TECHNONICOL

CONSTRUCTION SYSTEMS



INSTALLATION MANUAL

APPLICATION OF SINGLE-PLY ROOFING SYSTEMS WITH POLYMERIC MEMBRANES



for use in Russia and other CIS countries

LOGICROOF®

ECOPLAST®

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Introduction

1 Introduction

– This manual represents a brief guide for the correct application on the construction site; it contains only the basic rules and recommendations on installing single-layer roofing systems using **TechnoNICOL** polymeric membranes.

– **TechnoNICOL** polymeric membranes manufactured under the **LOGICROOF** and **ECOPLAST** trademarks are state-of-the-art roofing and waterproofing materials. These membranes are made of high-quality plasticized polyvinyl chloride (PVC-P). The multicomponent formulation is comprised of recent-generation plasticizers and additives allowing the manufacturer to produce a durable roofing material, which ensures protection against ultraviolet light, reliable fire safety, retention of plasticity under negative temperatures, and other advantages.

– The **LOGICROOF** and **ECOPLAST** PVC membranes are produced according to state-of-the-art extrusion technology in Russia's first integrated production facility. This technology allows the manufacturer to produce material with a homogeneous structure and without internal imperfections, which ensures high quality and durability during its operation.

– Certificates and test records issued by Russian and European independent organizations confirm the high quality of the **LOGICROOF** and **ECOPLAST** PVC membranes.

Types of roofing membranes and their scope of application

– For the execution of the main area roof as well as the vertical part of the joint between projecting structures and barrier walls, use **LOGICROOF** and **ECOPLAST V-RP** or **V-GR** reinforced membranes only, (depending on the chosen roofing system).

– **LOGICROOF / ECOPLAST V-RP** roofing membranes are reinforced with a resistant polyester mesh and are used on the main area of the roof when mechanically fixing (exposed system) they are also used for executing joints between the roof and vertical structures and barrier walls. Installation activities should not be carried out when ambient air temperatures are lower than minus **15°C**.

– **ECOPLAST V-GR** membrane is reinforced with glass fibre; it has increased resistance to punctures and impacts from sharp objects, it is used when installing ballasted and inverted roofs. This membrane has also additional resistance against the attack from microorganisms.

– **LOGICROOF V-SR** is a special, highly elastic, non-reinforced membrane. It has been designed for reinforcing the corners, sealing the connections between the roof and piping, antenna wires, equipment supports, etc. This membrane can be easily stretched after heating with hot air.

– **LOGICROOF V-RP ARCTIC** is designed for the cold regions of Russia; it retains high flexibility at very low temperatures and allows **LOGICROOF V-RP ARCTIC** membrane to be installed even in an ambient air temperature lower than minus **25°C**.

– **LOGICROOF / ECOPLAST V-FB** membrane have a laminated geotextile fleece under layer. The PVC membrane is designed for use with fully adhered systems. The geotextile simultaneously presents a separating layer and a surface for applying an adhesive. All rolls have a fleece free selvedge to allow the hot air welding of the sheets.

TechnoNICOL PVC membrane types

Type (brand)		Scope of application
LOGICROOF V-RP ECOPLAST V-RP	A PVC membrane reinforced with a polyester net; it has protection against ultraviolet light. To be installed at temperatures higher than minus 15°C.	To be used for mechanically fixed system. Designed for waterproofing the main field area of roof, barrier walls and connections.
LOGICROOF V-SR	A PVC membrane; it has protection against ultraviolet light.	Designed for waterproofing around pipes and the of reinforcement internal and external corners.
ECOPLAST V-GR	A PVC membrane has a high resistance against punctures; it contains fungicidal admixes; protection against ultraviolet light.	Designed as a waterproofing layer on ballasted and inverted roofing systems.
LOGICROOF V-RP ARCTIC	A PVC membrane with increased flexibility; it is reinforced with a polyester net and includes protection against ultraviolet light. To be installed at temperatures higher than minus 25°C.	For use in northern regions when using the mechanical fixed system. Designed for waterproofing the main field area of the roof, barrier walls and connections.
LOGICROOF / ECOPLAST V-FB with fleece under layer	A PVC membrane with a fleece under layer; it has protection against ultraviolet light.	Designed for use on fully adhered systems.

Transportation and storage

– **LOGICROOF** and **ECOPLAST** PVC membranes are delivered wrapped in an opaque film, reliably protecting the roll against dirt and ultraviolet light. Each roll is provided with a label indicating its date of production and batch number.

IMPORTANT! Please store the membrane in the factory packing placed horizontally on pallets; in doing so, there should be no more than two layers of pallets. Pallets should be kept at least 1 m away from any source of heat or heating equipment.

Store the membrane out of the direct contact of moisture and sunlight.

– When storing the membranes, installation of pallets carrying the product on inclined (i.e. greater than **3**%) surfaces IS NOT RECOMMENDED.

– In winter, keep the PVC membrane at **+10°C** for at least 12 hours before installation. For example, keep the membrane in a heated enclosure on the roof.

– The simplest type of the enclosure/protection can be made with the aid of unused packages of insulation. A heat gun may be used as a heating source.

Description of roofing systems using polymeric membranes

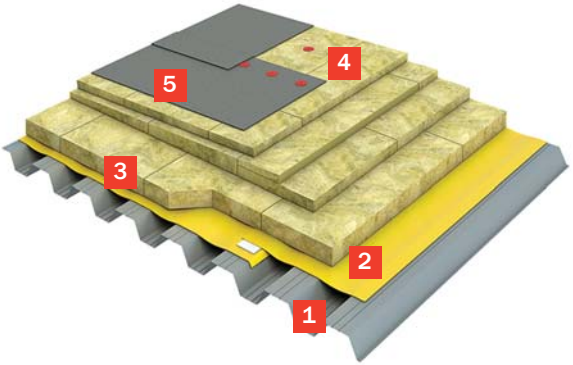
Mechanically fixed roofing systems

These systems use mechanical fasteners to allow fixing of both roofing membrane and heat insulation materials to the base.

TN ROOFING Classic

Fire hazard class of K0 (30) system.

Non-walkable roofing system on a corrugated steel deck with a roof covering made of polymeric membrane.



1 The deck - a corrugated steel sheet; graded as per design specifications. (For requirements on installing the deck, refer to **paragraph 3.1**);

2 TechnoNICOL vapour seal film. (For requirements on installing the vapour film, refer to **paragraph 3.3**);

3 lower insulation layer - mineral wool heat insulator TECHNOROOF **N30**;

* if necessary, tapered heat insulation material may be used to create slopes

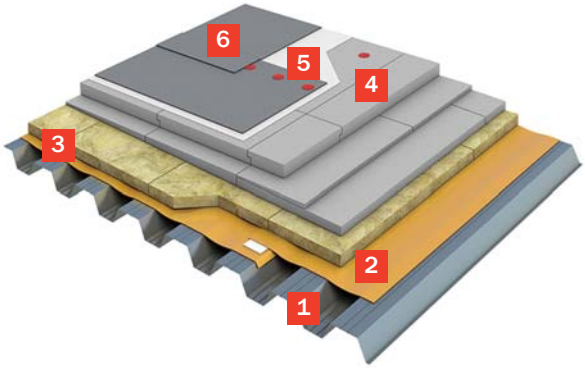
4 Upper insulation layer - mineral wool heat insulator TECHNOROOF **V60**. (For requirements on installing the insulation, refer to **paragraph 3.5**);

5 Polymeric reinforced membrane **V-RP** (LOGICROOF V-RP, LOGICROOF V-RP ARCTIC, ECOPLAST V-RP) mechanically fixed with the TechnoNICOL fastening system. (For further details, refer to **paragraphs 3.4, 5.1** and **5.3**).

TN-ROOFING Smart

Fire hazard class of K0(15) system

Non-walkable roofing system on a corrugated steel deck with a roof covering made of polymeric membrane and with combined heat insulation.



1 The roof deck - a corrugated steel sheet; graded as per design specifications. (For requirements on installing the base, refer to **paragraph 3.1**);

2 TechnoNICOL vapour seal film. (For requirements on installing the film, refer to **paragraph 3.3**);

3 Lower insulation layer - mineral wool heat insulator TECHNOROOF **N30** – a fire resistant layer; at least **50 mm** thick;

* if necessary, tapered insulation material may be used to create slopes

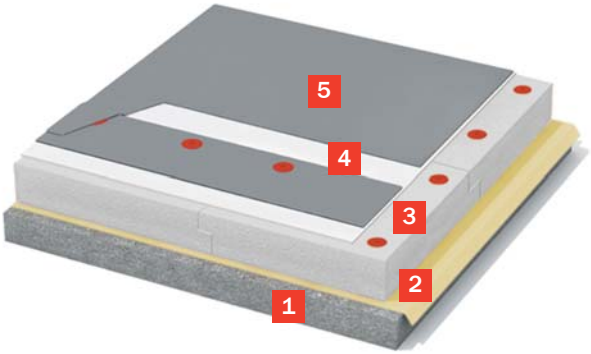
4 Upper insulation layer - extruded polystyrene foam CARBON PROF (See **paragraph 3.5** for requirements on installing the insulation);

5 **V-RP** polymeric reinforced membrane (LOGICROOF V-RP, LOGICROOF V-RP ARCTIC, ECOPLAST V-RP) mechanically fixed with the TechnoNICOL fastening system. (For more details, see **paragraphs 3.4, 5.1** and **5.3**).

Mechanically fixed concrete deck roofing system

Fire hazard class of K0(45) system

Non-walkable roofing system on a concrete base with a roof covering made of polymeric membrane and with polymeric insulation.



1 The deck – reinforced concrete deck or light/heavy weight concrete that ensures sufficient carrying capacity;

2 TechnoNICOL vapour seal film with sealed overlaps. (For requirements on installing the vapour film, refer to **paragraph 3.3**) or heat fusing bitumen vapour seal;

3 Insulation material - extruded polystyrene foam CARBON PROF or TECHNOROOF **N30** + TECHNOROOF **V60** mineral wool. (For requirements on installing the insulation material, refer to **paragraph 3.5**);

* if necessary, tapered insulation material may be used to create slopes

4 Separating layer, - glass fibre (weight should be at least **100 g/m²**) or geotextile. (Weight should be at least **150 g/m²**);

5 **V-RP** polymeric reinforced membrane (LOGICROOF V-RP, LOGICROOF V-RP ARCTIC, ECOPLAST V-RP) mechanically fixed with the TechnoNICOL fastening system. (For more details, refer to **paragraphs 3.4, 5.1** and **5.3**)

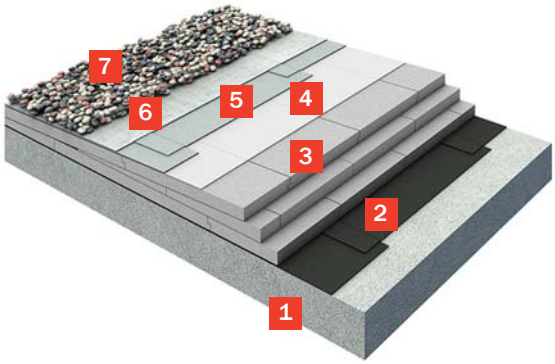
– When applying the membrane directly onto the deck it is necessary to install a geotextile separation layer with a weight of at least **300 g/m²** in order to protect the membrane from mechanical damage.

Ballasted system

In this system, the roof materials and the insulation materials are loaded with gravel or paving slabs (i.e. ballast). The membrane is mechanically fixed only at the perimeter and around protruding objects.

TN-ROOFING Ballast

Fire hazard class of K0 (45) system
This system is designed ballasted roofs as per the traditional layout of residential and public buildings.



1 The deck - a reinforced-concrete base or light/heavy concrete that ensures sufficient carrying capacity;

2 Heat fusing bitumen vapour seal Bikroelast HPP;

3 Heat insulation - extruded polystyrene foam CARBON PROF

* Tapered insulation material may be used to create slopes;

4 Separating layer - glass fibre (weight should be at least **100 g/m²**) or a geotextile (weight should be at least **150 g/m²**);

5 **ECOPLAST V-GR** polymericmembranereinforced with glass fibre;

6 Separating layer - geotextile (weight should be at least **300 g/m²**);

7 Ballast (river washed gravel; size **20-40 mm**).

Preliminary preparations

2 Preliminary preparations

1 Safety

Roof installation with the application of polymeric membranes must be carried-out in compliance with.

– Before starting work with electrical equipment powered from a **220** or **380 V** network, check the voltage of the electrical network.

– If it is impossible to obtain stable voltage values, it is recommended to interrupt welding until the power becomes stable again in order to avoid welding inadequate quality overlaps.

– Connect your welding equipment to a power receptacle provided with a protective grounding device. It is acceptable to use an extension cable with protective grounding. When working with a device, use an automatic switch with differential protection to ensure safety.

– Nozzles of hot air guns (of manual and automatic equipment) must be clean of deposits; air must freely pass through all holes of the nozzle. Do not work with deformed nozzles.

– Do not switch off your gun when it is working in the heating mode, as this may result in overheating and failure of the heating element. Before switching your gun off, set the temperature control to the “**0**” position and wait until the air at the nozzle’s exit cools off.

– When working with welding equipment, use gloves or pieces of cloth to ensure protection against potential burns.

- If the power cable is damaged or coiled, working with electrical equipment is prohibited. In all circumstances, reel out the cable completely before starting work.

- Upon completion of work with electrical equipment, disconnect all removable feed points from power sources and store them in a closed room or cover with an impervious material.

- In conditions of insufficient lighting, action should be taken to provide additional lighting on the roof and other safety measures.

- Do not install the roofing membrane without approving wind load, taking into consideration wind zones and the number of fasteners needed for each individual area.

- Roof installation without due consideration to wind load may result in the roofing membrane being blown off! For requirements for dividing the roof into wind zones, see **paragraph 5.3**.

2 Auxiliary equipment and tools

Use the following auxiliary equipment and tools to ensure a quick and high-quality installation of the roofing membrane.

- manual welding device (i.e. heat gun);
- narrow nozzle **40 mm**;
- narrow nozzle **20 mm**;
- silicone and teflon rollers (**40** and **28 mm**);
- narrow brass roller (**8 mm**);
- soft metal brush for cleaning the welding machine nozzles;
- tester for inspecting the quality of welded overlaps (hereinafter referred to as the weld tester);
- cutter with replaceable blades for cutting the membrane;
- tin snips;
- electric screwdriver;
- “night bat” roofing knife;
- spring tape measure;
- gloves (cotton or leather);
- cotton rags;
- TechnoNICOL cleaning agent for PVC membranes;
- TechnoNICOL liquid PVC;

– **The Silicone roller** is the main roller for welded joints;

– **The Teflon roller** is harder than the silicone roller; it may be used to ensure better rolling of the membrane;

– **The Narrow brass roller** is used for welding the joints at the points of transition from horizontal welds to vertical welds as well as for welding joints inaccessible to a wide roller.

– **The TechnoNICOL cleaning agent** is a special agent for cleaning PVC membranes. It should be used to remove dirt, grease from the membrane's surface around a weld area before applying liquid PVC.

– Before welding, wait until the cleaning agent fully evaporates from the membrane's surface.

– **The TechnoNICOL pressure sensitive adhesive** is used for sticking the PVC membrane to masonry, concrete, wood, and metal surfaces.

– **TechnoNICOL liquid PVC** is designed for additional sealing of welded overlaps; it eliminates the possibility of capillary suction of moisture into the reinforcing net.

– **PVC prefabricated elements for reinforcing internal and external corners** are used to ensure quick and high-quality reinforcement of corners on the roof.

– **Termination bars made of aluminium-magnesium alloy** are used for fastening the membrane's edge to the barrier wall.

– **TechnoNICOL polyurethane sealant** is used for sealing the termination bar.

– **Fixing bars made of aluminum-magnesium alloy** are used for fixing the membrane at angle change between horizontal and vertical welds and termination at the top of verticals.

– **Double sided Scotch tape** is used for sealing the vapour seal film overlaps.

– **Butyl-rubber tape** is used for attaching vapour seal film overlaps during negative temperatures.

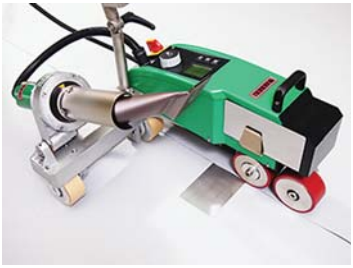
3 Hot air equipment for welding membrane overlaps

For welding the polymeric membrane, use special-purpose manual, semi-automatic and automatic hot-air welding equipment.

– The recommended models of manual welding machines are: **Leister Triac S** or **PID, HerzRion, HerzEron** provided with a set of nozzles and pressure rollers.
– A narrow nozzle (**40 mm** wide) is used for common welding on horizontal and vertical surfaces.
– A narrow nozzle (**20 mm** wide) is used for welding in hard-to-reach places when making junctions.

– The recommended model of semi-automatic equipment is:
– **Leister Triac Drive**.

– Semi-automatic equipment is used for welding overlaps on horizontal, vertical and inclined surfaces with a maximum inclination of up to approximately **30°**.



– It is recommended that the following automatic welding equipment should be used for welding common roof overlaps:

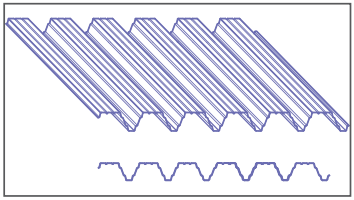
– **Leister Varimat** (230 V – 4600 W; 380 V -5700 W) or **Herz Laron** (230 V – 4600 W; 380 V - 5700 W) with a nozzle width of **40 mm.**

Installing the roofing components

3 Installing the roofing components

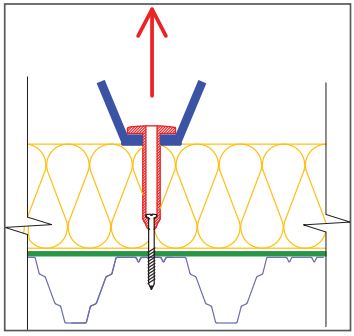
1 Preparing and laying the roof deck

The durability and reliability of the entire roof depends on the quality of the roof deck, pay special attention when laying the deck and make certain that it complies with the design documents.



– The thickness of the corrugated sheet must be no less than **0.7 mm**. When laying the corrugated sheet, its wide flange must be on top.

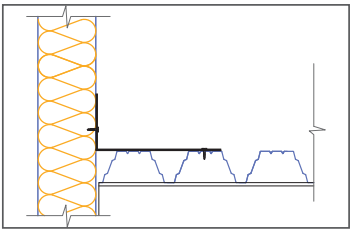
IMPORTANT! Please check the compliance of the fastening of the corrugated sheet to the load carrying structure on the entire roofing area with the design. The lateral joints of the corrugated sheet must be riveted or fixed with self-driving screws.



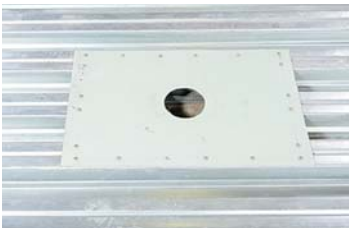
– The roofing system's mechanical fasteners used for the deck must be sufficiently resistant to tearing. A simple method for checking the load carrying capability of the roofing base is as follows: fasten the membrane (**V-RP 50 mm** wide) mechanically and apply vertical tearing force.

– If the load carrying capacity of the roofing base is sufficient, then the membrane will rupture rather than the fasteners tearing out from the roof deck.

– Around the perimeter of the corrugated sheet, in areas where the sheet is adjacent to vertical structures, it is necessary to fix an L-shaped profile made of galvanized steel of at least **0.8 mm** thickness.



– The dimensions of the L-shaped profile should be determined in-situ according to the type of corrugated sheet used. The main requirement is as follows: the horizontal part of the L-shaped profile must reach the **3rd** rib of the corrugated sheet (refer to drawing).



– Penetrations/holes through the corrugated sheet designed for service lines and rainwater outlets must be reinforced with galvanized steel of at least **0.8 mm** in thickness.

– If necessary, fill in the troughs of the corrugated sheet with a “non-flammable” material for a length of **250 mm**.

Filling the troughs of the corrugated sheet with loose insulation material is not recommended.

– Before applying the vapour seal film it is necessary to:

– fill all joints between the prefabricated reinforced-concrete structures;

– remove construction debris, water, snow or ice from the surface and troughs of the corrugated sheet.

– In order to remove snow from the troughs of the corrugated sheet, a special spade corresponding to the shape of the corrugated sheet can be used.

2 General guidelines on roofing installation

– In order to avoid trampling of the roofing components, protect the installed roof covering with empty pallets.

– Unprotected openings on the roof must be covered with walk able material or have fencing to prevent workers from falling.

– Distribute the pallets uniformly with the material across the entire roof to avoid deformation of the corrugated covering.

3 Installing the vapour seal film

The first stage of laying the roofing components involves the installation of the vapour seal layer. The vapour seal film performs the important function of heat insulation and protection against moisture entering from the rooms.

- Vapour sealing may be carried out using bitumen or polymeric materials.
- Special polyethylene film is mostly used with roofing decks made of corrugated sheets.
- Use TechnoNICOL vapour seal film to provide vapour sealing.
- When laying the film, pay attention to its integrity and follow the installation procedure.

- When laying the vapour seal film along the corrugated sheet ribs, overlaps should be attached on the top part of the corrugation;
- In order to attach the overlaps of the vapour seal film when the temperature is higher than **+5°C**, use double a sided Scotch tape.

- Lateral and end overlaps of the vapour seal film must be no less than **100 mm**.

– In order to attach the overlaps of the vapour seal film when the temperature is lower than **+5°C**, use butyl-rubber tape.

– When laying the vapour seal film across the corrugated sheet ribs, temporarily put a piece of plywood or OSB under the area to be sealed to ensure the quality of the overlap.

– In places where the roofing is adjacent to walls, skylights, shafts, and other structures, the vapour seal film must not be less than the height of the insulating layer.

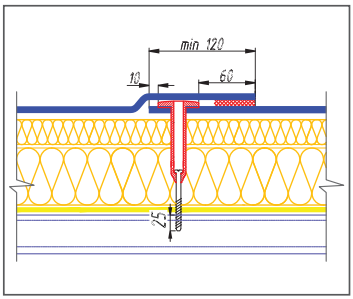
– For convenience purposes, when laying the heat retaining and additional sealing layers, stick the vapour seal film to the vertical structure.

4 Fasteners

The mechanical fastening pieces are an important part of the roofing components. The integrity and durability of the roof depends on the correct selection of the fasteners. Use TechnoNICOL fasteners to ensure reliable fastening of the roofing components.

IMPORTANT! When using a compressive heat insulation as a base beneath the membrane when fastening the roofing components, use telescopic tubes + self-driving screws.

– In order to fasten the membranes and insulation boards to a roofing deck made of galvanized corrugated sheeting, use TechnoNICOL telescopic fasteners and self-driving screws (dia. **4.8 mm**).

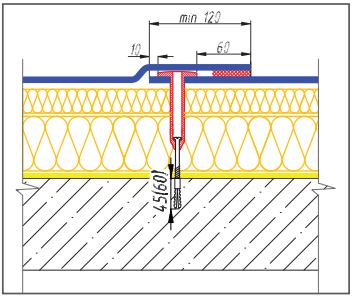


– The sharp end of the self-driving screw must puncture the metal by at least **25 mm**.

– The membrane sheets must overlap by at least **120 mm** if the radius of the telescopic fastener flange is **50 mm**.

IMPORTANT! The length of the telescopic element must be no less than 20 mm less than the insulating layer's thickness.

– For fastening the membrane to a deck made of **V15-V25** class concrete or to cement-sand screed (no less than **50 mm** thick) made of mortar of no less than class **M150** the TechnoNICOL roofing pointed screw (dia. **4.8 mm**) must be used in combination with a polyamide sleeve anchor (**45** or **60 mm** long).

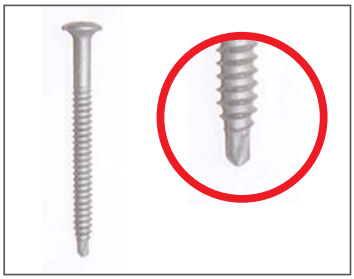


– The pointed roofing screw in combination with a polyamide sleeve anchor must be driven into a previously drilled hole.

IMPORTANT! When laying the membrane directly onto a rigid base, without a heat insulation layer, use a dish-shaped plate with an appropriate self-driving screw.

– Use a round or oval dish-shaped plate.

– For fastening the membrane and line holding pieces (i.e. the strips) to a combined screed made of oriented standard board, cement bonded particle board or asbestos-cement board, use a self-driving screw (dia. **5.5 mm**) without a smooth part.



– A self-driving fastener (dia. **4.8 mm**) for fastening to the corrugated sheet.

– A pointed self-driving screw (dia. **4.8 mm**) is used with a polyamide sleeve anchor when fastening to a deck made of concrete or a cement-sand screed.

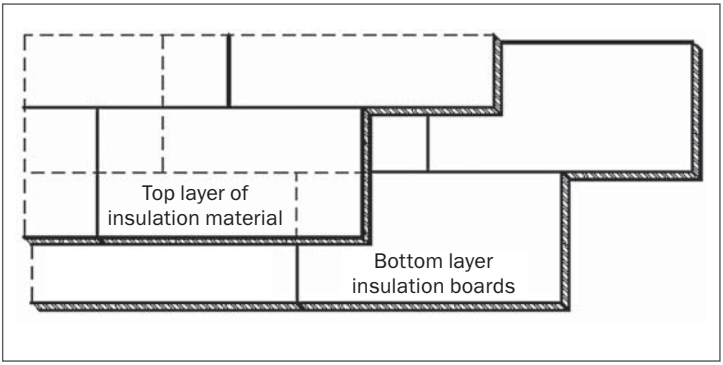
5 Laying heat insulation material

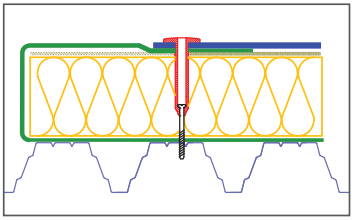
Generally, two layers of insulating boards with staggered overlaps are used to ensure heat insulation of the roofing system.

– Insulation boards should be laid on the vapour seal film. The surface of the vapour seal film must be dry.

– If corrugated steel sheeting is used as a roofing deck, then the long side of the insulation board must be laid transversal to the corrugation.

– Diagram for laying the insulation material





– At the end of each working day, in order to protect the previously installed materials from rain, put the ends of the vapour seal film beneath the roofing membrane and wrap the heat retaining material around it; secure the film mechanically.

– For brief interruptions in work, you may similarly overlap the film and secure it with a weight.

– At the beginning of the next working day, pull out the film from the fasteners and continue your work; leave the damaged part of the film for overlapping.

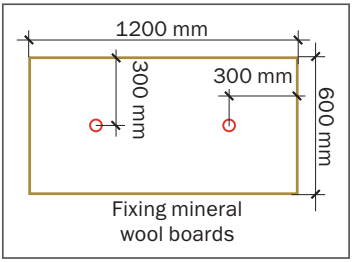
– Insulation material must be fastened separately from fastening the PVC membrane.

! **IMPORTANT! When laying insulation material in several layers, it is not necessary to individually fasten each layer! The insulation material may be fastened in one piece.**

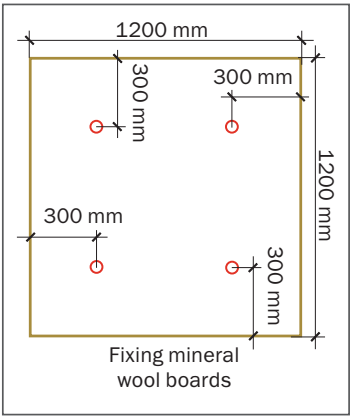
! **IMPORTANT! When laying the PVC membrane on a porous base (i.e.foam glass, PSB-S foam construction block, extruded polystyrene foam (XPS), PUR or PIR boards), it is necessary to provide a separation layer made of glass fibre (weight should be at least 100 g/m²) or geotextile (weight should be at least 150g/m²).**

– The separation layer material must overlap by at least **100 mm**.

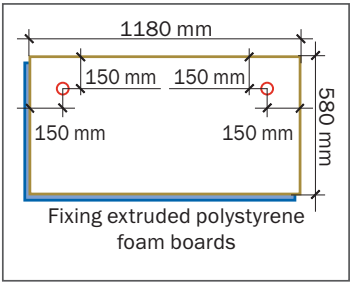
! **IMPORTANT! When laying the membrane on bitumen, it is necessary to provide a geotextile separation, (weight should be at least 300 g/m²).**



– At least two fasteners are required for fixing each insulation board with a size of **1200 x 600 mm**.



– At least 4 fasteners are required for fixing each insulation board with a size of more than one meter.



– When using combined insulation materials, lay the extruded polystyrene foam CARBON PROF with the label facing down. It is recommended that fasteners should be installed only on one edge, where the L-edge of the board to be fixed will border on the previous board.

Welding

4 Welding

1 Manual welding

Manual welding of membrane overlaps should be carried out with a special hot air gun. The application of a common construction hot air gun is prohibited because it generates an unstable air temperature at the nozzle outlet.

IMPORTANT! Before welding, read the instructions issued by the welding equipment's manufacturer.

– Check your welding equipment before welding the joints:
  – the nozzle clearance must be straight and clean, i.e. free of deposits,
  – air intake holes must be clean and open for free air passage. If necessary, clean the air intake holes with a soft brush.

– Values of air operating temperature may be adjusted with a temperature control in the range of **50** to **600°C**.

– For welding the PVC membrane, set the temperature value in the range of **450-550°C** according to weather conditions and rate of welding. After switching the gun on, to ensure air and nozzle warming, wait for **7-10 minutes** until the air and nozzle warm up (in cold weather this will take more time).

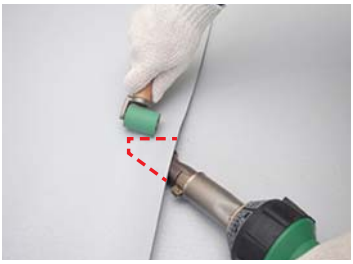
– Place the membrane sheets to ensure an overlapping width of at least **60 mm**.

1. Membrane spot tacking

– Make tacks in several places to secure the membrane. In order to make a tack, put the heated nozzle into the overlapping at a distance of more than **40 mm** and simultaneously press the membrane with your finger at the nozzle outlet.

– A correctly made tack must tear off easily, practically leaving no traces on the membrane.

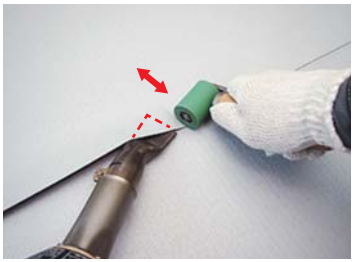
2. “Back or pre-welding”



– “Back or pre-welding” is to avoid air leakage from the welding zone; to do this, quickly insert the nozzle and roll down the membrane with one rib of the roller pressing it to the nozzle edge.

– A correctly made “back or pre-weld” must retain hot air in the welding zone.

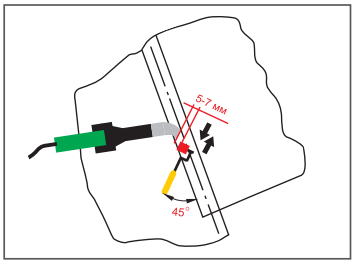
3. Welding



– In order to carry out the final welding, insert the hot air gun into the “remaining” overlap at a **45°** angle. In this case, the tip of the nozzle must extend **3-4 mm** out from the overlap.

– Raise the tip of the nozzle by **1-2 mm** to avoid melting the lower membrane.

– Move the silicon roller along the nozzle edge at a distance of **5-7 mm**.



– Move the gun along the overlap; simultaneously move the silicon roller “across the joint”. In this case, the roller must “jump” over the membrane’s edge. Apply force when the roller moves towards the outside edge.

IMPORTANT! “Three-pass” welding with the use of manual equipment TechnoNICOL liquid PVC must be applied to the welded overlaps and all roofing pieces.

– Apply TechnoNICOL liquid PVC to ALL manually welded overlaps (the upper membrane is shown in green).

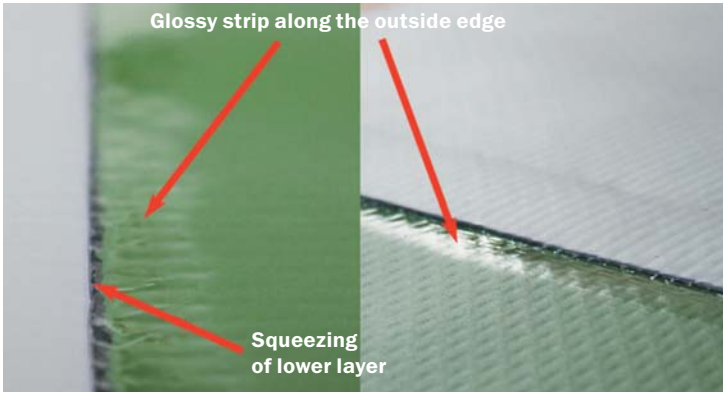
– The nozzle must be attached correctly to the neck of the welding gun.

IMPORTANT! Change the nozzle only after it has completely cooled.

– Remove deposits from the nozzle with a copper brush as they accumulate.

2 Criteria for a high quality weld

Main indications for a high-quality weld



- width of the final weld must be at least **30 mm**.
- cohesive rupture of the weld (i.e. exposure of the reinforcing net of one of the welded pieces along the entire width when the joint is torn off);

Visual indications:

- a glossy trace along the outside edge of the weld around 1 cm wide;
- a small leakage of substance (i.e. a "bead") coming out from the lower layer along the weld;
- no wrinkles on the overlap surface;
- no indications of material overheating (i.e. change of membrane colour, presence of deposits and carbon).

Main potential mistakes when welding with manual equipment:

- Absence of a "dense air pocket" within the overlapping.
- Improper welding parameters (i.e. air temperature, rate of gun movement and value of force applied to the roller), which may cause material to burn or fuse insufficiently (for details refer to **paragraph 4.5**).
- Improper preparation of membrane surface to be welded (i.e. presence of dirt, sand etc.).
- Highly raised hot air gun (in this case only **2-3 mm** of the membrane's edge results in being welded).
- Stopping the roller shot of the edge, i.e. the roller does not reach the outside edge of the overlap (this may result in an unwelded edge).
- Failing to move the roller along the edge of the nozzle (at an angle) or moving the roller along the overlap.

3 Weld quality Inspection

High-quality welds are crucial for ensuring the durability of roofs made using polymeric membranes. Inspect the quality after the welded joints have fully cooled.

– In order to check the quality of the weld, move the tester along the outside edge, pressing down slightly. – the tip of the tester must not penetrate the joint.

– The strength of the weld may be determined by a tensile test of a cut out sample **50 mm wide**; this test may be carried-out on a portable tensile machine of **Leister Examo** type or on stationary equipment.

– In order to check the quality without the aforementioned equipment, it is possible to use a strip (**Min 30 mm**) of the welded membrane (peel test). Just pull apart the welded membrane strip with your hands.

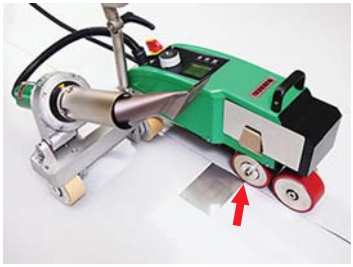
– Rupture of a high quality weld should occur on the material along with exposure of the reinforcing net, the weld should not delaminate. Measure the welded joint width; it must be no less than **30 mm**.

4 Automatic welding

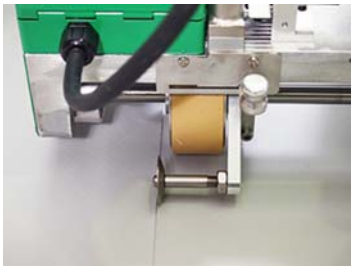
In order to obtain a high quality weld on the main roofing area, use special purpose automatic hot-air welding equipment.

IMPORTANT! Before welding, read the instructions issued by the manufacturer of automatic welding equipment.

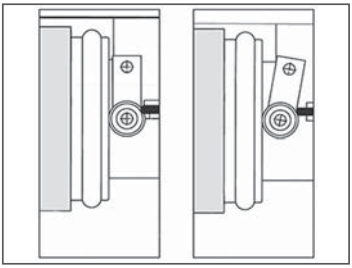
- Before welding, set the required parameters (i.e. air temperature and speed of the welding machine).
- For details on selection of parameters refer to paragraph **4.5**.



- In order to obtain a smooth edge facilitating additional manual welding, insert a metal plate with machined edges (**0.3-0.5 mm** thick) made of galvanized or stainless steel at the beginning of the weld.
- Place the welding machine so that its wheel is half way along the beginning of the metal plate.



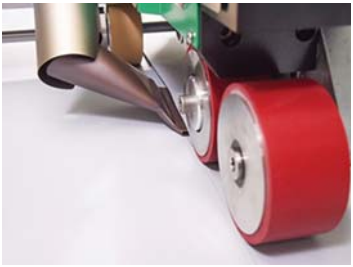
- The metal guide roller must be placed along the overlap edge in a lowered position.
- Following the above requirement is necessary in order to maintain the correct positioning of the machine during execution of the weld.



– If it is necessary to weld across a slanted roof surface, adjust the screw to compensate for the angle.

– Before welding, lift the edge of the upper membrane in order to facilitate insertion of the nozzle into the overlapping area. Be careful! Do not touch hot parts of the apparatus.

– Insert the nozzle into the overlapped area. The apparatus will move automatically.



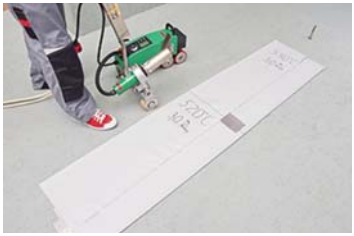
– Be sure that the tip of the nozzle extends from the outer limit of the weld by **3-5 mm.**

– Install a second metal plate at the end of the weld. When the roller wheel butts against the plate, take out the nozzle from the overlap area; the apparatus will stop automatically. Remove any deposits/dirt from the nozzle with a soft metal brush.

– Continue installation of the membrane using automatic welding equipment.

5 Selection of parameters for automatic welding equipment

The welding parameters such as air temperature and speed are not fixed; they depend on various factors, namely: ambient temperature, wind strength and other variables. Improper welding apparatus will prevent the welder from welding durable, high quality welds. Suitable parameters may be determined by executing a trial welding.



- At the beginning of each working day or in the case of significant weather changes, it is necessary to perform a trial weld in order to determine or correct the welding parameters.
- For this purpose, take two strips of membrane of sufficient width and length.
- Weld the strips together, varying the speed of the welding apparatus at intervals of **50 cm** in length. For convenience during this operation, the strips may be marked.

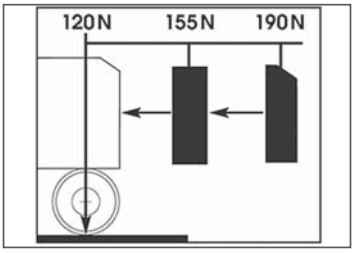
- When the weld cools down fully (at high ambient temperatures, cooling may require up to **20 minutes**), cut out a trial strip of the welded membrane (**min 30 mm wide**) from the centre part of each section and slowly pull the weld apart.

- For the main indications of a high quality weld, refer to **paragraph 4.2**.

– "Detaching" of the membrane (i.e. the weld separates without applying any force); cohesive tearing-off is not observed. In order to obtain a high quality weld, either reduce speed of welding or increase welding temperature.

– Indications of an improper weld are as follows:
  – visible indications of burning;
  – change of the membrane's colour;
  – significant extrusion of the membrane's lower layer.

– To obtain a high quality weld, increase the welding speed or decrease the welding temperature.



– One parameter may be changed apart from speed and temperature, which is general pressure; this parameter depends on the mass of the weights installed on the welding apparatus.

– A common recommendation is as follows: install **two** weights when welding is being carried out on mineral-cotton insulation. When welding is being carried out on a rigid surface (i.e. XPS, concrete, etc.) it is permitted to leave **one** weight or weld without any weight.

– Deposits from a dirty nozzle penetrate into the welded area. How to eliminate this problem:
1 – perform additional welding of the defective area with a manual hot air gun; treat the joint with liquid PVC.
or
2 – weld a patch of membrane over the defective area.

Elements navigation

1 – Welding T-joints, **page 56**

2 – Fastening along the centre of a standard roll, **page 60**

3 – Execution of internal corners, **page 63**

4 – Execution of external corners, **page 72**

5 – Execution around piping, **page 81**

6 – Execution of small-diameter penetrations, **page 90**

7 – Attachment to a barrier wall using a “concealed pocket”, **page 99**

8 – Execution of a low barrier wall, **page 101**

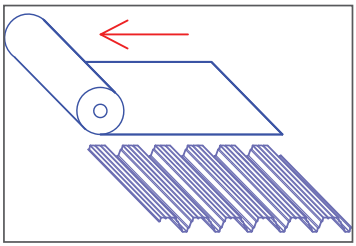
9 – Execution of a high barrier wall including attaching an edge strip, **page 103**

10 – Welding to the overhanging eaves (drip trim), **page 105**.

Installing the roofing membrane to the field area

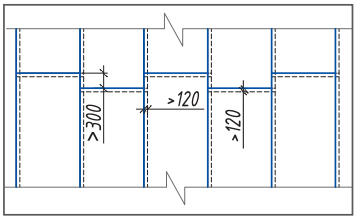
5 Installing the roofing membrane on the field area

1 Mechanically fixed installation systems



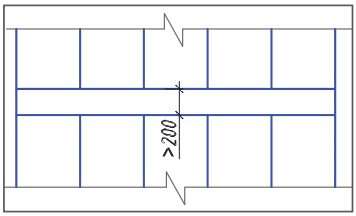
– In all circumstances, unroll the membrane perpendicular to the corrugated sheet ribs.

– Begin installing the rolls from the roof valley or from the counter slopes along the perimeter walls.



– The side and end overlap of the rollers must be at least **120 mm**.

– Always stagger each roll end in relation to the adjacent roll by at least **300 mm**.



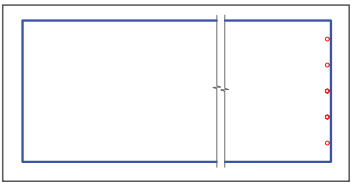
– If it is impossible to lay the membrane sheets without shifting the ends, then lay a separate strip across the main sheets. The width of the separate strip must be no less than **1 m**.

– Avoid the formation of wrinkles during positioning of the membrane to ensure high quality aesthetics.

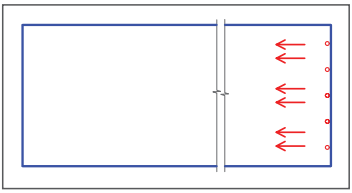
– If necessary, use “roofing pliers” in order to ensure additional tightening of the membrane at the fastening points.

– During winter, when installing the membrane in negative temperatures, small waves may form on the surface of the membrane. Such waves may result from characteristic properties of the material (i.e. different temperature shrinkage between the polymeric material and reinforcing net); usually they will disappear after the membrane relaxes during summer time.

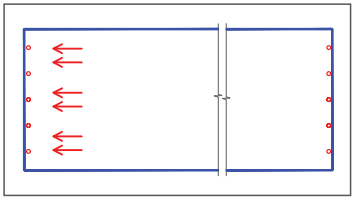
(!) **IMPORTANT!** The force of the tension on the membrane depends on the temperature. The membrane should not be tensioned too much when ambient temperature is greater than **+30°C**, this may cause excessive stresses to the membrane during negative temperatures in winter.



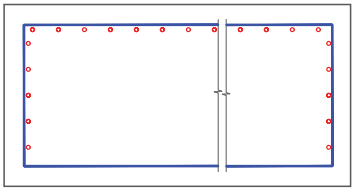
– Unroll the roll onto the deck. First, secure one end of the membrane sheet.



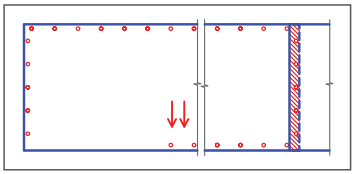
– Stretch the membrane along the sheet’s length to avoid the formation of wrinkles.



– In order to prevent the membrane from curling backwards, stand on the membrane and fasten the second end of the sheet.

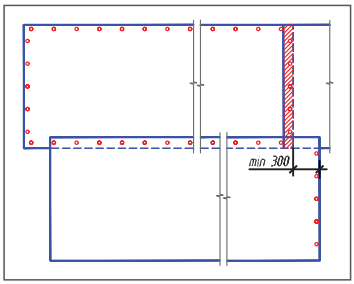


– Then secure the fasteners on the long side of the sheet.

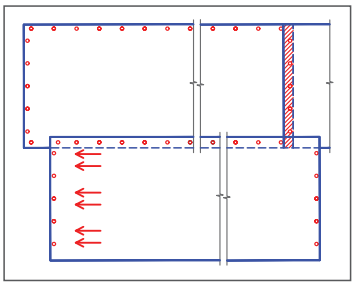


– Weld the next roll and the sheet end together.

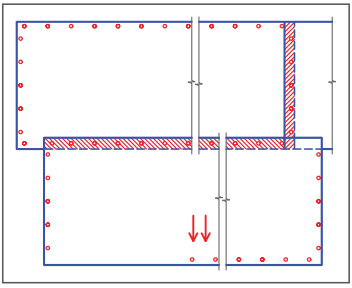
Then stretch the membrane across the sheet and secure the fasteners on the second long side.



– Unroll the next roll of the membrane sheet and shift its end by no less than **300 mm**. The overlap width must be no less than **120 mm**. Secure the sheet end.

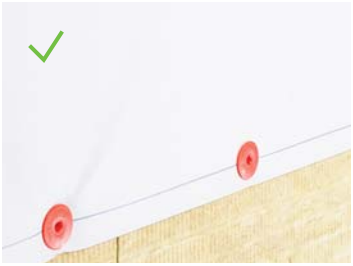


– Secure the second end of the sheet, similarly tensing it along its length.



– Weld the long side of the membrane sheet using automatic welding equipment.

– Wait until the welded joint cools down and stretch the membrane from the welded edge; then secure the opposite edge of the sheet. Continue installation repeating the same procedure.



– Secure the fasteners on the marked line drawn along the side of each **LOGICROOF** and **ECOPLAST** membrane sheet.

– When fasteners are not placed on the marked line.

– Fixing a fastener close to the sheet edge may cause the membrane to rupture during windy conditions.

– Perform the weld using automatic welding equipment.

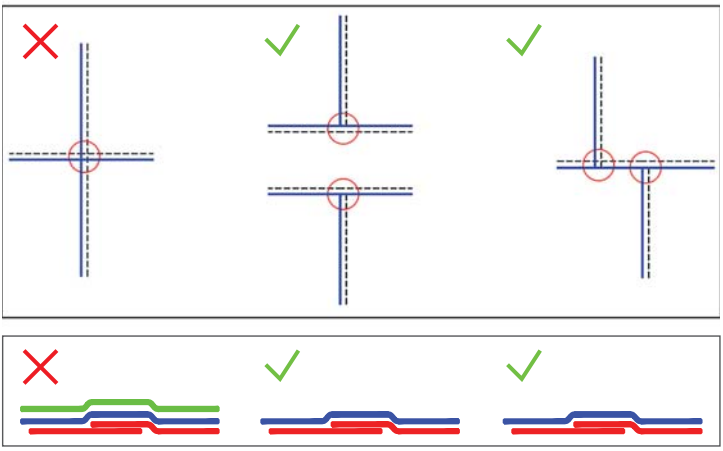
– Remove the metal plates from the beginning and end of the overlap; manually weld the remaining portion of the overlap.

– When welding to vertical roofing pieces, it is more convenient to begin welding using the narrow brass roller.

– Be sure to weld together the vertical part of the overlap between the adjacent membrane sheets.

2 Welding T-joints

Avoid **+**-shaped overlaps eliminating **four** layers of membrane. Make **T**-shaped and linear welded joints.



– In the case of a **+**-shaped overlap, it is necessary to weld a patch made of the membrane over the top of the **+**-shaped overlap.

IMPORTANT! When installing the membrane, you must round off all external corners!

– Weld together the upper membrane corner and the lower membrane sheet inserting a piece of metal below to avoid welding to the deck sheet. Weld in the end of the next roll using automatic welding equipment.

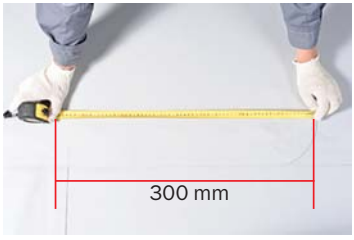
– Round off the corner of the upper sheet end with scissors. For convenience, mark the beginning of the weld overlap.

– Chamfer the lower membrane edge to the depth of the welded overlap (not less than **30 mm**) with a blade or special tool.

– Weld in the remaining portion of the overlap.

– Check the quality of the weld with a tester.

– Treat manually welded areas with liquid TechnoNICOL PVC.

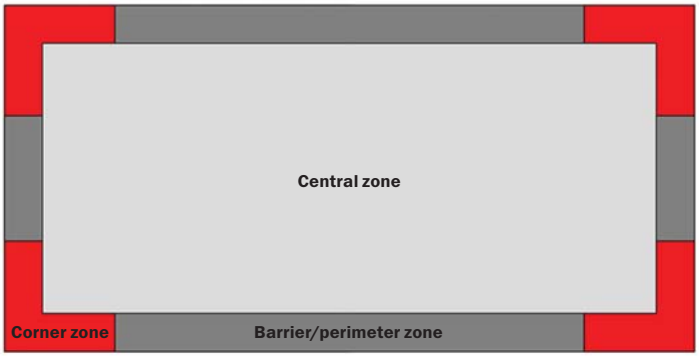


– Ensure that adjacent sheets are staggered by at least **300 mm**.

IMPORTANT! For T-joints, chamfer the middle layer of the membrane to ensure a high quality weld when using automatic welding equipment. Additionally, roll the T-joints with a brass roller immediately after using automatic welding equipment.

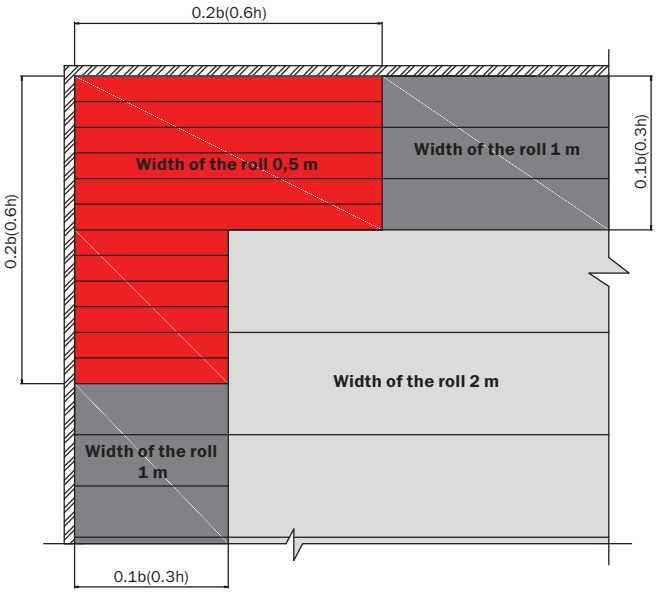
3 Wind affected zones

Action of wind load is a significant factor and can affect roof durability.



- By normative, any roof is subdivided into **3 zones** with regard to the level of wind load effect, namely: a corner zone, side edge zone and a central zone.
- The most significant effect of wind load is observed in the corner and in the side edge zones, therefore an increased number of fasteners must be used in these zones.
- The dimensions of the wind zones and number of fasteners required must be established in the design.
- The minimum distance between the fasteners must be no less than **180 mm**.
- The spacing of the fasteners is limited by the distance between the corrugated sheet flanges. Accordingly, a limited number of fasteners may be fixed in one running meter of the membrane.
- If a two-meter wide membrane is used, then no more than **2.5** fasteners may be fixed in **1 m²**. If a design requires more fasteners (usually this relates to the corner and side edge wall zones), then it is necessary to use sheets of a **1 m** or **0.5 m** width (refer to the diagram), or it may be necessary to attach additional fasteners to a two meter sheet and weld a **20 cm** cover strip over the top. (Refer to **paragraph 5.4**).

Example of installing the membrane in the corner and side edge zones using sheets of reduced width:



– For buildings which have a height greater than or equal to one third of the building's width (**h≥b/3**), the width of the edge and corner zones amounts to no less than one tenth of the building's width (**0.1b**).

– For buildings which have a height less than one third of the building's width (**h<b/3**), the width of the edge and corner zones amounts to no less than three tenths of the building's height (**0.3h**).

4 Installing fasteners along the centre of the standard roofing sheet

An increase in the number of fasteners in the corner and edge zones may be attained by means of fixing additional fasteners along the centre of the standard **2 m** wide roll.

– Fix the fasteners along the centre of the roll. Weld in a reinforcing element made of a round piece of V-PR reinforced membrane beneath the margin fastener (example shown in green).

– Cut a strip (**200 mm** wide) out of V-PR reinforced membrane (example shown in green).

– In order to secure the strip, tack it to ensure sheet alignment and movement.

– Lengthwise, weld the strip to the deck using the automatic welding equipment.

– Additionally weld in the strip ends manually.

– Treat manual welds with liquid TechnoNICOL PVC.

6 Executing corners

6 Inside/outside corners

1 Execution of inside corner

1.1 Installing the membrane around the internal corner

Roofing components must be protected against water ingress during work.

– Turn up both long side and end side of the membrane sheet onto the barrier wall by **50-80 mm**.

– Fold the membrane as shown in the picture.

– Weld the inside part of the fold.

– Weld the fold to one side of the turn up.

1.2 Installing to up-stands around an internal corner using up-stands of a different height as an example

Attach the membrane to the up-stand when executing the inside corner.

– Fold down the overlapping piece intended for the up-stand. It is good practice to place a piece of membrane beneath the piece in order to prevent adhesive from smearing deck membrane.

– Pour a small amount of **TechnoNICOL** contact adhesive into a tray.

– Using a roller, apply a layer of the contact adhesive to one of the up-stands.

– Then apply adhesive to the corresponding piece of membrane. Be careful not to appl adhesive to any area that you may have to weld.

– First, push the membrane in the corner using a narrow brass roller.

– Then attach the membrane onto the up-stand using a silicon roller.

– Cut the membrane as shown in the picture.

– Apply adhesive to the second up-stand and membrane.

– Attach the membrane onto the second up-stand using the same procedure.

– Do not use TechnoNICOL contact adhesive for adhering the PVC membrane to the deck.

1.3 Installation of a pre-fabricated inside corner

In order to ensure quick and high quality execution of the internal corner, use a prefabricated corner piece. This piece is made of non-reinforced PVC with a higher thickness; it is easily welded to the PVC membrane.

– Secure the central part of the prefabricated piece.

– Weld the piece using a brass roller starting from the centre and working outwards.

– Weld the main area of the prefabricated piece.

– Finally, weld the edges of the piece using a brass roller…

– In a similar way, weld in all sides of the piece. Check the quality of the welded joint with a tester; treat the horizontal part of the welded joint with liquid TechnoNICOL PVC.

1.4 Execution of the internal with the vertical membrane using the “envelope method”

When waterproofing the internal corner using the “envelope method”, the application of force is not required.

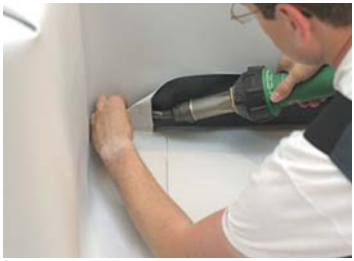
– Form a “fold” with the material in the internal corner.

– Fold the material to one side as shown in the picture and mark out a vertical strip (**20 mm** wide). Cut the marked strip as shown in the picture.

– Using a manual hot air gun, weld the overlap to the field membrane (deck).

– The width of the weld should be no less than **30 mm**.

– Weld the inside of the fold envelope along the perimeter using a manual hot air gun. The width of the envelope should be no less than **20 mm**.



– Take particular care when welding the internal part of the corner.

– When working, use rollers of different widths.

– Using a narrow brass roller starting the weld from the vertical (corner) working towards the outside.

– Using a manual hot air gun, weld the overlap to the right horizontal part. The width of the welded joint should be no less than **30 mm**.

– Weld in the material overlap in the corner. Take particular care when welding with the narrow brass roller. Check the quality of all welds with a tester before treating them with liquid TechnoNICOL PVC.

2 Executing the external corner

2.1 Installing the membrane around an external corner

In order to ensure best waterproofing, weld in a round roundel made of non-reinforced membrane.

– Pierce the membrane with a roofing knife at the point of contact between the membrane and corner base.

– Draw a line at a **45°** angle from the bottom corner to the top edge of the membrane and cut the membrane with a knife along this line.

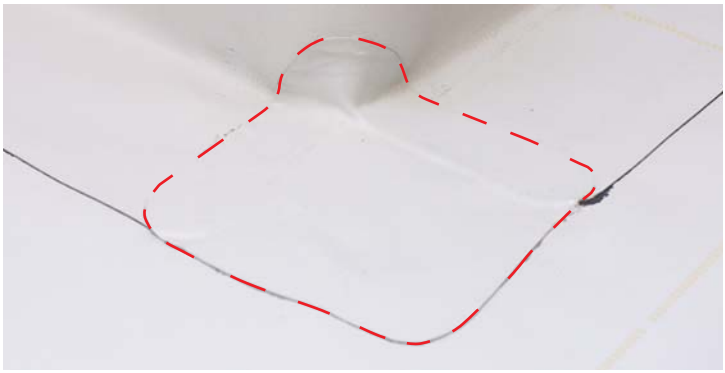
– Apply the membrane as shown in the picture and secure it along the perimeter.

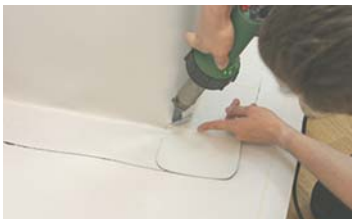
– Cut off excess pieces of membrane. The turn up at angle change of the field membrane onto the up-stand should be no less than **50 mm**.

– To ensure the best result of the corner, weld in a round piece made of **V-SR** non-reinforced membrane (example shown in yellow). For this detail, weld from the centre outwards using a brass roller.

– Then weld in the main area of the piece.

2.2 Execution of the external corner using a V-SR non-reinforced membrane





– Cut a piece out of a **V-SR** membrane; its dimensions must cover the vertical and horizontal overlap of the membrane by no less than **30 mm**.

– Using a manual hot air gun, heat one of the corners and stretch it to obtain the shape shown in the picture.

– Fit the piece. In order to obtain the best result it must fit tightly into all sides of the corner.

– Using the narrow nozzle of the hot air gun and your fingers, weld in the piece around the edge of the corner.

– Heat and weld small segments at a time which you can press with your fingers. Repeat this action until the entire corner has been totally welded.

– Execute this step using a brass roller.

– Weld in the remaining area to the field membrane using a silicon roller. Check the quality of the welds with a tester before applying TechnoNICOL liquid PVC.

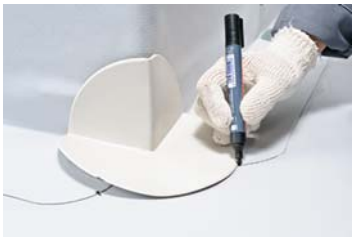
2.3 Executing the external corner with a prefabricated outside corner

To ensure quick and high quality results of the external corner, use an appropriate prefabricated outside corner. This piece is made of non-reinforced PVC sheet and is above the average thickness; it is easy to weld it to the PVC membrane.

– Adhere a patch made of the **V-RP** membrane around the external corner of the up-stand (vertical).

– Cut the membrane bend in the membrane in the corner with a roofing knife.

– Round off all the corners using scissors. Weld the overlap of the patch to the field membrane.



– Fit the prefabricated outside corner piece and mark it. Chamfer the membrane edge to the depth of the required weld (no less than **30 mm**).

– Tack the prefabricated piece with to the field membrane.

– Begin to weld in the piece along the corners starting from the centre of the patch and moving towards the edges. Use a narrow hot-air gun nozzle (**20 mm**) and a brass roller.

– Weld in the internal part of the prefabricated corner starting from the centre and moving towards the edges; stopping approximately **3 cm** from the edges.

– Finally, weld in the outer edge of the piece. Follow the same procedure on the vertical parts of the piece. Check the quality of the weld with a tester before treating them with TechnoNICOL liquid PVC.

7 Execution of protruding objects

7 Execution of protruding objects

1 Installing the membrane around piping

Fix the field membrane around the pipe/object.

– Mark the area of contact between the membrane and the pipe.

– Press the membrane tightly against the pipe and cut it straight up.

– Cut the membrane around the base of the pipe as shown in the picture.

– Fix the membrane sheet end to the deck and round off the corners using scissors.

– Weld a strip over the cut sheet (example shown in green).

– Check the quality of the weld with a tester.

1.2 Waterproofing a pipe using prefabricated piece

In order to ensure a quick and reliable connection to piping, use a suitable prefabricated PVC piece.

– Cut off the top part of the prefabricated piece to the requested diameter.

– Pull the prefabricated piece over the pipe and tack it to the field membrane in several places.

– Chamfer the patch edges to the width of the weld (not less than **30 mm**).

– Weld in the flange of the prefabricated piece around the edges using a silicon roller.

– Check the quality of the welded joint with a tester.

– Fill in the gap between the prefabricated piece and the pipe with TechnoNICOL sealant.

– Tighten the joint with a metal clamping ring.

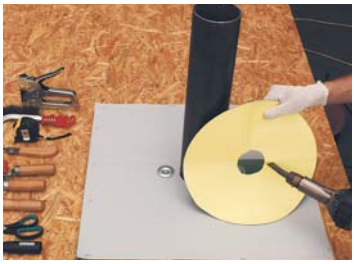
– Treat the joints with TechnoNICOL liquid PVC.

1.3 Execution of a pipe with a non-reinforced membrane

– Cut a round patch out of a **V-SR** non-reinforced sheet (example shown in yellow); its diameter must ensure that the installed fasteners are covered by **40 mm**.

– Fold the patch into two and roll the crease. Then fold again and roll the crease again.

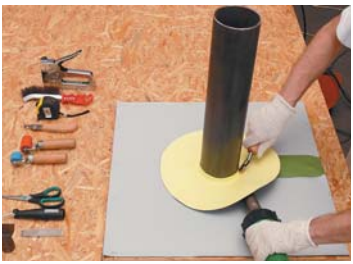
– Cut an circle in the centre making sure that the hole is **40 mm** smaller than pipe's diameter.



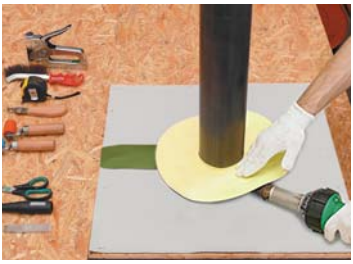
– Heat the patch on both sides around the hole using a hot air gun until the membrane softens.

– In order to ease the installation of the patch on the pipe, you can stretch the internal hole with your fingers.

– Prevent the patch from cooling down; quickly and forcefully pull the patch on the tube and roll the "turn-up" at the base with a brass roller.

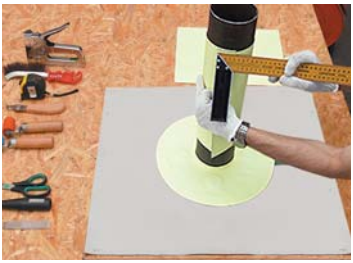


- Weld the inside of the flange around the base of the pipe using a hot air gun, simultaneously pressing with the brass roller.
- Chamfer the strip edge to the width of the requested weld (not less than **30 mm**).



- Weld the inside part of the flange to the fielf membrane using a manual hot air gun.

- Finally, weld the flange around the outer the edge.
- Check the quality of the weld with a tester.



- Cut a piece (30-40 cm. wide) of **V-SR** non-reinforced membrane. The length of the strip must be greater than the pipe's circumference by **4 cm** in order to ensure an overlap for the weld.

– Wrap the piece around the pipe, pull it with your fingers and tack it in several places using a hot air gun. Use a **20 mm** nozzle width.

– Remove the piece from the tube and round off the lower corner of the membrane in the overlap.

– Weld the overlap using a manual hot air gun and roll it using a teflon or silicon roller.

– In order to ease the work (especially for a large number of pipes of similar diameter), you may use a horizontal auxiliary pipe.

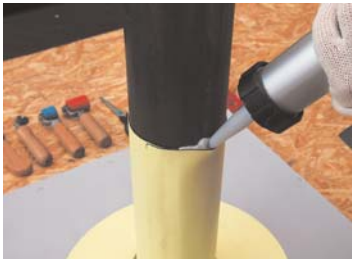
– Turn the piece inside out and weld the overlap on the inside.

– Chamfer the bottom part of the overlap.

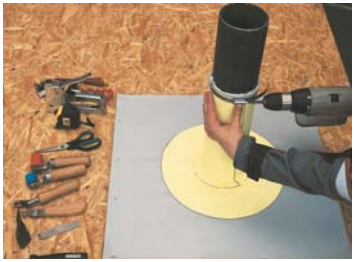
– Heat up a small area of the lower part of the pipe wrap, until it softens.

– Stretch the heated area of the pipe wrap by holding it with your hands as shown in the picture. Heat and stretch the entire circumference until you to obtain a “skirt” from the stretched membrane.

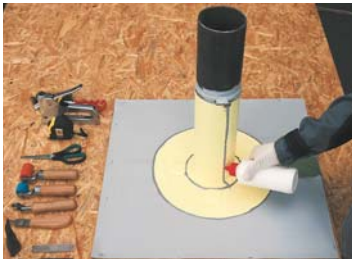
– Pull the patch over the pipe. Weld the “skirt” at the base to the flange.



– Fill in the gap between the prefabricated piece and the top using TechnoNICOL polyurethane sealant.



– Tighten with a metal clamp.



– Check the quality of the welds with a tester; treat the horizontal part of the welded joint with TechnoNICOL liquid PVC.

2 Waterproofing around a small-diameter protruding object

– Cut a section in the membrane sheet in order to pass it around the small diameter object.

– Weld a strip of **V-RP** reinforced membrane over the cut (example shown in green).

– You may then continue to lay the standard membrane rolls.

– Fix the membrane to the deck around the small-diameter penetration.

– Cut a round patch out of **V-SR** non-reinforced sheet (example shown in yellow).

– Fold the patch into four as shown in the picture.

– Cut out the centre of the circle.

– Heat the piece with hot air; move the hot air gun uniformly around the hole until the membrane softens.

– Quickly place the patch over the small-diameter object before the membrane cools down.

– Tack the patch in several points.

– Chamfer the edges of the strip to the depth of the weld (not less than **30 mm**).

– Weld the patch to the field membrane; pay special attention in correspondence to the strip.

– Check the quality of the weld with a tester.

– Cut one more round patch out of **V-SR** non-reinforced membrane.

– Fold the patch into four.

– Using a roofing knife, make a hole in order to determine the centre of the circle.

– Using a roofing knife, make a cut from the centre to the edge of the circle.

– Fold the segment you just cut and roll it.

– Using a roofing knife, make a cut **2 cm** away from the fold line.

– Round off the corners using scissors.

– Tack the overlaps of the circle in order to obtain a cone.

– Work against a corner in order to ease welding.

– Weld the complete overlap.

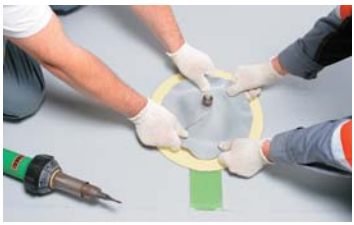
– Turn the item inside out and weld on the inside. Check the quality of the weld with a tester.

– Heat up a small area around the outside part of the cone, moving the nozzle along it until the membrane softens.

– Stretch the heated area until you obtain a “skirt”. Place your hands in the manner shown in the picture. Successively heat and stretch cone around the entire circumference of the base.

– Make a cut on the top of the cone with a roofing knife.

– Heat up the membrane around the hole using a manual hot air gun.



– Do not allow the patch to cool down; quickly pull the cone over the small-diameter penetration.

– Tack the cone's "skirt" to the field membrane.

– Execute a back/pre -weld using a brass roller. While following this step, press the brass roller outwardly to guarantee the required tension on the membrane.

– Weld the outer edge of the remaining material to the field membrane.

– Check the quality of the weld with a tester. Fill with PU sealant at the top of the cone and tighten with a clamping ring.

– Treat the welds with TechnoNICOL liquid PVC.

Execution of verticals and outside perimeter trim

8 Execution of verticals and outside perimeter trim profiles

1 Fixing at angle change barrier wall using a “concealed pocket”

Fixing at angle change to the barrier wall using a “concealed pocket” ensures the highest reliability during operation and the quickest installation.

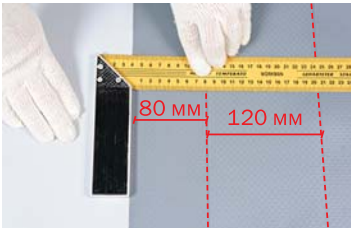
– **Cut a strip of V-RP reinforced membrane out of the standard sheet**.

– In order to expedite the work, it is acceptable to tear off a lateral strip; to do this, make a cut on the membrane with a roofing knife, then pull the strip. Thanks to the special netting, the break will occur along the thread of the reinforcing net.

– It is necessaryto place the torn edge of the membrane so that after installation, it is protected against moisture; place this edge on the vertical surface of the barrier wall or inside the overlap.

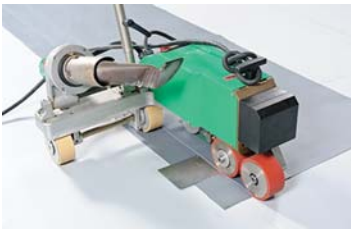
– The width of the strip must be equal to the height of the membrane overlap on the barrier wall (or the length of the membrane required for wrapping the barrier wall) plus the size of the membrane overlap on the horizontal surface (not less than **150 mm**).

– Also prepare a narrow strip of **V-RP** reinforcing membrane (**120 mm** wide) for making a “pocket”.



– On the inner side of the membrane strip intended for a wall barrier, draw a line at a distance of **80 mm**. from the lower edge of the sheet; in relation to this line, draw a strip for the “pocket”. You may use a special prefabricated piece for obtaining the “pocket”.

– Tack the pocket strip at several points along the opposite edge.



– Using automatic equipment, weld the pocket strip to the lower edge of the patch.

– Loosen the tacks.

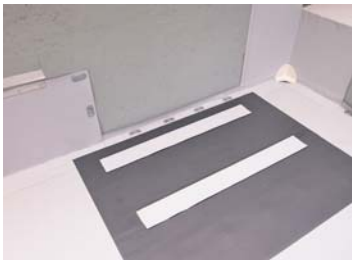
– Insert a holding strip into the “concealed pocket” and stretch the “pocket” membrane using roofing pliers; simultaneously press the holding strip with the pliers. When attaching, place a metal plate under the fasteners to avoid damage to the membrane.

– If a holding strip of less than the standard length is necessary, cut both edges of the strip using snips.

– Break the strip at the cut.

– The distance between the fasteners and the holding strip must be **200 mm**.

– Raise the free edge of the patch to the barrier wall.

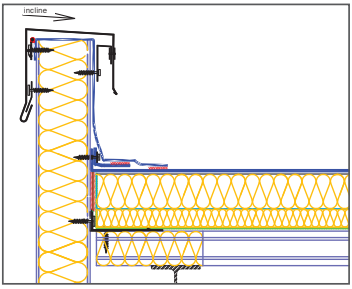


– If the height of the membrane overlap on the barrier wall is greater than **450 mm** or if it is necessary to make a barrier provided with an additional layer of insulation, then use an additional concealed pocket with a holding strip to allow for fastening.

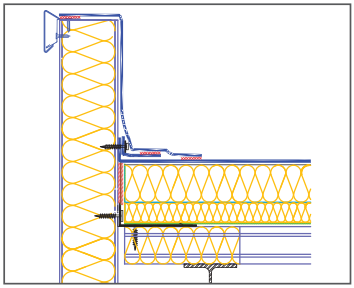
– Place the additional strip into the pocket. When securing the margin fastener, pull the membrane corner diagonally to avoid forming wrinkles on the membrane.

– In case of a low barrier wall (usually **350 mm** high) throw the membrane over the barrier wall; pull the outer side of the membrane with one hand and smooth out the membrane upwards with your other hand to avoid wrinkles.

– Fasten the membrane mechanically to the outer side of the barrier wall.



– On the horizontal part of the barrier wall covered with the membrane, install facing (for sandwich-panels) to protect the fa ade from becoming damp.

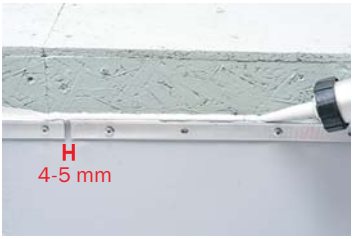


– Or install an eave trim made of laminated PVC metal. See details on PVC metal **in paragraph 8.2**.

– For barrier walls greater than **350 mm** in height, completion must be carried out using an edge strip. In order to stretch the membrane uniformly along the entire length of the barrier wall, begin attaching the edge strip from the centre. To ensure appropriate tension on the membrane, use roofing pliers.

– Round off all the corners. Weld a strip to the field membrane using automatic equipment.

– Weld in all the overlaps. Before doing so, chamfer the horizontal edge of the lower membrane.



– Cut off the excess membrane above the edge strip with a sharp knife and apply a sealant to the gap between the edge strip and the wall.

– When fixing the membrane on the external and internal corners, leave a **4-5 mm** gap between the edge strips. Additionally, reinforce the edges of the strips.

– A height difference on the barrier wall is possible.

– Check the quality of the welds with a tester. Treat manually welds with TechnoNICOL liquid PVC.

2 Execution of the connection to a drip trim profiles

In order to execute overhanging eaves on a concrete base, when performing modification and construction operations, use eave trims made of laminated PVC metal with a coating thickness of no less than **800 mm**.

IMPORTANT! Before the installation, check which side the PVC coating is applied to. It is possible to weld the membrane to the coated side only.

– Overlap the main roof covering to the eaves and fasten it mechanically. Use metal washers as fasteners.

– Using tin snips, cut the fabricated eaves trims made of PVC metal at a **45°** angle. Secure the eave trims to the base.

– Leave an **expansion gap** between each profile.

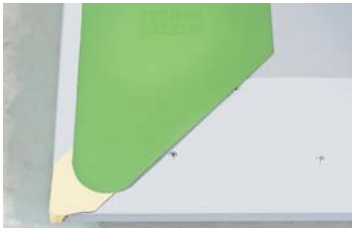
– The width of the gap must be **3-5 mm**. Adjust the gap and secure the next eave trim.

– Stick some masking tape over the gap to avoid welding it to the PVC membrane.

– Cut a piece out of non-reinforced **V-SR** membrane (example shown in yellow) and round off its corners.

– Tack the PVC membrane to the PVC metal and then weld the non-reinforced PVC membrane to the eave trim with the use of a manual hot air gun and roller. Cut off the excess non-reinforced PVC membrane at the bottom with a roofing knife.

– Cut a strip (**300 mm** wide) out of the reinforced **V-RP** membrane (example shown in green) and tack it to the field membrane using a hot air gun.



– Round off the corners using scissors and cut the end at a **45°** angle.

– On the inside, weld the strip to the main roof covering with the use of automatic hot air equipment.

– Chamfer the edges of the non-reinforced membrane to the depth of the weld (not less than **30 mm**).

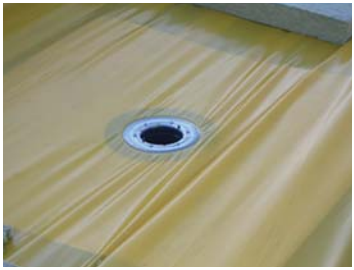
– Weld the strip to the prefabricated profile using a manual hot air gun.

– Check all welds with a tester; pay special attention to the area where the reinforced membrane overlaps the non-reinforced membrane.

– Apply TechnoNICOL liquid PVC to all trim profile welds.

Installing water outlets

9 Installing water outlets



– It is good practice to use a two-level roof drain. The lower flange of the roof drain makes it possible to tighten the vapour seal film correctly and that the vapour seal function around the penetration through the film.

– In order to obtain a smooth hard base around the roof drain, which will prevent the roof drain from falling through, use XPS boards.

– The dimensions of this area must be no less than **1 x 1 m.**

– With single-level roof drains, it is better to use butyl-resin tape on the vapour seal film around the perimeter of the reinforcement plate. Press the XPS board tightly against the tape.

– Make a hole in the board for installing the roof drain. In order to ensure a tight junction of the roof drain flange, chamfer the edge of the hole, for example, by melting the XPS board using a manual hot air gun.

– Place a piece of glass fibre (weight should be no less than **100 g/m²**) as a separation layer between the XPS plate and the membrane and insert the roof drain into the hole.

– To ensure additional sealing, apply PU sealant along the outer edge of the roof drain; apply sealant around all bolts.

– Take a piece of **V-RP** membrane (**1 x 1 m**) and fit it over the roof drain; using a knife, cut holes in the membrane for the bolts, then push the membrane onto pins.

– To ease this operation you may use a prefabricated piece made of the membrane.

– To improve the reliability of the connection, apply the PU sealant around the outer edge of the roof drain.

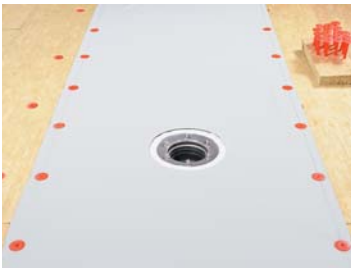
– Tighten the counter flange with the nuts.

– After tightening all of the nuts, a small amount of sealant should squeeze out from under the flange.

– Turn up the membrane piece and fasten the roof drain to the base with long self-driving screws.

– Fasten the piece to the deck so that the fasteners penetrate the reinforcement sheet (refer to paragraph 3.1).

– Continue to install the membrane in the field area in the usual manner. After fastening the sheet, locate the roof drain centre under the membrane, use the bolts to find the centre.



– With the use a small strip of membrane and a marker, draw a circle around the perimeter of the outlet (its radius must be greater than that of the flange by **6 cm**).

– Using a pair of scissors, carefully cut out the membrane along the marked line avoiding to damage the membrane below.

– Execute a pre-weld/back at least 30mm from the outside edge, finish welding the remaining portion to the membrane below.

– Treat all hand welds with TechnoNICOL liquid PVC.

Training courses for contractors

If you want to gain more experience in working with polymeric membranes as well as learn the secrets and field tips not included/mentioned in this publication, then you welcome to one of TechnoNICOL training centres!

Advantages provided by the training courses:

- increase in productivity and quality of workmanship;
- acquisition of experience in working with state-of-the-art materials and methods;
- minimization of issues on the part of the client and supervising bodies when hiring you for work;
- execution in compliance and accordance with the latest requirements of the modern construction market in terms of regulations and quality.

Administrative manager of the Training Centres course:

Tel.: +7 (347) 291-25-02,

Free call: 8-800-200-05-65

E-mail: seminar@tn.ru

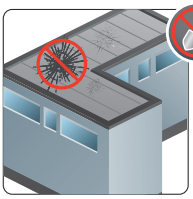
All knowledge in one portal www.seminar.tn.ru

Corporate author: Evgeny Spiryakov, Dmitry Fisyurenko, IldusNagayev

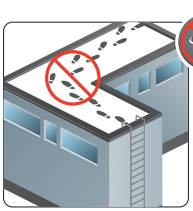
Please send your ideas and comments with regard to this manual to logicroof@tn.ru

Basic working instructions

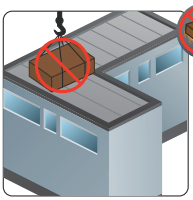
Keep the roof free from flammable, and toxic substances, greases, oil products, and bitumen.



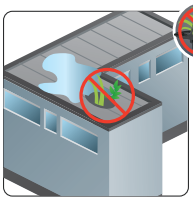
Avoid mechanical damage to the polymeric membrane.



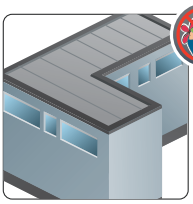
Movement on the roof at -15°C is prohibited.



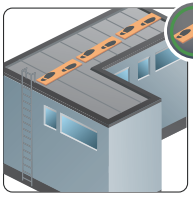
Storage of construction materials, equipment etc. on the roof is prohibited.



Make sure that the roof drainage system is serviceable.



Unauthorized persons should not be allowed to stay on the roof.
Maintain a register of personnel working on the roof.



Move only along protective walkways.

Remove snow from the roof only using a wooden spade. Leave a protective layer of snow (no less than 10 cm.) on the roof.

Technical support
8 800 200 05 65
www.logicroof.ru

II/2014 v2.0