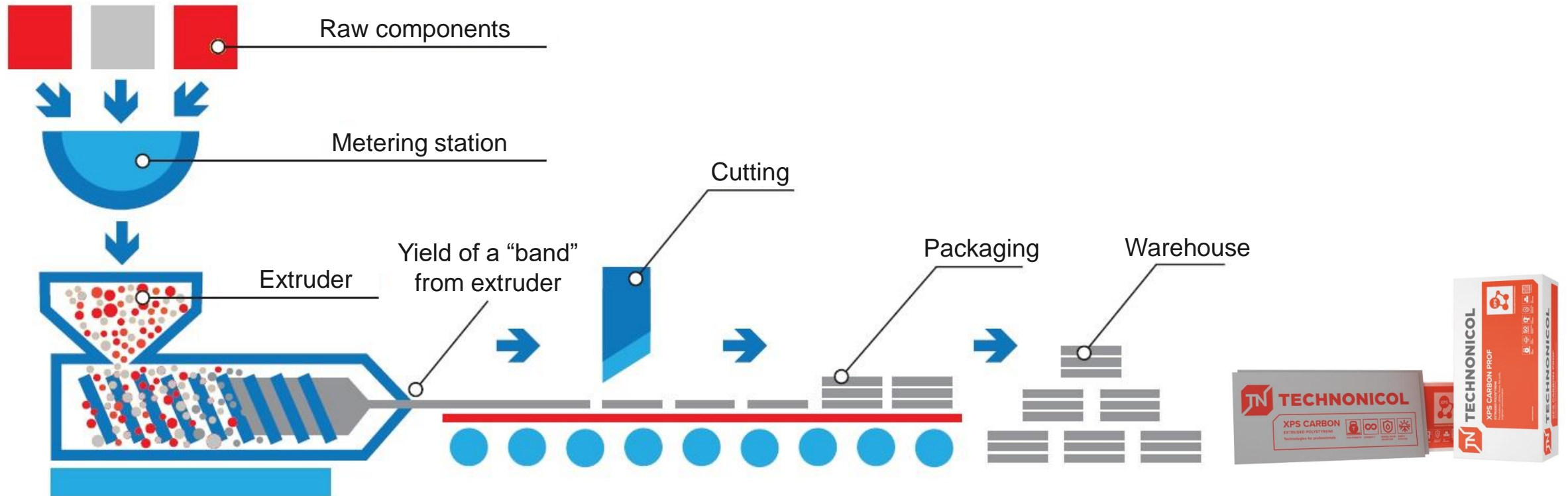


XPS TECHNONICOL CARBON

EXTRUDED POLYSTYRENE FOR MODERN CONSTRUCTION SOLUTIONS

XPS PRODUCTION PRINCIPLE:

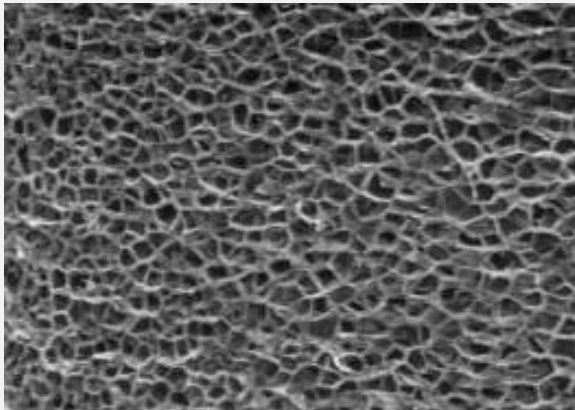


STRUCTURE OF XPS:

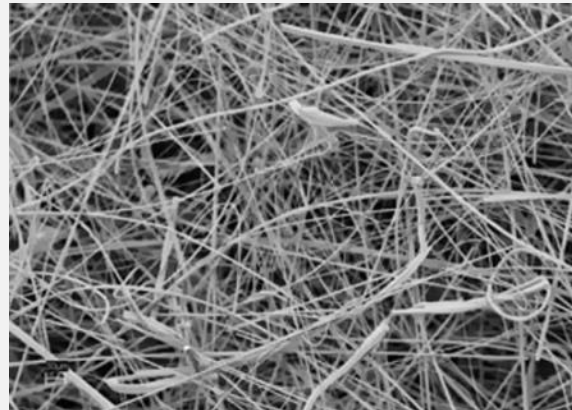
High-quality extruded polystyrene possesses closed-pore structure with equal cells throughout the material.

Comparison of structure of various thermal insulation

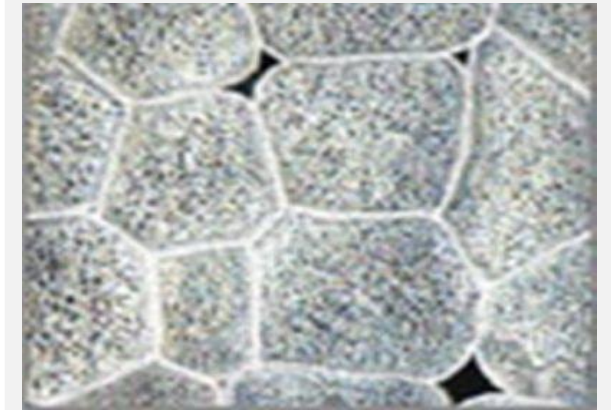
XPS



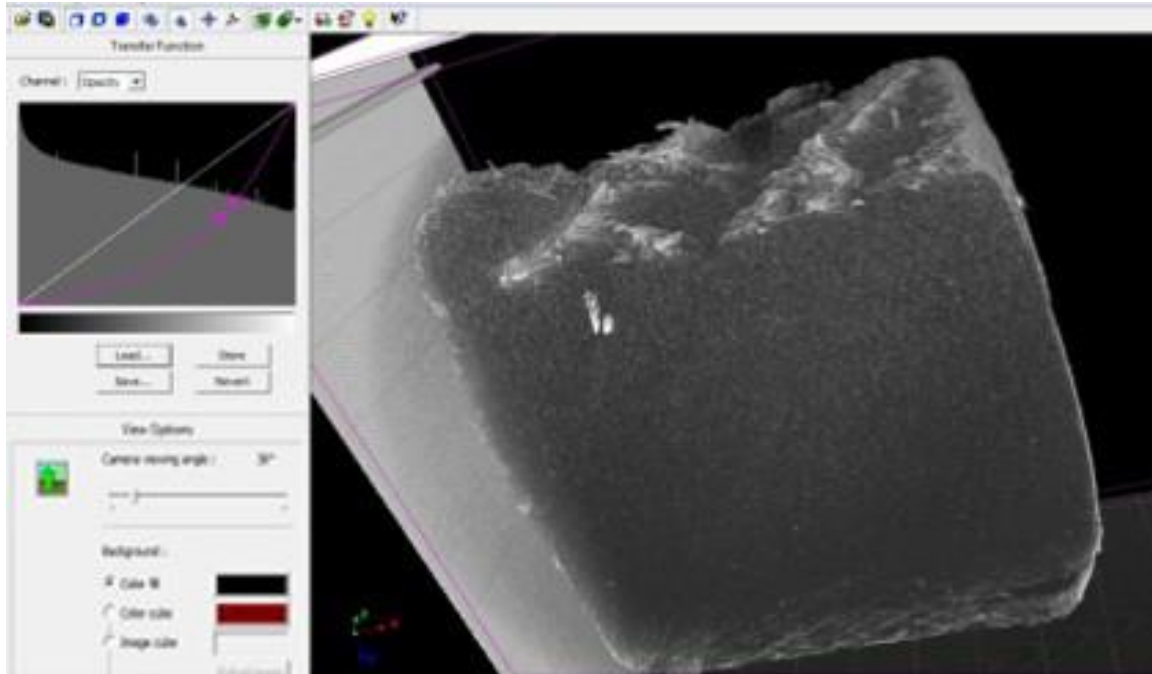
STONE WOOL



EPS

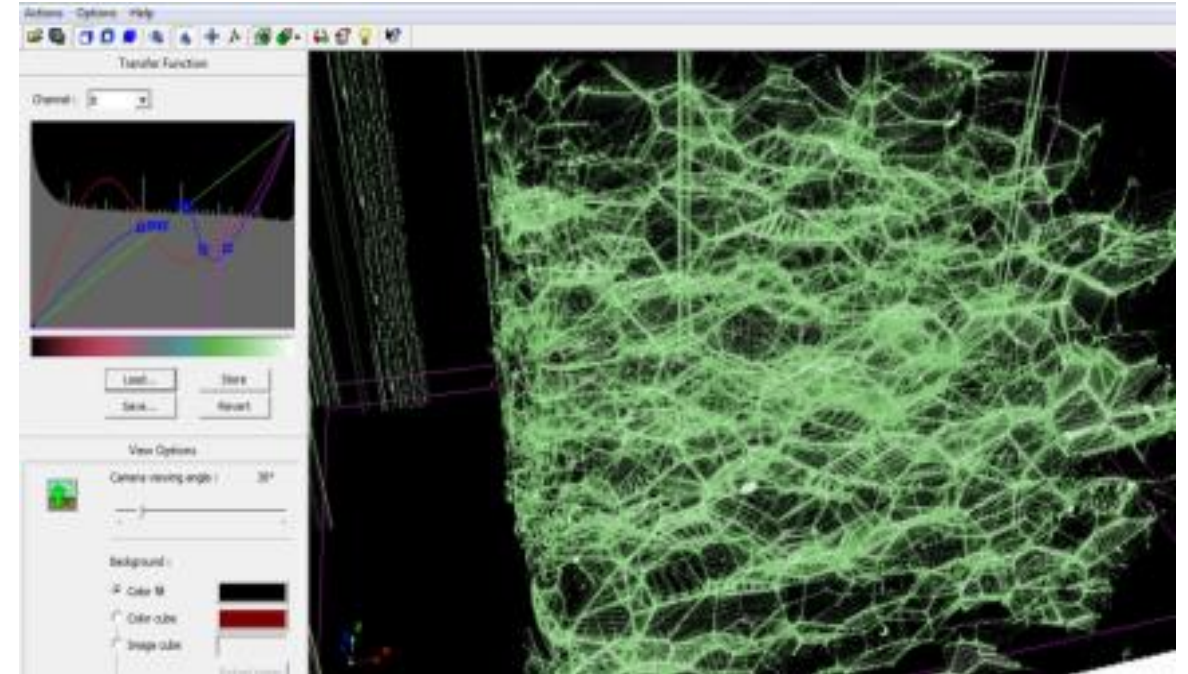


STRUCTURE: MICROTOMOGRAPHY – COMPARISON OF STRUCTURE OF VARIOUS XPS



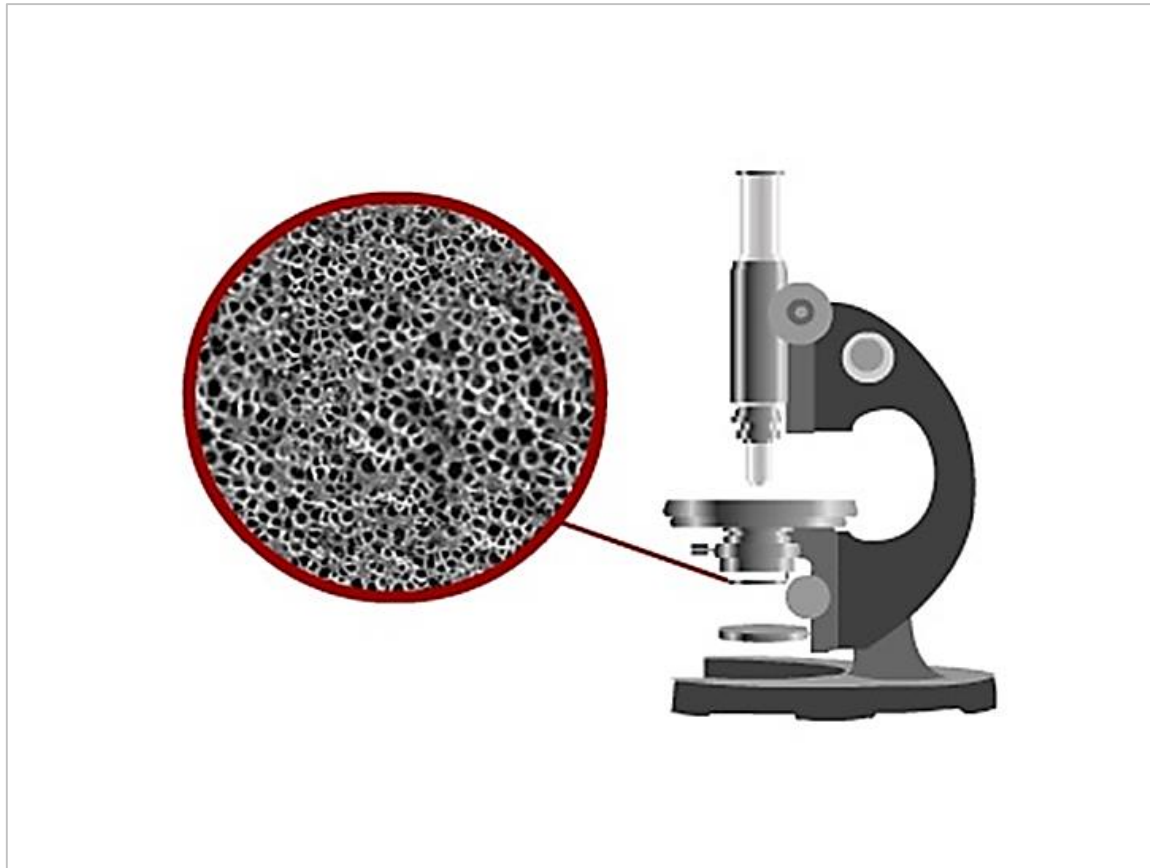
XPS TECHNOMICOL:

- Uniform structure
- Minimal size of the cells of 0.1-0.2 mm provides low water absorption and high strength of the material
- Long-life material



ANOTHER XPS:

- Non-uniform structure
- Large cells, which lower strength of the material and increase water absorption of the material
- Short service life



STRUCTURE: UNIQUE COMPOSITION WITH NANOGRAFITE



Since 2011 XPS TECHNONICOL is being produced with addition of nano-sized graphite particles to the structure of the material.

Unique nanographite technology enabled significant increase of thermal efficiency and physic-mechanical properties of thermal insulation.



Protects facilities from thermal losses. Warm winters, comfortable summers!

ENERGY EFFICIENCY



Thermal conductivity is a property of material to conduct heat throughout itself. The lower thermal conductivity, the warmer the material.

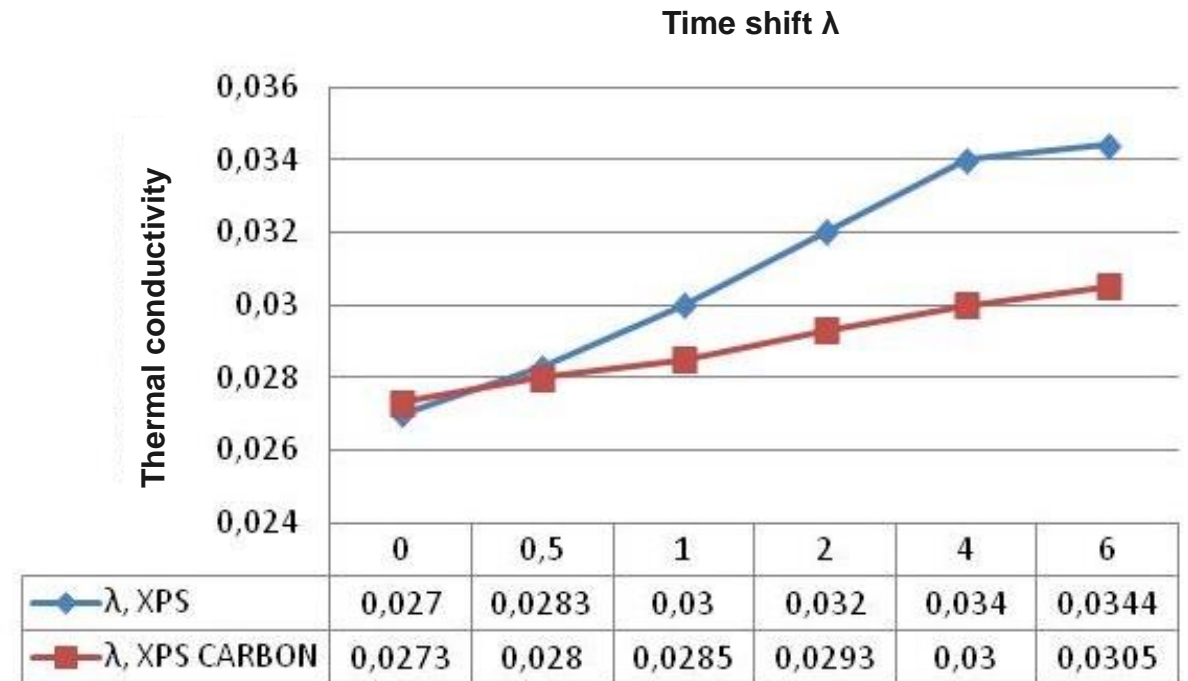
According to the results of the trials, thermal conductivity coefficient of XPS TECHNOMICOL is $0.028-0.034$ (25 ± 5) °C, W/m*K.

Moreover, this value almost does not alter during operation. Due to low thermal conductivity coefficient XPS TECHNOMICOL is an efficient thermal insulation.



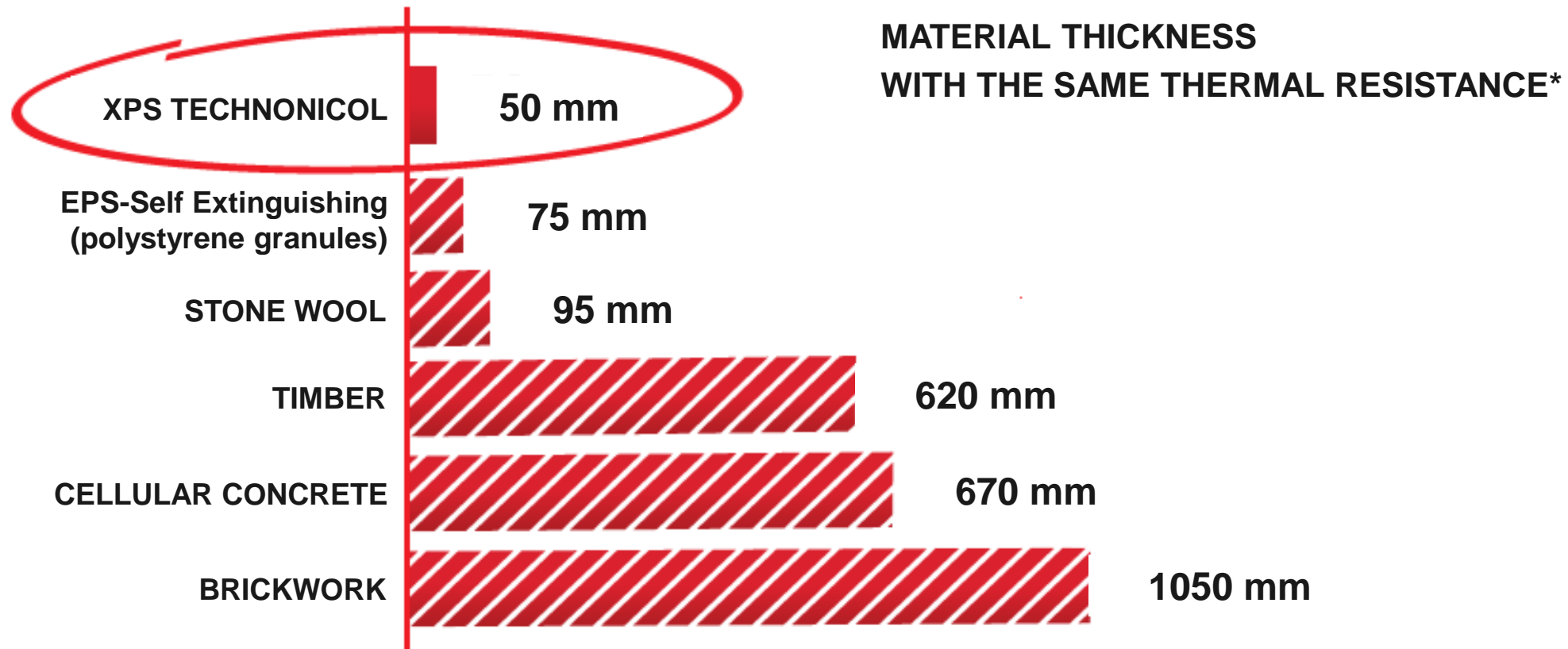
ENERGY EFFICIENCY

Thermal conductivity comparison of XPS TECHNONICOL and another XPS without graphite (carbon).

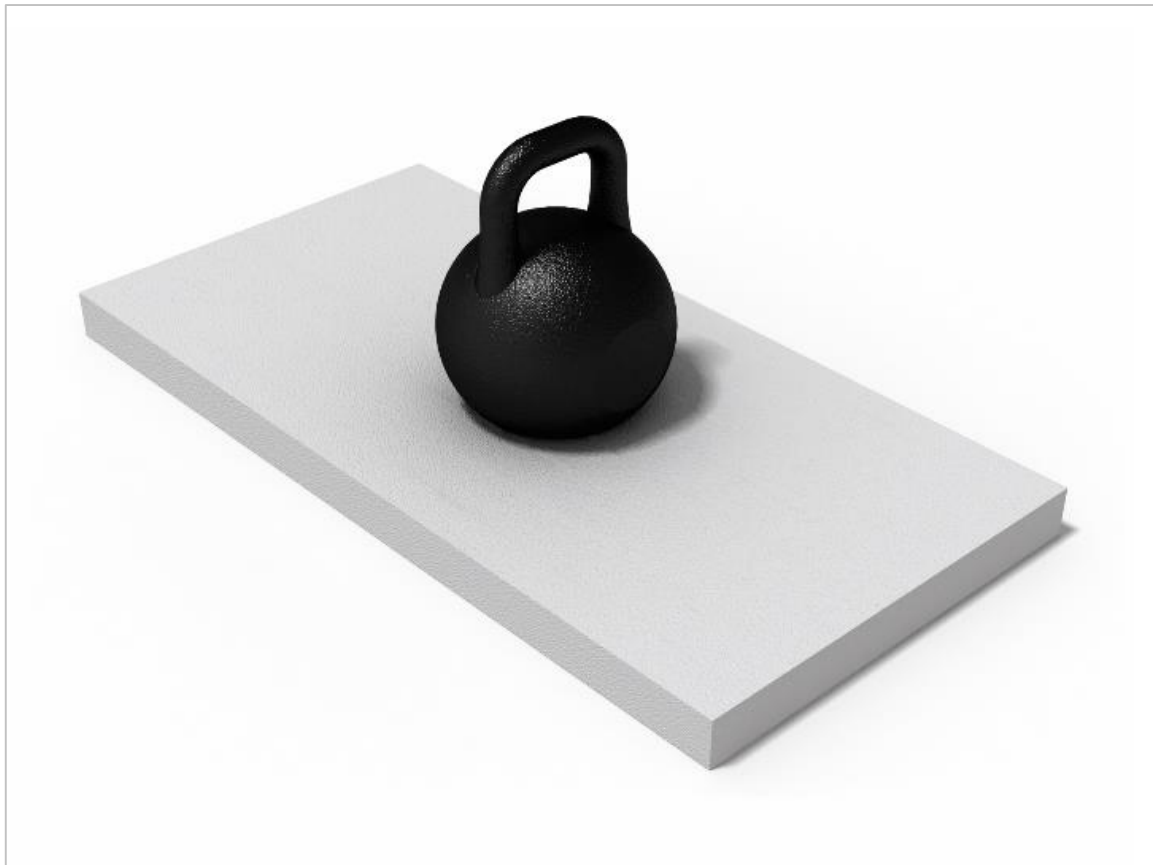


ENERGY EFFICIENCY

Due to low thermal conductivity coefficient one needs less amounts of XPS TECHNONICOL thermal insulation compared with other thermal insulations.



*This calculation is a recommendation.



Compression strength at 10% linear deformation not less than 200 kPa = **20 tons per m²**.

HIGH STRENGTH

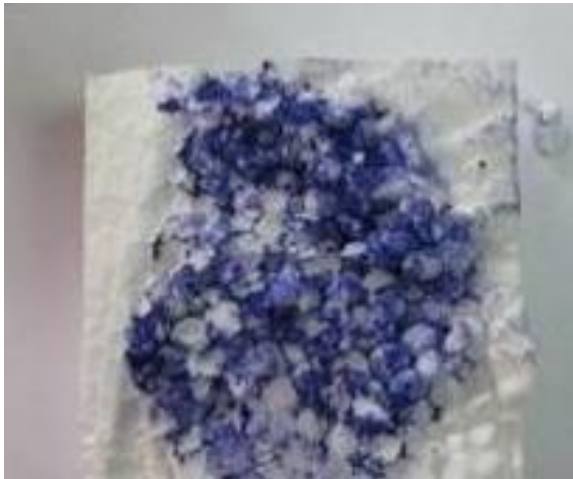
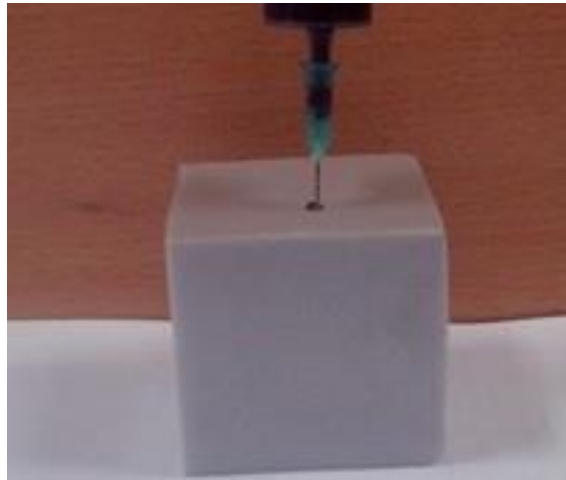
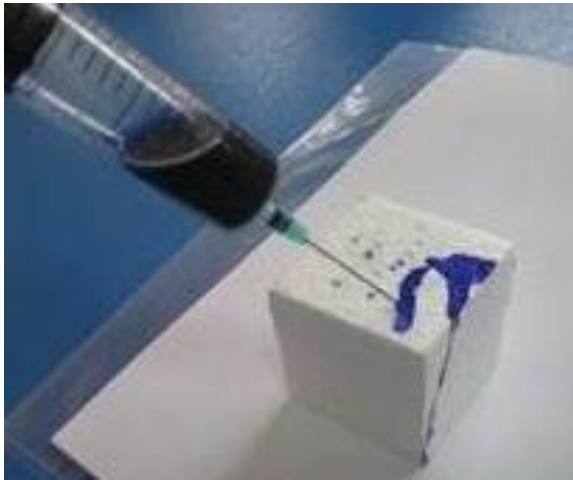


High strength enables using of XPS TECHNONICOL in loaded constructions:

- Foundations
- Stylobate
- Load-bearing roofs
- Road construction

Types of strength:

- Compression strength at 10% deformation
- Bending strength



EPS

XPS TECHNONICOL

MINIMAL WATER ABSORPTION



XPS TECHNONICOL possesses almost zero water absorption coefficient:

- Does not absorb water during operation
- Does not swell and disintegrates



The material does not lose its main properties with time, thus is highly durable.

Technical Conclusion on Compliance of extruded expanded polystyrene (XPS) supplied by Technonicol to the new System LLC for the order of PPR qualified facilities

№	№	№	№	№	№
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10

Form 11/2018



ENVIRONMENT-FRIENDLY AND SAFE



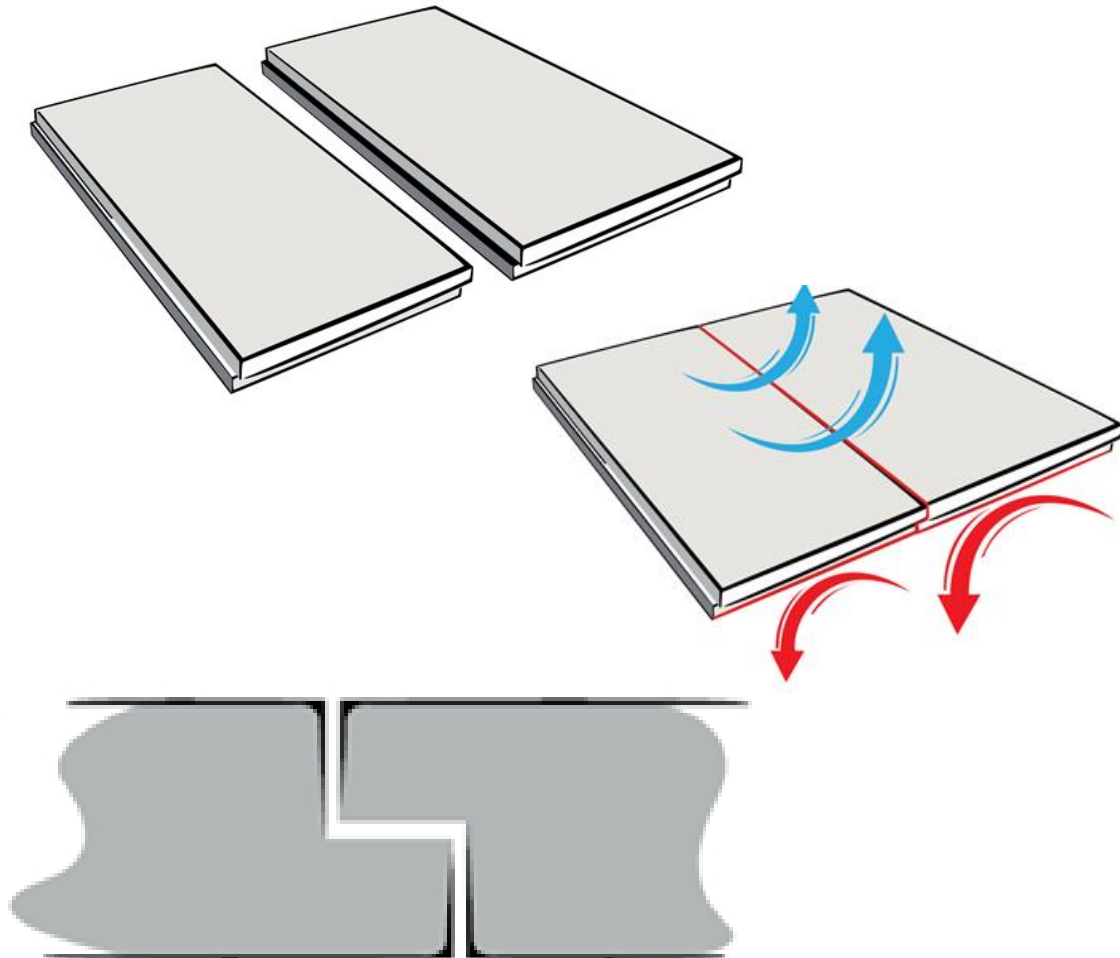
XPS TECHNICONICOL is eco-friendly and safe, which is proved by the corresponding certificates:

- Eco-certificate VITALITY LEAF
- LEED expert evaluation
- Does not emit harmful agents
- Highly biostable (proved by Testing Center “Biostoykost” of MSU Ecocenter)
- Is not a nutrient for gnawers (proved by Institute for Disinfectology)



XPS is produced from general-purpose polystyrene. Food containers are also produced from such polystyrene.

SIMPLE INSTALLATION



APPLICATION TEMPERATURE



From -70 °C up to +75 °C.





Unpacked product should be kept away from direct sun light!

RELIABLE PACKAGE:

- Precipitations have no impact on the product, thus the material can be stored outside
- Packed in “UV-film”, thus is not affected by the sun
- The product is palletized, which makes storage convenient and prevents the product from being thrown in all directions with the wind



MATERIALS RANGE

TECHNONICOL CARBON ECO

XPS TECHNONICOL CARBON ECO is a thermal insulation material with uniformly distributed closed cells, which does not swell, shrink or absorb water. It is chemically resistant and is not a subject to putrefaction. The high strength of the material allows receiving an equal and simultaneously rigid base that essentially increases the durability of the whole thermal insulation system.

AREAS OF APPLICATION:

TECHNONICOL CARBON ECO is used in buildings and constructions while arranging the thermal insulation of basements, roofs, floors and facades.

Properties	Performance
Thermal conductivity, λ_D , W/m ² *K	0.028-0.034
Compressive stress at 10% deformation, kPa	≥200
Long term water absorption by immersion WL(T) 0.7, %	≤0.7
Reaction to fire – ignitability, Euroclass	F
Density, kg/m ³	20-30

DIMENSION:



- Length = 1180-4000 mm
- Width = 580-650 mm
- Thickness = 20-100 mm



TECHNONICOL CARBON PROF 300

XPS TECHNONICOL CARBON PROF 300 is a thermal insulation material with uniformly distributed closed cells, which does not swell, shrink or absorb water. It is chemically resistant and is not a subject to putrefaction. The high strength of the material allows receiving an equal and simultaneously rigid base that essentially increases the durability of the whole thermal insulation system.

AREAS OF APPLICATION:

TECHNONICOL CARBON PROF 300 is used in buildings and constructions while arranging the thermal insulation of basements, roofs, floors and facades, construction of railways and highways.

Properties	Performance
Thermal conductivity, λ_D , W/m*K	0.028-0.034
Compressive stress at 10% deformation, kPa	≥ 300
Long term water absorption by immersion WL(T) 0.7, %	≤ 0.7
Reaction to fire – ignitability, Euroclass	F
Density, kg/m ³	25-35

DIMENSION:



- Length = 1180-4000 mm
- Width = 580-650 mm
- Thickness = 50-200 mm



TECHNONICOL CARBON SOLID 500

XPS TECHNONICOL CARBON SOLID 500 is a thermal insulation material with uniformly distributed closed cells, which does not swell, shrink or absorb water. It is chemically resistant and is not a subject to putrefaction. Record high compressive stress performance of the material at deformation makes TECHNONICOL CARBON SOLID 500 the best choice for the most important and complicated projects.

AREAS OF APPLICATION:

TECHNONICOL CARBON SOLID 500 is used in buildings and constructions while arranging the thermal insulation of basements, operated roofs, loaded floors, foundations of transportation facilities.

Properties	Performance
Thermal conductivity, λ_D , W/m*K	0.028-0.034
Compressive stress at 10% deformation, kPa	≥ 500
Long term water absorption by immersion WL(T) 0.7, %	≤ 0.7
Reaction to fire – ignitability, Euroclass	F
Density, kg/m ³	30-45

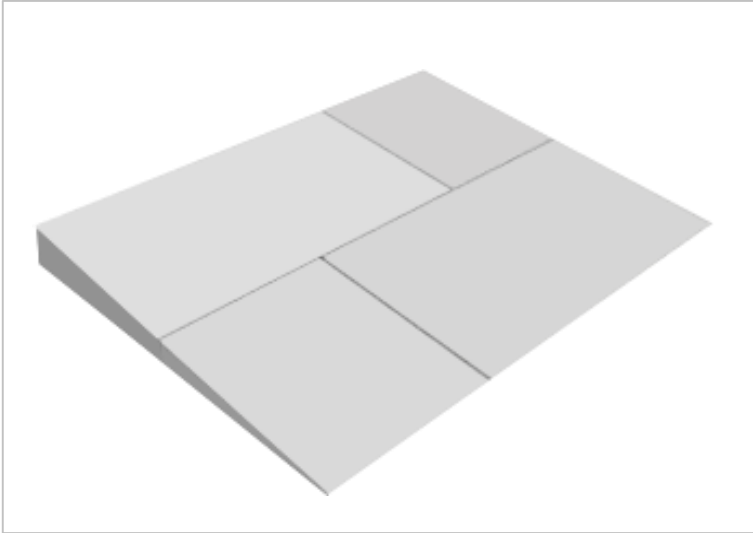
DIMENSION:



- Length = 1180-4000 mm
- Width = 580-650 mm
- Thickness = 40, 50, 60, 100 mm



ADDITIONAL SLABS TYPE



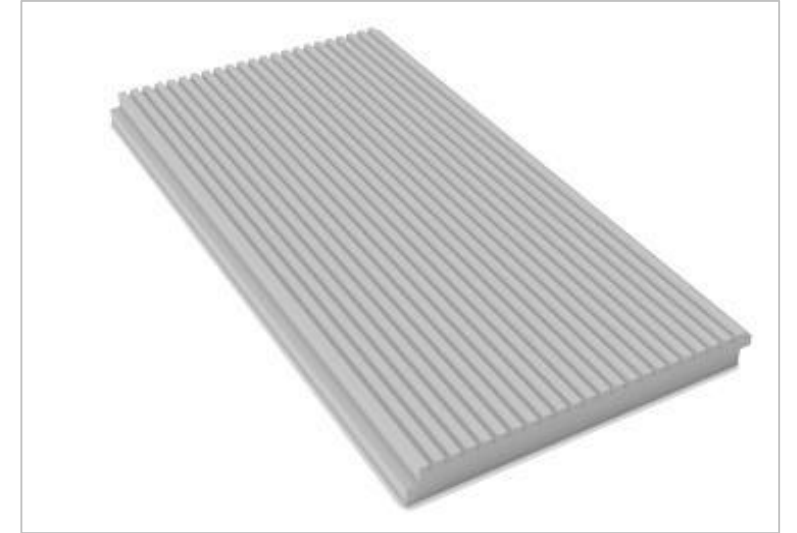
SLOPE

Slope shaped slabs are used to install the slope on flat roofs in order to drain water on the roof to funnels.



FACADE

Slabs with a rough surface are used to increase the adhesion of facade plaster.

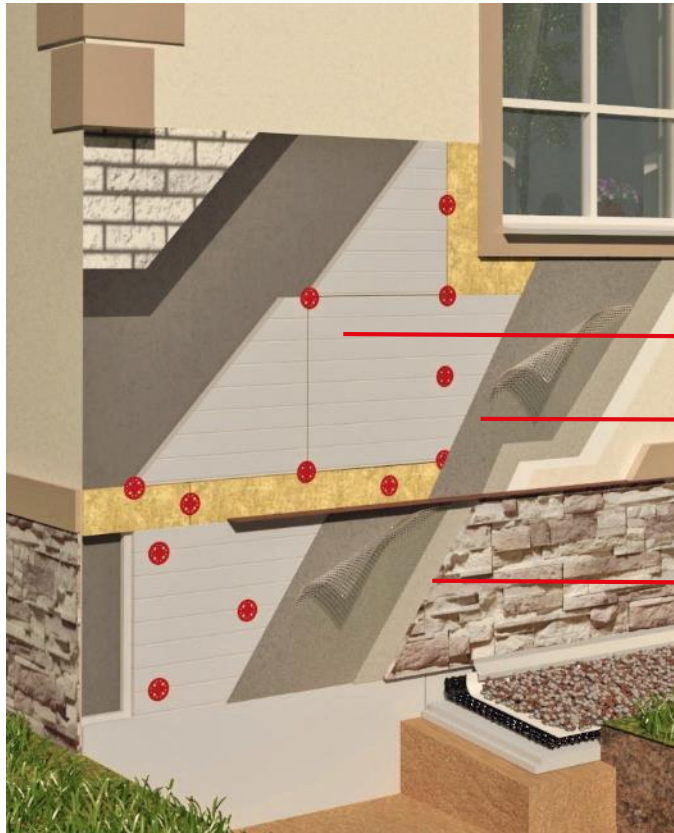


DRAINAGE

Slabs with grooves are used for construction of wall drainage and additional thermal insulation of the foundation.

PLASTER FACADE

Plaster facade is a multilayer thermal insulation system.



Thermal insulation layer

Reinforced plaster layer

Protective-decorative
plaster layer



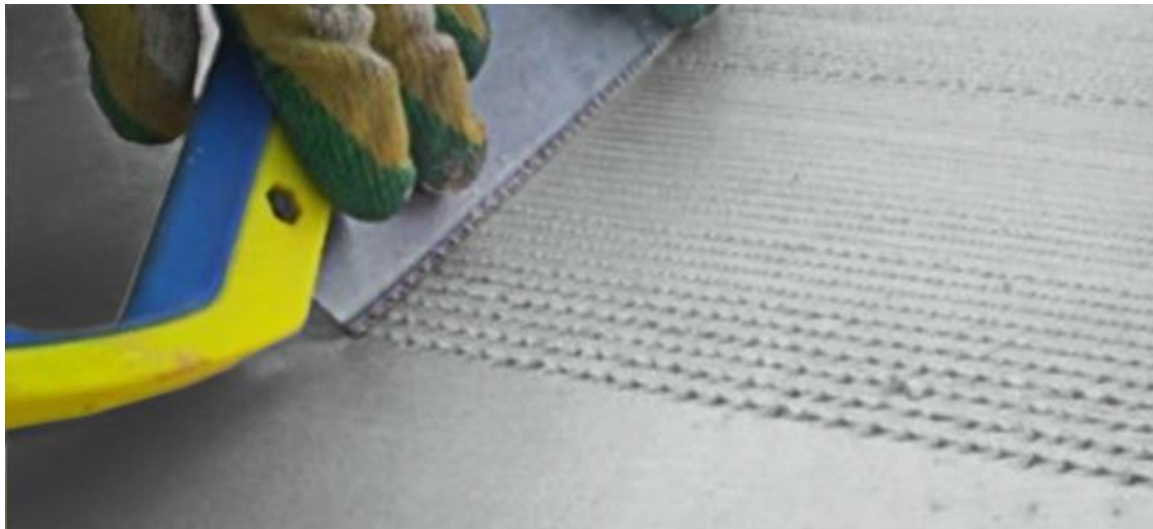


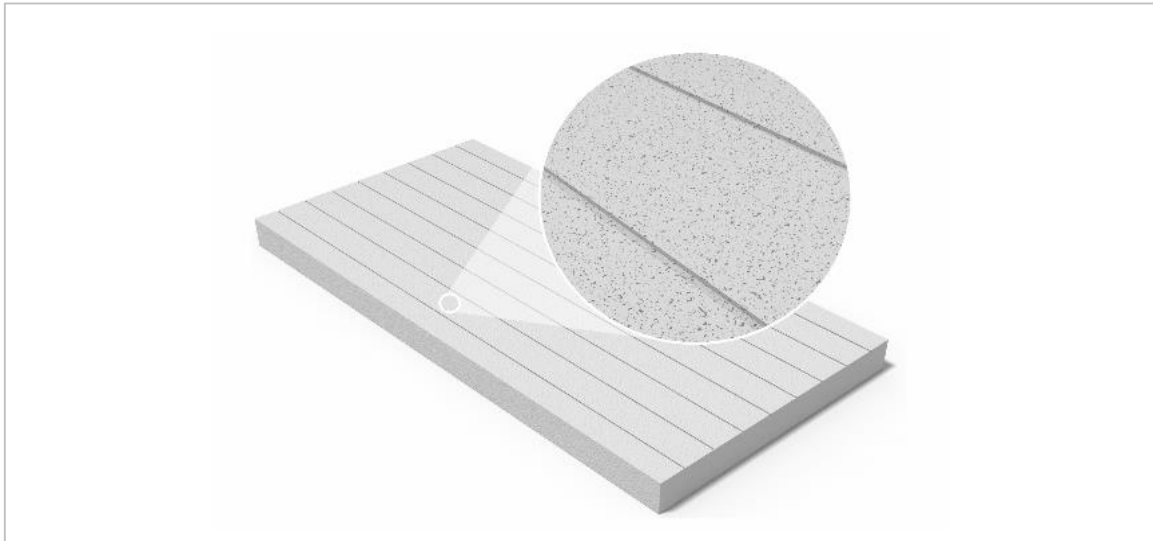
EXAMPLE OF MANUAL TREATMENT OF THERMAL INSULATION SLABS

When there is no manufactured milling on the slabs, one has to treat the slabs manually with:

- Porcupines. Disadvantage – bad adhesion
- Panel saw, or metal brush. Disadvantage – labor-consuming

Manual treatment of thermal insulation slabs is inefficient!

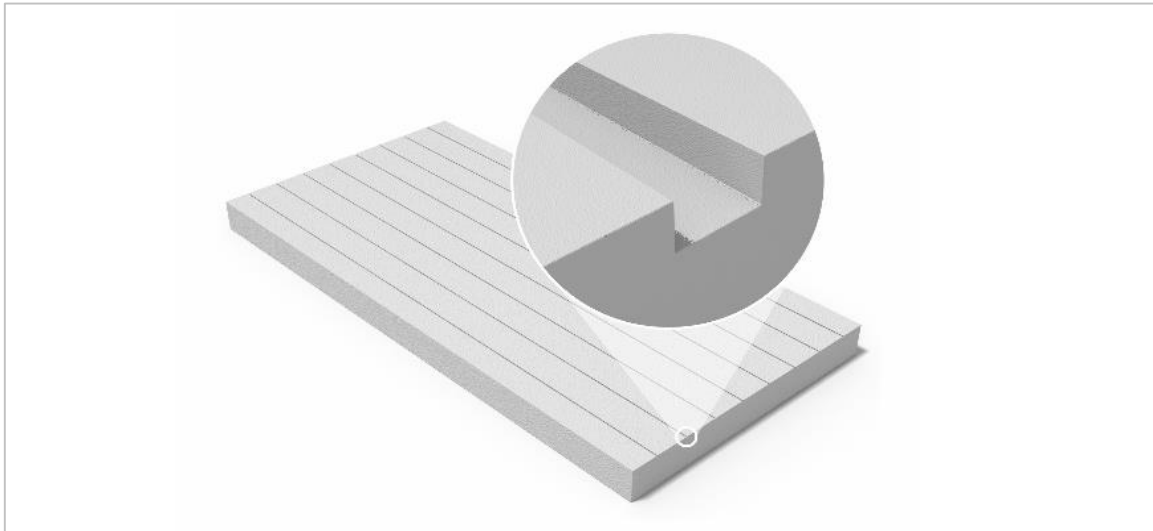




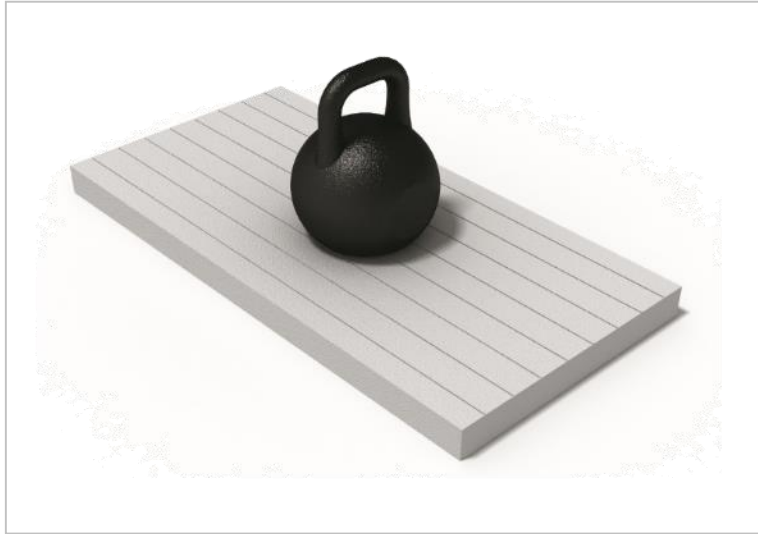
HIGH ADHESION TO THE SURFACE

Special type of surface of XPS TECHNOMICOL CARBON FACADE slabs is achieved thanks to manufacturing milling technology:

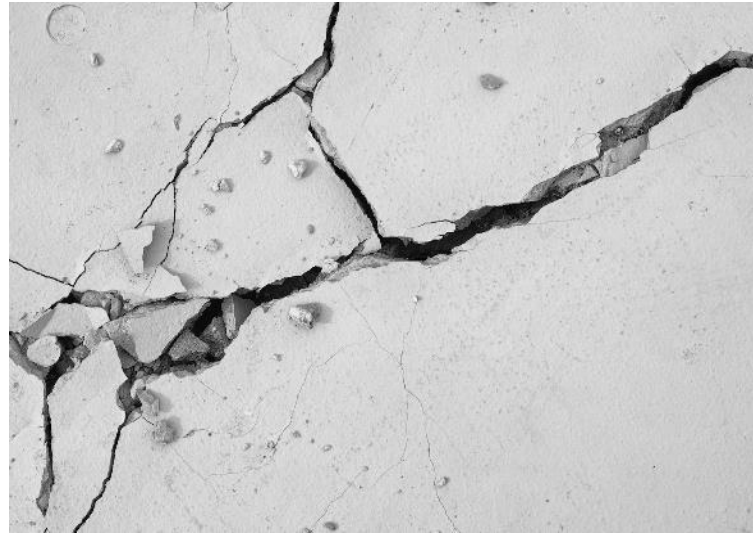
- Milled surface provides maximal adhesion with the surface and plaster
- Special micro-channels increase adhesion even more without overconsumption of plaster



ADVANTAGES OF XPS IN THERMAL INSULATION OF FACADES



Compression strength at 10% linear deformation is not less than 200 kPa = 20 tons per m².



Low-strength thermal insulant.



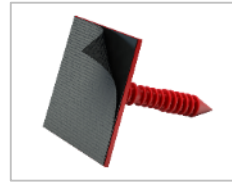
High-strength thermal insulant.

INSTALLATION

CHOOSING OF INSTALLATION METHOD



Fastening XPS to waterproofing



Fasteners TECHNOMICOL
Consumption 4 pcs/m²



Mastic TECHNOMICOL No.27
Consumption 0.6-1 kg/m²



Foam glue TECHNOMICOL
Consumption 1 cartridge per 10-12 m²



Fastening XPS on basement to decking

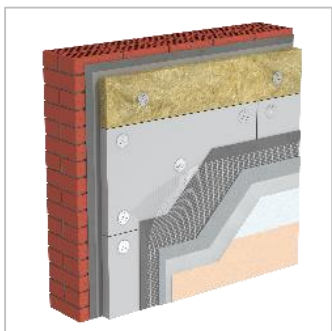
Adhesive compound for XPS
Consumption 5-6 kg/m²



Disk-shaped facade anchor.
Consumption 5-7 pcs/m²



Foam glue TECHNOMICOL
Consumption 1 cartridge per 10-12 m²



Fastening XPS on facade to decking

Adhesive compound for XPS
Consumption 5-6 kg/m²



Disk-shaped facade anchor.
Consumption 5-7 pcs/m²

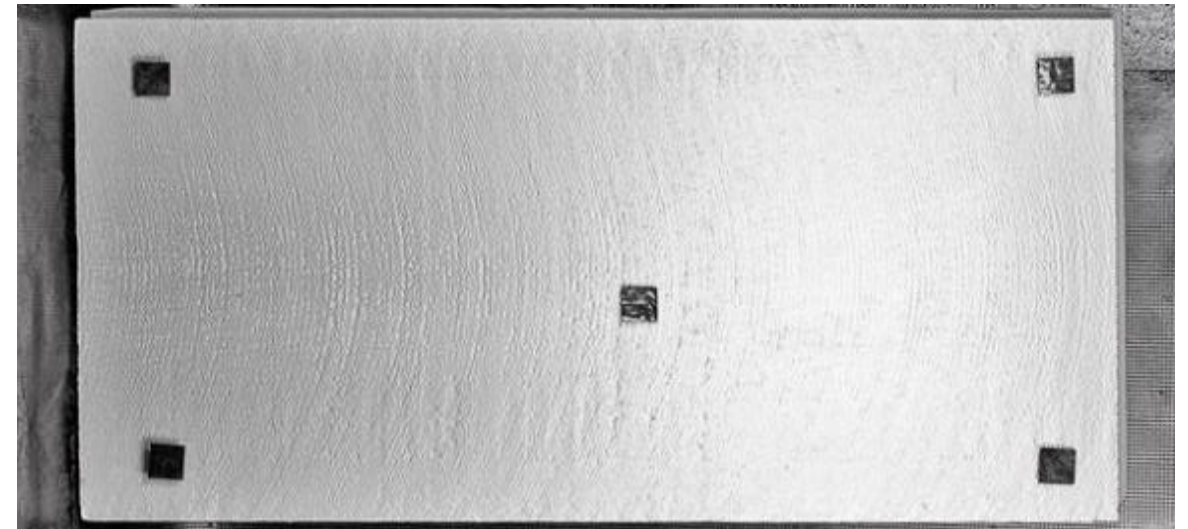
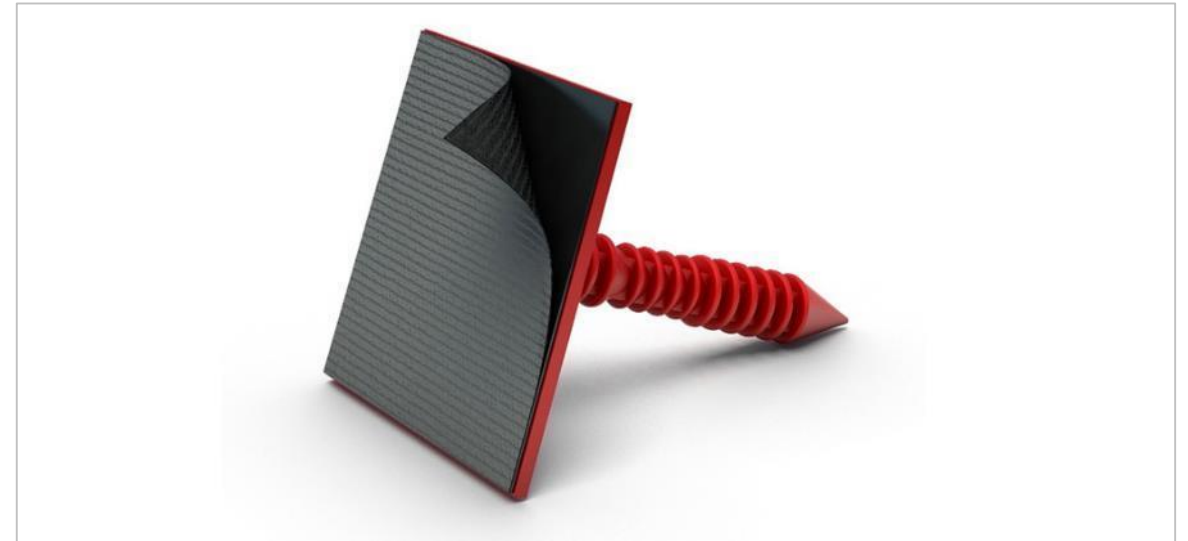
FASTENERS TECHNONICOL – TO ADHERE XPS TO MEMBRANES

Fasteners are used for temporary fixation of extruded polystyrene slabs to bitumen or polymer-bitumen membranes in systems of foundation waterproofing. It is recommended to finish a backfilling within 3-5 days.

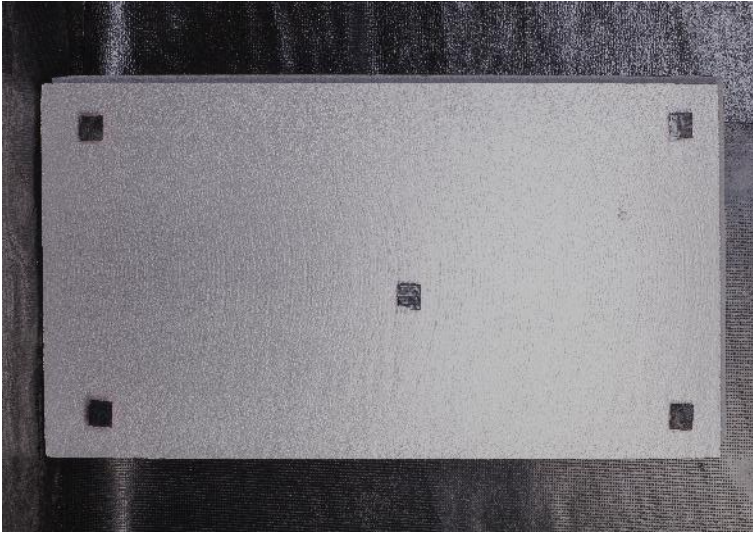
The fastener is made of low pressure polyethylene and is a stud with locking teeth and a flat pad with an adhesive layer that is protected by an easily removable siliconized film. Installation of fasteners must be carried out at a temperature $\geq +10$ °C.

Consumption of fasteners – 4 pcs/m².

Properties	No.01	No.02
Flat-width, mm	40±2	65±1
Flat-length, mm	40±2	65±1
Stud size, mm	40±2	78.5±1
Packaging, pcs/box	200	100

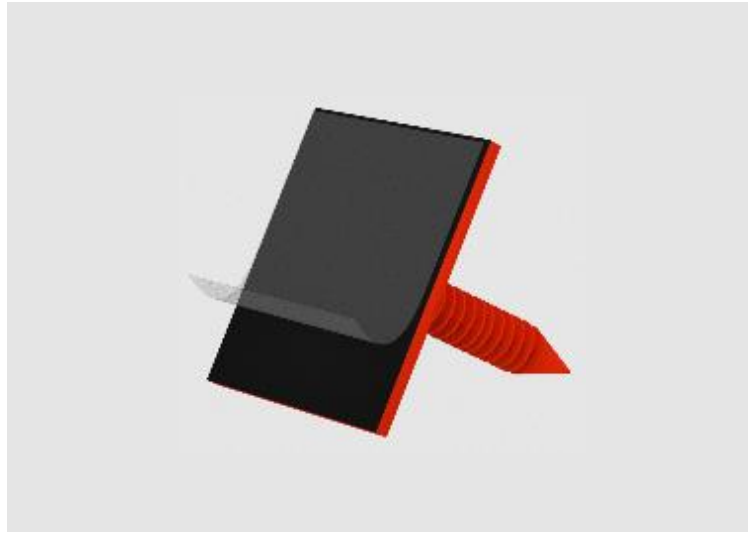


INSTALLATION WITH FASTENERS TECHNONICOL



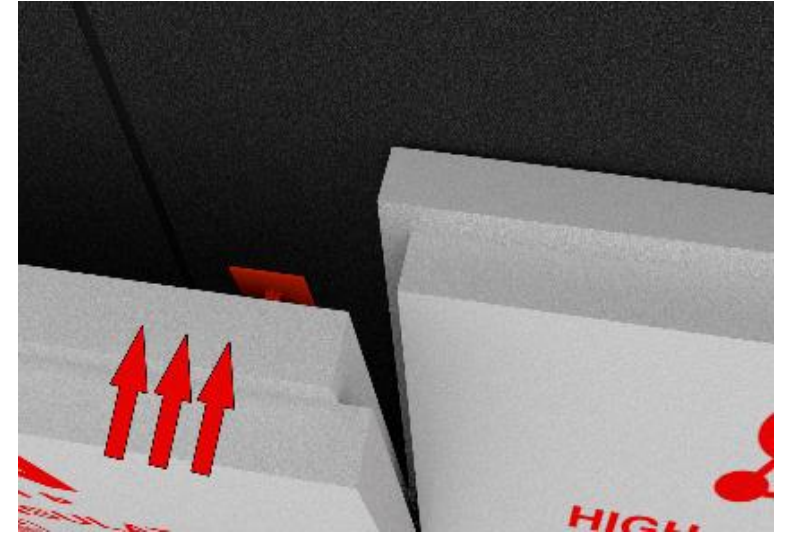
STEP 1

Drive in fasteners No.01 or No.02 in the thermal insulation slabs.



STEP 2

Remove protective film from the mastic side of the fastener.



STEP 3

Install the slabs in the designed position on the waterproofing bitumen material.

ADHESIVE COMPOUND FOR XPS

The compound is designed for adhesion of extruded polystyrene to polymer-bitumen insulation materials, as well as to concrete, metal and wooden surfaces in foundation insulation systems.

The mastic is applied as points or strips by using a spatula. The mastic should be applied to all corners and in the center of a fixed slab.

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

Guaranteed storage period 18 months.

Properties	Performance
Strength of adhesion to the surface (with concrete and metal), MPa	0.1
Mass fraction of nonvolatile substances, %	75-80
Shear strength of glued bond, kN/m	0.1
Heat endurance, °C	+90



EXPANDING FOAM GLUE TECHNOMICOL FOR POLYSTYRENE

Expanding Foam Glue TECHNOMICOL is designed for fixing slabs of extruded or expanded polystyrene to the surface during the thermal insulation of roofs, external and internal walls, cellars, foundations, floors, both in new construction and in renovation. It is used for temporary fixation slabs of XPS and EPS plates to vertical surfaces:

- Inside premises for thermal insulation of walls, interior partitions, balconies and loggias
- For thermal insulation of facade, basement or/and foundation

It is also used for:

- Fixing of cracks between heat-insulating slabs
- Adhesion of XPS and expanded polystyrene to various materials



Properties	Performance
Time of the polymerization start, min	≤15
Curing time (at 20 °C and relative humidity over 50%), h	≤2
Adhesion strength with concrete, MPa	≥0.4
Adhesion strength with expanded polystyrene, MPa	≥0.09



INSTALLATION WITH FOAM GLUE

For installation of XPS TECHNOMICOL, use FOAM GLUE TECHNOMICOL for extruded polystyrene:

- Minimal expansion
- Consumption: 1 cartridge of foam glue per 10-12 m² – efficient
- Reliable fastening of slabs to any material



INSTALLATION WITH FOAM GLUE



STEP 1

Shake the cartridge.



STEP 2

Apply Expanding Foam Glue TECHNOMICOL for XPS on the perimeter of the slab with a 2 cm gap from the edge, then apply a 2-3 cm wide strip of foam glue in the center of the slab.



STEP 3

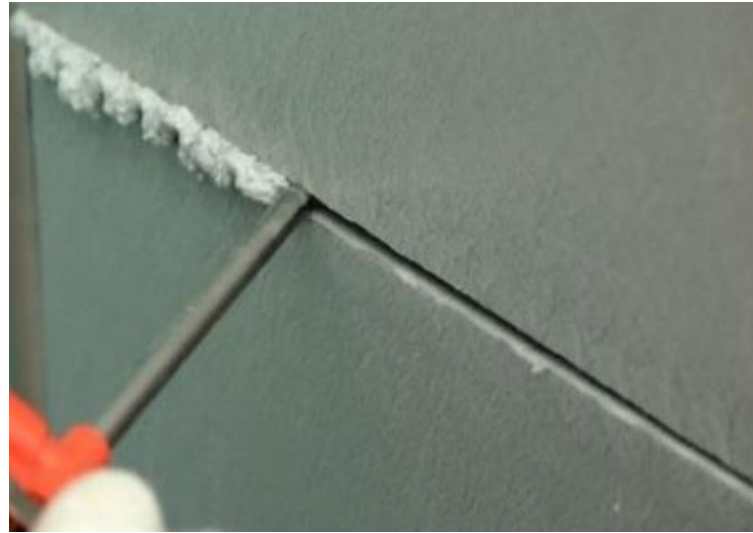
Wait 7-10 minutes.

INSTALLATION WITH FOAM GLUE



STEP 4

Stick the slabs to the surface.



STEP 5

Seal the junctions.



STEP 6

Clean the gun from the foam.

INSTALLATION WITH ADHESIVE COMPOUND



STEP 1

Contour-dot application of adhesive compounds (for installation of slabs on decking with more than 3 mm irregularities).



STEP 2

Continuous application of adhesive compounds (for installation of slabs on decking with less than 3 mm irregularities) with notched trowel with 10-12 mm serrated edges.

MECHANICAL FASTENING



STEP 1

Impact-anchors to be driven not earlier than in 24 hours after installation of slabs, i.e. after complete hardening of adhesive compound.



STEP 2

Use plastic anchors. Number of anchors should meet the requirements of the design, but use not less than 5 pcs per slab.



STEP 3

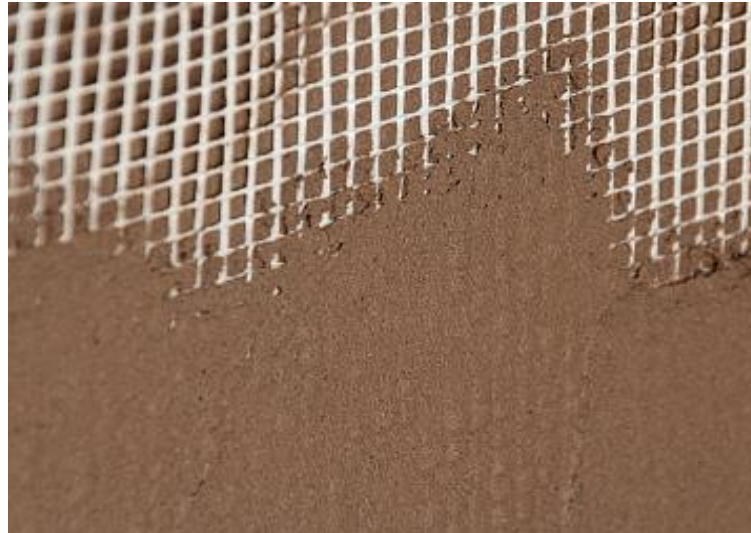
Insert an anchor into the hole and drive it with a hammer. After installation of anchors drive (thread) expansion tips.

SURFACE REINFORCEMENT



STEP 1

A grid to be installed in small sections (not more than 1 m²). Bulges on the grid are not admissible.



STEP 2

Adjacent sections of the grid to be joined by overlapping of their ends. The grid has to be sunk into the plaster layer.

FINISHING



Application of exterior decorative layer is only admissible when the reinforced protective layer is completely dry, but not earlier than in 72 hours.

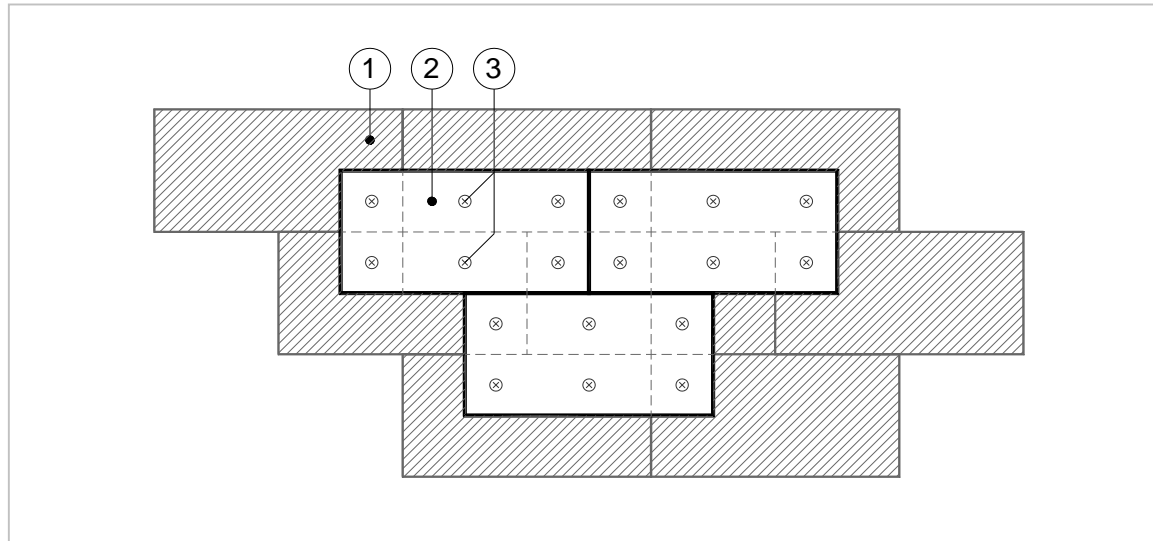
Before application of a decorative layer, treat the surface with primer.



Decorative plaster to be applied in one movement determined by desired texture.

When needed, one can apply paint on the plaster layer with a roller.

CONSTRUCTION SOLUTIONS



INSTALLATION OF THERMAL INSULATION

Thermal insulation slabs of one layer are recommended to be installed with a half-length displacement in relation to junctions in adjacent rows.

Junctions of the upper row of insulation slabs to be arranged with an at least 200 mm displacement relatively to the lower row.

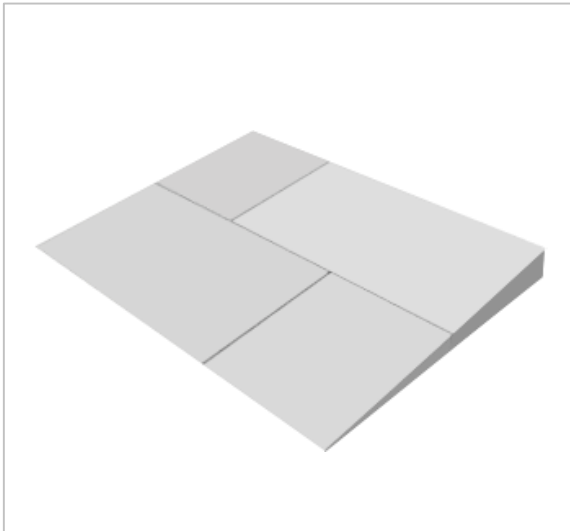
Seams between thermal insulation slabs should not be larger than 5 mm.



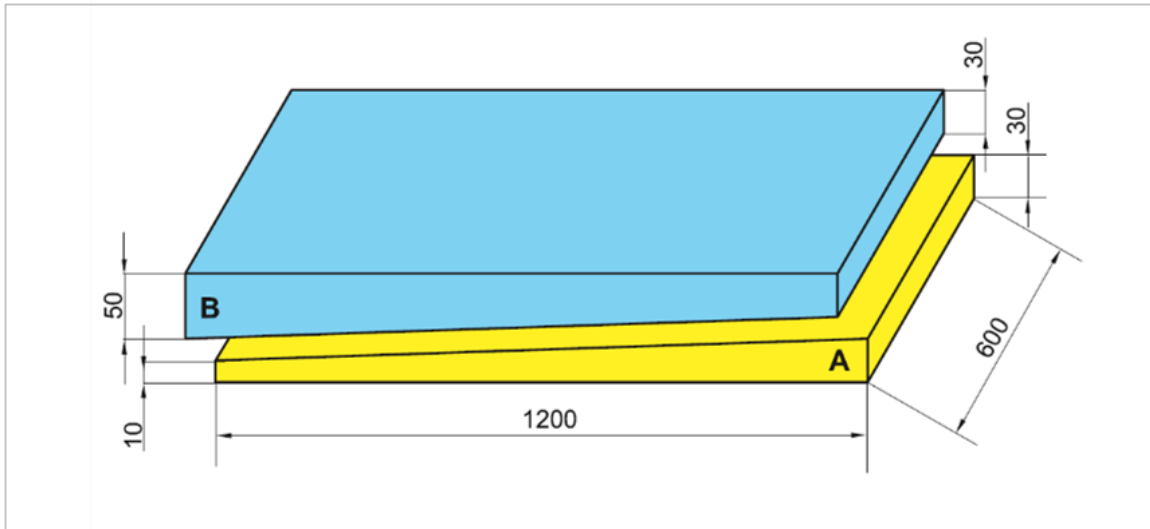
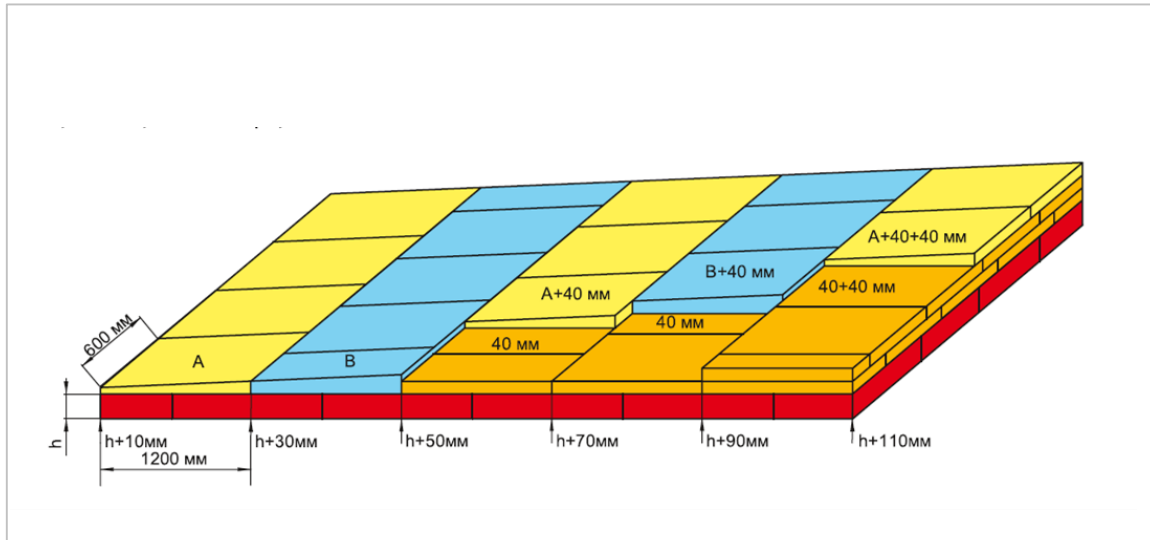
ARRANGEMENT OF A ROOF SLOPE

XPS TECHNONICOL CARBON PROF SLOPE – is a set of slabs for arrangement of roofing slopes. CARBON PROF SLOPE slabs help to solve the problem of stagnant zones associated with:

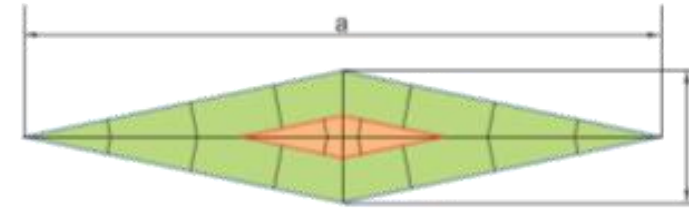
- Arrangement of a slope on the roof, expansion of slope, or change of water runoff direction
- Arrangement of valley sloping in direction of water funnels, gutters near airshafts and roof-lights
- Arrangement of an additional slope for water runoff from the apron (counter slope)



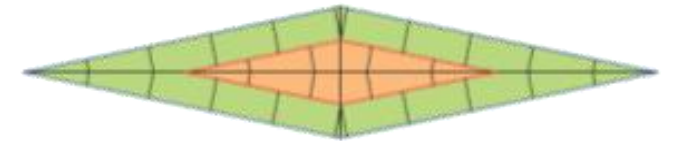
For valley slopes, water runoff from the aprons, roof lights, elevator shafts, roof vents, and expansion of the slope near the apron, XPS TECHNONICOL CARBON PROF SLOPE 3.4% or 8.3% slabs are used.



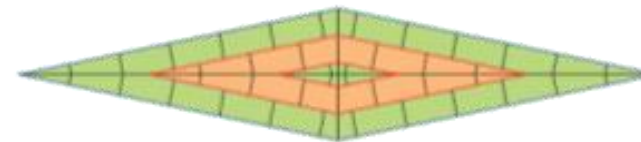
ARRANGEMENT OF SLOPES BETWEEN FUNNELS



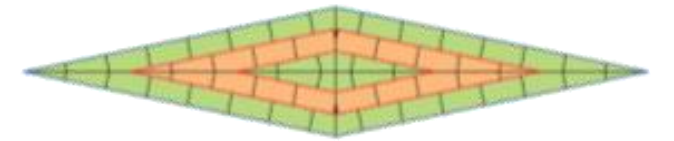
9 m distance between the funnels



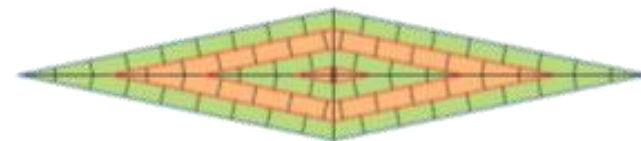
12 m distance between the funnels



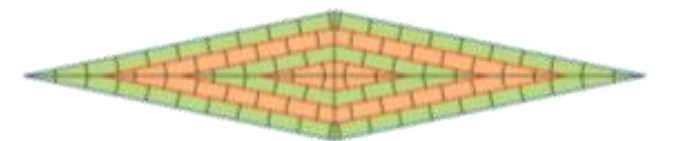
15 m distance between the funnels



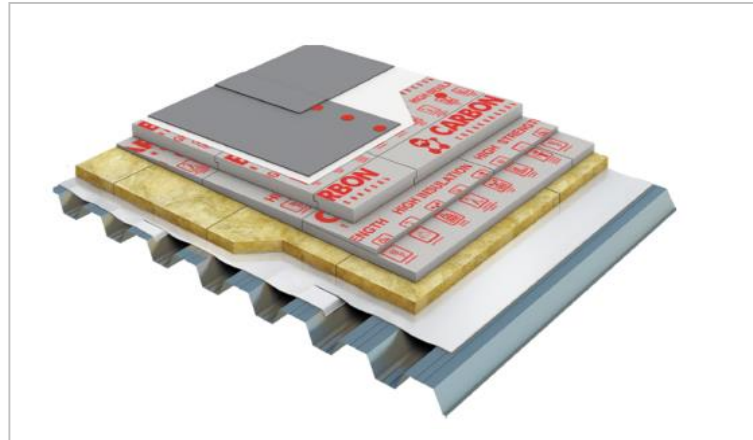
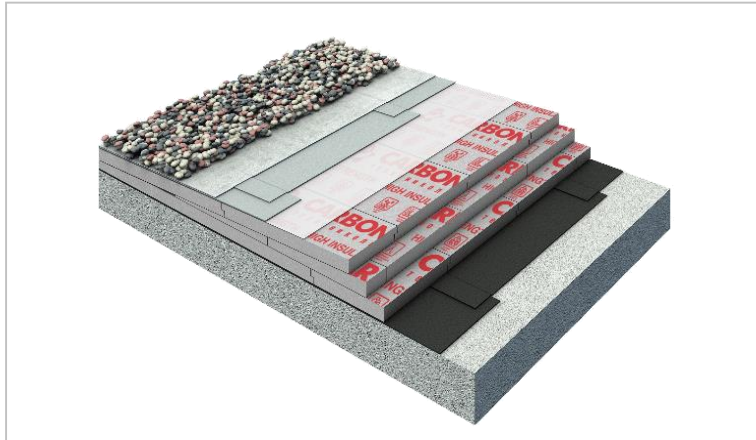
18 m distance between the funnels



21 m distance between the funnels

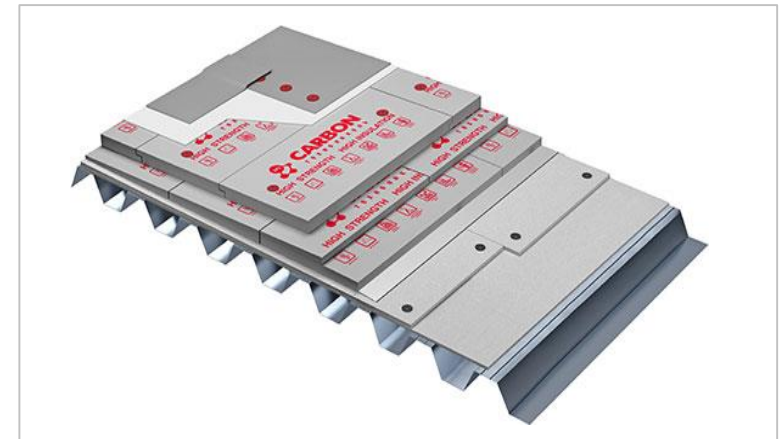


CONSTRUCTION SOLUTIONS:

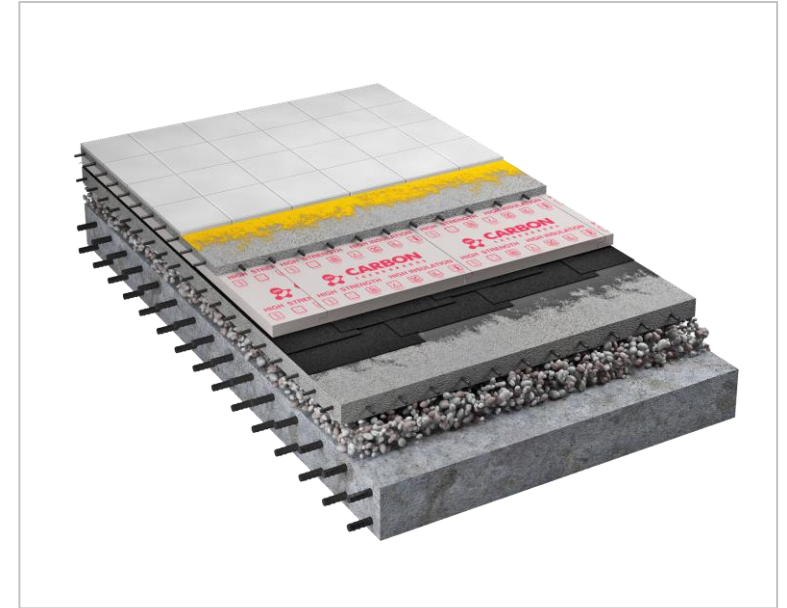
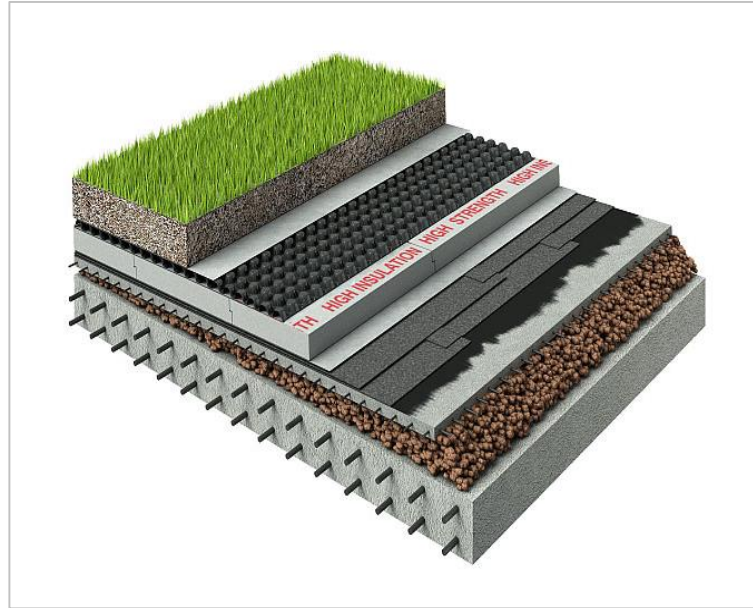


NOTE!

It is necessary to use a SEPARATION LAYER between PVC membrane and XPS (for instance, fiberglass, $\geq 100 \text{ g/m}^2$).



CONSTRUCTION SOLUTIONS:



NOTE!

XPS thermal insulation should not be exposed to the UV radiation. Finishing layer to be installed directly after installation of XPS (for instance, ballast layer).

CONSTRUCTION SOLUTIONS:



NOTE!

Thermal insulation slabs are recommended to be installed after complete cooling of torch-on applied polymer-bitumen waterproofing membrane.

THANK YOU FOR ATTENTION!

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