out loosely, overlapped by approx. 10 cm and sealed tightly with a suitable double-sided adhesive tape in the overlap. PE foils must be sealed tightly at all connections using double-sided butyl adhesive tape. Above air-conditioned rooms, both the connections and the seam overlaps must be sealed with butyl adhesive tape. The processing instructions of the respective manufacturer must be observed.

On trapezoidal sheet metal substrates and in areas above air-conditioned rooms, we recommend the use of a self-adhesive aluminum composite vapor barrier from POLYFIN AG. This must be tightly connected to overlaps, flashings and penetrations.

4.9 Thermal insulation

Only thermal insulation materials that are temperature-resistant, dimensionally stable, dimensionally stable and impact-resistant as a base for the roof waterproofing should be used. Rigid foam boards should be designed with a stepped seam or laid in 2 layers in an offset pattern.

Insulation boards made of PU must be fastened in addition to the waterproofing according to the manufacturer's instructions. According to the flat roof guidelines, the necessary bridging of the clear width between the top chords must be taken into account for trapezoidal steel profiles.

The minimum thickness of the thermal insulation should be selected according to the table below, regardless of the required thermal protection.

Size Clear width between the upper chords [mm]	Recommended minimum thickness of the thermal insulation material [mm]		
	EPS	PU	Mineral wool
70	40	40	50
100	50	50	80
130	60	60	100
150	70	60	120
160	80	70	120
170	90	80	140
180	100	80	140

Recommended measuring thicknesses on trapezoidal profiles

5. Installation

5.1 General information

Polyfin® / Polyfin Duo® are roofing and sealing membranes that can be plasticized and homogeneously welded by applying heat. Polyfin® / Polyfin Duo® membranes can be laid exposed to the weather.

The surface waterproofing must be connected to the load-bearing substrate in the roof plane, in front of connections and terminations, at the roof edge and in valley areas in accordance with DIN 18531 as follows: Mechanical fastening in front of flashings and terminations, at the roof edge and in valley areas can be carried out with individual roof membrane fasteners (linear fastening), metal strips, rails or composite sheet metal angles (line fastening) and should be connected to the substructure with at least 4 fasteners per running meter, regardless of the calculated number of fastening elements.

Polyfin® membranes are compatible with bitumen and polystyrene and are ideal for the renovation of bituminous waterproofed roofs. Slightly standing water on the waterproofing has no influence on the technical values or on the expected service life of Polyfin® roofing and waterproofing membranes.

6. Lose laid and ballasted

6.1 New sealing

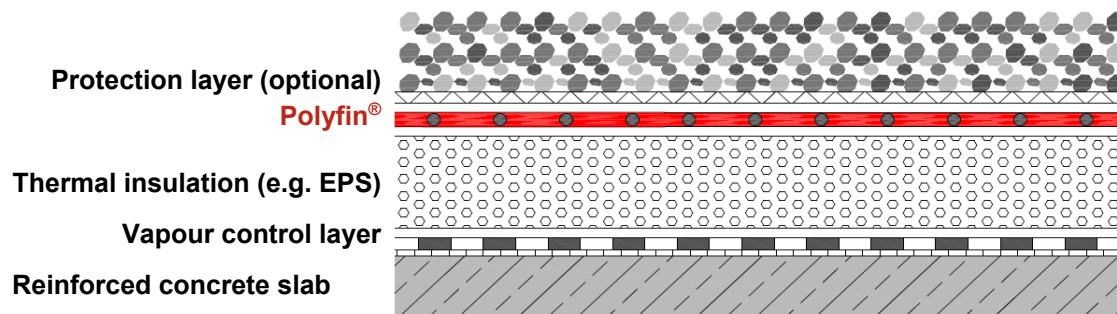
Laying the waterproofing under ballast requires sufficient static load reserves, which must be determined in advance. This installation method has proven to be particularly effective on solid load-bearing shells.

Edge fixing at penetrations, connections and terminations is also mandatory when laying under ballast. See also 6. The connecting strip must be connected windtight to the top of the wall.

The Polyfin® roofing membrane is rolled out, aligned and the subsequent roofing membrane is laid and welded with an overlap of ≥ 5 cm.

If the membrane is laid loosely on polystyrene insulation, the overlap must be increased (recommended ≥ 8 cm) so that the insulation material is not damaged when welding with hot air.

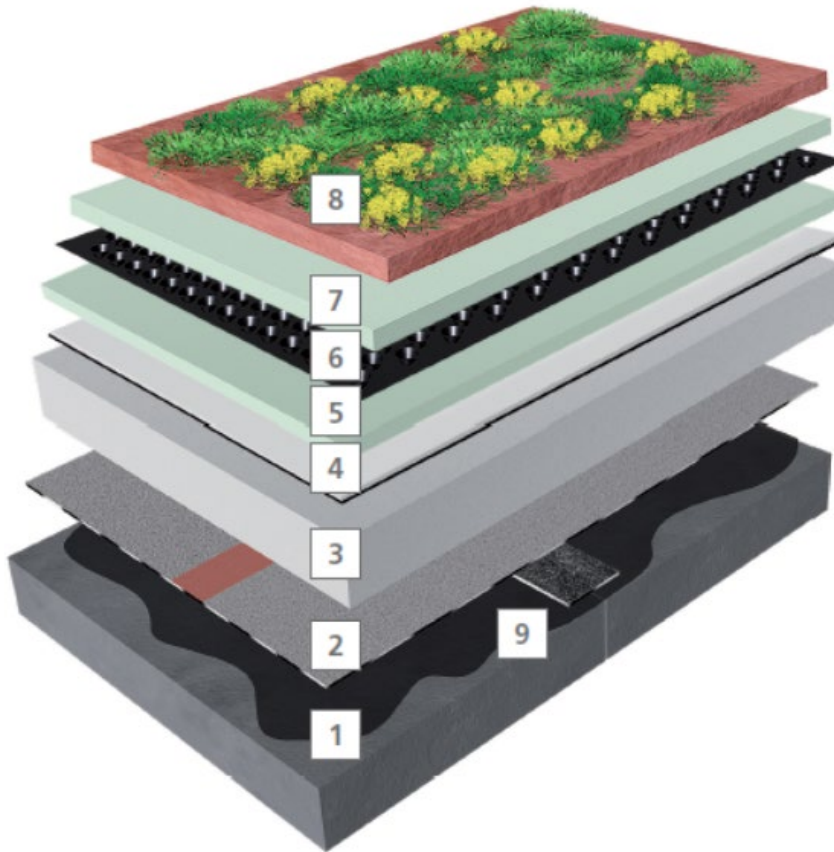
The use of a protective layer between the roof membrane and the ballast is carried out in accordance with the flat roof guidelines (see chapter 7.2 “Protective layers”). The ballast is based on the specifications of the flat roof guidelines or DIN 1991-1-4: 2005/NA: 2010-12 (wind loads). In edge and corner areas, the gravel ballast may be displaced by wind forces. It may therefore be necessary to take additional, suitable measures to ensure wind resistance.



Suitable loads for securing against wind suction must be applied immediately after installation!

6.2 New sealing – roof garden

Root-resistant Polyfin® roofing membranes are laid as described in section 5.2.1. After completion of the waterproofing work, any necessary slip or protective layers must be installed.



Roof build up:

1. Primer
2. Vapour control layer
3. Thermal insulation
4. **Roofing membrane Polyfin 30., Polyfin 40.. v oder Polyfin Duo 30., Polyfin Duo 30.. GS or Polyfin Duo 5018 SK**
5. Protection layer
6. Drain- and retention element
7. Protection layer
8. Extensive roof garden
9. In case of precast concrete elements: Expansion joint

Immediately after installation, suitable loads must be applied to prevent wind suction!

The use of a protective layer between the roofing membranes and the ballast is carried out in accordance with the flat roof guideline (see chapter 7.2 “Protective layers”). The ballast is based on the specifications of the flat roof guideline or DIN 1991-1-4: 2005/NA: 2010-12 (wind loads).

It is advisable to divide the area to be sealed into sections by installing penetration seals and to record these in an installation plan, photos, etc..

6.2.1 Inverted roof

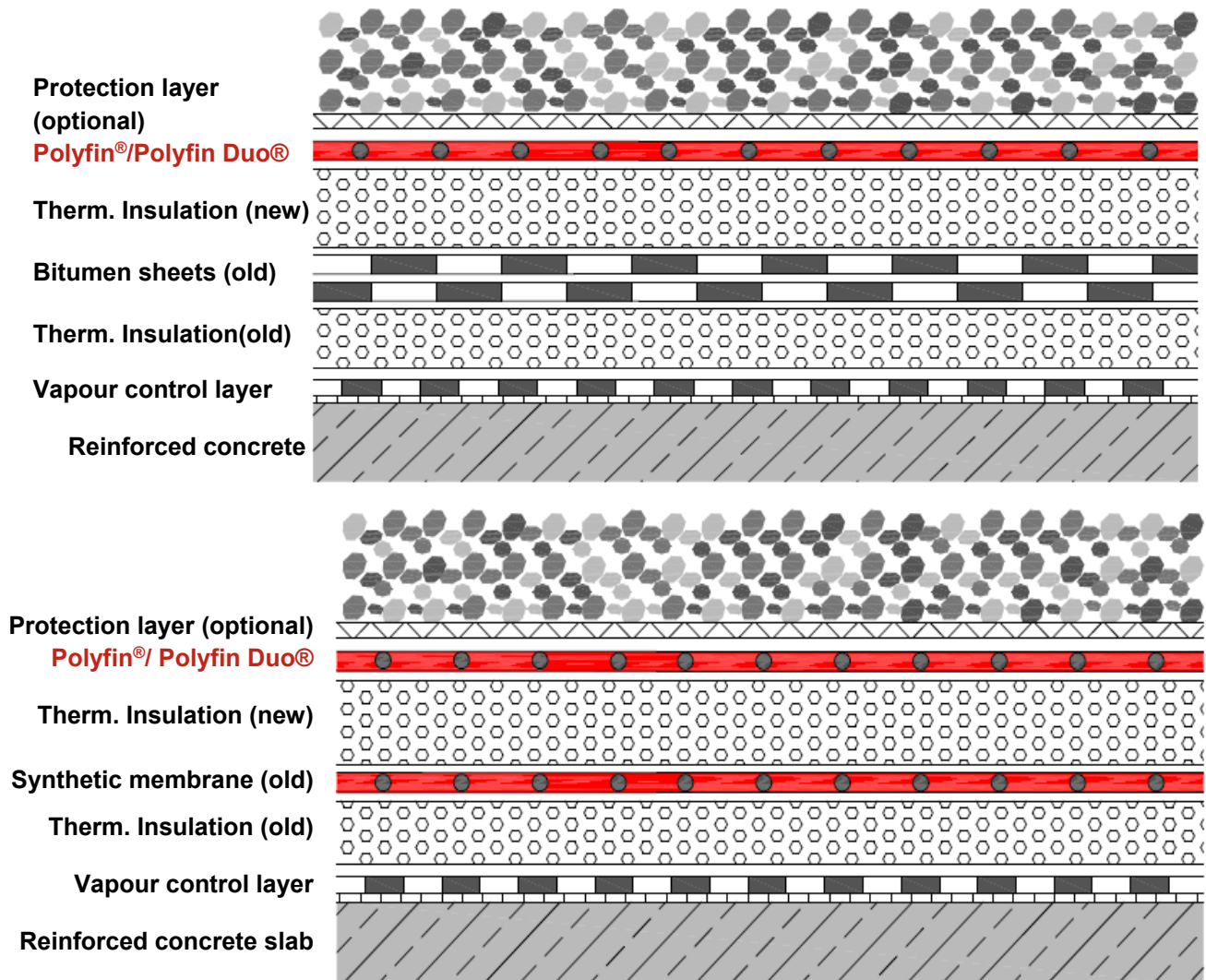
Polyfin® membranes are laid as described in section 4.1. Thermal insulation boards made of extruded polystyrene (XPS) are applied to the waterproofing. The boards are designed with a circumferential stepped seam and must be laid tightly butted. A trickle protection membrane is placed between the thermal insulation and the ballast. The trickle protection membrane to be used must always meet the following requirements: Building material class B2 according to DIN 4102 or class E according to DIN EN 13501-1, tear-resistant, open to diffusion, sufficient UV stability. The specifications must be confirmed by the nonwoven manufacturer.

The ballast load is based on the specifications of the flat roof guideline or DIN 1991-1-4: 2005/NA: 2010-12 (wind loads). It is advisable to divide the area to be sealed into sections by installing penetration seals and to record these in an installation plan, photos, etc.

6.3 Refurbishment – bitumen- and single ply synthetic roof

When renovating with ballast, Polyfin® / Polyfin Duo® roofing membranes are laid as described in section 5.2.1. Beforehand, it must be checked whether additional thermal insulation in accordance with the Building Energy Act (GEG) or a protective layer (plastic fleece, at least 300 g/m²) in accordance with DIN 18531 is required.

When laying new Polyfin® / Polyfin Duo® roof waterproofing under ballast, a fire protection layer between the insulation and roofing membranes can be dispensed with, provided the ballast is suitable for providing “resistance to flying sparks and radiant heat”.



Immediately after installation, suitable loads must be applied to prevent wind suction!

The use of a protective layer between the roofing membranes and the ballast is carried out in accordance with the flat roof guidelines (see chapter 7.2 “Protective layers”). The ballast is based on the specifications of the flat roof guideline or DIN 1991-1-4: 2005/NA: 2010-12 (Windloads).

7. Mechanical fastening

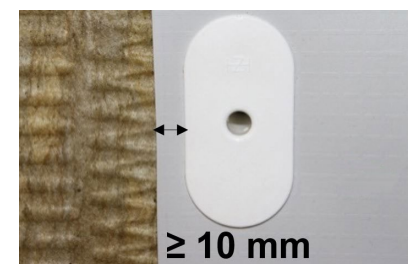
7.1.1 Mechanically fastened installation

This installation variant has proven to be very economical, particularly on substrates that do not require pre-drilling and where self-drilling screws can be used (trapezoidal steel sheets as well as wood and wood-based substrates).

Only fastening systems (self-drilling screws, wood screws or dowel systems with the corresponding load distribution plates) with European Technical Approval (ETA) should be used. The systems must be corrosion-protected, corrosion-resistant if necessary, made of non-ferrous metals or non-ageing, dimensionally stable and temperature-resistant plastic.

- Mechanical fastening in the roof plane:

On request, POLYFIN AG will provide the installers of Polyfin and Polyfin Duo roofing membranes with project-specific fastening plans in which the fastener arrangement, spacing and membrane widths are specified. During installation, care must be taken to ensure that the distance of at least 10 mm (see illustration) between the load distribution plate and the edge of the membrane is maintained.



- Mechanical fastening in front of flashings and terminations, at the roof edge and in valley areas can be carried out with individual roof membrane fasteners, metal strips, rails or composite sheet metal angles and should be connected to the substructure with at least 4 fasteners per running meter, regardless of the calculated number of fastening elements. This edge fastening (linear or line fastening) is not used for wind suction protection in the calculation.

Only fasteners that cannot unscrew due to their own movements or vibrations may be used. The pull-out strength of the fasteners from the supporting structure must be at least 0.4 KN per fastening element.

When renovating thermally insulated roof structures, only corrosion-resistant stainless steel fasteners should be used in accordance with the flat roof guidelines.

7.1.2 Installation - general

In the case of trapezoidal steel profiles and timber formwork, the roofing membranes should generally be laid at right angles to the top beads or board joints.

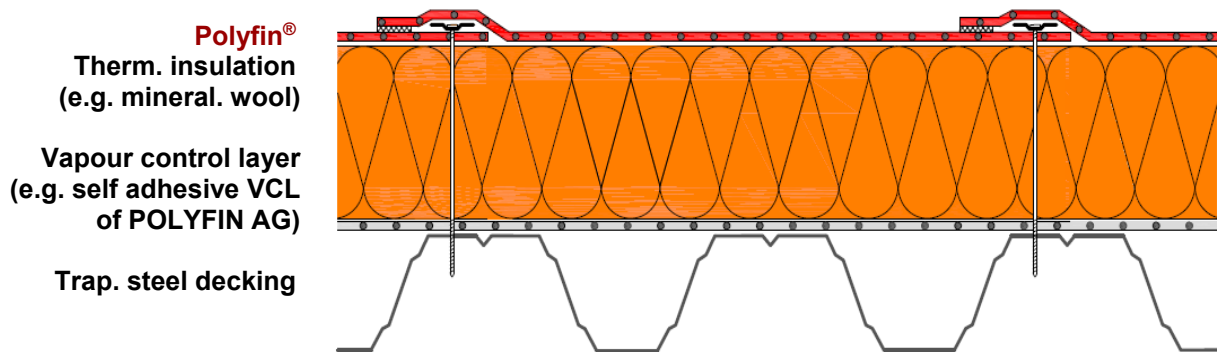
In order to accommodate the calculated number of fasteners in the corner and edge areas, it is possible to work with narrower sheet widths or to place additional fasteners in the middle of the sheet and weld a strip over them. The sheet overlap is made up of: Fastener width, width of the weld and, above all, 1 cm distance between the fastener plate and the edge of the sheet (see sketch in chapt. 5.3.4).

We recommend using narrower strip widths in corner and edge areas, as the variant with additional fasteners in the middle of the strip is associated with increased effort (cleaning work, additional strip material, additional weld seam, etc).

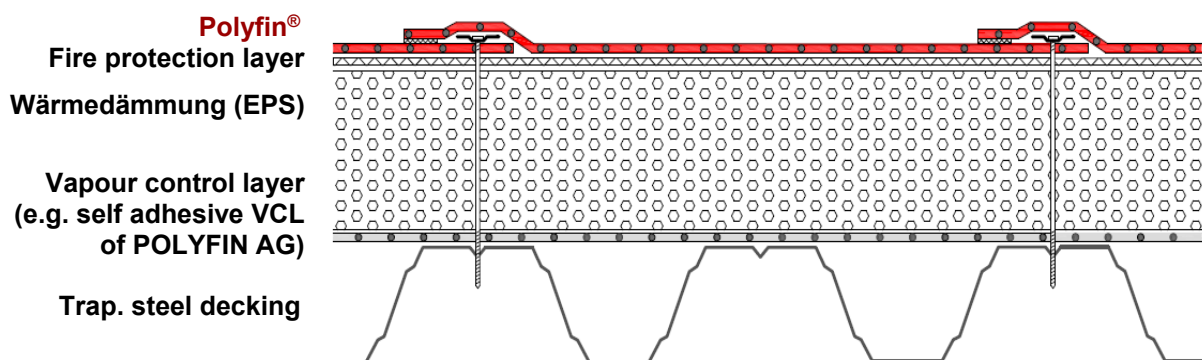
7.2 Light industrial roof

In the installation method with mechanical fastening, all layers of the roof structure are anchored to the supporting structure with a force fit. The insulation boards must be mechanically fastened in accordance with the manufacturer's instructions. In the case of trapezoidal steel profiles, the insulation boards must be arranged at right angles to the top chords, as must the roofing membranes. The minimum thickness of the insulation boards must be dimensioned in accordance with the flat roof guidelines so that there is no penetration into the deep corrugation.

The compressive strength of the thermal insulation must be sufficient for the mechanical fastening system and must be guaranteed in the long term.



When installing Polyfin® roofing membranes with mechanical fastening on EPS insulation, a fire protection layer (glass fleece 120 g/m² A2) must be placed between the roofing membranes and the insulation.



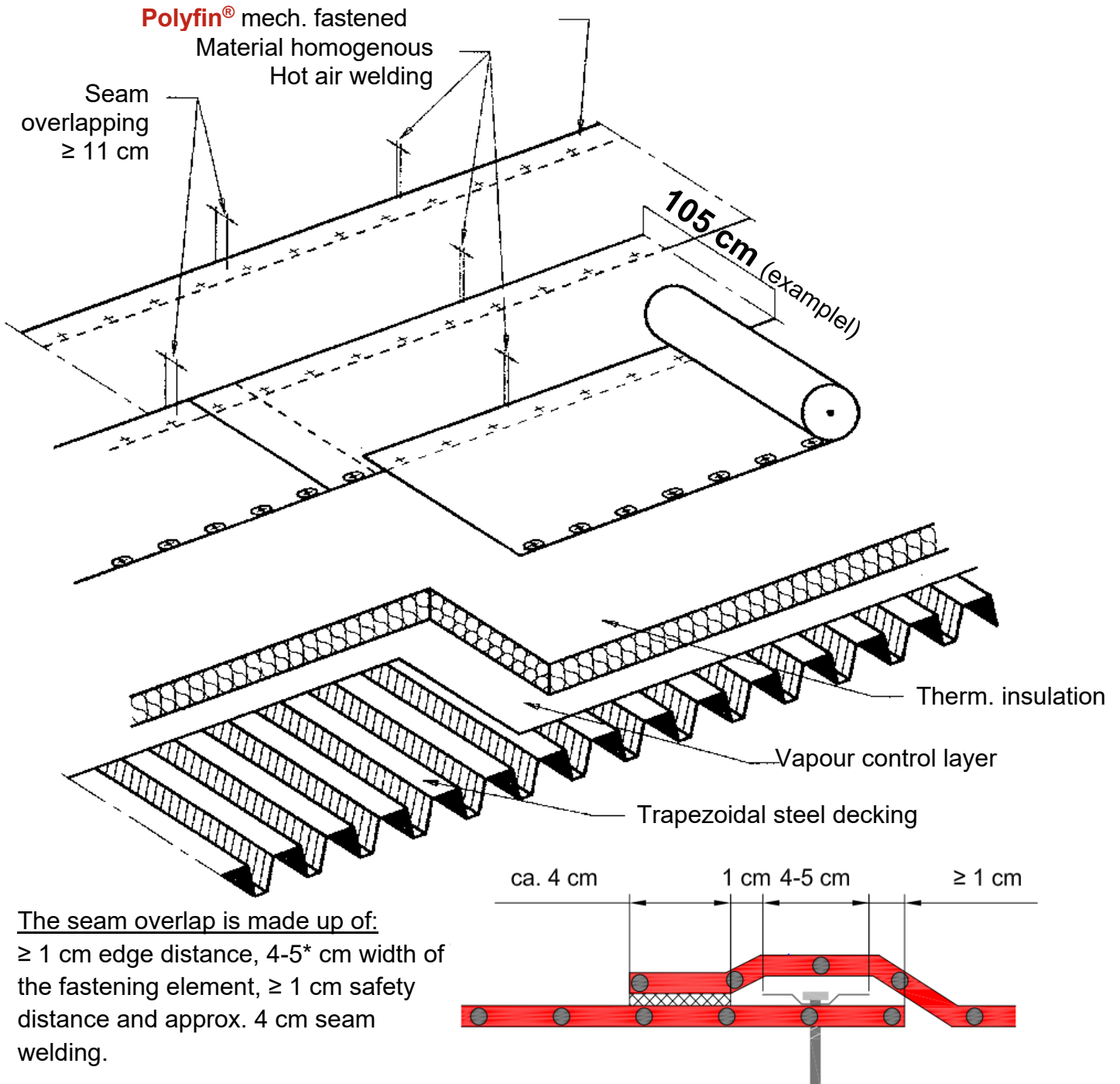
The spacing and the number of mechanical fasteners are based on the specifications of the flat roof guideline or DIN 1991-1-4: 2005/NA: 2010-12 (Wind loads).

In the case of small-format insulation boards, care must be taken to ensure that they are securely positioned in accordance with the flat roof guidelines.

The “hard roofing” has been verified for tested roof structures. If you have any questions, please contact the POLYFIN AG application technology department

7.3 Asymmetrical fastening system (in the seam overlapping)

Fastenings are made at the edge of the sheet. The fastening elements must be positioned at the same distance parallel to the edge of the sheet.

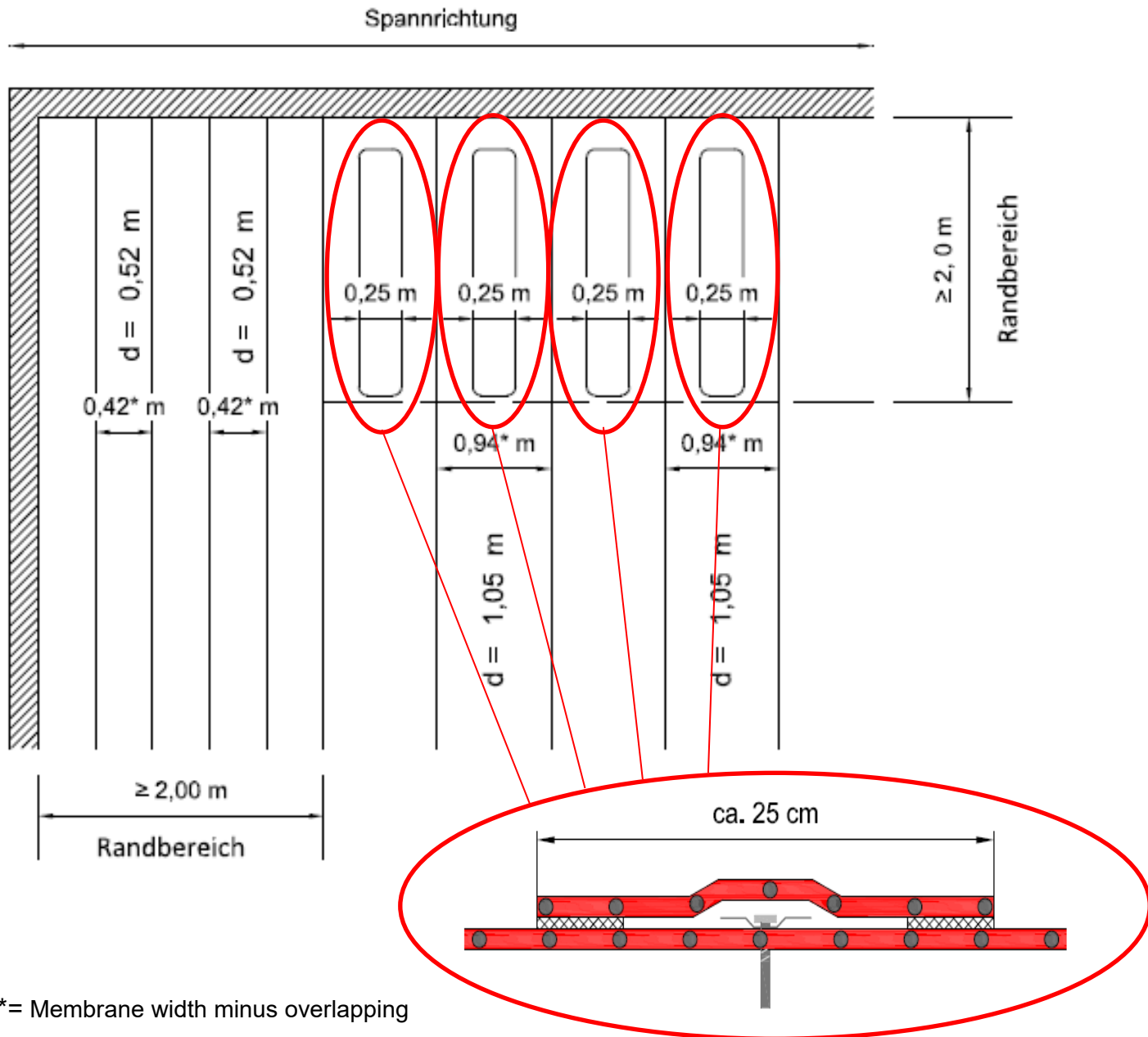


The seam overlap is made up of:
≥ 1 cm edge distance, 4-5* cm width of the fastening element, ≥ 1 cm safety distance and approx. 4 cm seam welding.

* For 5 cm wide plastic washers, we recommend increasing the overlap to 12 cm -13 cm.

7.4 Symmetric fastening

This system is also used for lightweight roof constructions, especially for the edge and corner areas. The fasteners are arranged as center fasteners in the membrane according to specifications and welded over with Polyfin® 3015-3025 strip material (≥ 25 cm wide) (see example sketch below, in combination with membranes fastened in the covered seam)



8. Bonded installation

8.1 Bonding in general

Bonded installation can be used if loose laying with ballast or laying with mechanical fastening is not economically or technically feasible. When bonding, all layers in the roof layer structure are usually bonded together. Hot bitumen and polyurethane adhesives can be used as adhesives for roofing and waterproofing membranes. The processing instructions of the adhesive manufacturer must be observed.

The quantity of adhesive must be measured according to POLYFIN AG specifications. Polyfin® membranes with fleece backing on the underside must be used for bonding to the appropriately prepared substrate. The fleece backing must be dry.

The sheets must be overlapped by at least 5 cm. As the membranes are welded using hot air, the area where the seam is joined must be free of bitumen.

For renovations, bonding is only permitted if the old roof structure is bonded in a secure position. With regard to the permissible processing temperatures of the adhesives, the manufacturer's processing instructions must be observed.

8.1.1 Bonding with polyurethane adhesive

Bonding with PU cold adhesive is only possible with fleece-laminated Polyfin 4020 v, 4018 v and 4015 v roofing membranes.

PU adhesive in strips

Polyurethane adhesives must be low in solvents and suitable for roof waterproofing. Polyfin-PUR adhesives or Biso PUK are suitable. The adhesive is applied to the substrate or insulation boards in strips. The adhesive manufacturer's instructions apply (adhesive quantities as specified by POLYFIN AG, see table below). Please refer to chapter 4 regarding the substrate.

Full-surface bonding is generally recommended. The adhesive must be spread / distributed evenly, e.g. with a lambskin roller or a notched trowel. Avoid accumulations of adhesive.

The adhesive must be moistened with an even, light spray after application and before rolling in the roofing membranes.

When bonding in strips, the adhesive must only be applied in parallel strips and not in serpentine lines.

Table for strip bonding in accordance with the Flat Roof Guideline 2020 (Section 2.6, Table 1):

Roof area	number of parallel stripes	Adhesive quantity per stripe	Total adhesive amount
Inner area (I)	4 Stripes/m ²	40 g/m	Wind load calculation by Polyfin AG
Int. perimeter (H)	5 Stripes/m ²	40 g/m	Wind load calculation by Polyfin AG
Ext. perimeter (G)	6 Stripes/m ²	40 g/m	Wind load calculation by Polyfin AG
Corners (F)	8 Stripes/m ²	40 g/m	Wind load calculation by Polyfin AG

Fleece backed Polyfin®-membranes are rolled into the viscous adhesive and pressed into place. The technical specifications of the adhesive manufacturer must be observed. Only the surface that can be sealed within the reaction time should be prepared for bonding. Depending on the weather and the adhesive, it is only possible to correct the position within 10-20 minutes.

Bonding with sprayable PU roof membrane adhesives

Fleece-laminated Polyfin roofing membranes can also be fully bonded to the substrate using suitable, sprayable roofing membrane adhesives. The adhesive manufacturer's instructions must be observed.

Advantages:

- Even, practically full-surface adhesive distribution possible without adhesive build-up
- Low consumption
- Very fast curing compared to liquid PU adhesives
- Compared to partial-surface bonding, there is no need to divide up the roof area

The waterproofing membrane is firmly anchored to the load-bearing substrate at the roof edge and at junctions and connections. In order to prevent the adhesive cords from marking (in the case of adhesive applied in strips), the bonded membranes must be unrolled with a closed roller or a suitable weight. When bonding with PUR adhesive, slight discoloration may occur on the surface of colored FPO membranes. However, this has no influence on the function or the expected service life of the waterproofing membrane.

The “hard roofing” has been verified for tested roof structures. If you have any questions, please contact the POLYFIN AG application technology department.

Verlegung

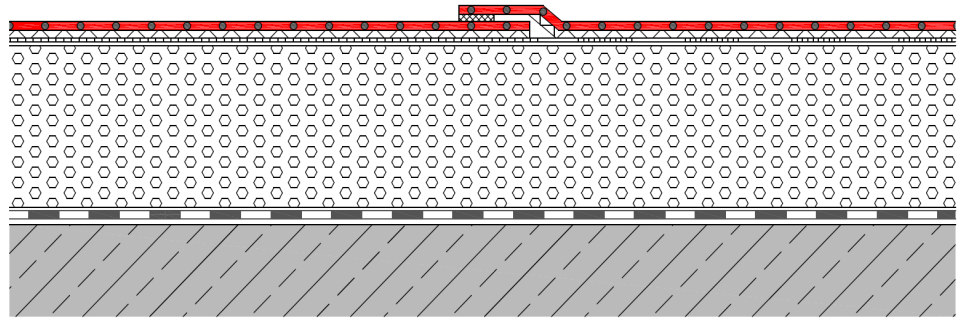
The fleece-laminated FPO roofing membranes of the v-series (Polyfin 4015 v - 4020 v) can be bonded directly to unlined polystyrene insulation (EPS insulation) using PUR adhesive.

Polyfin® 4015 v - 4020 v

Therm. insulation (EPS)

**Vapour control layer
(bitumen based)**

Reinforced concrete slab



As PUR adhesives have a low initial adhesion, the sheets must first be secured against wind suction by applying a load. Minor protrusions in the area of the adhesive strips are possible.



Application example: Full-surface adhesive application of a sprayable PU roof membrane adhesive.

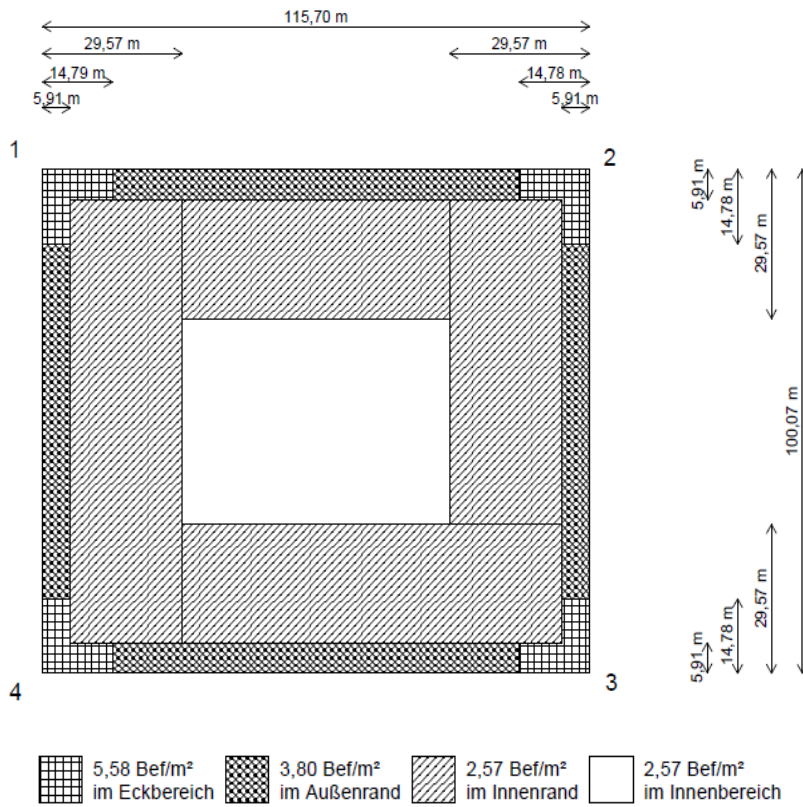
8.1.2 Self-adhesive installation

Self-adhesive installation is only possible with Polyfin Duo® 5018 SK. There is a separate data sheet on processing instructions and substrate requirements, which is available on the product website.

Determining the wind suction loads

The wind suction loads are determined using the latest edition of DIN EN 1991-1-4: 2005. When calculating the number of fasteners, a distinction is made between inner, inner edge, outer edge and corner areas. POLYFIN AG offers the service of determining the number of fasteners individually for each object as an individual verification in accordance with DIN 1991-1-4: 2005 / NA: 2010-12. This can result in cost advantages. In the case of renovation, pull-out values must be determined as the basis for a calculation.

Example calculation for a rectangular building



Remark:

Application manual attached. Be sure to observe!

9. Connections and flashings in general

Connections to surface waterproofing are made with sheets or strips of Polyfin® 3015-3025 / Polyfin Duo® 3015 - 3020. Suitable measures must be taken to absorb horizontal forces in accordance with DIN 18531, particularly at junctions and roof penetrations. For this purpose, the surface waterproofing must be fastened to the substrate with individual brackets (at least 4 per running meter), rails or composite sheet metal angles (mechanically fastened every 25 cm). In the case of fillet formations on rising building components and changes in direction of more than 3° from the horizontal, the roofing membranes must be mechanically fastened at the lowest point every 25 cm (4 pieces per running meter).

In the case of statically separated components, a rigid connection with the surface seal must be avoided at all costs. Overstressing in the connection area due to tensile, shear or shear forces must be prevented by design measures. Connections and terminations must be made windtight.

Connections and terminations must be designed in such a way that no water can run behind them. Seams that run against the direction of water flow cannot be avoided at connections. This is not a disadvantage with hot air welding.

The connecting strips must be welded onto the surface waterproofing at a maximum distance of 20 cm from the groove. The connection strips can be laid loosely or bonded over the entire surface using POLYFIN Contact Adhesive W.

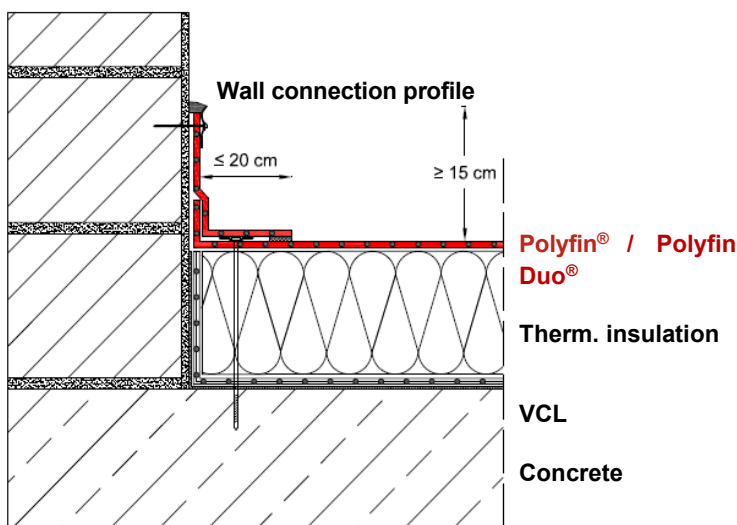
Wall connection profiles / clamping profiles must be dimensioned and fastened according to their function. The fixing distance should not be more than 20 cm. Their individual length should not exceed 2.50 m. If the upper edge of the clamping profile is not protected from weathering by an overhanging strip or the wall cladding, it must be bent so that a sealant chamfer at least 10 mm wide and 6 mm thick can be inserted or additional sealing is provided by pre-compressed tapes. Sealant chamfers must be maintained regularly.

For connection heights over 50 cm, the vertical waterproofing membrane must be bonded over the entire surface and mechanically secured against slipping in the upper area or mechanically fastened in between. The intermediate fastening can be carried out, for example, with a wall connection rail as a two-part concealed connection with a concealed composite sheet metal strip, onto which the roof waterproofing is welded, or individual roof membrane fasteners (4 pcs./lfdm). The one-piece design with a Polyfin® / Polyfin Duo® strip is also permissible. See also 6.4, "High parapet connection".) This applies to wall connections, parapets, continuous rooflights and all other rising components.

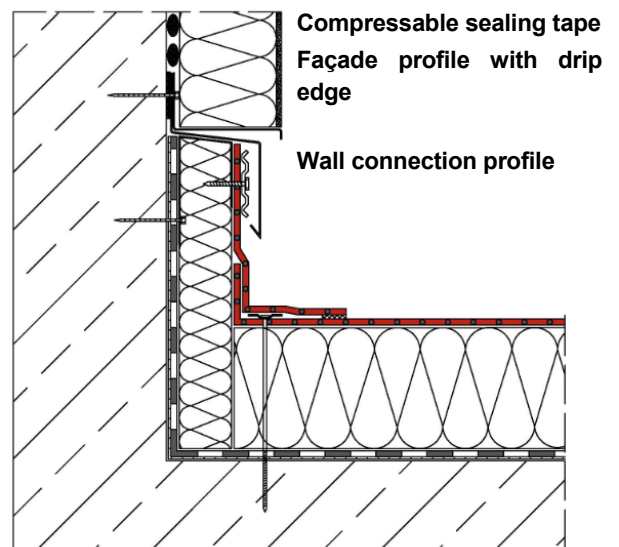
Alternatively, a "tensioned connection" version is also possible up to heights of 1 m (for details, please contact the application technology department).

9.1 Wall connection without movement joint

The Polyfin® 30.. / Polyfin Duo® surface waterproofing must be mechanically fastened to the roof edge in the valley area. The Polyfin® 30.. / Polyfin Duo® connection strip is run loosely up the rising component and mechanically fastened using a wall connection rail. According to the flat roof guidelines, the connection height should be at least 15 cm above the surface of the waterproofing or ballast (gravel fill). The flashing strip is then guided onto the roof surface and the existing valley fastening (fastening element, rail or composite metal angle) is professionally covered. The flashing strip is welded onto the surface waterproofing at a maximum distance of 20 cm from the valley.

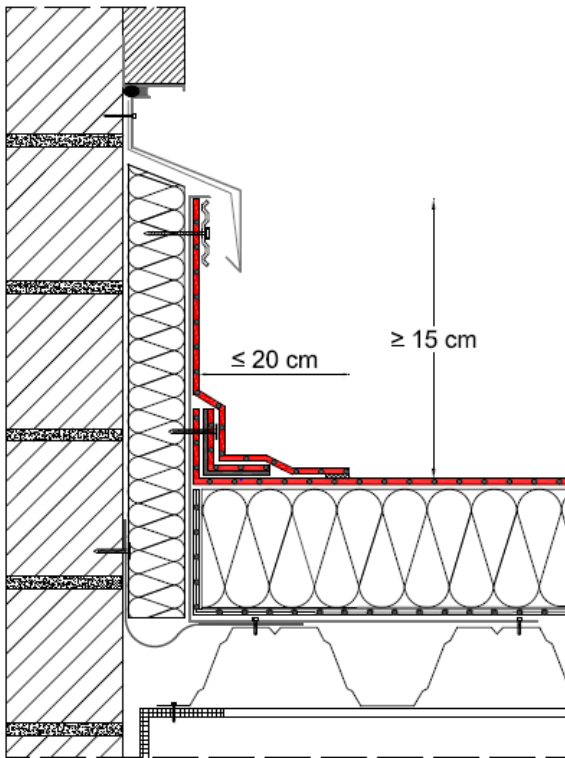


Wall connection without movement joint, non-insulated



Wall connection without movement joint, therm. insulated

9.2 Wall connection with movement joint



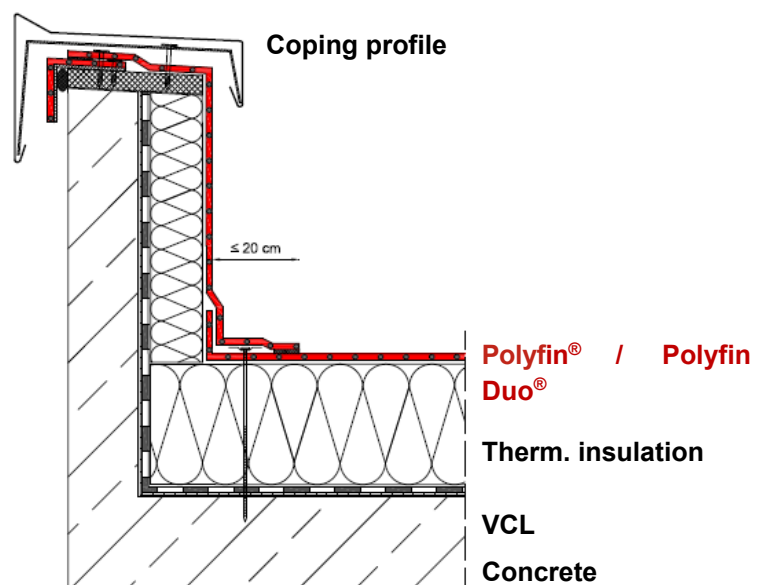
In contrast to the rigid connection, the Polyfin® 30..- / Polyfin Duo® 30..connection strip is not mechanically fastened to the rising component, but to an auxiliary construction, a galvanized angle sheet or similar. The flashing strip is welded onto the surface waterproofing at a maximum distance of 20 cm from the valley.

- Polyfin® / Polyfin Duo®**
- Thermal insulation**
- Vapour control layer**
- Trapezoidal steel decking**

9.3 Parapet flashing without movement joint

Installation is carried out in the same way as for the rigid wall connection. However, the Polyfin® 3015-3025 / Polyfin Duo® 3015 - 3020 strip material is mechanically fastened to the wall crown and guided loosely onto the roof surface following the profile.

A wall cover profile must then be professionally installed on the parapet crown. The connecting strip must be connected to the wall crown in a windtight manner (e.g. with composite sheet metal angle and pre-compressed sealing tape) (see sketch 1).



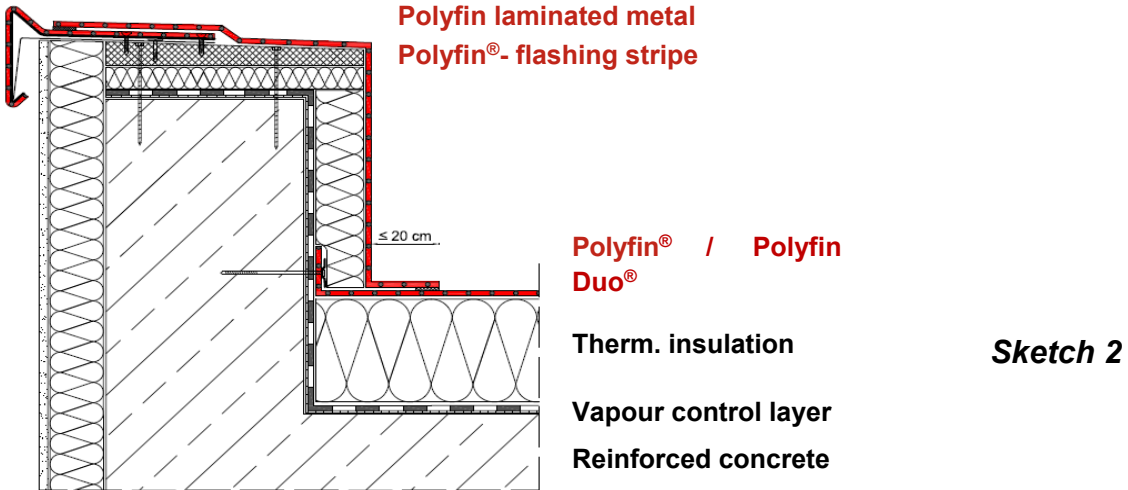
Sketch 1

- Polyfin® / Polyfin Duo®**
- Therm. insulation**
- VCL**
- Concrete**

Flashings and connections

The parapet end can also be designed with a multi-edged composite sheet with an outer panel and drip edge (see sketch 2).

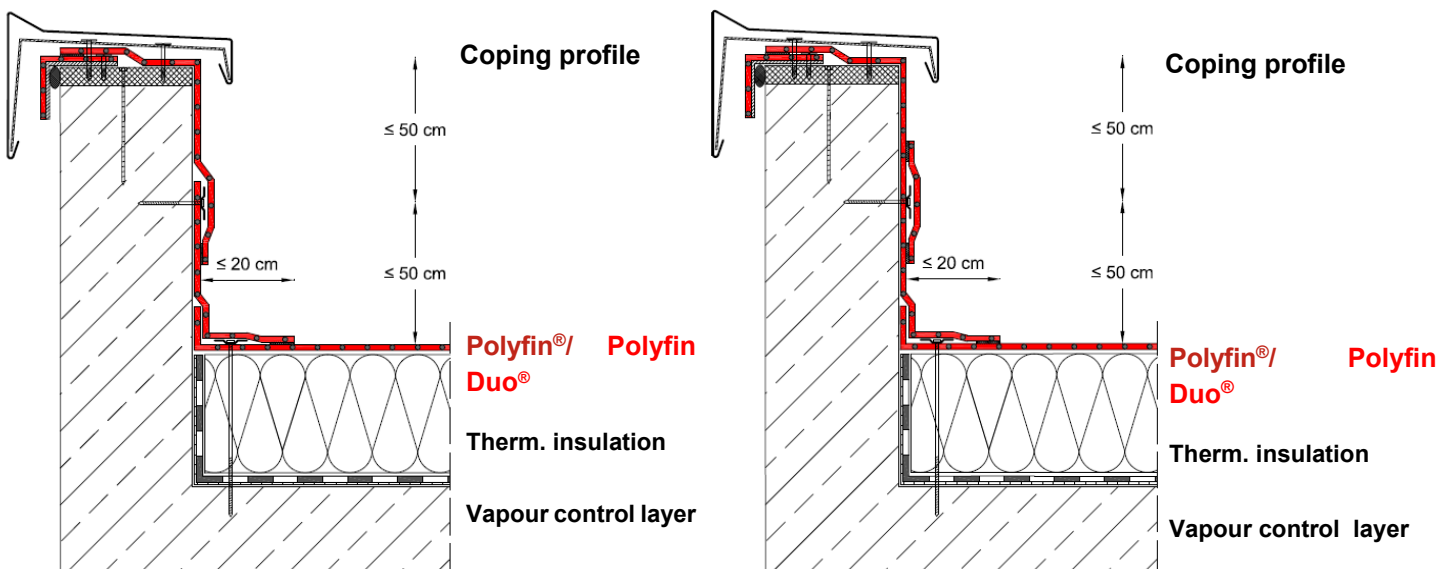
The parapet coping must have an inward slope of at least 2%



9.4 High parapet flashing

For parapet heights over 50 cm, the vertical waterproofing membrane must be bonded over the entire surface and mechanically secured against slipping in the upper area or mechanically fastened in between. The intermediate fastening can be carried out, for example, with a wall connection rail as a two-part concealed connection (see sketch on the left) with a concealed composite sheet metal strip onto which the roof waterproofing is welded, or individual roof membrane fasteners (4 pieces per running meter). The one-piece design with a Polyfin® strip is also permissible (see sketch on the right).

The connecting strip must be connected to the top of the wall in a windtight manner (e.g. with a composite sheet metal angle and pre-compressed sealing tape).



9.5 Parapet flashing with movement joint and coping profile

Installation is the same as for the movable wall connection. A wall cover profile must be professionally installed on the parapet crown. The connection strip is welded onto the surface seal at a maximum distance of 20 cm from the groove.

9.6 Parapet flashing with movement joint under cladding

With higher parapets, the wall cladding or a folded Z-profile covers the movable connection. The wall cladding must be designed in such a way that rainwater is prevented from running behind it. The connection strip is welded onto the surface seal at a maximum distance of 20 cm from the groove.

9.7 Verge and roof edge formation

A professional edge finish is required at the verge/roof edge. Multi-piece commercial profiles and folded profiles made of POLYFIN composite sheet metal are suitable for this purpose, to which the roofing and waterproofing membrane can be professionally connected. For this purpose, the waterproofing membrane must be led up to the outer edge of the roof and professionally mechanically fastened. The additional connection strip is attached to the roof edge profile, guided onto the roof surface and professionally welded to the surface sealing. For folded roof edge profiles made of composite sheet metal, the fastening distance of the screws should not be more than 20 cm. The screws must be offset from each other.

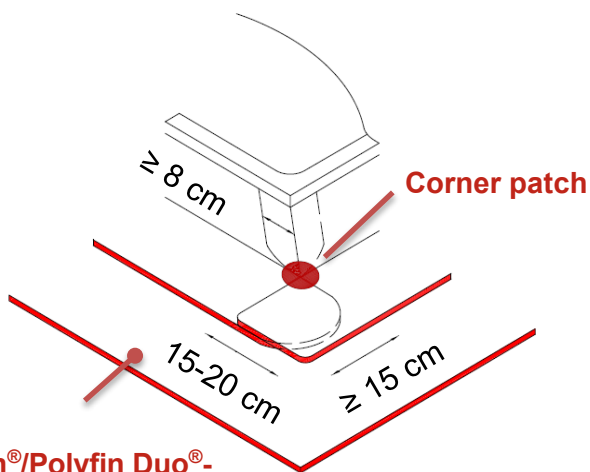
9.8 Flashing to dome lights and linear roof lights

The Polyfin® / Polyfin Duo® roofing membranes are brought up to the curb and professionally fastened in the valley.

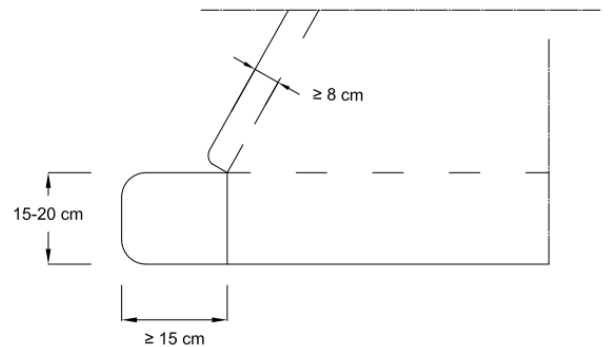
The Polyfin® / Polyfin Duo® connection strip is mechanically fastened to the curb with wall connection rails. The flashing strip is laid loosely, formed close to the curb and guided onto the horizontal roof surface. It must professionally cover the existing edge fastening. For installation, the flashing strip is fixed at the corners.

The flashing strip can also be bonded to the substrate using POLYFIN contact adhesive W. The flashing strip is welded at a maximum distance of 20 cm from the vertical upstand of the upstand. The intersection point at the corner between the roof surface and the curb must be secured with corner fittings or corner patches (homogeneous material Polyfin® 1020 / Polyfin Duo® 1020) from our system accessories range (see sketch below).

The size of the corner patches depends on the local conditions. The fastening around the skylight dome should be made directly in the valley. Special fixing screws may need to be used.



Polyfin®/Polyfin Duo®-sealing

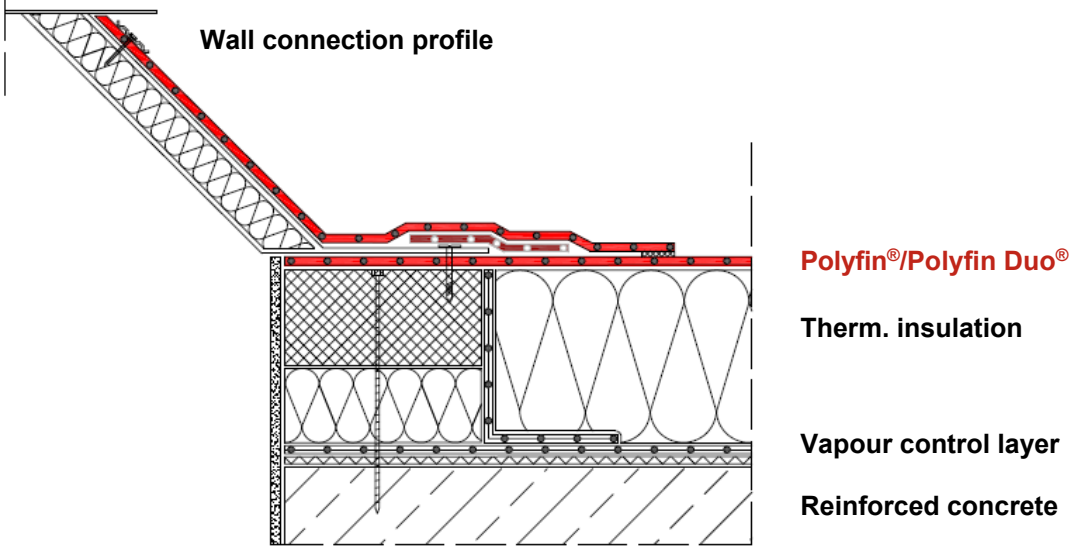


POLYFIN roof light corner with 1 patch Polyfin 1020

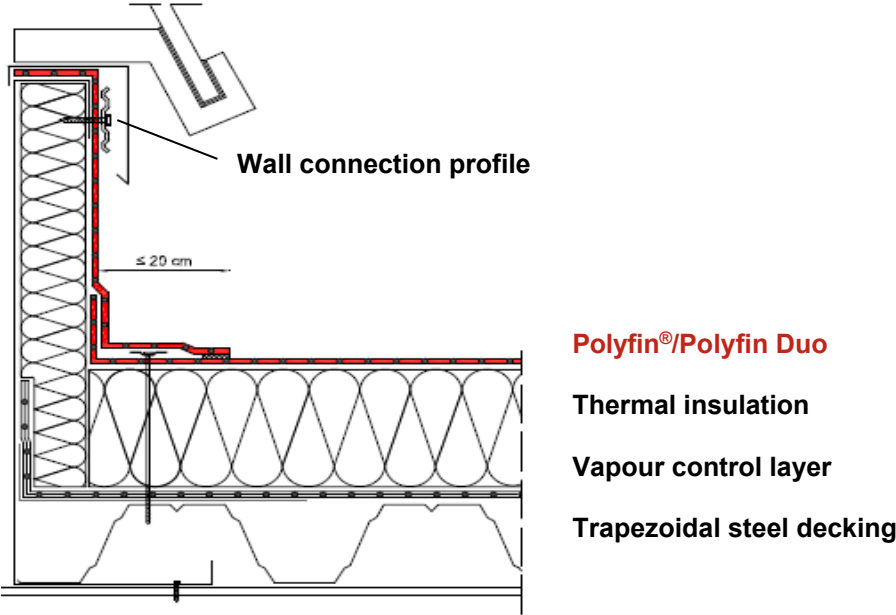
[POLYFIN application video „roof light corner with one patch“](#)

Flashings and connections

Roof light flashing



Linear roof light flashing



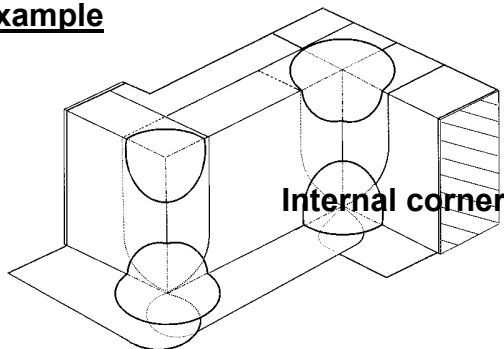
9.9 Internal and external corners

In corner areas, Polyfin® 30.. or Polyfin Duo® 30.. is guided around the corner and welded. Protection can be provided with molded parts or with round corner protectors made of homogeneous Polyfin® 1020 / Polyfin Duo® 1020 material. The size of the corner protectors depends on the detail design.

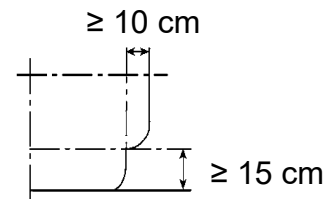
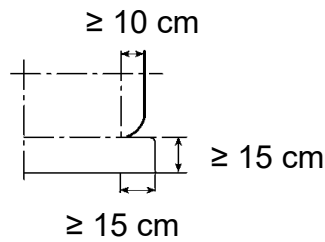
Forming the inside corners using the “pinch fold method” is not permitted.

Outside corners can also be used for square or rectangular roof penetrations.

Example



External corner



POLYFIN application video [„hot air welding with hand gun“](#)



9.10 Flashing to drainage systems

a) Internal drainage

For a secure connection to internal drainage systems, drains with a factory-fitted connection flange made of Polyfin ® 4020 v (fleece-laminated on the underside) should preferably be used (see sketch 1).

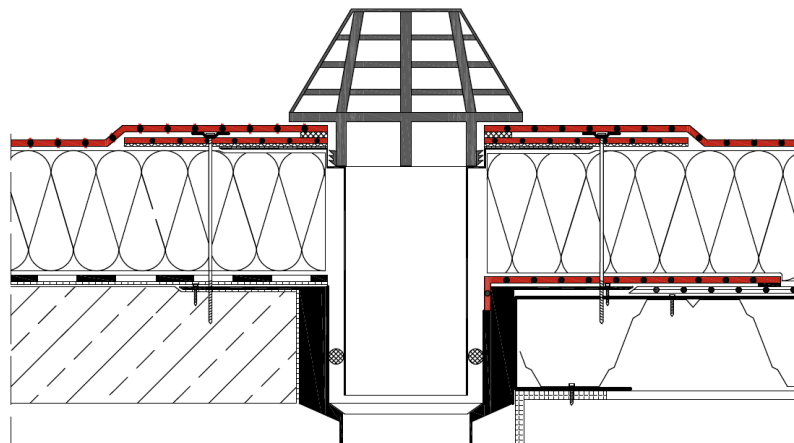
The extension unit and base unit must be fixed to the substrate with at least 4 individual fasteners.

Polyfin®/ Polyfin Duo®

Thermal insulation

Vapour control layer

Reinforced concrete



Sketch 1



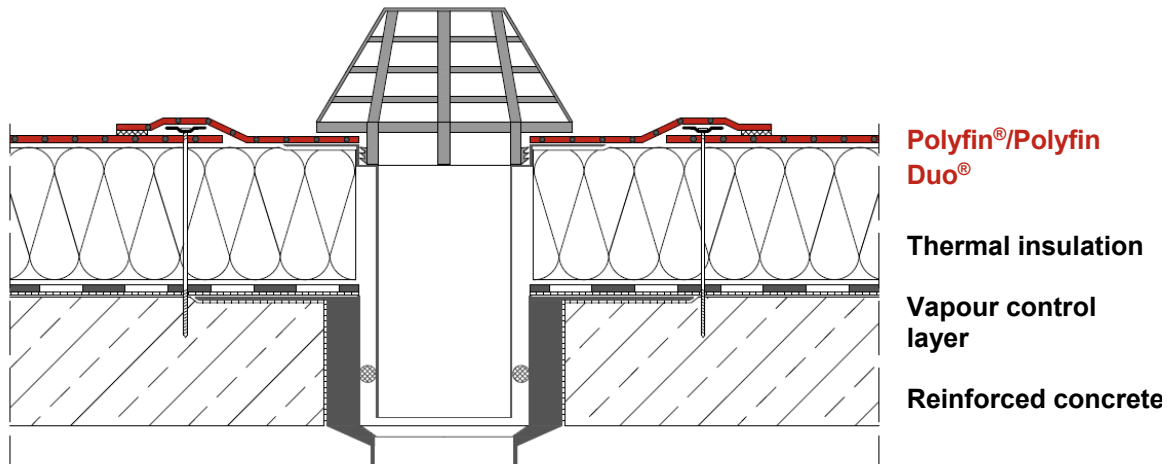
POLYFIN application video
[roof outlet with warm roof extension](#)



Flashings and connections

The Polyfin® 30. / Polyfin Duo® 30. connection sleeves can be flanged directly into clamping flange gullies with sealing inserts. Inserts must be used in accordance with the drain manufacturer's instructions.

The Polyfin® / Polyfin Duo® roof waterproofing membrane must be mechanically fixed with at least 4 individual fasteners:



Sketch 2

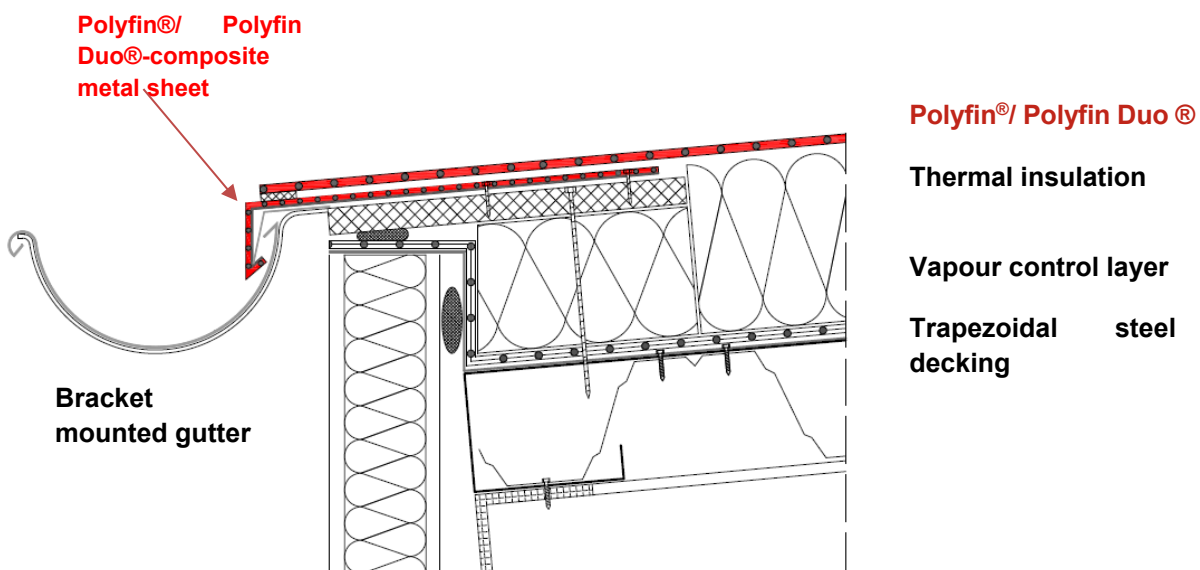
The gully extension unit must be professionally and mechanically fastened to the substructure. Components separated by a joint must be drained independently of each other. In the case of thermally insulated roof structures, the roof gullies must be embedded in the thermal insulation to ensure unimpeded water drainage. Appropriate fittings are available in our range of system accessories for renovation work.

Flashings and connections

b) External drainage

The gutter flashing (Polyfin®/Polyfin Duo® composite sheet) must be professionally and mechanically fastened to the eaves board (offset every 15 cm) using screws. Stiffening sheets may be required depending on how the system is installed. The individual composite sheets must be fastened with a gap of approx. 5 mm in the joint areas. The joint areas are covered with expansion strips (approx. 15 cm wide) made of Polyfin® 1020/Polyfin Duo® 1020/ or Polyfin 30.. / Polyfin Duo® 30.. The cover strip is welded on both sides, leaving an unwelded expansion zone of at least 4 cm above the sheet joint.

The surface seal can be welded directly onto the Polyfin®/Polyfin Duo® composite sheet.



Flashings and connections

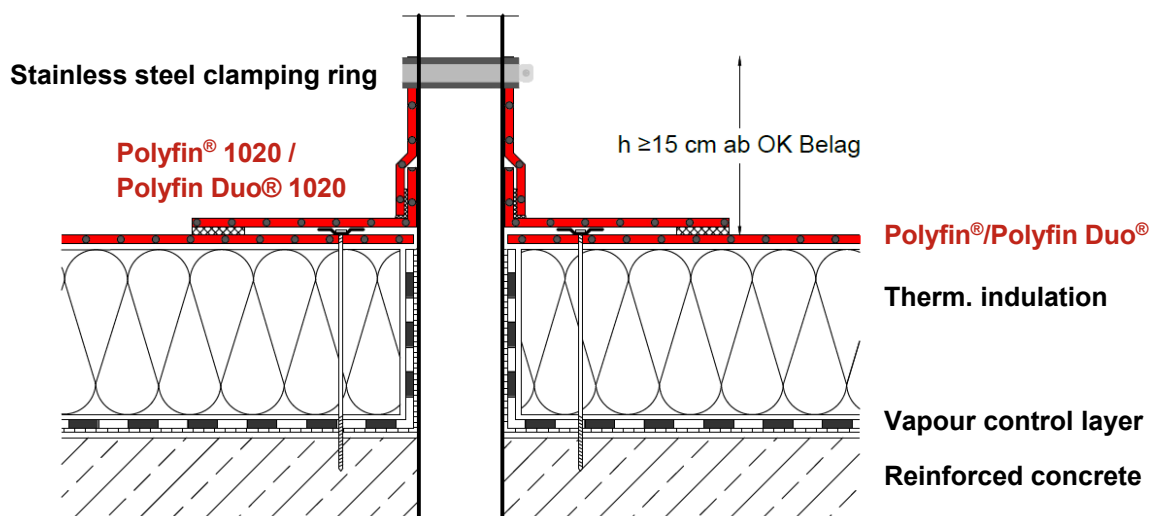
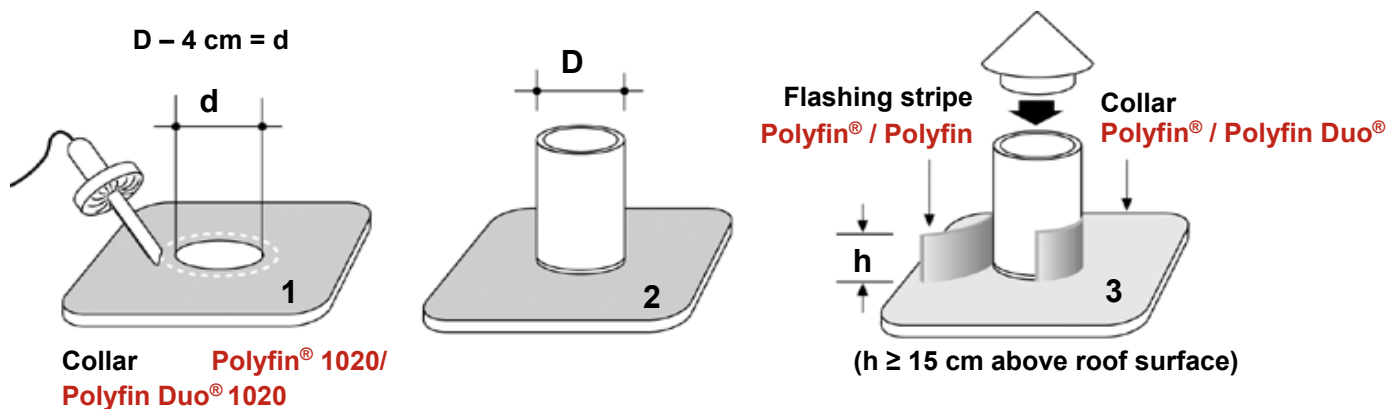
9.11 Connection to roof penetrations

Pipe penetrations are made with fittings from our range of system accessories or a flange approx. 50 x 50 cm and a sleeve made of Polyfin® 1020/Polyfin Duo® 1020.

A hole is cut out in the middle of the flange. The diameter of the cut-out results from the pipe diameter minus approx. 4 cm. The area around the cut-out is heated with the hand welder so that the heating is the same on the top and bottom [1]. The cut-out is widened to the required size and pulled over the pipe. If this is not possible on the pipe itself, prefabrication can be carried out on a pipe of the same diameter. By selecting a smaller diameter for the cut-out, a collar is created around the pipe [2]. The collar is then formed onto the pipe and welded to the collar using homogeneous material [3]. The flange is aligned with the surface seal and welded on professionally.

Above the water-bearing level, the collar is pressed onto the pipe, e.g. with a stainless steel clamping band (see sketch below).

Rectangular roof penetrations such as chimneys, roof hatches, ventilators etc. are executed in the same way as wall connections.





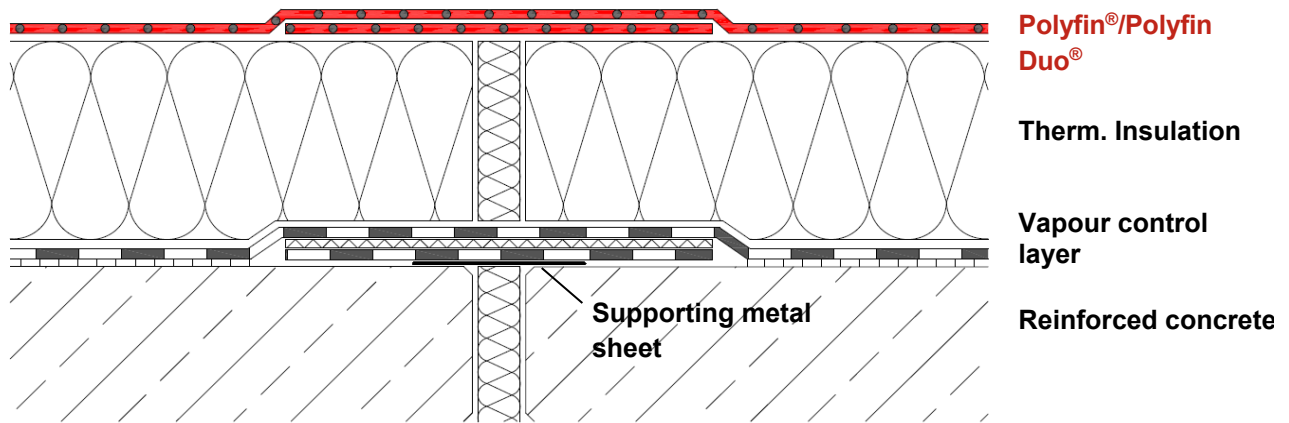
POLYFIN application video [„sealing of a pipe penetration“](#)



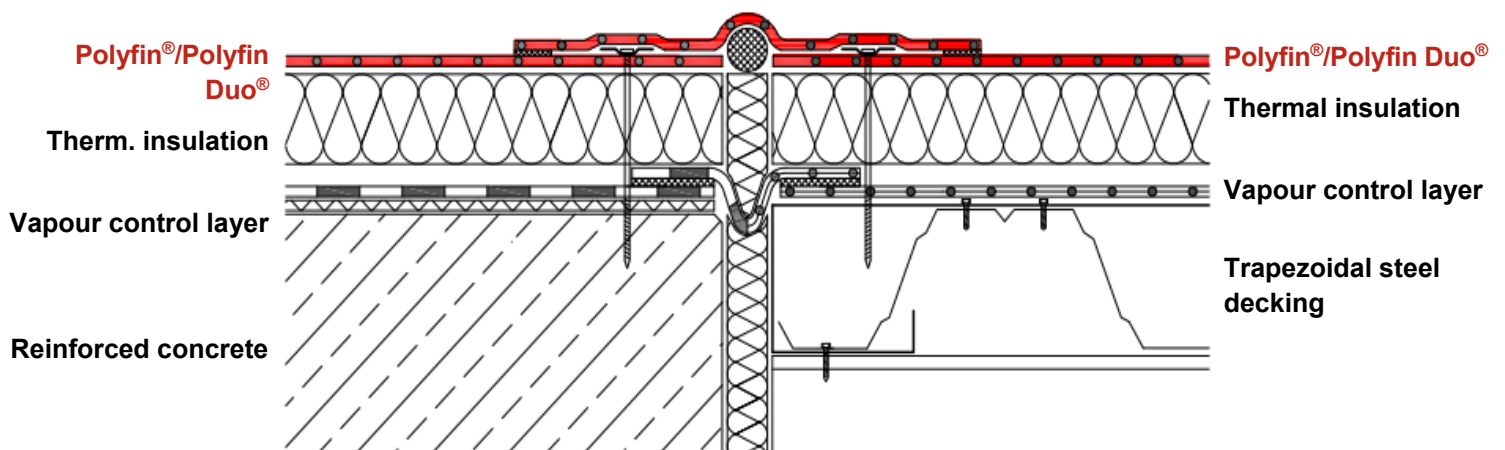
POLYFIN FPO/TPO - sealing of a pipe penetration

9.12 Structural joints and expansion joints

Joints in the structure of the building must also be designed as joints in the layered structure above. The type of design depends on the expected movements. Type 2 structural and expansion joints can be designed as high points in accordance with the flat roof guideline. They must not pass through roof openings and must not be closer than 50 cm to such points.



Example of joint type 1 (in accordance with the flat roof guideline)



Example of joint type 2 (based on the flat roof guideline)

Depending on the component movement, it may be necessary to work with upstands and auxiliary constructions.

10. Trennlagen Separating layers - Protective layers - Fire protection layers

Our roofing and sealing membranes are plasticizer-free and generally do not require a separating layer in contact with other materials such as bitumen and polystyrene. However, when renovating “old roofs”, for example, a separating layer can be useful to reliably prevent undesirable reactions (e.g. discoloration) with an old waterproofing on which renovation work is being carried out. Depending on the requirements of the applicable General Building Inspectorate Test Certificate (“Brand-ABP”), the separating layer may also be required as a fire protection layer.

When renovating old bitumen roofs, the separating layer can also act as a protective layer at the same time (to prevent material discoloration of the new waterproofing).

Fire protection layers

Fire protection layers may be required to verify the „hard roofing“ of the fire protection layers (the requirements of the applicable general building authority test certificates must be taken into account). For example, in certain structures it may be necessary to place a 120 g/m² A2 glass fleece between the insulation material and the waterproofing.

Separation layers

Suitable separating layers include raw glass fleece, plastic fleece, PE film, etc.

Wood preservatives must not have a harmful effect on the roof structure.

Protection layers

It may be necessary to place a protective layer above and/or below the roof waterproofing.

A protective layer is typically placed below the waterproofing if the substrate is relatively rough or can be expected to be rough. This is typically the case with substrates made of concrete or timber formwork, for example. Suitable protective layers within the meaning of DIN 18531 are, for example, synthetic fiber fleeces with a surface weight of 300 g/m². If fleece-backed Polyfin membranes are laid on the underside, the fleece on the underside assumes the function of the protective layer.

Protective layers above the waterproofing may be necessary if the roof surface is used, for example. Protective layers are also required if, for example, chillers are placed on the waterproofing. These can also be 300 g/m² synthetic fiber nonwovens.

It must be ensured that the separating layers are drill-proof.

10.1 Protection layers

In the case of rough, sharp-edged substrates, a protective layer must be laid to protect the roof waterproofing. A protective layer may also be required when renovating bituminous surfaces (possibly not for Polyfin® 4015 v - 4020 v). Polyester nonwovens, for example, are suitable for this purpose. A protective layer is recommended for single-layer waterproofing. In the case of point loads or loads that could damage the roofing and waterproofing membrane, e.g. pneumatic

application of gravel and used roofs, a protective layer is required. As a rule, plastic fleece (300 g/m² according to DIN 18531) can be used for this purpose.

10.2 Sliding layers

When applying concrete directly to the waterproofing, 2 layers of PE film (2 x 0.25 mm), for example, must be used in accordance with DIN 18531 ff. The POLYFIN AG application technology department must be consulted before using other separating layers.

10.3 Occupational safety

Sufficient ventilation must be ensured in closed rooms when welding the sheets and applying adhesives and cleaners. The general accident prevention regulations of the trade associations as amended must be observed.

In particular, the safety instructions on the safety data sheets and on the respective containers must be observed for adhesives and cleaners.

10.4 Hazard class

Polyfin®/Polyfin Duo® roofing membranes are not hazardous substances and therefore do not require labeling. The roofing membranes are environmentally compatible and are not classified as a substance hazardous to water (no danger to groundwater or animal life). No dioxins, furans or corrosive gases are produced during welding and incineration.

Safety data sheets are available for adhesives and cleaners, from which safety measures for handling and working with the products as well as information on the In can be taken. Further information can be found in the respective R and S phrases of the safety data sheets.

10.5 Fire classification

Polyfin®/Polyfin Duo® roofing membranes are tested in most common roof structures in accordance with the requirements for “hard roofing” (resistance to flying sparks and radiant heat as defined by the MVVTB and the LBauOs) in accordance with DIN 4102, Part 7 or the European standard DIN V ENV 1187 in conjunction with DIN EN 13501, Part 5. As a building material, Polyfin®-/Polyfin Duo® roofing membranes are classified as class E according to DIN EN 13501, part 1.

Test certificates can be requested from the POLYFIN AG application technology department!

10.6 Fire protection layers

The arrangement of a fire protection layer between the waterproofing and insulation or substrate may be necessary depending on the requirements of the applicable General Building Inspectorate Test Certificate. A raw glass fleece 120 g/m², A2 (Polyfin 3015 - 3024, Polyfin Duo 30.. ®) is suitable as a fire protection layer in exposed, mechanically fastened structures on polystyrene thermal insulation material (EPS).

10.7 Storage

Polyfin®-/Polyfin Duo® roofing membranes must be stored dry on building sites and outdoors, in their original packaging, on a level, clean surface.

On building sites, the rolls must be protected and covered with suitable means if necessary. The instructions in the technical data sheets must be observed.

Polyfin® adhesives and cleaners must be stored in accordance with the requirements of the relevant safety data sheet..

10.8 Reflection radiation

Polyfin®, Polyfin Duo® and O.C.-Plan® membranes are designed for the temperatures of +80°C typically expected on flat roofs in accordance with DIN 18531.

In front of glass facades or highly reflective metal installation parts, temperatures of sometimes well over 100°C can occur due to heat radiation reflecting on the waterproofing in addition to direct sunlight. Such temperature effects can damage the roof waterproofing.

Suitable measures must be taken to prevent this. In the area in front of glass facades, for example, this can be a heavy surface protection of the roof waterproofing. Highly reflective metal surfaces (e.g. on ventilation ducts) can also be coated with matt, dark paints, for example.

If building protection mats are laid in front of glass façades that are not immediately covered with tiles or gravel, the reflective radiation between the building protection mats and the waterproofing can lead to heat build-up. This can be avoided if the ballast is immediately applied to the entire surface of the building protection mats, or by using a separating layer of e.g. 200 g/m² polyester fleece between the waterproofing and the building protection mats.



Extreme case as an example: Reflected radiation with light bundling using the example of new, rectangular ventilation ducts arranged at a short distance from the roof surface.

The sunlight is focused by the folds in the ventilation duct sheets. Some of the focal points are located on the roof surface, recognizable as bright spots.

10.9 Application temperature

Polyfin® / Polyfin Duo® roof waterproofing may only be applied in weather conditions that could have a detrimental effect on the work to be carried out if special measures are taken to prevent adverse effects. Such weather conditions are, for example, temperatures below +5 °C, wetness, snow and ice or strong winds. These measures must be planned taking into account the conditions at the time of execution, depending on the materials to be used, and provided for as a special service.

11. Certifications and tests

Aspects such as CE marking according to area of application, national requirements for the type of construction (e.g. for fire protection) and any requirements regarding the impact of roof waterproofing products on the environment must be taken into account during planning.

The following text lists the properties of the individual products with regard to the various requirements.

Not all national certificates and the application of the respective products are described in these installation instructions. The focus here is on the requirements and certifications relevant in Germany.

11.1 CE mark

Synthetic roof waterproofing is subject to harmonized European standards and must therefore have a CE mark in accordance with DIN EN 13956 in order to be traded as roof waterproofing within the European Union. EN 13967 applies to structural waterproofing membranes.

Polyfin FPO membranes and O.C.-Plan ECB membranes are properly CE-certified for the applications described in these installation instructions.

ATTENTION: A CE mark alone does not authorize the use of a roof waterproofing membrane for certain types of construction. As a rule, there are additional national requirements for the type of construction. In Germany, for example, these are DIN SPEC 20.000-201 (roof) and DIN SPEC 20.000-202 (structural waterproofing), as well as DIN 18531 ff. and requirements for the fire behavior of a roof layer package when exposed to fire from the outside and, if applicable, also from the inside.

11.2 DIN SPEC 20.000-201 and DIN SPEC 20.000-202

The products described in these installation instructions each comply with DIN SPEC 20.000-201 (roof) and/or DIN SPEC 20.000-202.

The respective technical data sheets contain a corresponding marking using the abbreviations prescribed by the standards.

11.3 DIN 18531 ff.

Synthetic roofing membranes from POLYFIN AG are designed to be used within the scope of DIN 18531 ff.

Please note in particular: FPO membranes such as Polyfin are “K2-capable” in this sense from an effective material thickness of 1.5 mm“.

11.4 CE certifications, monitoring and tests - overview

DIN EN 13956 (roof waterproofing)
DIN SPEC 20.000-201 (Roof waterproofing)
DIN EN 13967 (waterproofing of buildings)
DIN SPEC 20.000-202 (waterproofing of buildings)
DIN EN 13501-1 (Classification of construction products)
DIN EN 13501-5 (Classification of construction products)
DIN V ENV 1187 (Fire behavior of roofing)
DIN 4102-7 (Fire behavior of roofing)

11.5 12.5 Resistance to external fire exposure, “Hard roofing”, “Resistance to flying sparks and radiant heat“

The requirements regarding resistance to external fire exposure are set out in the model building regulations and state building regulations.

DIN 4102-4 describes roof structures that fulfill the criteria of “hard roofing” without verification. For example, these are roofs with ballast, e.g. made of 5 cm gravel 16/32, intensively greened roofs and, since 2016, also roofs with extensive green roofs, whereby certain requirements are also placed on the green roof system in each case. The exact wording of the standard must be observed here.

In Germany, other structures, in particular with freely weathered roof waterproofing, require proof of a “General Building Inspectorate Test Certificate”, which is usually based on a system test in accordance with CEN TS 1187-1 (tests in accordance with DIN 4102-7 are also still permitted), taking DIN 4102-23 into account if necessary. A classification Broof(t1) can also be carried out on the basis of a test in accordance with CEN TS 1187-1 using DIN EN 13501-5. However, such a classification report does not currently constitute proof of usability for Germany.

The superstructures in the corresponding combinations (primarily roofing membrane and insulation material), for which the “hard roofing” is verified as described above, are available on request. Some of them are also shown in the individual POLYFIN AG product folders.

11.6 Resistance against roots

The root resistance of various POLYFIN AG membranes has been verified by testing in accordance with EN 13948 and FLL. All tested membranes have passed this test without the addition of root growth inhibiting additives.

11.7 Environment

The influence and impact of building products on the environment can be viewed from different angles.

With regard to Polyfin and Polyfin Duo products, the following core properties can be outlined in this context:

- PVC-free, plasticizer-free, solvent-free
- Free from halogens such as chlorine and bromine
- Free from root toxins

POLYFIN AG has also had independent fact sheets and declarations drawn up with regard to building certification systems such as LEED, DGNB and BREEAM. The corresponding declarations are available on request.

EPDs (environmental product declarations) are available for various membranes.

11.8 Applicable standards, rules and guidelines

DIN 18234 (Structural fire protection of large-surface roofs)
DIN 18531 (Roof waterproofing)
DIN 18336 (Waterproofing work) = VOB
DIN 18338 (Roof waterproofing work) = VOB
DIN 1991-1-4: 2005/NA: 2010-12
DIN 18195 Waterproofing of buildings - Definitions
DIN 18807, parts 1 to 3 (trapezoidal steel profiles) DIN 18807, parts 1 to 3 (trapezoidal steel profiles)
DIN 4102 (fire behavior), DIN CEN TS 1187, DIN EN 13501
DIN 4108 (thermal insulation)
Energy Saving Ordinance EnEV / from November 2020 GEG
Industrial building, high-rise building and hospital guidelines
Technical rules for metal work in the roofing trade
If additionally agreed by the parties involved in construction (guidelines from associations)
Technical rule of the DUD / VDD , or “abc of roofing and waterproofing membranes”
German roofing trade - rules for waterproofing - with flat roof guidelines

12. Important notes

The applicable regulations and standards such as DIN 18531, the technical rules for metal work in the roofing trade, the flat roof guidelines if agreed, the safety regulations of the employers' liability insurance associations and all installation and operating instructions of the accessory suppliers must be observed.

The information in this publication is based on current knowledge and over 45 years of experience. A legally binding assurance of certain properties or suitability for a specific application can only be given after written approval by POLYFIN AG. The large number of possible application conditions make it necessary for the user of the products to carry out their own professional testing and handling.

As our material warranty requires compliance with the above regulations, we recommend obtaining the approval of POLYFIN AG for local conditions, materials and techniques that are not described in these installation instructions.

This applies in particular to intended deviations from these processing instructions and installation instructions as well as from the other regulations mentioned at the beginning of these instructions.

With the publication of a newer edition of the installation instructions, this edition loses its validity. The currently valid version is available from POLYFIN AG.

The General Terms and Conditions apply.

13. POLYFIN-accessories

We offer you the right accessories for our Polyfin® / Polyfin Duo® roofing and sealing membranes. Our flat roof accessories brochure contains, for example, fittings, connection sleeves, roof outlets, system ventilators and other accessories.

The flat roof accessories brochure, Polyfin® and Polyfin Duo® brochures and the technical data sheets can be downloaded from our homepage www.polyfin.de.



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