



# EXTRUDED POLYSTYRENE

Heat insulation material

1 / 2016

**TECHNO  
NICOL**

**CONSTRUCTION  
SYSTEMS**

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**ABOUT THE COMPANY**

1993 - TechnoNICOL company was founded in 1993. In 1994 the Company launched its own first production plant for roll-fed roofing in Vyborg. In subsequent years, dozens of its own sales offices were opened throughout Russia.

1998 - The Vyborg plant started cooperating with Nordic countries, and it made its first deliveries of materials to Finland and Sweden. This established a new operational level for the Company, that set new challenges - acquiring knowledge of the foreign construction market, studying the regulatory and technological base became necessary.

1999 - The Company had 5 production sites and 35 retail branches in different regions of the Russian Federation. During this year the Company entered the Ukrainian market and opened its first retail branch in Kiev.

Built in 1998 in Ryazan, the Technoflex plant became one of Europe's most modern factories in the production of roofing and waterproofing materials. In 1999, deliveries to Eastern European countries began (the Czech Republic, Slovakia and Poland).

2000 - The TechnoNICOL continued its expansion in Europe. The Company acquired its first foreign plant "Gargzdu MIDA", located in Lithuania. At the same time, TechnoNICOL expanded its product range, and, therefore, MIDA factory, which was producing bitumen shingles, began producing of roll-fed bitumen materials. This provided the Company opportunity to learn about a new and interesting segment - products for pitched roofs. Products started to be actively delivered to the Baltic countries (Latvia, Lithuania and Estonia).

2001-2008 - The product range was actively expanded, and new plants were launched:

- A production of stone wool heat insulation under the TECHNO brand was launched as the production of TechnoNICOL XPS, heat-insulating slabs made of extruded polystyrene foam.
- Plant for producing flexible tiles SHINGLAS was opened in Ryazan.
- Production of mastics was organized for making packaged deliveries of waterproofing and heat-insulating materials to European venues. Deliveries were made from Vyborg, Ryazan and Osipovichi plants.

At the same time, representative offices in Latvia, Poland and Turkey were opened during this period.

2008 - The "Dehtochema" Czech plant was acquired by the TechnoNICOL company, which is located in the city of Bělá pod Bezdězem.

This plant had been manufacturing bitumen insulating materials for more than a hundred years. The plant was founded in 1868. The Company expanded its supply-chain to Central European countries.

This time was difficult for the Company, since TechnoNICOL, like all other major European producers, became affected by the global economic crisis. But the Company successfully overcame the crisis, while maintaining and even strengthening its position in certain product markets.

2009-2013 - The Company has cooperated with more than 50 independent sales partners and retailers operating in Western and Eastern Europe, Nordic countries and Baltic countries.

At the same time large-scale reconstruction of the plant in the Belarusian town of Osipovichi was on its way. An increase in the product range and capacity of the plant was aimed at the production of roll-fed materials focused exclusively on the European market.

2013 - Since December 2013 the Italian plant "Italiana Membrane" became part of TehnoNICOL Corporation. The company has several manufacturing facilities and can therefore satisfy any need in building and construction industry: APP and SBS bituminous waterproofing membranes; ancillary products for application; thermal and acoustic insulating materials, in rolls or flat board, laminated to waterproofing membranes; liquid membranes and protective paints, asbestos cement encapsulating coatings; synthetic TPO polyolefin membranes; APP bituminous shingles for pitched roofs.



**PRODUCTION**

Production plants of the Corporation are equipped with modern high-performance equipment made by leading European manufacturers: Boato International (Italy), Eurovek (Slovenia), Selen (Denmark), Bernstorff (Germany) etc. Unique product lines, developed with the participation of the specialists of the Corporate Technical Center, are used for the production of modern insulating materials.



All plants of the Corporation are subjected to state environmental appraisal at their design stage. The inside and outside environment at our industrial sites is monitored daily. We invest in waste-free production, advanced equipment, and environmental protection technologies. All products developed and manufactured by TechnoNICOL meet sanitary and environmental standards and are safe for human beings and the environment. We create energy-efficient technologies and materials to save the environment.

**SERVICE**

TechnoNICOL has built the plants, producing raw materials for its products, in order to increase the stability of production and to guarantee an uninterrupted supply of materials. The plants, manufacturing glass fiber, mineral dressings, paper and cardboard packaging, metal constructions and so on, are the parts of the Corporation.



Our production capacities and equipment enable us to supply materials for large construction projects and to develop unique products based on your individual requirements. Following the regional market demands, we extended geography of our plants. It made us more flexible and now we can supply our products more promptly without extra transportation costs.



We are proud of what we produce and create. We enjoy seeing how new high-quality materials are produced from plain raw components with our up-to-date equipment, our work and efforts. We are glad to know that our materials are used in the construction of such complex objects as: houses, plants, bridges, and social infrastructure facilities, which improve the level and quality of life.





TechnoNICOL company specialists developed a unique technology for producing extruded polystyrene slabs with nanoscale carbon materials. This will significantly increase the heat efficiency of the material to increase its strength, provide a low coefficient of water absorption.

**WHAT IS IT MADE FROM?**

Extruded polystyrene slabs are produced by mixing polystyrene beads at an elevated temperature and pressure with the introduction of the blowing agent and subsequently extruding from the extruder. Due to the structure of XPS TECHNOMICOL has good thermal insulation and high compressive strength, does not rot, shrink or swell and it is chemically resistant.



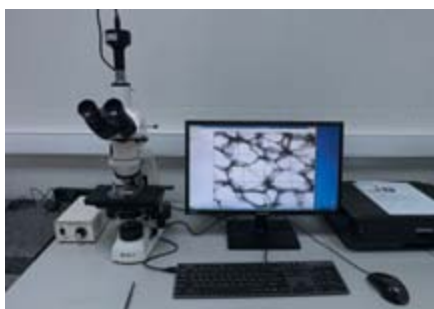
Due to the improved physical and mechanical properties, TECHNOMICOL extruded polystyrene production has excellent energy-saving performance.

The extensive use of the material caused by the unique and valuable properties, combined in one material: a low heat conductivity, high strength, biological resistance, ecological compatibility and durability of use.

We strive to make the perfect product - the most reliable, convenient to operate and profitable in all respects.

**PRODUCTION QUALITY**

The extruded polystyrene TechnoNICOL CARBON produced on modern equipment. The production lines are equipped with a computer control system. Each plant is equipped with its own research laboratory, carrying out a continuous multistage quality control of the products.



All production range TechnoNICOL has all the necessary hygiene certificates.

In the production are used only the primary raw materials obtained from reliable suppliers.


The extruded polystyrene slabs TECHNOMICOL CARBON ECO has passed voluntary certification "Leaf of Life", which confirms the safety of housing construction.


**RANGE OF MATERIALS**


The use of heat insulation materials is an obligatory stage of many construction and repair processes. Wide range of TECHNOMICOL XPS production is divided by area of application and allows the use of products in both civil and private housebuilding. The product range includes insulation for plaster and ventilated facades, pitched and flat roofs, floors, walls, etc.



 Standard slabs.

 Slabs with grooves are used for is used in construction to provide wall drainage and additional heat insulation of the foundation.

 Slabs with a rough surface micro grooves are used to increase adhesion to the protective layer of plaster in the heat insulation of facades.

 Slabs "slope" shaped are used to install the slope on the flat roof, to drain the water on the roof to the funnels.

**FEATURES**



**EFFECTIVE HEAT INSULATION**

XPS TECHNOMICOL CARBON contains graphite nano particles & has a uniformly distributed closed-cell structure. This decrease thermal conductivity & increase compressive stress.



**HIGH FROST RESISTANCE**

Extruded polystyrene may be used in the temperature range from -70 to +75 °C, it allows the use of material in all climatic areas of Europe.



**HIGH STRENGTH**

The strength of extruded polystyrene TECHNOMICOL CARBON is from 25 to 50 t/m<sup>2</sup>, and is fully compliant with the most stringent requirements for heat insulation materials.



**SUSTAINABILITY**

All TechnoNICOL materials are subject to strict sanitary and epidemiological control to obtain the corresponding conclusions.



**RESISTANT TO RODENTS**

Extruded polystyrene TECHNOMICOL CARBON is a very effective rodent deterrent due to high density and other key performance factors.



**MINIMAL WATER ABSORPTION**

Slabs TECHNOMICOL CARBON have minimal water absorption, so its insulating properties remain unchanged throughout the life cycle.



**EASY INSTALLATION**

The slabs of extruded polystyrene are easily cut, quickly and securely installed using adhesives or mechanical fasteners.



**BIO-RESISTANT TO MOLD FUNGI**

TECHNOMICOL CARBON extruded polystyrene is biologically stable material and is fully resistant to most active destroying factors.



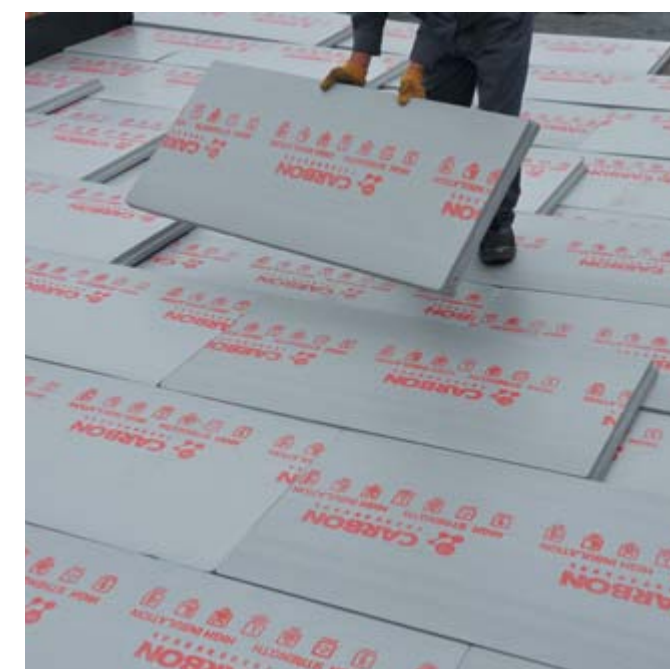
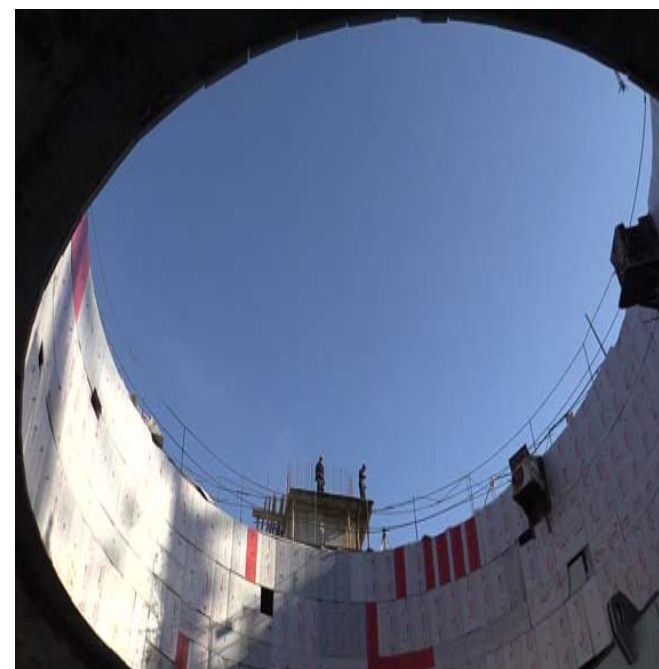
**EXACT DIMENSIONS**

The accuracy of the geometric dimensions of heat insulation boards can improve the speed of installation, quality of work.



**USEFUL LIFE 40 YEARS**

Extruded polystyrene TECHNOMICOL CARBON has high performance characteristics: durability is at least 40 years.





**INSULATING FOUNDATIONS**

Insulation slabs are fixed to a vertical surface in such a manner so that they do not adversely affect the tightness of the waterproofing course. When using TechnoNICOL bitumen or bitumen-polymer materials for waterproofing purposes, bonding insulation slabs are glued onto TECHNOCOL No. 27 adhesive mastic. The mastic is designed for adhesion of extruded polystyrene slabs to bitumen and polymer-bitumen insulation materials, as well as to concrete, metal, and wooden surfaces. Mastic surface coverage: 0.6–1 kg/m<sup>2</sup> when applied as strips, and 0.5-0.8 kg/m<sup>2</sup> when applied as points. When installing slabs on a waterproofing membrane made of a plastic sheeting protection, remove it using the burner flame. The mastic application temperature shall be from 10°C to +40°C. Before using at low temperatures, keep the mastic at room temperature for a period of no less than one day. After fixing the heat insulation slabs, back-filling should be made.

Insulating slabs in the plinth area (above the ground) are glued using an adhesive compatible with the thermal insulation materials and providing the necessary adhesion to the base. In this area, facade dowels should be installed. Four 600 x 1200 mm dowels per slab are mandatory.

Indoors heat insulation can also be glued onto the wall surface using the above methods or fixed mechanically with a subsequent finishing covering.



In cases when insulation of foundation is required, insulating slabs are installed directly on the waterproofing membrane. If PVC materials (LOGICROOF T-SL) are used as waterproofing, a separation layer of geotextile or glass fiber should be provided between it and an insulating layer.



If tied reinforcement is planned for reinforcing concrete monolithic foundation slabs or reinforced floor insulation slabs, a single-skin protection against liquid components of concrete with a plastic film 150-200 microns thick is sufficient. PVC sheets are laid with overlapping of 100+150 mm using a double-sided self-adhesive tape. If the reinforcement work involves welding, a screed of low-grade concrete or cement and sand composition should be provided over the film.



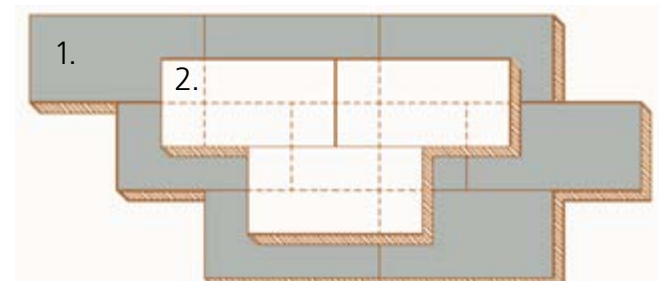
In case of waterproofing using PVC materials, heat insulation slabs of extruded polystyrene should be bonded with polyurethane materials using PVC banding tapes or any other method that will provide a secure insulation fit. In addition, it is recommended to provide a separation layer of geotextile or glass fiber between the extruded polystyrene and PVC membrane.

**FLOOR INSULATION**

Use of extruded polystyrene slabs indoors is environmentally safe since the material is located between the additional layers protecting it from external influences (floor slab panel, combined or cement-sand screed with topcoat). Heat and sound insulation slabs shall be installed by pulling. The slabs are installed freely without any additional support. In cases of double (or more) layered heat and sound insulation, the seams between slabs should be placed



in a staggered order, providing a snug engagement to each other (Figure 1). It is recommended to install the heat and sound insulation slabs of one layer with an offset in adjacent rows, equal to half of their length. The joints of insulation slabs of the upper layer should be placed with an offset of at least 200 mm with respect to the joints of the lower layer.



1 - bottom layer of slabs; 2 - top layer of slabs

Figure 1 - The offset when installing slabs of the upper and lower layers

**Insulation of roofs**

When installing extruded polystyrene slabs, it is recommended to install fasteners only on one side in the area where the L-shaped plate edge presses the adjacent slab (Figure 2).

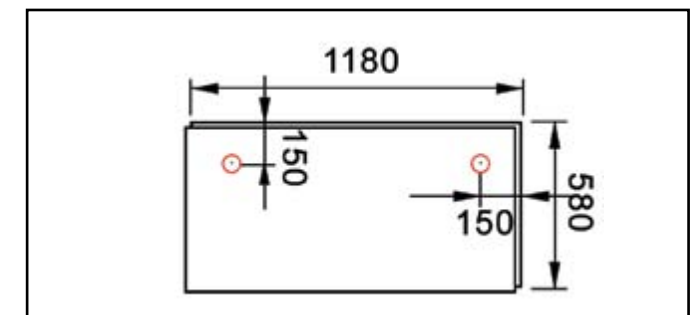
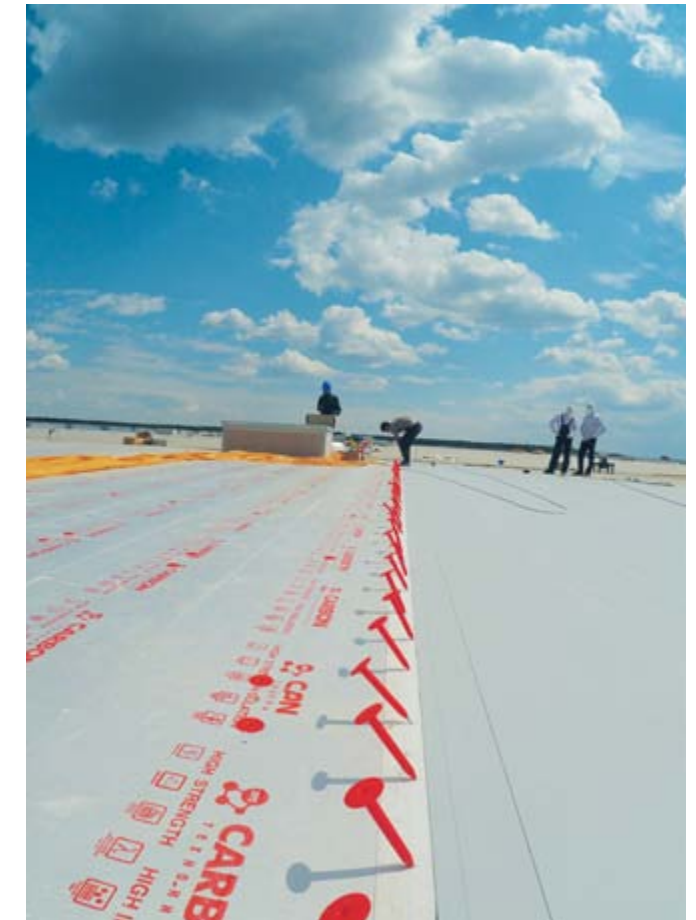


Figure 2 - Insulation slabs installation

When installing insulation slabs in two layers, the top layer thickness should be not less than the thickness of the lower insulation layer.



## TECHNONICOL CARBON ECO

### Descriptions of material:

XPS TECNONICOL CARBON ECO is a thermal insulation material with uniformly distributed closed cells, which does not absorb water, hot swell or shrink. It is chemical-resistant and is not subject to digestion.

High resistibility allows to receive equal and simultaneously rigid base, and it essentially increases term of operation of the whole thermal-insulation system.



### Field of application:

TECHNONICOL CARBON ECO – is an up-to-date thermal insulation material widely used in building and construction while arranging thermal protection of the basement, roofs, floors and facades.

### Physicomechanical characteristics

Thickness, mm	Heat conductivity		Compressive stress, under 10 % deformation (kPa)	Long term water absorption, %	
	Rd, m K/W	$\lambda_d, W (m^*K)$		Immersion	Diffusion
20	0,588	0,034	200	≤0,7	≤3,0
30	0,882				
40	1,176				

### Dimension

Name of product	Thickness, mm	Length, mm	Width, mm	Package quantity		
				slabs, pcs	m <sup>2</sup>	m <sup>3</sup>
TECHNONICOL CARBON ECO	20	1180*	580/600	20	14,4	0,27376
	30			13	8,8972	0,26692
	40			10	6,844	0,27376
TECHNONICOL CARBON ECO F** with the L- form edge	30	1180*	580/600	13	8,8972	0,26692
	40			10	6,844	0,27376

\*Slabs of other sizes can be produce by agreement with the customer

\*\*Slabs with a rough surface are used to increase adhesion to the protective layer of plaster in the heat insulation of facades.

According to tests slabs with a rough surface & micro grooves have twice better adhesion than slabs with the ruffle surface.



Slabs with a rough surface micro grooves are used to increase adhesion to the protective layer of plaster in the heat insulation of facades.

## XPS TECHNONICOL CARBON PROF 300

### Descriptions of material:

XPS TECHNONICOL CARBON PROF 300 is a thermal insulation material with uniformly distributed closed cells, which does not absorb water, well and shrink, is chemical-resistant and is not subject to digestion. High resistibility allows to receive equal and simultaneously rigid base, and it essentially increases term of operation of the whole thermal-insulation system. TECHNONICOL CARBON PROF 300 contains nano particles graphite that reflect heat radiation.



### Field of application:

TECHNONICOL CARBON PROF 300–is an up-to-date thermal insulation material, which widely used in building and construction while arranging thermal protection of the basement, roofs, floors, facades, thermal insulation of railways and highways.

### Physicomechanical characteristics

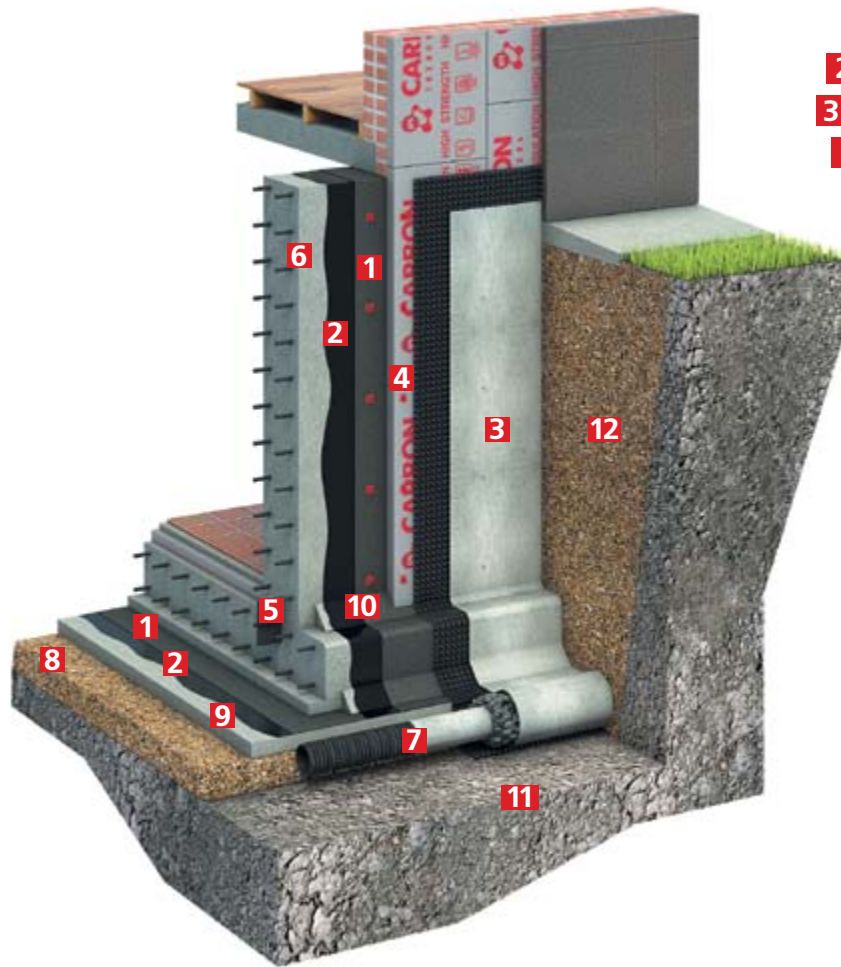
Thickness, mm	Heat conductivity		Compressive stress, under 10 % deformation (kPa)	Long term water absorption, %	
	Rd, m K/W	$\lambda_d, W (m^*K)$		Immersion	Diffusion
50	1,471	0,034	300	≤0,7	≤3,0
60	1,765				
70	2,059				
100	2,941				

### Dimension

Name of product	Thickness, mm	Length, mm	Width, mm	Package quantity		
				slabs, pcs	m <sup>2</sup>	m <sup>3</sup>
TECHNONICOL CARBON PROF 300	50	1180*	580	8	5,4752	0,27376
	60			7	4,7908	0,28745
	70			6	4,1064	0,28745
	80			5	3,422	0,27376
	100			4	2,7376	0,27376
TECHNONICOL CARBON PROF SLOPE	Slab J	1200	600	20	14,4	0,288
	Slab A			20	14,4	0,288
	Slab K			10	7,2	0,288
	Slab B			10	7,2	0,288
	Slab M			12	8,64	0,288
TECHNONICOL CARBON PROF F with the L- form edge	50	1180	580	8	5,4752	0,27376
	60			7	4,7908	0,28745
	80			5	3,422	0,27376

## TN – FOUNDATION DRAINAGE

Foundation insulation system with a residential underground floor



System description:

- 1 Waterproofing membrane Technoelast K-MS 170/3000
- 2 Bitumen primer TECHNOMICOL No. 01
- 3 Drainage membrane with geo-textile
- 4 Extruded polystyrene TECHNOMICOL CARBON ECO
- 5 Waterstop
- 6 Foundation wall
- 7 Drain pipe
- 8 Gravel layer
- 9 Concrete foundation base
- 10 Angle fillet
- 11 Soil
- 12 Backfill soil

### Scope of application:

**TN-FOUNDATION Drainage** system is used for protection of underground constructions in residential buildings or occupied premises constructed on clayed and loamy soils, regardless of ground water levels as well as in sandy soils when ground water levels are above a foundation slab level. The above-mentioned system is also recommended for use in the constructions located in filamentous watering area in cases of use in harsh environmental conditions like temperature and humidity.

### Description :

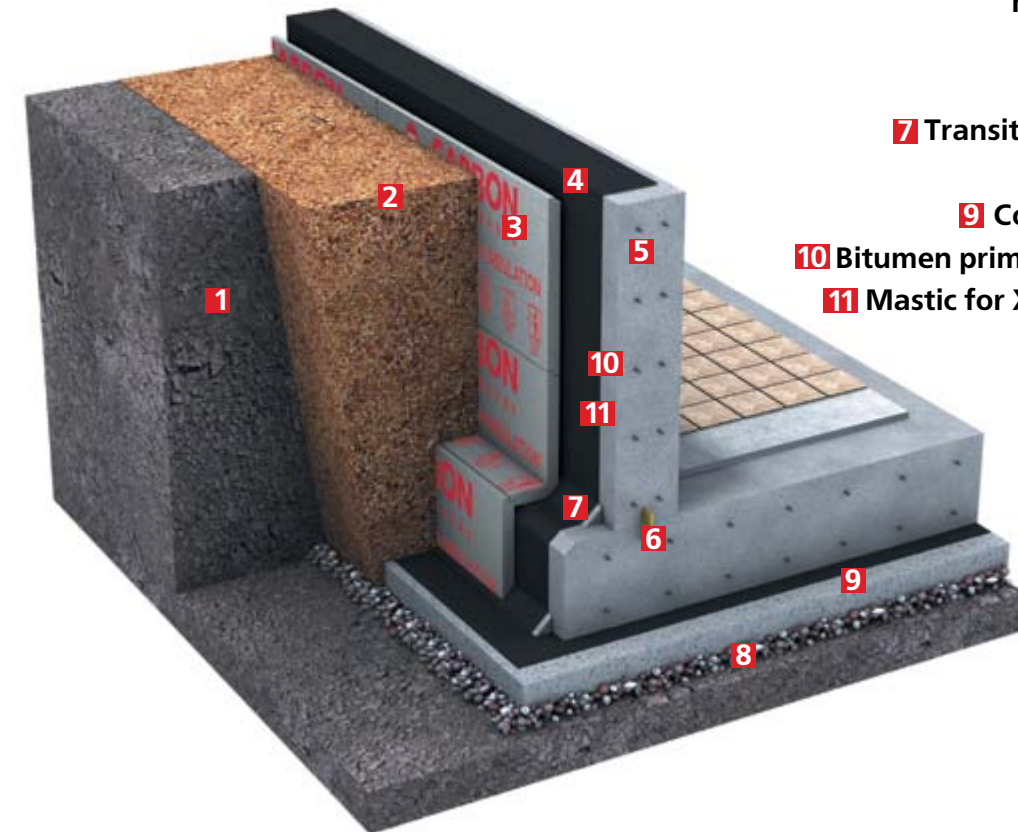
The necessity of having heat insulation is preconditioned by the fact that the heat loss through the cottage substructure amounts up to 20% of the total heat loss. Heat insulation of heated underground floors allows sufficiently decreasing any unreasonable heat loss. Heat insulation of non-heated underground floors provides an opportunity to maintain a constant temperature of 5–10°C throughout the year as well as to avoid the formation of condensation, dampness, and mold growth on the interior surfaces of the underground premises.

### Advantages:

- usable underground floor;
- foundation wall doesn't freeze up;
- additional protection of constructions and foundation elements in aggressive hydrological conditions

## TN – FOUNDATION THERMO SYSTEM

Foundation insulation system with a low level of ground water



System description:

- 1 Soil
- 2 Backfill soil
- 3 Extruded polystyrene TECHNOMICOL CARBON ECO
- 4 Waterproofing membrane Technoelast K-MS 170/3000, 2 layers
- 5 Foundation wall
- 6 Waterstop
- 7 Transitional upstand (molding)
- 8 Gravel layer
- 9 Concrete foundation base
- 10 Bitumen primer TECHNOMICOL No. 01
- 11 Mastic for XPS TECHNOMICOL № 27

### Scope of application:

**TN-FOUNDATION Thermo** system is used for the protection of underground constructions in residential buildings or occupied premises constructed on sandy soils with low ground water levels (below the foundation slab level) in cases when the depth of soil freezing is up to the foundation slab level. Additionally, horizontal heat insulation can be used under the perimeter pavement made of TECHNOMICOL CARBON polystyrene foam slabs.

### Description :

Water insulation of the underground part is assured by the application of two layers of Technoelast XPS torchable bitum-polymeric materials overlaying on the preliminarily prepared basis by way of application of the TECHNOMICOL primer. Application of the heat insulation layer made of TECHNOMICOL CARBON ECO/PROF extruded polystyrene foam allows preventing the foundation structure from freezing up. Thus, optimal temperature-humidity conditions for occupied premises as well as additional protection of a water insulation layer against mechanical damages and other negative factors are assured. TECHNOMICOL CARBON ECO/PROF extruded polystyrene foam is recommended to be used as a heat insulation layer.

### Advantages:

- ideal for a newly-constructed building;
- foundation wall doesn't freeze up;
- two-layer water insulation system;
- applicable in any hydrological conditions.

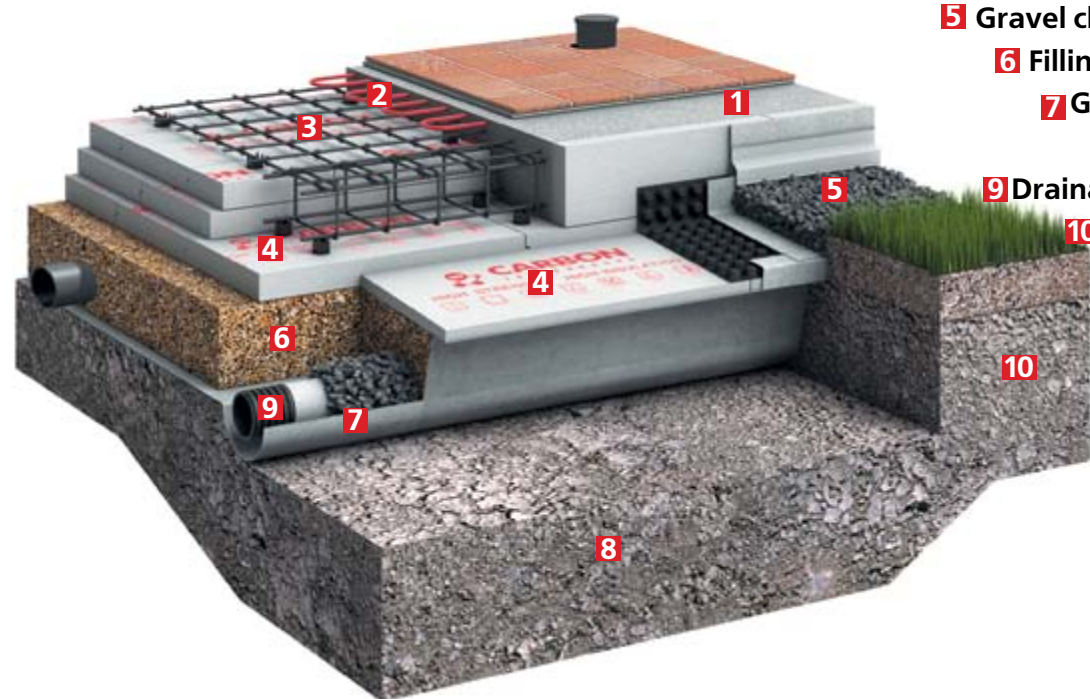


## TERMAL-INSULATED SWEDISH SLAB

Insulation of a shallow-buried foundation using the Swedish plate technology

System description:

- 1 Concrete
- 2 Floor thermal system
- 3 Reinforcement
- 4 Extruded polystyrene TECHNOLIC CARBON ECO SP
- 5 Gravel chippings
- 6 Filling (sand)
- 7 Geofabric
- 8 Soil
- 9 Drainage pipe
- 10 Topsoil



### Scope of application:

It is recommended during construction of buildings made of lumber, whole section timber, glued laminated timber, rounded logs, as well as building blocks, bricks, and stone. It is applicable for development sites with the following types of soil: sand, clay sand, clay loam, clay, water-saturated and weak soil (peat); development sites with difficult terrain: with level difference of up to 250 mm foundation lengthwise.

### Description:

Swedish slab technology incorporates the system of a heat-insulated solid-cast foundation slab and a communication network including a floor heating system. Comprehensive approach allows obtaining heat-insulated basis within a short period of time with the embedded engineering systems and a flat floor ready for laying tiles, installation of laminate floor boards, or other floor covering.

### Advantages:

- construction of a foundation slab takes up to 10–15 days, depending on its size and form;
- foundation slab surface is ready for installation of floor covering;
- heat insulation layer reliably protects against heat loss, which means reduced building heating expenses;
- soil under the heat-insulated slab does not freeze up minimizing problems on heaving soil;
- foundation laying does not require heavy equipment (except for a small truck tractor for excavation purposes).

### Efficiency:

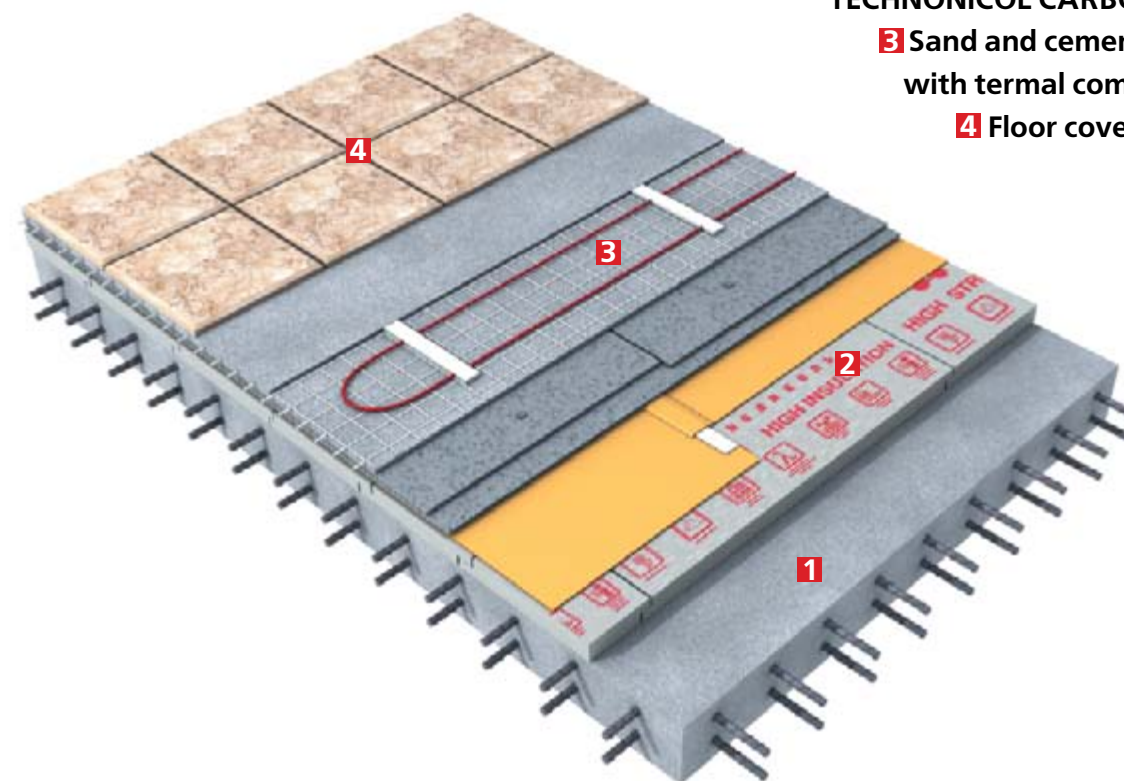
- heat insulation properties of the material comply with the European energy efficiency of building requirements;
- high compressive strength of XPS TECHNOLIC CARBON ECO SP, specifically at 2% linear deformation of more than 200 kPa, allows using the material in foundations and assure minimal shrinkage;
- minimal water absorption of XPS TECHNOLIC CARBON ECO SP 0.2% ensures exceptional durability, at least 40 years in humid conditions as compared to expanded foam.

## TN-THERMO FLOOR

Foundation insulation system using the Heated floor technology

System description:

- 1 Metal deck slab
- 2 Extruded polystyrene TECHNOLIC CARBON ECO
- 3 Sand and cement screed with thermal components
- 4 Floor covering, tile



### Scope of application:

**TN-Thermo Floor** system is designed for creating a floor heating system using electric heating cables. Warm floor system allows creating the most comfortable conditions for stay inside, reducing the costs for the main heating. The system offers an opportunity to not use main heating at all.

### Description:

Application of only 20 mm-thick extruded polystyrene foam layer allows a significant decrease in thermal energy flux in undesirable directions due to high heating insulation properties, which maximizes heat-generating layer (electric heaters) efficiency. Use of extruded polystyrene foam when the heating system is off allows a significant decrease in heat loss, which is impossible when installing standard foil-coated materials in warm floor systems. Warm floor structure using extruded polystyrene foam also has great sound insulation properties: impact noise level decreases up to 28 dB. Thus, the requirements for flooring insulation in residential buildings with the highest categories of acoustic comfort are met.

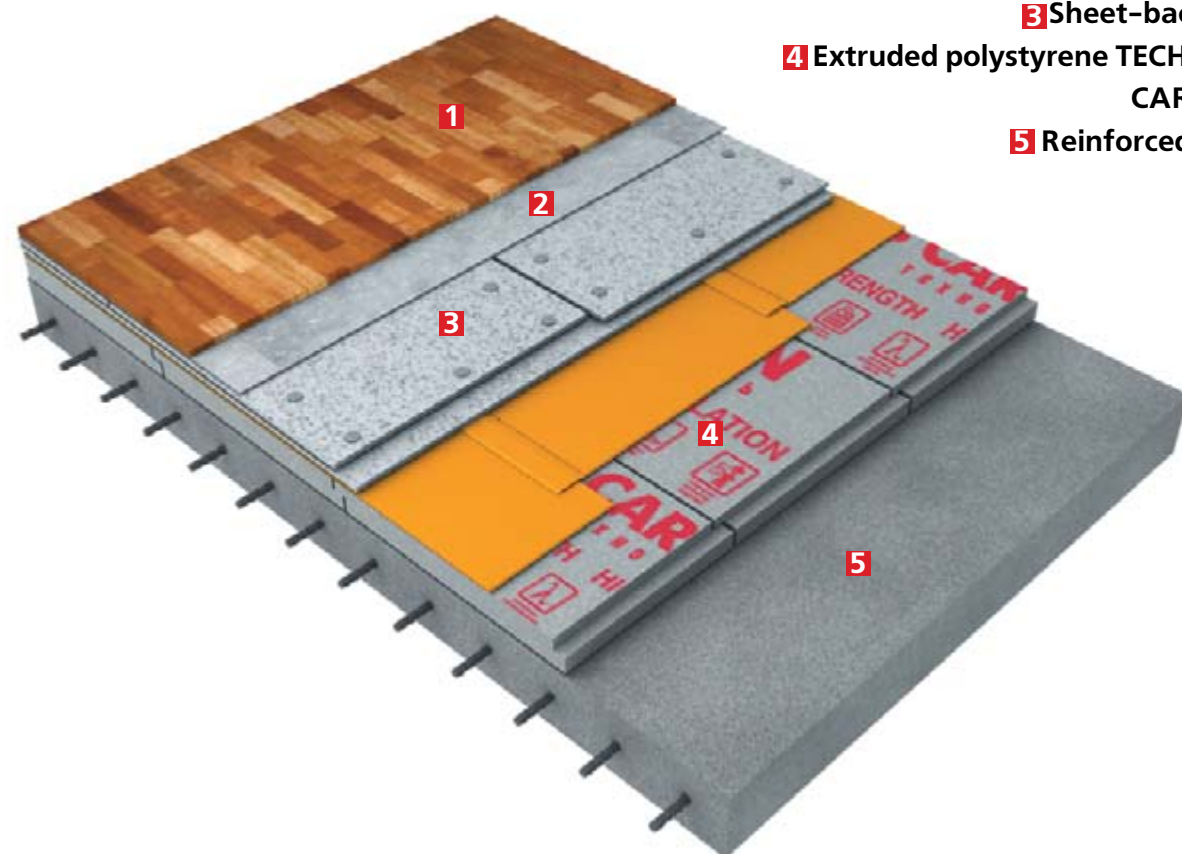
### Advantages:

- decrease in thermal fluxes in undesirable directions;
- substantial electricity savings;
- due to high thermal and technical properties of TECHNOLIC CARBON slabs, warm floor continues its operation for another 24 hours with an electrical heating component switched off!
- sound insulation up to 28 dB.



## TN-STANDARD FLOOR

Floor insulation system



System description:

- 1 Wooden flooring or laminated
- 2 Base sheet
- 3 Sheet-backing coat
- 4 Extruded polystyrene TECHNONICOL CARBON ECO
- 5 Reinforced concrete

### Scope of application:

**TN-Standard FLOOR** is a widely known system. It is used for sound and heat insulation of flooring, residential, public and administrative buildings.

### Description:

TECHNONICOL CARBON ECO/PROF extruded polystyrene foam is widely used in private house construction and repair. TECHNONICOL CARBON ECO/PROF is perfectly suited for heat insulation of floors in residential building, for example, in a city apartment or a cottage. As a rule, floors do not experience big loads in such premises.

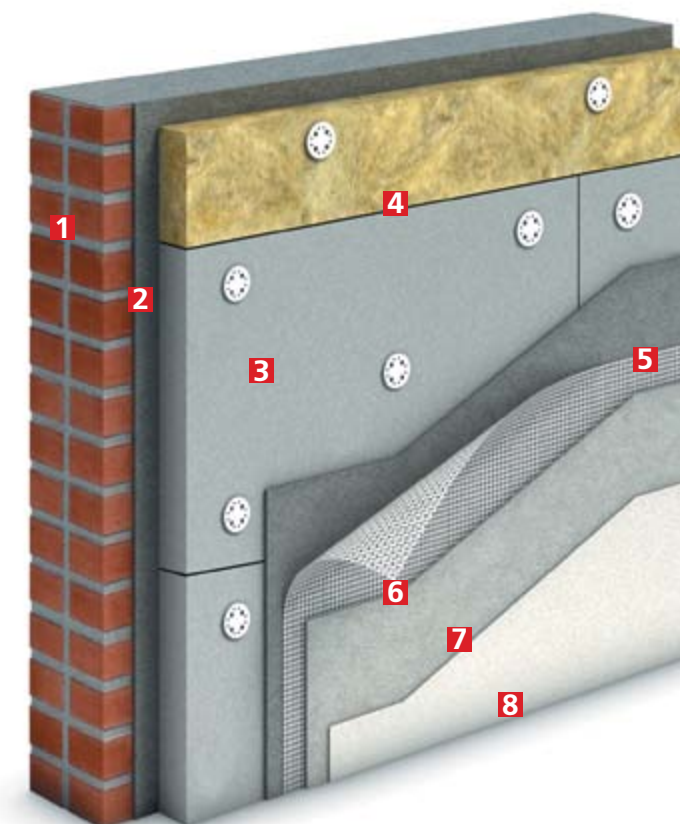
Heat insulation made of TECHNONICOL CARBON ECO/PROF extruded slabs possesses reasonable strength to make light-weight floor with the use of only dry technological solutions, i.e. when sheet-backing coat is used as a distributing course and is made, for example, of two sheets of gypsum plasterboard, oriented strand board, and cement bonded particle board. Sheet-backing coat sheets should be either glued onto each other or interconnected mechanically.

### Advantages:

- no need for classical wet coating;
- quick installation of the construction;
- ideal for private house construction and reparation.

## TN-COMBI FACADE

Insulation solutions for facade plaster, socles, and other structures



System description:

- 1 External wall
- 2 Leveling course
- 3 Extruded polystyrene TECHNONICOL CARBON ECO FAS
- 4 Stone wool
- 5 Base plaster layer
- 6 Reinforcing net
- 7 Decoration plaster
- 8 Finish coat

### Scope of application:

**TECHNONICOL XPS CARBON ECO FAS** slabs are recommended for basements of facades, e.g. ventilated cladding, layer-built masonry, or plaster systems with a heat insulating layer of TECHNONICOL mineral wool.

### Description:

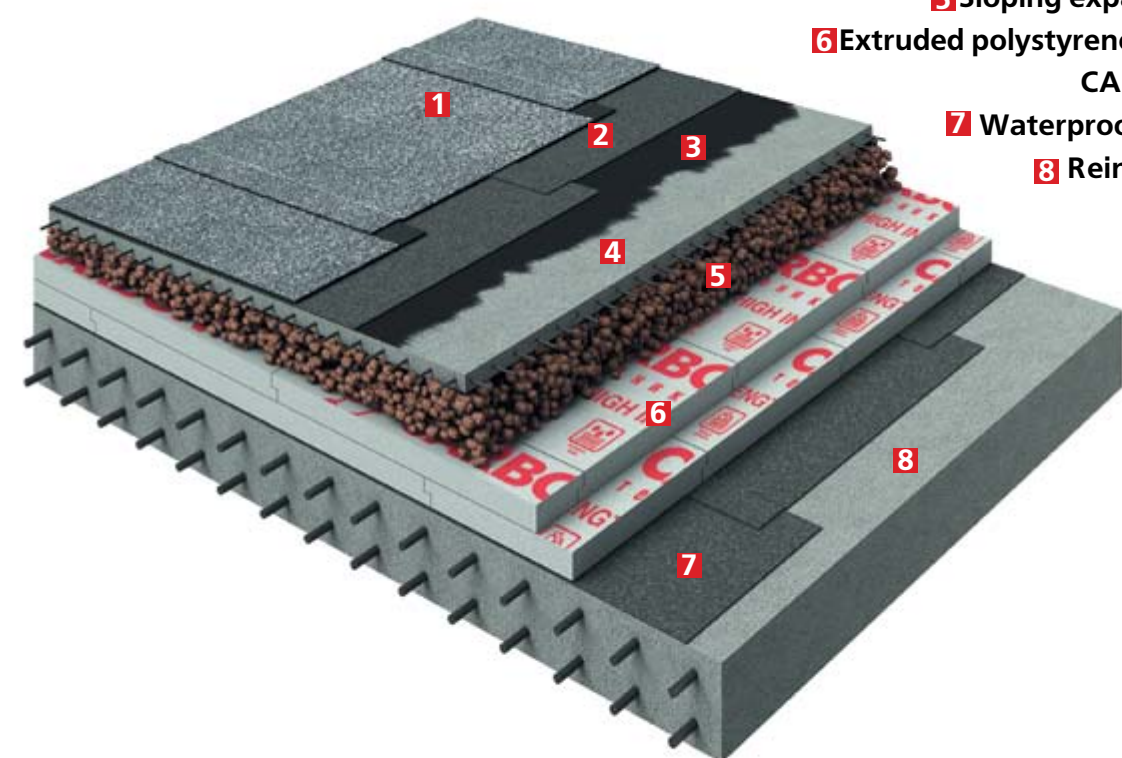
XPS TECHNONICOL CARBON has a very low thermal conductivity, making it one of the most efficient thermal insulation materials in facades construction. In many structures, when choosing a material, water absorption is crucial. Over time, any water absorbing material loses substantial part of its insulating properties unlike XPS TECHNONICOL CARBON slabs with their minimal water absorption properties. Therefore, their insulating properties remain unchanged during their entire service life. TECHNONICOL CARBON ECO FAS slabs of extruded polystyrene with a special machined surface and adhesive grooves allow for faster facade erection due to their constructability. Milled surface and grooves increase adhesion to the plaster and adhesive layer. Thus, it allows reducing efforts and saving time when it comes to the slab surface processing. Slabs are easy to cut and resistant to damage during installation.

### Advantages:

- high adhesion of adhesive compounds;
- suitable for facade basements;
- increased compressive strength;
- ultimate geometry fidelity;
- green product;
- reduced heat loss on facades and in basements.

## TN-STANDARD ROOFING SYSTEM

Roofing insulation system for industrial and public buildings with load-bearing structures of reinforced concrete



System description:

- 1 Waterproofing membrane Technoelast K-MS 170/3000
- 2 Waterproofing membrane Technoelast VENT EPV
- 3 Bitumen primer TECHNINICOL No. 01
- 4 Reinforced sand cement screed
- 5 Sloping expanded clay layer
- 6 Extruded polystyrene TECHNINICOL CARBON PROF 300
- 7 Waterproofing membrane
- 8 Reinforced concrete foundation

### Scope of application:

**TN-Standard ROOFING SYSTEM** is used for installation of roofing in industrial and public-purpose premises with reinforced concrete bearing constructions. This is a traditional system of roofing pie which has long proved its worth since the times of application of ruberoid water insulation. It is popular among construction and operating companies due to its high reliability and maintainability.

### Description:

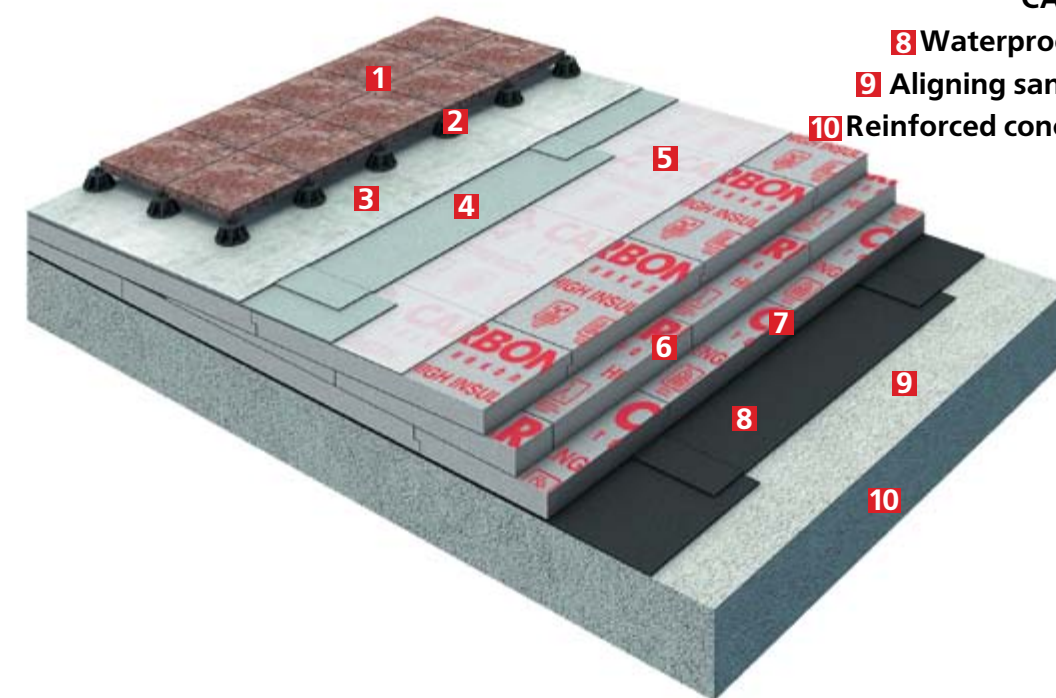
TECHNINICOL CARBON PROF extruded polystyrene foam is used as a heat insulation layer which is characterized by low thermal conductivity, minimal water absorption, and high compressive strength. All these advantages of the TECHNINICOL CARBON PROF extruded polystyrene foam make it exclusively beneficial within the TN-Standard ROOFING SYSTEM.

### Advantages:

- classic solution for your roof;
- reliable heat insulation;
- opportunity to choose a variety of roofing colors.

## TN – TERRACE ROOFING SYSTEM

Ballast inversion roofing with bitumen-polymer waterproofing coating



System description:

- 1 Paving slab
- 2 Plastic supports
- 3 Needle-punched heat-treated geofabric
- 4 PVC waterproofing membrane
- 5 Separating layer – glass-fibre wrapping material, 100 g/m<sup>2</sup>
- 6 V-shaped slab roof sloping TECHNINICOL CARBON PROF SLOPE
- 7 Extruded polystyrene TECHNINICOL CARBON PROF 300
- 8 Waterproofing membrane
- 9 Aligning sand cement screed
- 10 Reinforced concrete foundation

### Scope of application:

**TN-Terrace ROOFING SYSTEM** has been designed with due regard for the requirements to foot load. It is used for construction on the roofs of modern multi-functional complexes. The application of plastic supports allows installing slabs with zero sloping, lightening roofing weight, and avoiding the formation of puddles on the roof surface.

### Description:

TN-Terrace ROOFING SYSTEM is designed for the lightweight version of the roofing to withstand foot load with water insulation covering based on polymeric membranes. The difference of this solution is that there is no screed on the heat insulation layer, which leads to the reduction of labor intensity, the cost, and weight of the roof covering. Paving slab is installed on special plastic supports. TN-Terrace ROOFING SYSTEM is a particular case of a ballast system in which paving slabs perform the role of the ballast. The advantage of the ballast system lies in the better protection of the roof covering against mechanical damages. Moreover, the roof covering is in a lesser degree exposed to the obsolescence caused by UV radiation.

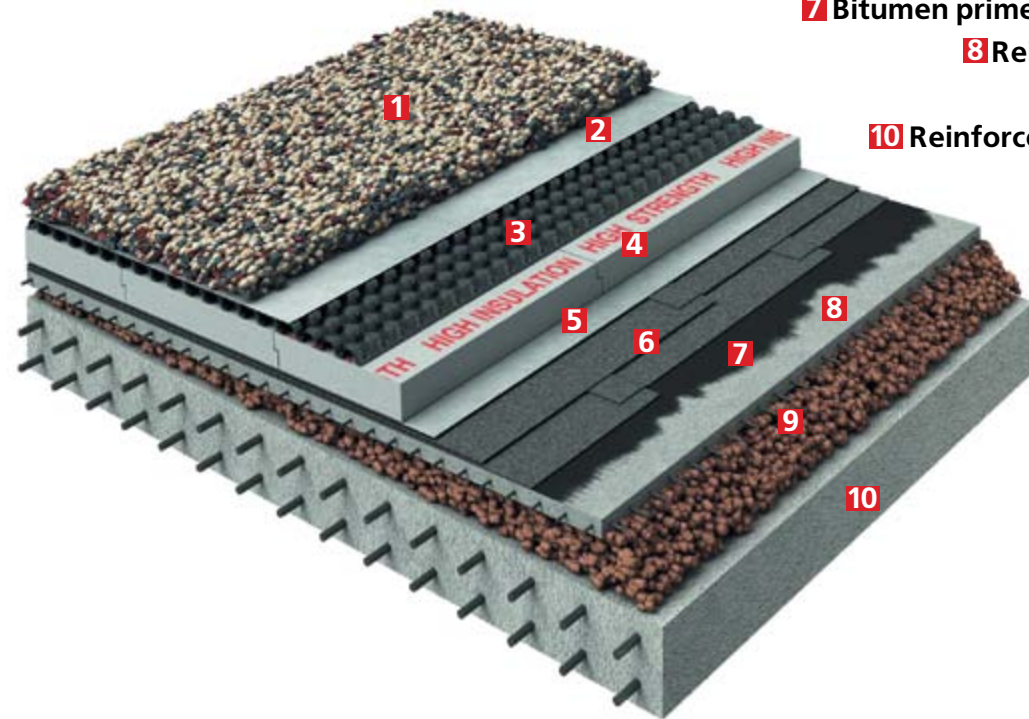
### Advantages:

- foot load resistance;
- protection of roof materials against overheating and direct exposure to UV radiation;
- possibility to install slabs in order to create zero roof sloping.



## TN-ROOFING SYSTEM INVERSE

Public roof on plastic supports

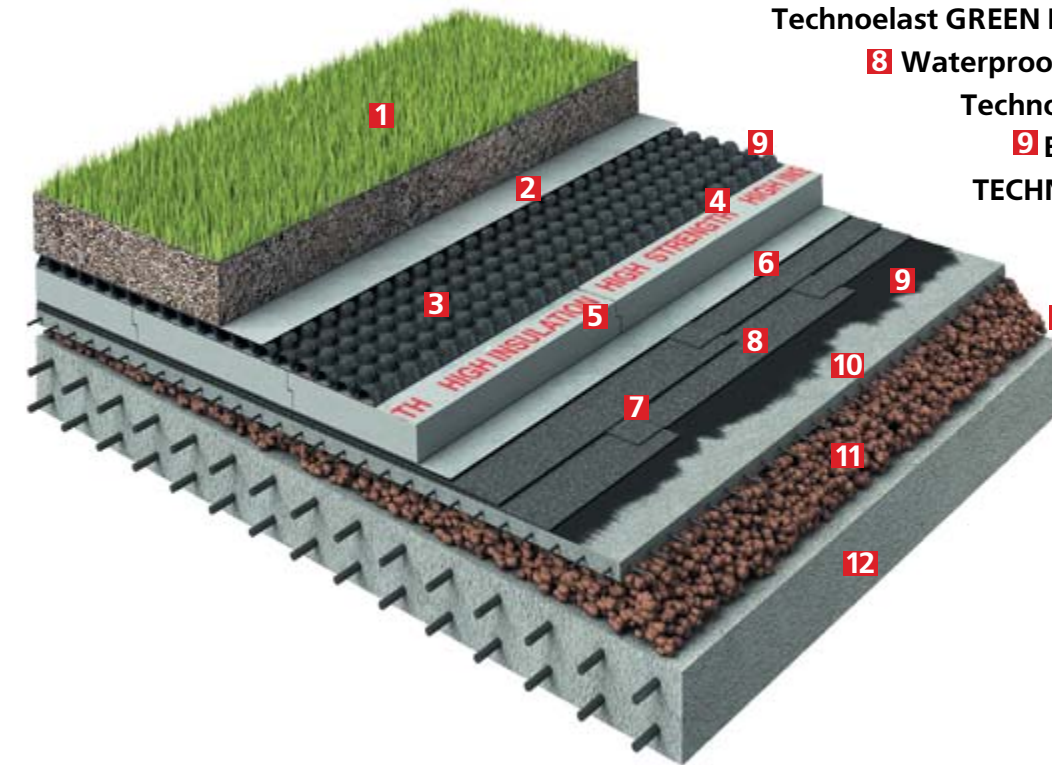


System description:

- 1 Ballast bed – gravel and gravel chippings graded 20–40 mm.
- 2 Geotextile, 150 g/m<sup>2</sup>
- 3 Drainage membrane
- 4 Extruded polystyrene TECHNOMICOL CARBON PROF 300
- 5 Geotextile, 300 g/m<sup>2</sup>
- 6 Waterproofing membrane Technoelast SBS EPP – 2 layers
- 7 Bitumen primer TECHNOMICOL No. 01
- 8 Reinforced cement screed
- 9 Sloping layer
- 10 Reinforced concrete foundation

## TN-ROOFING SYSTEM GREEN

Public roof with green spaces



System description:

- 1 Soil with green planting
- 2 Geotextile, 150 g/m<sup>2</sup>
- 3 Drainage membrane
- 4 Geotextile, 150 g/m<sup>2</sup>
- 5 Extruded polystyrene TECHNOMICOL CARBON PROF 300
- 6 Geotextile, 300 g/m<sup>2</sup>
- 7 Waterproofing membrane Technoelast GREEN K-MS 170/3000
- 8 Waterproofing membrane Technoelast SBS EPP
- 9 Bitumen primer TECHNOMICOL No. 01
- 10 Reinforced cement screed
- 11 Sloping layer
- 12 Reinforced concrete foundation

### Scope of application:

**TN-Inverse ROOFING SYSTEM** is used for installation of ballast non-usable roofs in accordance to the inverse scheme (water insulation under heat insulation) in residential and public buildings and premises with the use of roof covering made of bitum-polymeric materials. Such system is convenient to be used for roofing in the regions with permanently low ambient temperatures as well as in the buildings with multi-level roofs.

### Description:

Inverse laying system is used for roofs with balustrades; the slope should not exceed 3%. Steam insulation is not used. In this case, roof membrane plays the role of steam insulation. Only TECHNOMICOL CARBON PROF extruded polystyrene foam is used as heat insulation due to the fact that it has minimal water absorption, low thermal conductivity, as well as it is capable of withstanding high operating loads. In inverse systems, it is recommended to use Technoelast EPP bitum-polymeric torchable materials laid in 2 layers. Roof covering is kept in place by the weight of an insulating material and ballast bed laid on top of it.

### Advantages:

- wide choice of compatible foundation materials;
- perfect weather resistance – water insulation properties are active at a constant temperature;
- easy to upgrade the roofing system during a total renovation.

### Scope of application:

**TN-Green ROOFING SYSTEM** is used for construction on the roofs of modern multi-functional complexes and requires minimal human intervention for the effective operation during its entire service life. The method of its operation depends on the owner's imagination only. This system implies soil with landscaped area serving as the ballast.

### Description:

The advantages of inverse roofs can be fully observed when installing the roofs with landscaped area, the so called green roofs. Green roofs perform a number of functions in modern city planning. For example, they ensure the increase in the number of green plants and heat protection of the roof. Inverse roofing is installed only on concrete foundations, the slope of which should not exceed 10%.

### Advantages:

- opportunity to create leisure area on a roof;
- ecological compatibility of a solution;
- additional sound insulation of the roof from external impact;
- up-to-date design solution.



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