

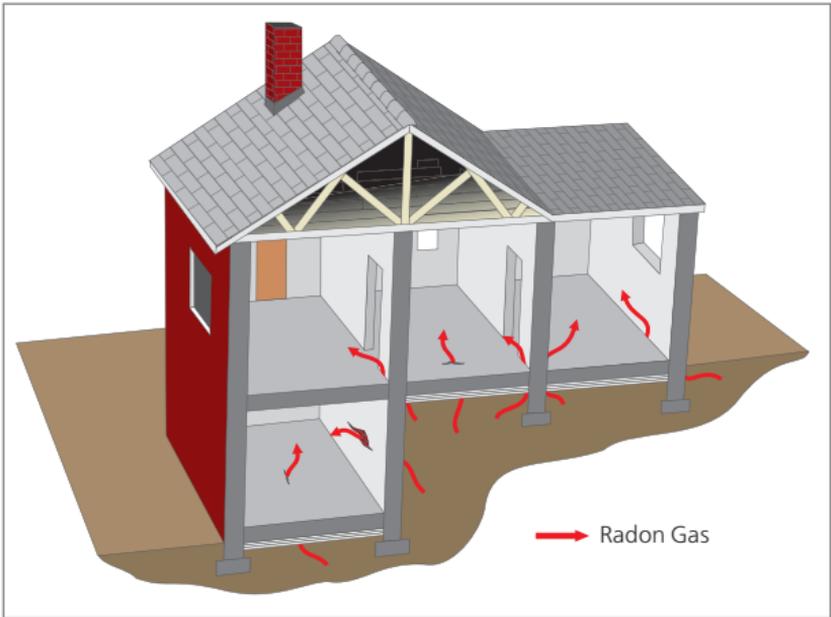


TECHNOELAST BASE R

Effective protection
of basement and foundation
from moisture and radon



The main problems of modern construction projects is to ensure safety of human life. Particular attention is paid to the protection from radon gas.



What is radon?

Radon is a naturally occurring radioactive gas created from the natural decay of uranium in the Earth's rock and soil. You cannot see, smell or taste radon.

Why is radon dangerous?

Radon is radioactive. Outdoors, there is little danger from radon because the concentrations are low. Inside a home, radon is trapped and becomes concentrated. Long-term exposure to radon has been associated with an increased risk of lung cancer.

How does radon enter my home?

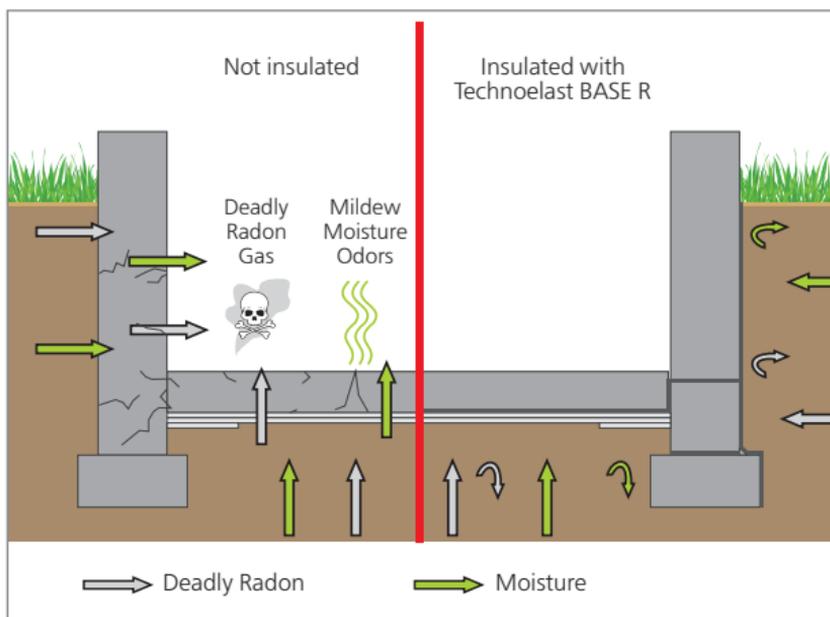
Radon moves to the surface through cracks and voids in the rock and soil. The air pressure inside a home is typically lower than the atmospheric pressure outside and the pressure in the soil under the home's foundation. This difference in pressure means that the house acts like a giant vacuum, drawing radon in through cracks and voids in the foundation walls and the basement blocks and through drains, sumps, joints and loosely fitted pipes.

To solve the problem in gas-protection and waterproofing of buildings is required to use new building materials, which prevent radon and water penetration.

PROTECTION FROM MOISTURE AND RADON

Moisture, mold and radon problems of the foundations and lower parts of the walls can be solved reliably and at low cost by correct designing of the structure.

Radon concentration in the new building should not exceed 200 Bq/m^3 . However, in some places, a concentration of radon in the indoor air shows up to 10-15 - fold higher.



To prevent the penetration of gas into the living premises it is necessary to create a so-called gas-insulating screen.

Modern technology offers a wide range of insulating materials - membranes, films, various types of protective liquids. Most common are different type of bitumen membranes, which can be used as waterproofing and some kind of radon barrier purposes.

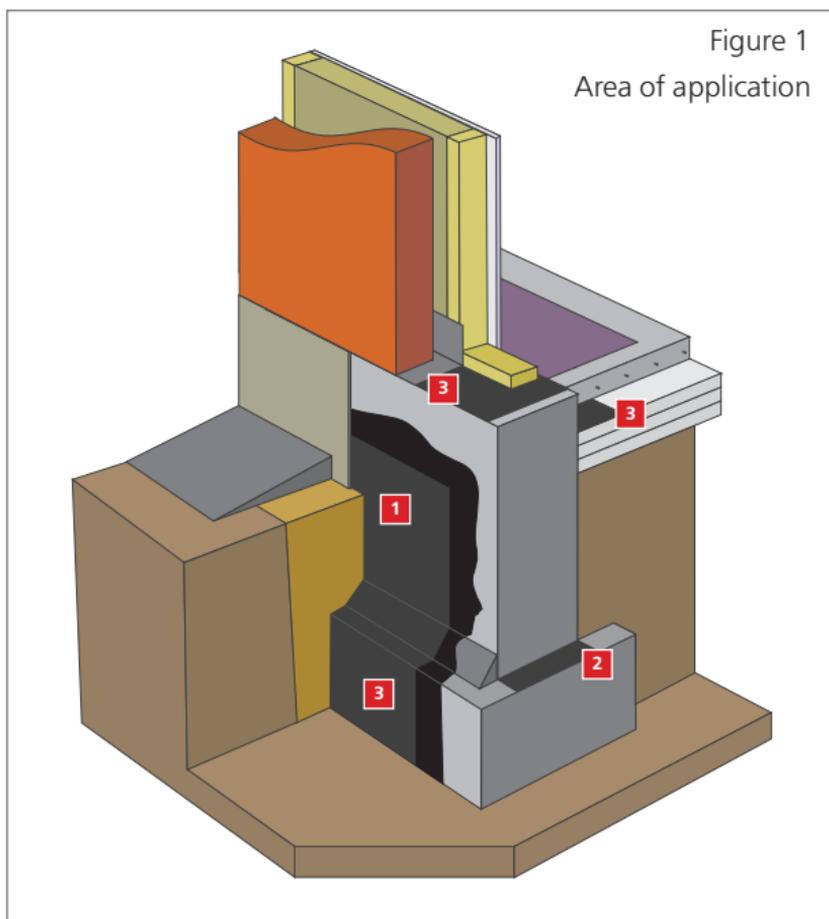
The waterproofing and gas-insulation roll-fed polymer-bitumen material Technoelast BASE R is due to protect the indoor premises of buildings and structures from moisture and the radon gas. It was developed exactly for high radon concentration areas.

The material has all certificates and correspond with requirements to be used as radon barrier material by tests.



Its effectiveness is confirmed by studies of leading Technical University "ČVUT" - Laboratory studies of radiation protection.

Technoelast BASE R has also an excellent adhesion as a material that is designed to be used as base waterproofing material. Ideal for installation as two-layer waterproofing for the foundations according to EN 13969.



Summing up we can say that Technoelast BASE R can be used for the following purposes:

1. as base and foundation waterproofing membrane.
2. as waterproofing sheet between foundation and base construction block.
3. as radon barrier for the indoor premises (basement, cellar and inner block walls and floor).

If you are unsure about your area radon concentration, it is more safe to use Technoelast BASE R as base waterproofing material for you and yours family health!

MAIN RULES OF TECHNOELAST BASE R INSTALLATION



The mounting surface must be flat and clean. The top surface of the foundation must be sloped and corrected with grout.



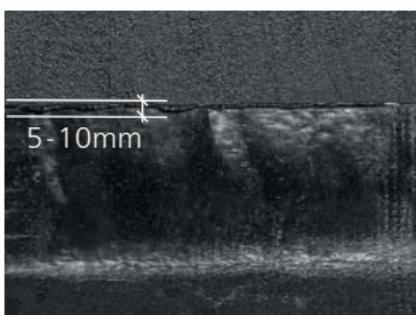
Before applying membrane, the surface of the foundation must be treated with TechnoNICOL Primer Nr.01, which is allowed to dry before attaching the base membrane.



Installation is carried out by melting the bottom surface of the membrane by gas-torch.



Overlaps of the joints should be 100 mm.

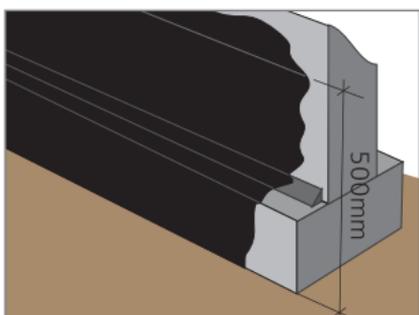


Small bitumen leaking along the edge of the roll shows the proper fusing temperature conditions (approximately 5-10 mm).

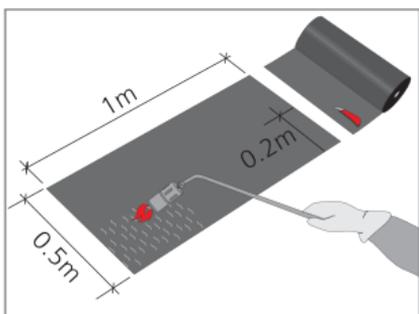
USE AS BASE MEMBRANE

Base membrane Technoelast BASE R protects the top of the footing and the foundation wall from wetting by flowing rain and melt water, as well as it reduces the rise of capillary moisture in the wall structures.

Ordinary low foundation



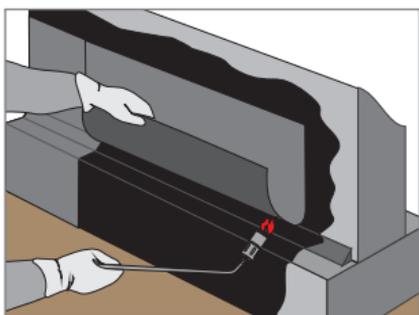
Depending of the height of the base, 0.5 or 1.0 m wide membrane should be used, which is cut with hooked roofing knife, if necessary.



Area of 1m wide and 200 - 300 mm high is melted from the center of top edge of membrane.

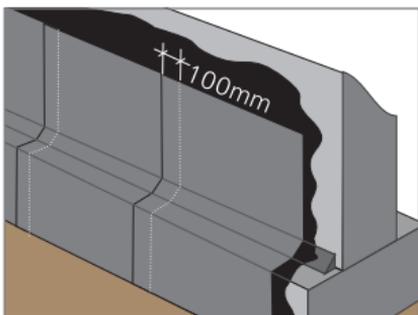


Afterwards the membrane is pushed to the base on the right side. Melted surface sticks to the base and membrane stays in place.



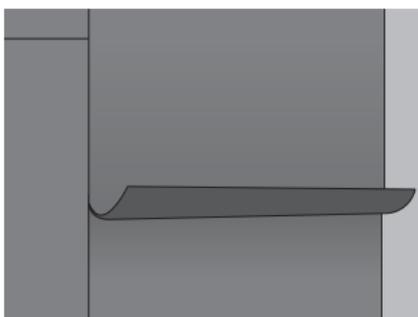
After this, areas which are loose should be melted and pressed to the base. Welding bitumen must be melted enough and, if it's necessary, surface of attachment must be dried and heated to ensure adhesion. For this purpose it is

necessary to do triangle slash test, which can determine the success of the welding attachment.



Overlaps of the joints should be 100 mm.

Membranes can be installed vertically or horizontally. The horizontal application can be made from one or several membranes with overlaps, when suitable application length is 2-3 m.



If two membranes are used, the bottom is always attached first, so the lower edge of the top membrane overlaps on the bottom one.

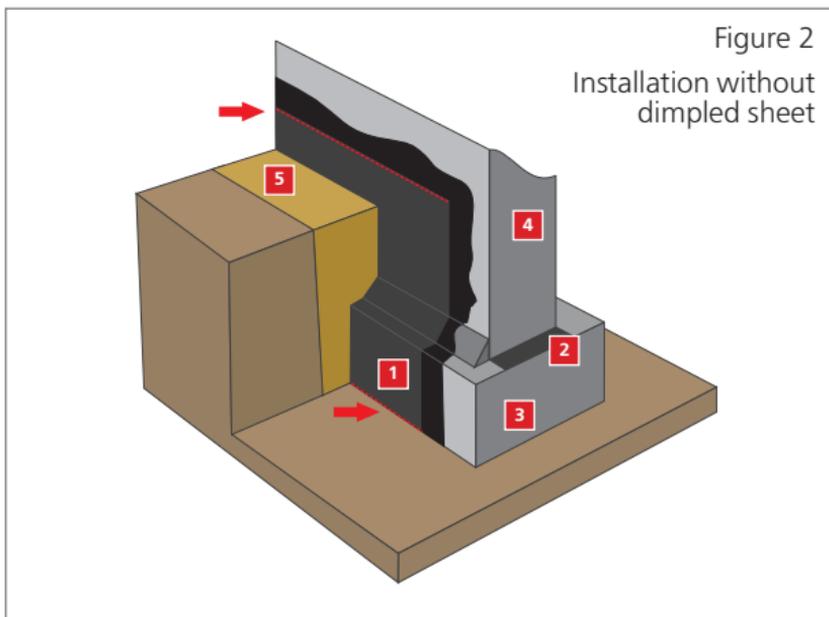


Figure 2
Installation without dimpled sheet

1. Base membrane - Technoelast BASE R,
2. Base sheet - Technoelast BASE R,
3. Foundation,
4. Pinth/Base,
5. Ground level

The lower edge of the membrane is applied at the bottom of the base and upper edge at the level of the ground surface (Fig. 2), with this solution there is no need for a dimpled sheet at all.

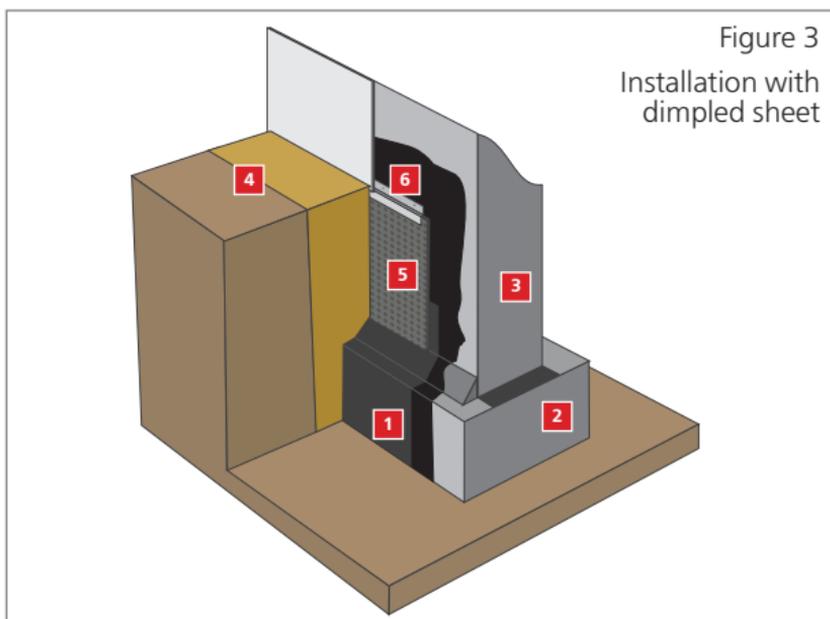


Figure 3
Installation with dimpled sheet

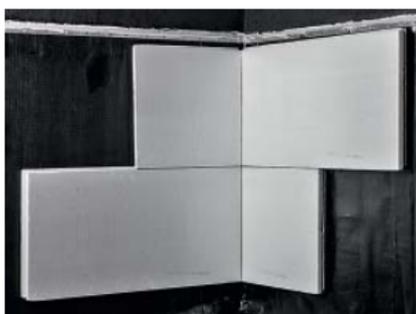
- 1. Base membrane - Technoelast BASE R, 2. Foundation, 3. Pinth/Base
- 4. Ground level, 5. Dimpled sheet, 6. Edge-sealing profile

If the top part of base is protected with dimpled sheet, base membrane is installed only to the lower part of the base (Fig. 3).

The membrane and the dimpled sheet overlap must be at least 300 mm and membrane's upper edge must reach such height, where subsoil water can reach in the worst situation. The upper edge of the base should be protected with edge-sealing profile.

The cellar walls

In places which are more humid than normal or with high risk of radon, base membrane is applied to the level of the ground surface.

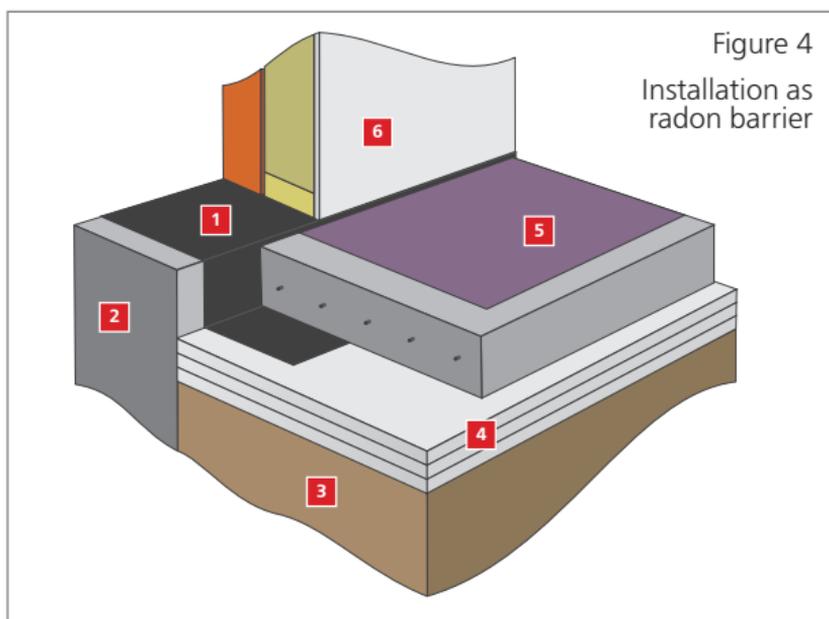


In this case dimpled sheet is not required, but the heat insulation slabs (TECHNONICOL CARBON PROF 300) are installed up over base membrane for the whole wall area, to avoid the moisture condensation of the wall structure.

USE AS RADON BARRIER

Radon barrier prevents radon to permeate from the soil to the building. The structure must be completely airtight, so that radon gas does not pass through it. Air should not flow through the foundation of constructions or their joints, even at negative pressure in the premises.

Technoelast BASE R, generally, is installed on the top surface of the base and it is bended under the ground-based floor, on heat insulation (Fig. 4)



1. Radon barrier - Technoelast BASE R, 2. Pinth/Base
3. Ground, 4. Heat insulation, 5. Floor construction, 6. Wall construction

Membrane's outer edge is mounted equally with the outer edge of the base.

Bitumen on the bottom surface of the membrane is heated to the extent that the membrane sticks to the top surface of the base and remains stationary. Membranes are bent to the inner surface of the base and under the floor construction, like shown in Fig. 4.

! Don't attach Technoelast BASE R with heat to the inner surface of the base, because it must be able to stretch when floor starts to shrink.

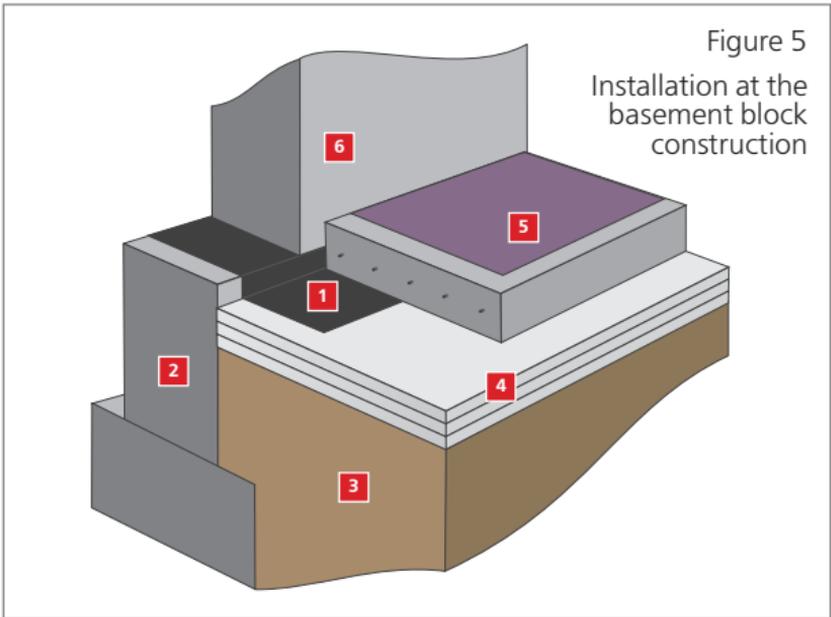


Figure 5

Installation at the basement block construction

- 1. Radon barrier - Technoelast BASE R, 2. Pinth/Base
- 3. Ground, 4. Heat insulation, 5. Floor construction, 6. Basement block

In basement block constructions (Fig. 5) and at the load-bearing inner walls (Fig. 6), radon barrier membrane installs below the top surface of the floor on first block construction seam, where it is bended under the floor construction and on the top of heat insulation.

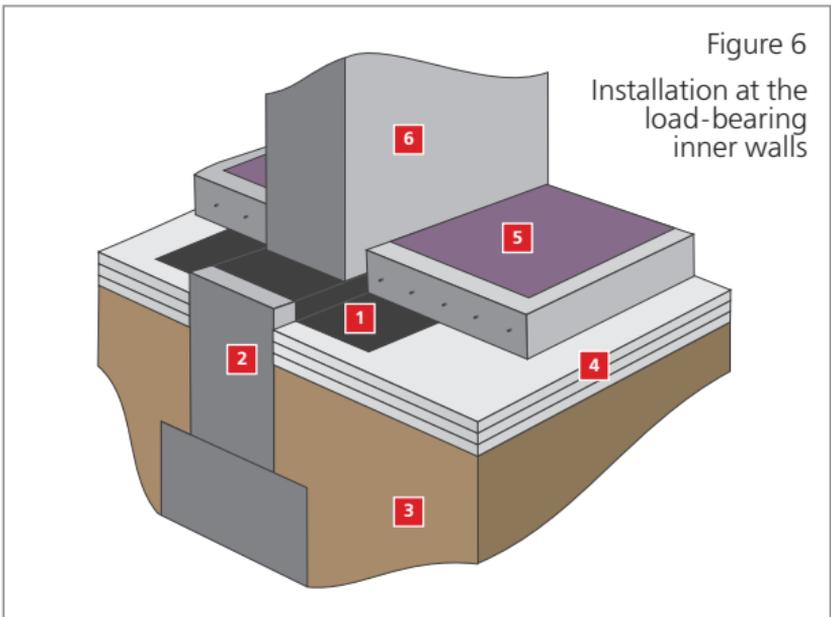


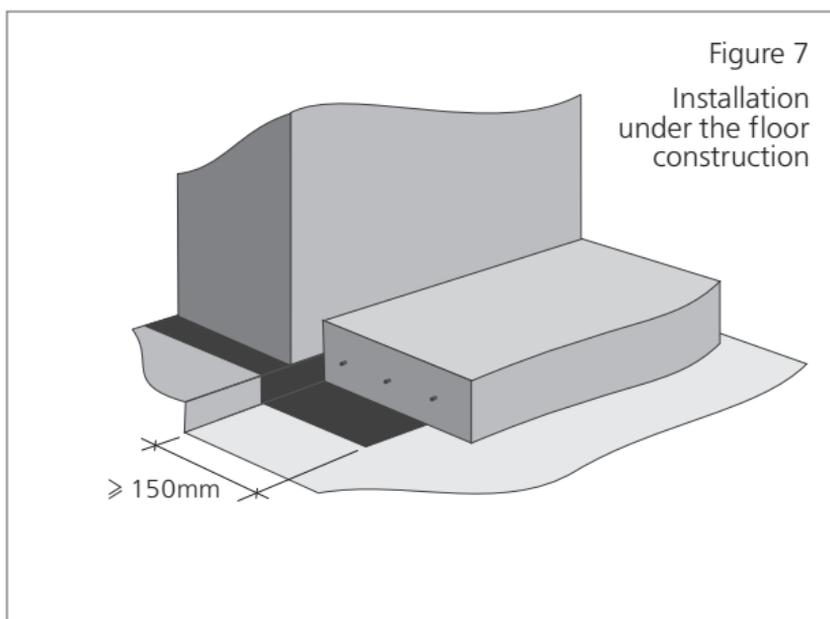
Figure 6

Installation at the load-bearing inner walls

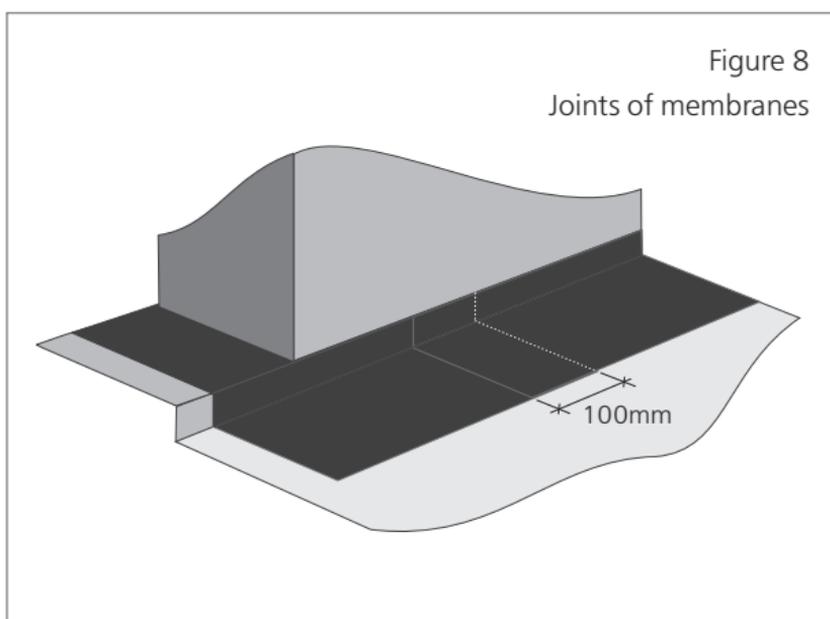
- 1. Radon barrier - Technoelast BASE R, 2. Pinth/Base
- 3. Ground, 4. Heat insulation, 5. Floor construction, 6. Supporting wall

The surface of the membrane must be clean, so that adhesion between concrete and the membrane is sufficiently good and the air-tightness is ensured, even if the concrete slab shrinks and may settlement slightly.

The membrane must extend below the floor construction horizontally at least 150 mm. Floor foundation pouring close to wall lines (outer walls and load bearing inner walls) is made directly on the radon barrier membrane.



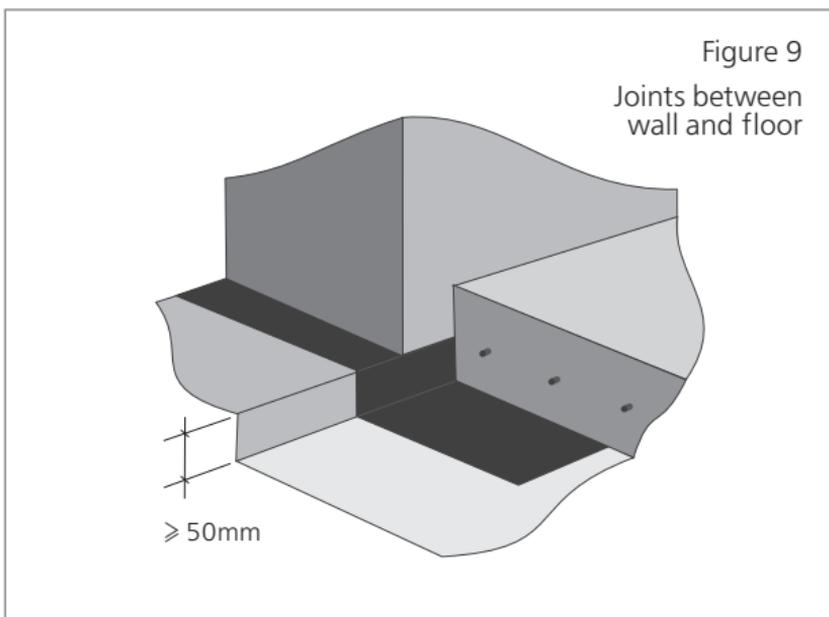
The joints of membranes must be overlapped at least 100 mm and joint's air tightness is ensured by melting membranes to each other.



! If necessary, vertical bars are installed on the outer wall block joints through the radon barrier membrane.

Joins between inner block walls and the floor

Radon barrier should be installed between blocks in to the seam, which is at the level of the floor, or slightly below, but at least 50 mm above the lower surface of the floor pouring (Fig. 9). Installed this way, radon membrane will not form water chambers in the structure.



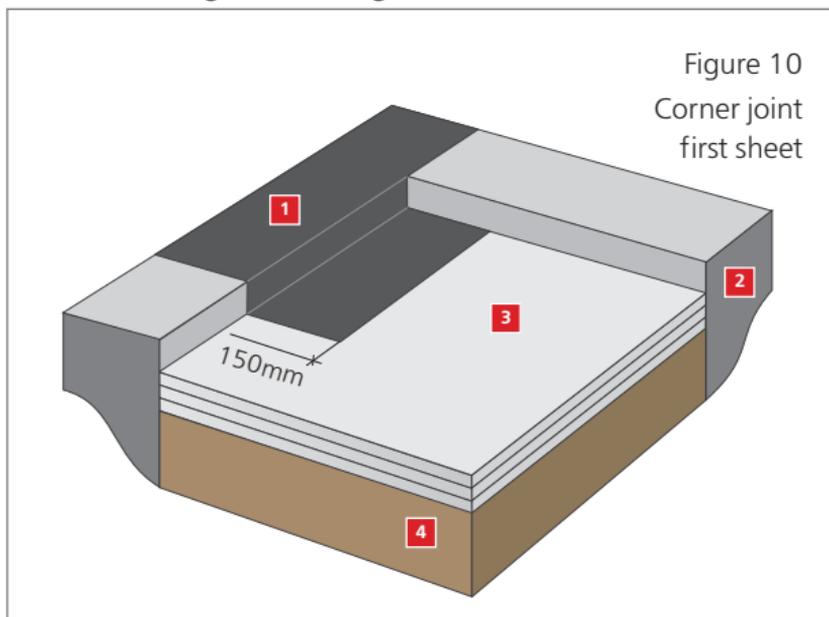
- ❗ Membrane should not be attached to the vertical surface of the block by heating (flexibility for floor shrinkage).
- ❗ Radon barrier should not be installed horizontally so that the lower surface of the floor pouring and seam of the blocks are at the same level, so that membrane won't be cut when floor shrinks.

Radon barrier can also be fitted to the first seam of blocks, which is at least 20 mm below the lower surface of the floor pouring. In this case it is confirmed that the membrane remains intact even at the floor shrinkage.

- ❗ This kind of installation method can cause "water chamber" at the lower part of the wall, if nearby occurs a water damage. It is necessary to pay particular attention to the use of this technique at waterproofing of wet premises.

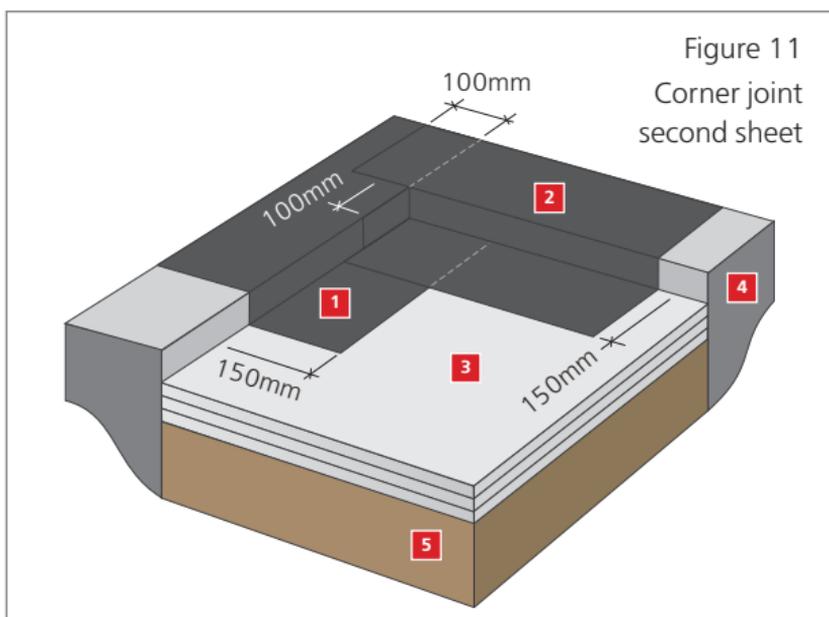
Corner joints

Corner joints are made by cutting edges of the membrane as shown in Fig. 10 and Fig. 11.



1. Radon barrier - First sheet of corner joint,
2. Base construction, 3. Heat insulation, 4. Ground

Seams are sealed by melting. Joints overlapping should be at least 100mm.



1. Radon barrier - First sheet of corner joint,
2. Radon barrier - Second sheet of corner joint, 3. Heat insulation,
4. Base construction, 5. Ground

Corners are sealed with TECHNOMICOL Mastic Nr. 23 (Fixer), if necessary.

Radon sealing and waterproofing of cellar outer wall block construction

In the basement block constructions radon barrier membrane is also installed on the outer wall till the level of the ground.

Generally, it is required to install heat-insulating slab upright against the wall on outer surface of the radon barrier membrane, in order to avoid moisture of condensation between the wall structure and internal surface of radon barrier.

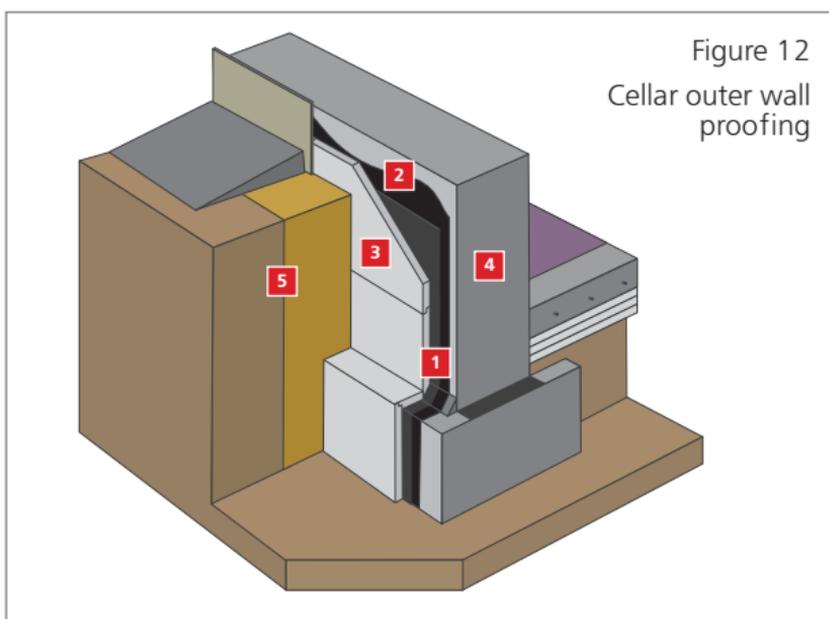


Figure 12
Cellar outer wall proofing

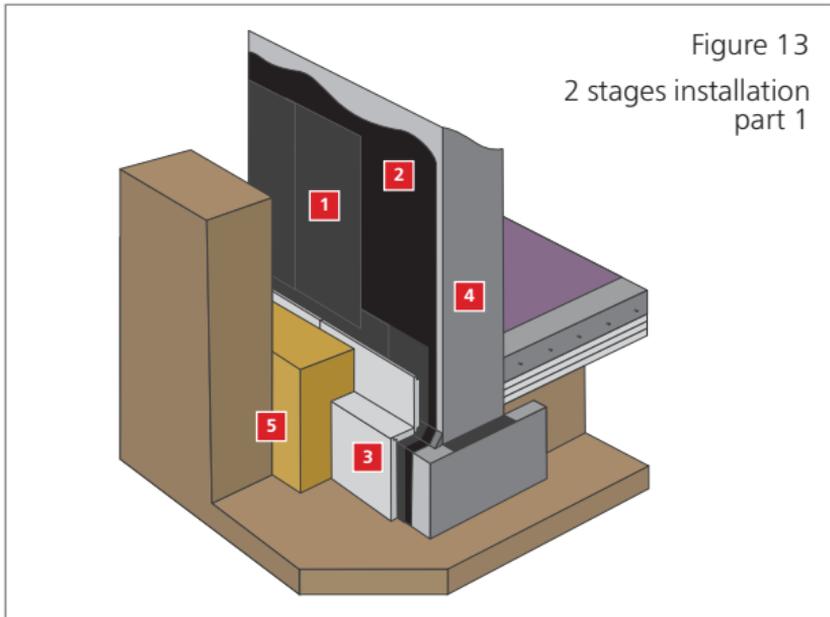
1. Radon barrier - Technoelast BASE R, 2. Primer, 3. Heat insulation, 4. Cellar wall, 5. Ground level

- Surface of the wall must be smoothed first. Smooth and dry surface is treated with TECHNINICOL Primer Nr. 01 to provide reliable adhesion.
- When prepared surface has dried, radon barrier membrane is attached by heating and welding its bottom surface to the wall.

- ⚠ Membranes can be installed both vertically and horizontally. The overlaps must be at least 100 mm.
- ⚠ If there is possibility of water pressure, appearing at the lower part of the wall (the effect of the groundwater, heavy rains, melting water or blocked drainages). The overlaps should be at least 150 mm.

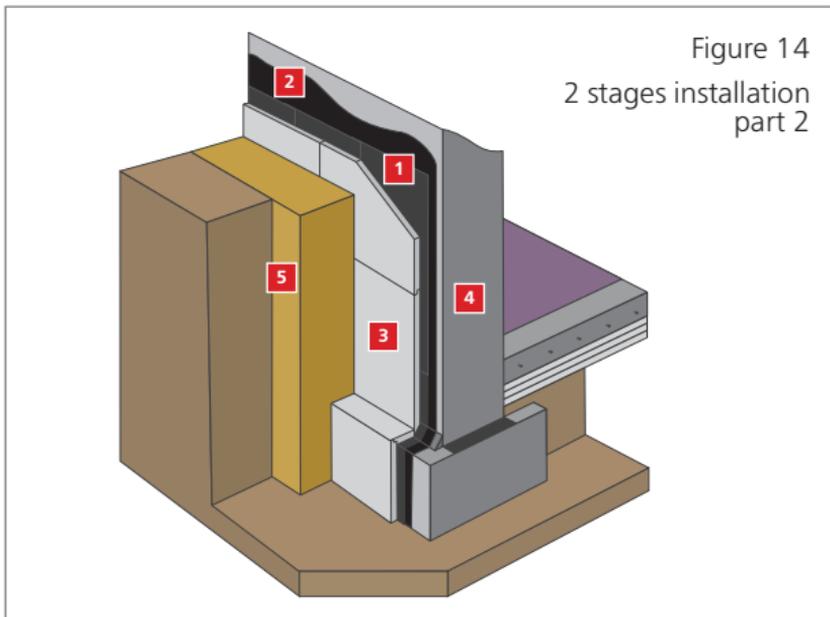
If the radon barrier is also installed on the front edge of the foundation and on the bevel, it also works as base membrane.

Membrane is better to install vertically and 1 meter in height. If the height of the wall is greater than 2 meters, generally it is done in two stages.



1. Radon barrier - Technoelast BASE R, 2. Primer,
3. Heat insulation, 4. Cellar wall, 5. Ground

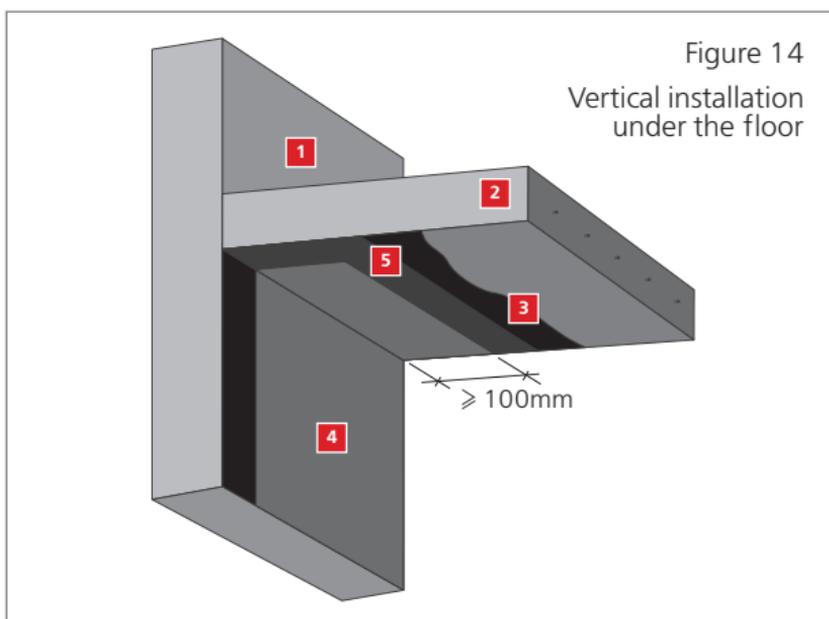
The lower part is insulated first, then the heat insulation is mounted to the lower part, afterward it is filled with soil layers and then the same with the top part.



1. Radon barrier - Technoelast BASE R, 2. Primer,
3. Heat insulation, 4. Cellar wall, 5. Ground

Split-level structures

For split-leveled structures radon sealing is designed individually.



1. Wall construction, 2. Floor construction, 3. Primer,
4. Radon barrier - Film surface to concrete,
5. Radon barrier - Sand surface to concrete

The membrane, which is attached to a vertical surface under the floor (Fig. 14), must be accompanied by a membrane, which is turned around under the floor pouring, so that the concrete will be against the membrane's top surface (surface with the sand).

TECHNOELAST BASE R



Application areas:

Designed for installation as protective radon barrier on buildings and constructions, for waterproofing of engineering structures. Ideal for installation as two-layer waterproofing for the foundations according to EN 13969. Used for basements and foundations as radon gas protection (according to ČSN 73 0601).

Description:

Technoelast BASE R is roll-fed, torchable, polymer-bitumen, radon barrier, waterproofing material. Manufactured according to EN 13707:2004+A2:2009. Material is produced by two-sided placing of polymer-bitumen binder, consisting from bitumen, SBS (styrene-butadiene-styrene) polymer modifier and mineral filler (talc, dolomite etc.), on the polyester base. Fine-grained sand on the top surface is used for placing of the top layer of waterproofing on cold- and hot-applied mastics; fine sand improves coupling of waterproofing system's layers. Polymer film is used as a protective layer on the bottom surface.

Application method:

Torch-on application on the prepared surface. Glued to the prepared surface on hot- or cold-applied mastics.

Characteristics	Test method	Value
Length / width, m	EN 1848-1	10x1/0.7/0.5
Weight, kg/m ²	EN 1849-1	4.0-0.2
Reinforcement type and weight		polyester, 220 g/m ²
Maximum tensile force , N/50 mm longitudinal / transverse	EN 12311-1	700/500±100
Resistance to tearing, N	EN 12310-1	180/180±30
Elongation, %	EN 12311-1	50/50±10
Flow resistance at elevated temperature, °C	EN 1110	≥ 100
Flexibility at low temperature, °C / Ø mm	EN 1109	≤ -25/30
Water tightness	EN 1928	absolute
Protective covering type: top surface bottom surface		sand film

TECHNONICOL BITUMEN PRIMER №01



Application areas:

TECHNONICOL Bitumen Primer №01 is used for preparation (prime coating) of bases before installation of torch-on or self-adhesive waterproofing materials. The prime coating is necessary for ensuring the strong adhesion of the waterproofing materials to porous, rough and dusty surfaces. Can be applied on concrete slab, cement-sand screed, etc.

Description:

The primer presents a solution of high-quality bitumen oil, with a softening temperature of no lower than 80°C, in specially selected organic solvents. It has an enhanced penetrability and short drying time.

Storage:

Store in dry place protected against sunlight, at temperatures between -20°C and +30°C.

Application method:

Ready for use primer is applied to the base at once, that offers additional convenience and enhanced performance. Is recommended to be applied by paint roller or brush.

Consumption of primer - 0.25-0.35 l/m².

Characteristics	Value
Mass fraction of non-volatile substances, %	30–40
Drying time at 20°C, h, no more than	12
Relative viscosity, s, in the range	10–30
Softening temperature, °C, not less than	+80

TECHNONICOL MASTIC №23 (FIXER)



Application areas:

The mastic is designed for the seams waterproofing of shingle and others bitumen materials, for adhesion of bitumen materials to brick, concrete, metal, wood, ceramic and other surfaces.

Description:

TECHNONICOL Mastic №23 is a multicomponent material consisting of bitumen, butadiene-styrene termoplastic elastomer or its modifications, filler, solvent and technological additives.

Storage:

Store in dry place protected against sunlight, at temperatures between -20°C and $+30^{\circ}\text{C}$.

Application method:

Before applying mastic you should clear the surface of dust, oils, ice-buildup and other contamination. Mastic application on a moist surface is not permitted. When mastic is applied to porous bases, the surface should first be primed-coated by using bitumen primer. Wait until the primer is completely dry.

Carefully mix mastic before application! Distribute mastic using a spatula on one of the surfaces in a layer 0.5–1 mm thick. Connect surfaces, avoiding the formation of folds and bubbles. It is recommended to use a special rollers. Press surfaces until the appearance of mastic from a seam.

Consumption of mastic depends on the type of work.

Characteristics	Value
Strength of adhesion to the base, MPa with concrete	0.5
with steel	0.8
Strength of adhesion between layers, MPa roll-fed material – concrete	0.5
roll-fed material – roll-fed material	0.5
Shear strength of glued bond, kN/m	4.0
Nominal strength, MPa	75
Heat endurance, $^{\circ}\text{C}$	110

TECHNONICOL CARBON PROF 300

**Application areas:**

TECHNONICOL CARBON PROF 300 is designed for heat insulation of basements and cellars, heated floors, floors on the ground, insulation of cold bridges in panel construction.

Description:

TECHNONICOL CARBON PROF 300 extruded polystyrene foam is a heat-insulating material with uniformly distributed closed cells.

The material is characterized by: high thermal capability, stability of volume and form, high resistance to deformations and physical stresses, low water absorption, resistance to microorganisms and rodents, simplicity of fitting-up, easiness of cutting and handling.

High strength allows to receive equal and simultaneously rigid base, and it essentially increases term of operation of the whole heat-insulating system.

Storage:

TECHNONICOL CARBON PROF 300 slabs should be stored sorted by brands and dimensions, in a dry closed place, horizontally in piles at a distance of not less than 1.5 m from heaters. Slabs on pallets or linings should be stored under an awning, protecting them against atmospheric precipitation and sunlight.

Application method:

Glued on attaching mastic or fixed on the special fasteners.

Characteristics	Value		
Compressive stress under 10% deformation (kPa)	300		
Thermal conductivity, λ_d , W/(m*K)	0.035		
Reaction to fire, Euroclass	Class E		
Levels of water-absorption capability during long-term full immersion	≤ 0.7		
Temperature range for normal operation	-70 °C to +75 °C		
Thickness, mm	50	60	80
Length, mm	1180		
Width, mm	580		



We presented our recommendations in a brief, visual and easy-to-work form.

If you didn't find the answer on your question in this manual or you need more information about how to apply the material with protection against radon, contact our company technical representative in your region. Contact details can be found at web-site: www.tn-europe.com

If you want to get practical skills, learn the secrets, are not included in the manual, - welcome to our seminars and workshops!

Benefits of training:

- The growth of productivity and quality of work performed.
- The acquirement of working skills with new materials.
- Minimization of claims from the customer.
- Execution of works in accordance with the requirements of modern construction market in terms of quality.

Submit requests for training or technical support to:
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