TECHNONICOL

XPS TECHNONICOL

EXTRUDED POLYSTYRENE

KNOWLEDGE. EXPERIENCE. CRAFTSMANSHIP.

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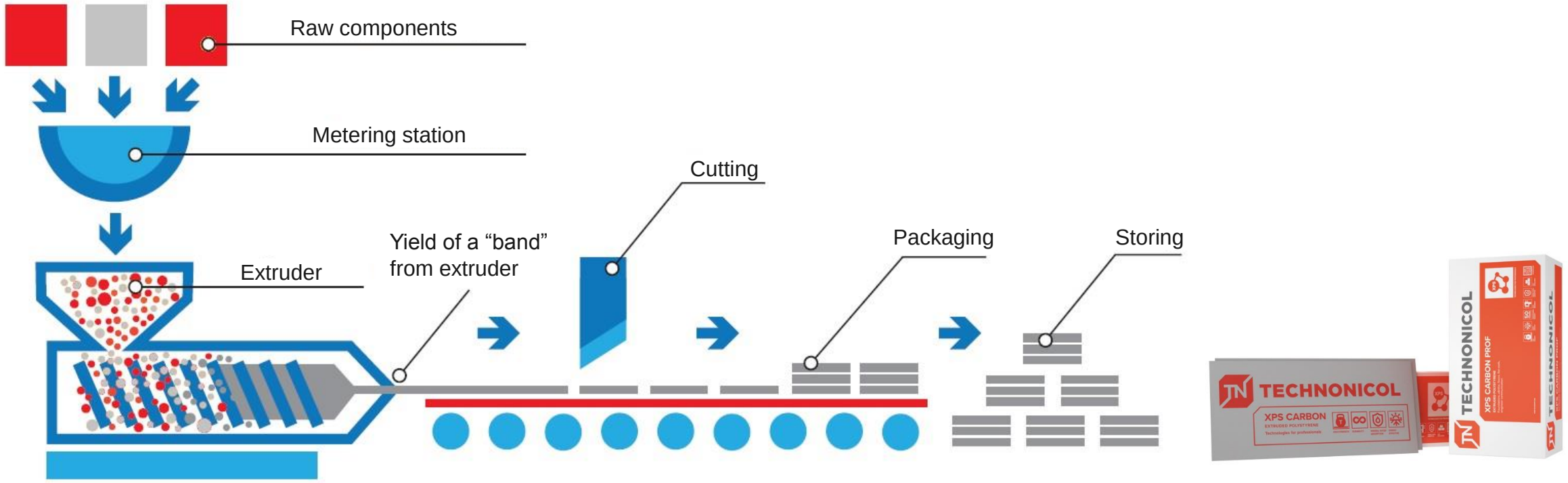
EXTRUDED POLYSTYRENE

XPS PRODUCTION PRINCIPLE:



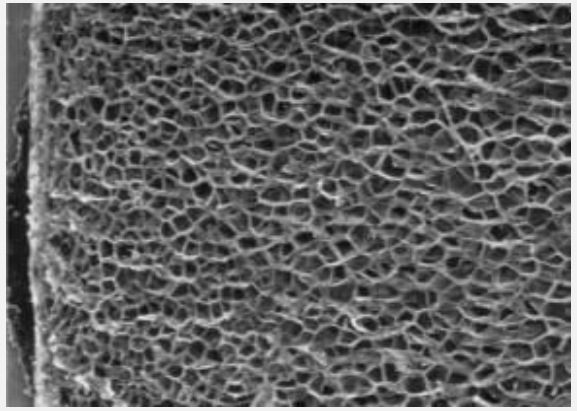
EXTRUDED POLYSTYRENE

STRUCTURE OF XPS:

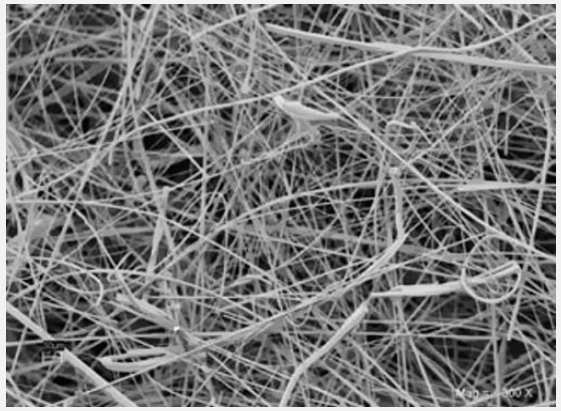
High-quality extruded polystyrene possesses closed-pore structure with equal cells throughout the material.

Comparison of structure of various thermal insulation

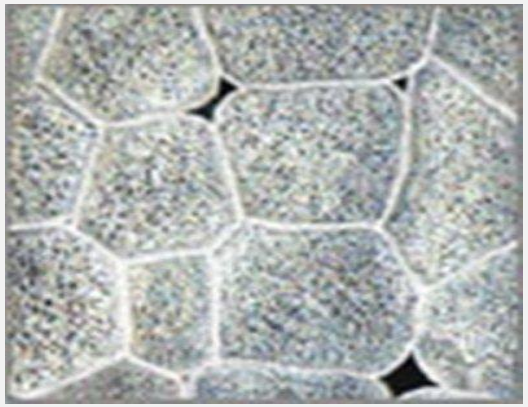
XPS



STONE WOOL

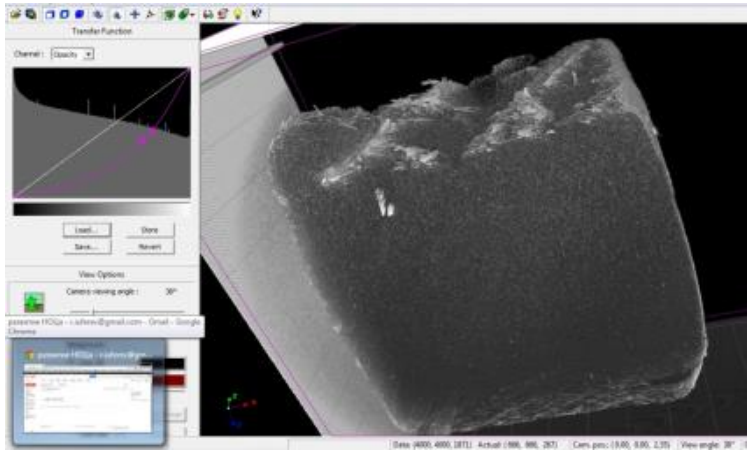


EPS



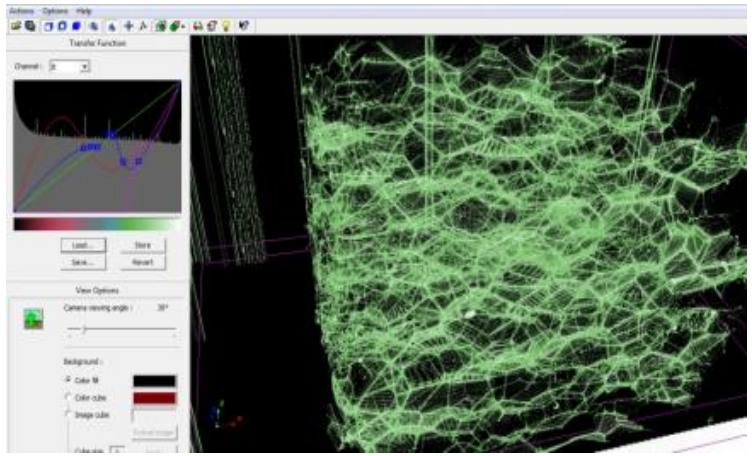
EXTRUDED POLYSTYRENE

STRUCTURE: MICROTOMOGRAPHY - COMPARISON OF STRUCTURE OF VARIOUS XPS



XPS TECHNONICOL

- 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

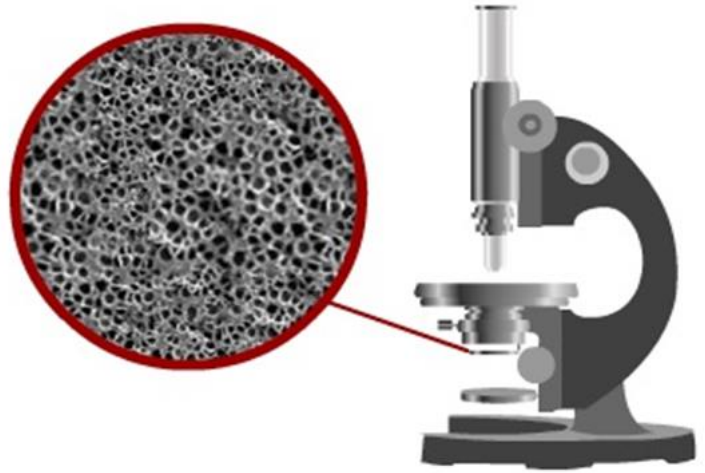
- Non-uniform structure
- Large cells, which lower strength of the material and increase water absorption of the material
- Short service life

EXTRUDED POLYSTYRENE

STRUCTURE: UNIQUE COMPOSITION WITH NANOGRAPHITE

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 physico-mechanical properties of thermal insulation.



PROPERTIES OF EXTRUDED POLYSTYRENE

ENERGY EFFICIENCY

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

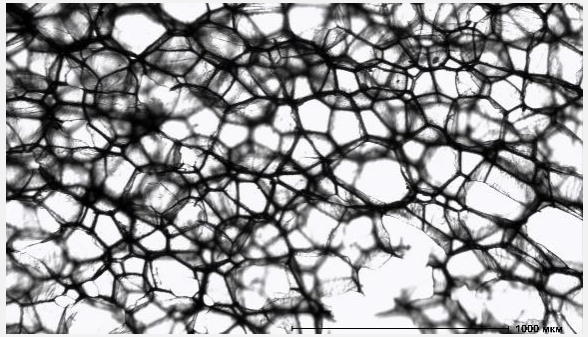
Thermal conductivity is a property of material to conduct heat throughout itself.
The lower thermal conductivity, the warmer the material.

According to the results of the trials, thermal conductivity coefficient of XPS TECHNONICOL is 0.029–0.032 (25±5) ˚C, W/(m*K).

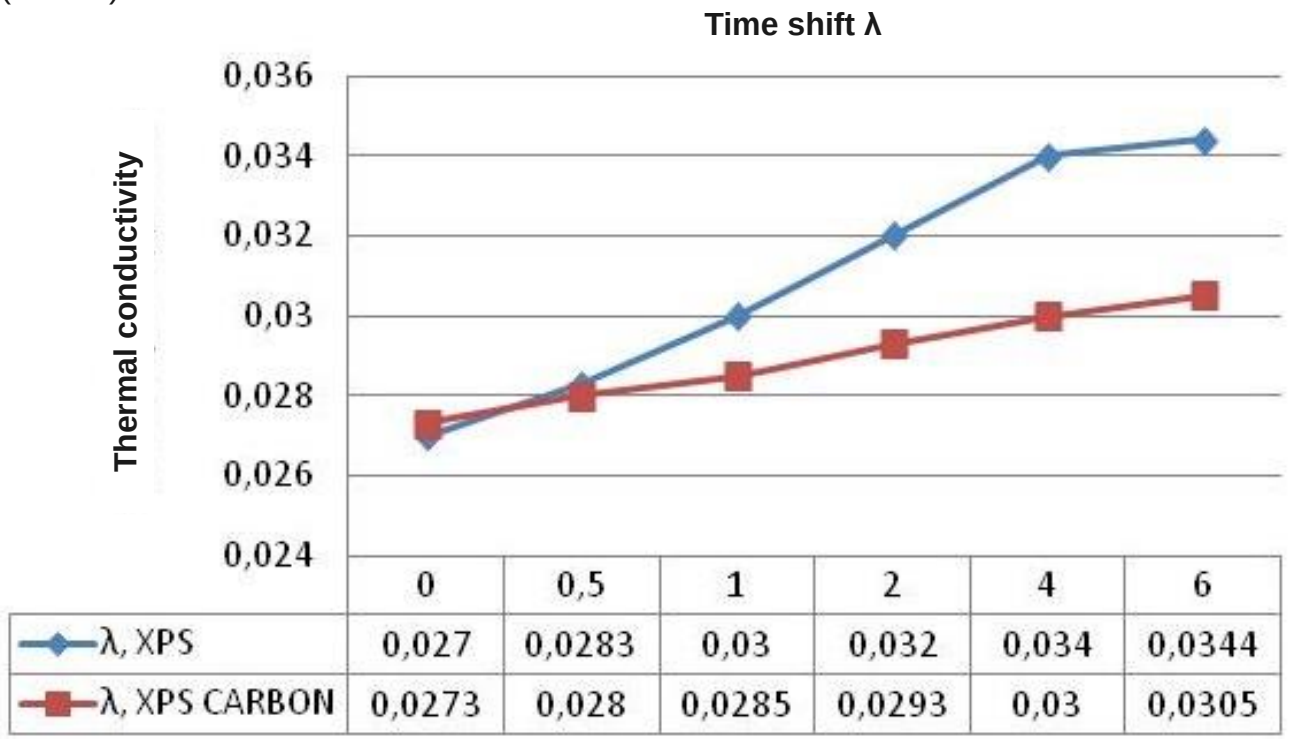
Moreover, this value almost does not alter during operation.
Due to low thermal conductivity coefficient XPS TECHNONICOL is an efficient thermal insulation.

PROPERTIES OF EXTRUDED POLYSTYRENE

ENERGY EFFICIENCY



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

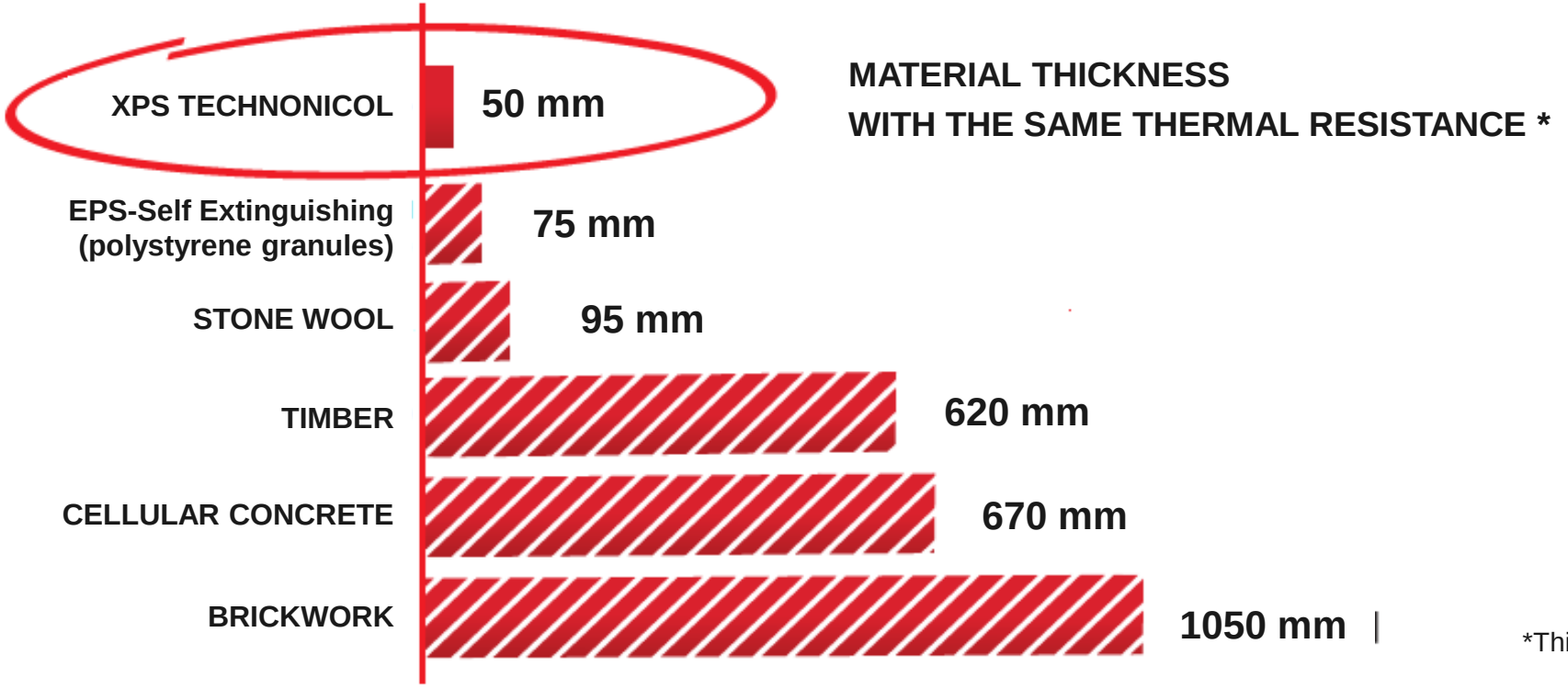


	0	0,5	1	2	4	6
λ, XPS	0,027	0,0283	0,03	0,032	0,034	0,0344
λ, XPS CARBON	0,0273	0,028	0,0285	0,0293	0,03	0,0305

PROPERTIES OF EXTRUDED POLYSTYRENE

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.

PROPERTIES OF EXTRUDED POLYSTYRENE

HIGH STRENGTH

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

High strength enables using of XPS TECHNONICOL in loaded constructions:

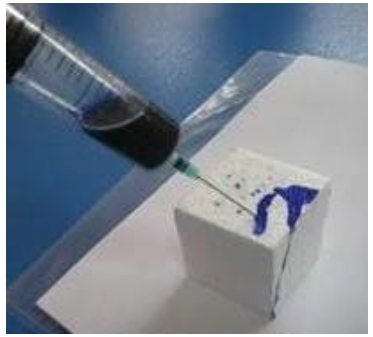
- Foundations;
- Stylobate;
- Load-bearing roofs;
- Road construction.

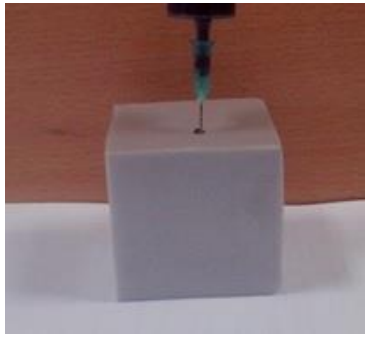
TYPES OF STRENGTH:

- Compression strength at 10% deformation
- Bending strength

PROPERTIES OF EXTRUDED POLYSTYRENE

MINIMAL WATER ABSORPTION

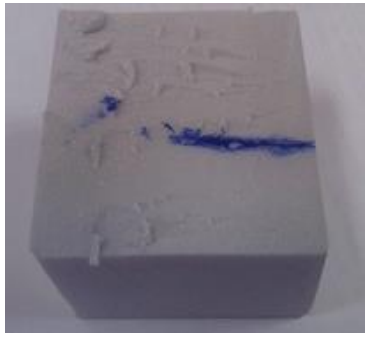




XPS TECHNONICOLS possesses almost zero water absorption coefficient.

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

EPS



XPS TECHNONICOL

Product does not lose its main properties over time, thus is highly durable.

COMPARISON OF XPS AND EPS PERIMETER

LONG TERM WATER ABSORPTION BY IMMERSION, WL(T)

XPS CARBON ≤ 0.7%

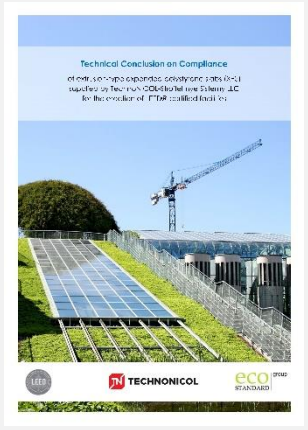
EPS PERIMETER ≤ 2%

- At using in humid conditions (especially in the foundation zone, when it comes in direct contact with moisture-saturated soil), EPS absorbs more moisture, which, when freezing and thawing, destroys the structure of the material. This directly affects the durability of the material and deteriorates thermal insulating properties.

Due to its minimal water absorption characteristics, its insulating properties remain stable throughout the whole life cycle.

PROPERTIES OF EXTRUDED POLYSTYRENE

ENVIRONMENTALLY FRIENDLY AND SAFE



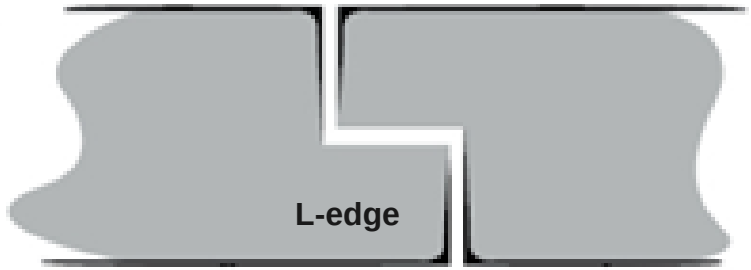
XPS TECHNONICOL is eco-friendly and safe, which is proved by the corresponding certificates:

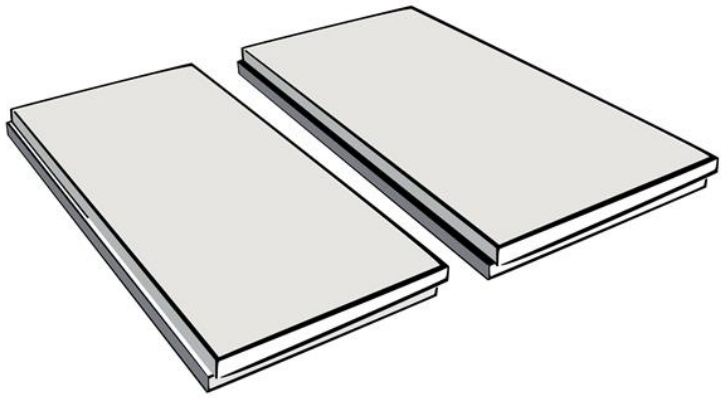
- Eco-certificate VITALITY LEAF
- LEED expert evaluation
- Does not emit harmful agents
- Highly biostable (proved by Testing Center “Biostoykost’” of MSU Ecocenter)
- Is not a nutrientfor gnawers (proved by Institute for Disinfectology).

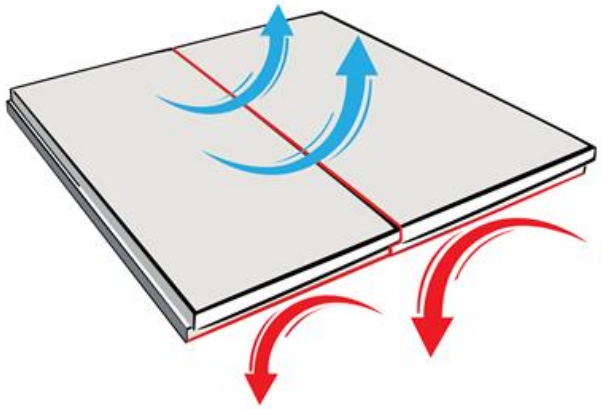
XPS is produced from general-purpose polystyrene.
Food containers are also produced from such polystyrene.

PROPERTIES OF EXTRUDED POLYSTYRENE

SIMPLE INSTALLATION







APPLICATION TEMPERATURE

From **- 70˚C** up to **+ 75˚C**

PROPERTIES OF EXTRUDED POLYSTYRENE

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

Unpacked product should be kept away from direct sun light!

PRODUCT RANGE

EXTRUDED POLYSTYRENE

TECHNONICOL CARBON ECO

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 system.

AREAS OF APPLICATION:
TECHNONICOL CARBON ECO is used in building and construction while arranging thermal protection of the basement, roofs, floors and facades.

Thickness, mm	Heat conductivity		Compressive stress, kPa (10% def.)	Long term water absorption, %	
	R_D, m²*K/W	λ_D, W/(m*K)		Immersion	Diffusion
20	0.571	0.034	200	0.7	0.3
30	0.857				
40	1.143				

DIMENSION:
- Length = 1180 - 5400 mm
- Width = 580, 600 mm

EXTRUDED POLYSTYRENE

TECHNONICOL CARBON PROF 300

XPS TECNONICOL CARBON PROF 300 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 system.

AREAS OF APPLICATION:
TECHNONICOL CARBON PROF 300 is used in building and construction while arranging thermal protection of the basement, roofs, floors, facades, railways and highways.

Thickness, mm	Heat conductivity		Compressive stress, kPa (10% def.)	Long term water absorption, %	
	R_D, m²*K/W	λ_D, W/(m*K)		Immersion	Diffusion
50	1.428	0.034	300	0.7	0.3
60	1.714				
70	1.945				
80	2.286				
100	2.778				

DIMENSION:
- Length = 1180 - 4500 mm
- Width = 580, 600 mm

EXTRUDED POLYSTYRENE

TECHNONICOL CARBON PROF 300 TB

XPS TECNONICOL CARBON PROF 300 TB is a thermal insulation material produced by thermobonding. TECHNONICOL CARBON PROF 300 TB is used in building and construction while arranging thermal protection of the basement, roofs, floors, facades, railways and highways.

Thickness, mm	Heat conductivity		Compressive stress, kPa (10% def.)	Long term water absorption, %	
	R_D, m²*K/W	λ_D, W/(m*K)		Immersion	Diffusion
110	3.235	0.034	300	0.7	0.3
120	3.529				
130	3.824				
140	4.118				
150	4.412				
160	4.706				
170	5.000				
180	5.294				
190	5.590				
200	5.882				

THERMOBONDING – is a successive gluing of XPS slabs of standard thickness to form of 80-400 mm thick blocks.

ADVANTAGES:

- High tensile strength properties of the layers due to successive adhesion of the slabs at macromolecular level
- Advanced thermal insulation properties
- No thermal bypasses in constructions
- Quicker installation by installing thicker slabs in one layer
- High durability

EXTRUDED POLYSTYRENE

TECHNONICOL CARBON SOLID

XPS TECNONICOL CARBON SOLID 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 system.

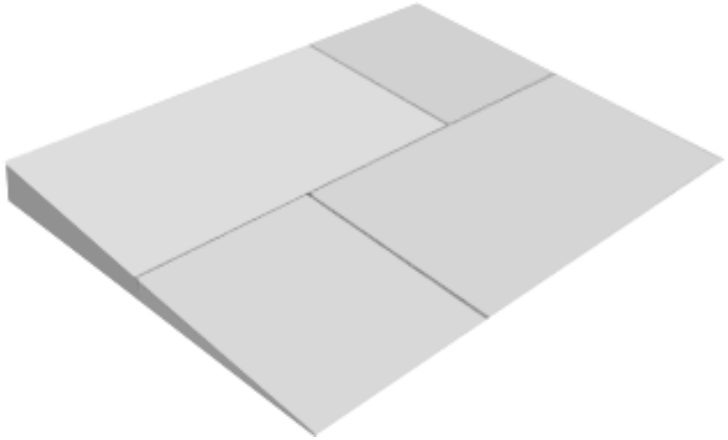
AREAS OF APPLICATION:
TECHNONICOL CARBON SOLID is used in building and construction while arranging thermal protection of the basement, roofs, railways and highways.

Thickness, mm	Heat conductivity		Compressive stress, kPa (10% def.)	Long term water absorption, %	
	R_D, m²*K/W	λ_D, W/(m*K)		Immersion	Diffusion
50	1.515	0.033	500	0.7	3.0
100	2.94	0.034	500	0.7	3.0

DIMENSION:
- Length = 1180 - 4500 mm
- Width = 580, 600 mm

EXTRUDED POLYSTYRENE

ADDITIONAL SLABS TYPE



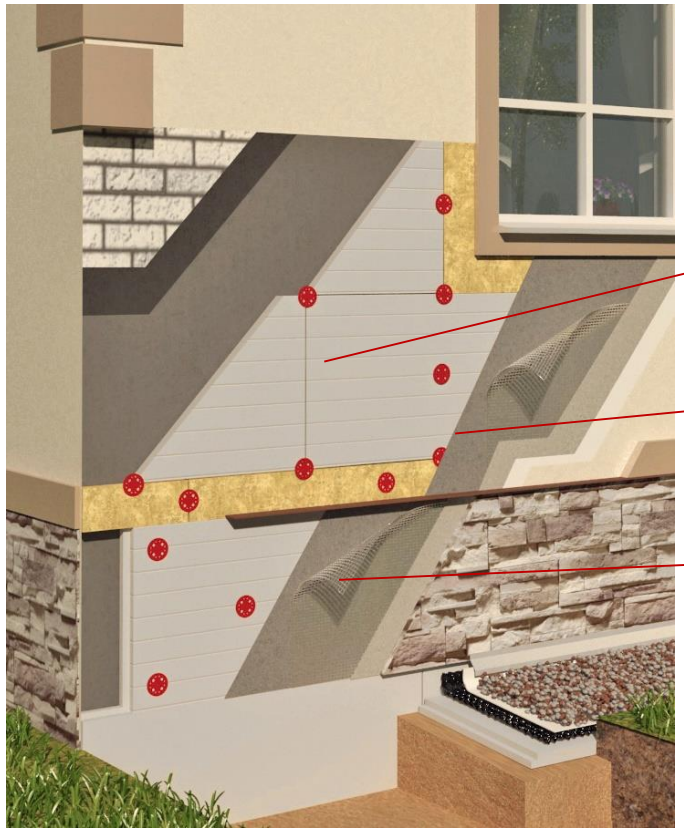
SLOPE
slope shaped slabs are used to install the slope on flat roofs in order to drain water on the roof to funnels.

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.

EXTRUDED POLYSTYRENE

PLASTER FACADE



Plaster facade is a multilayer thermal insulation system.

- Thermal insulation layer
- Reinforced plaster layer
- Protective-decorative plaster layer

EXTRUDED POLYSTYRENE

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

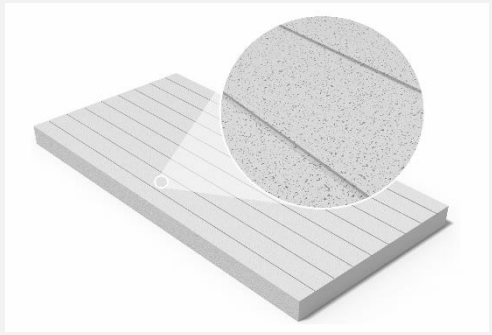
- Panel saw, or metal brush

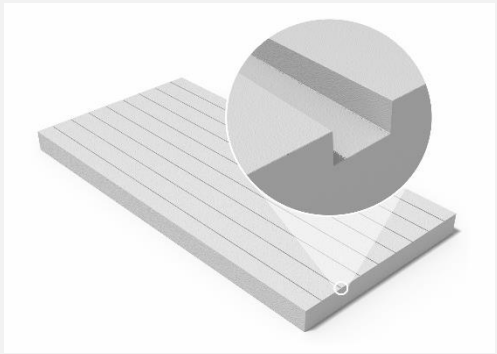
  Disadvantage – labor-consuming

MANUAL TREATMENT OF THERMAL INSULATION SLABS IS INEFFICIENT

EXTRUDED POLYSTYRENE

HIGH ADHESION TO THE SURFACE



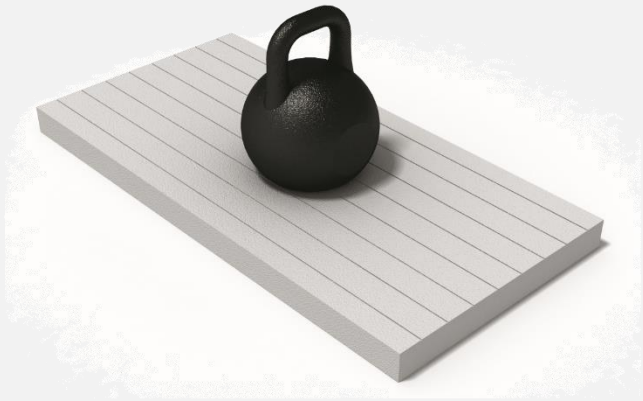


Special XPS CARBON ECO F slabs surface manufacturing milling technology:

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

EXTRUDED POLYSTYRENE

ADVANTAGES OF XPS
IN THERMAL INSULATION OF FACADES



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

Low-strength thermal insulant

High-strength thermal insulant

TECHNONICOL

INSTALLATION

EXTRUDED POLYSTYRENE

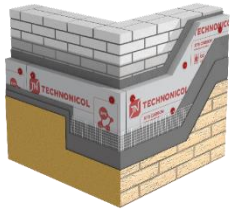
CHOOSING OF INSTALLATION METHOD

Fastening XPS
to waterproofing

Fasteners TECHNONICOL
Consumption 4 pcs/m^2

Mastic TECHNONICOL No.27
Consumption 0,6×1 kg/m^2

Foam glue TECHNONICOL
Consumption 1 cartridge
per 10-12 m^2

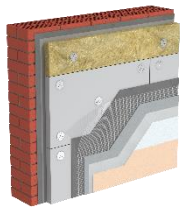


Fastening XPS on
basement to decking

Adhesive compound for XPS
Consumption 5-6 kg/m^2

Disk-shaped façade anchor.
Consumption 5-7pcs/m^2

Foam glue TECHNONICOL
Consumption 1 cartridge
per 10-12 m^2



Fastening XPS on
facade to decking

Adhesive compound for XPS
Consumption 5-6 kg/m^2

Disk-shaped façade anchor.
Consumption 5-7pcs/m^2

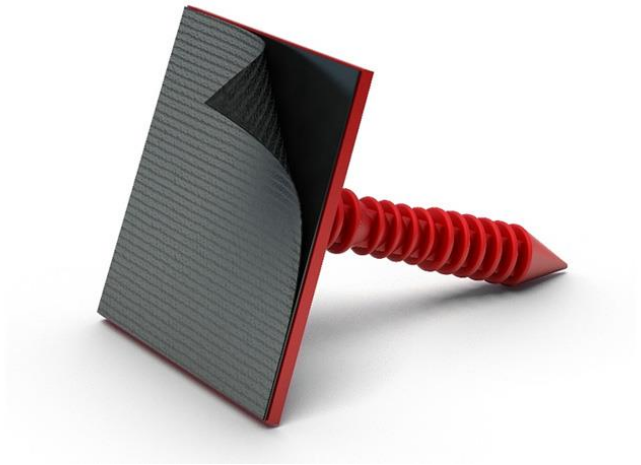
EXTRUDED POLYSTYRENE

FASTENERS TECHNONICOL - TO ADHERE XPS TO MEMBRANES

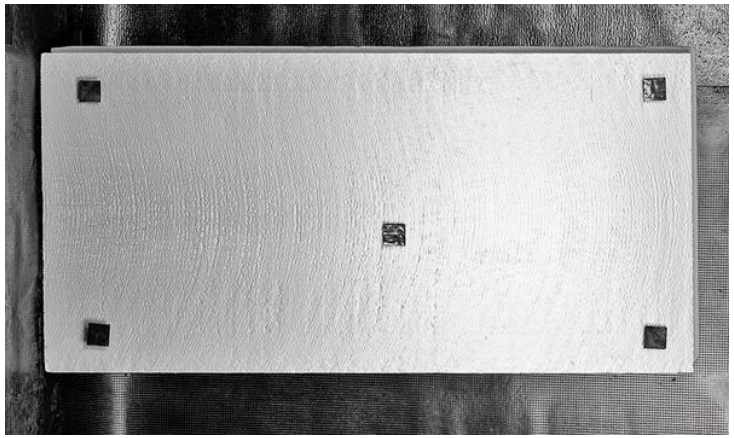
Fasteners are used for temporary fixation of XPS slabs to various surfaces: bitumen or bitumen-polymer membranes in systems of foundation waterproofing.
At this it is recommended to finish a backfilling within 3-5 days.

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 ⩾ +10 °C

Consumption of fasteners - 4 pcs / m^2



PROPERTIES	Nr. 01	Nr. 02
Flat-width, mm	40±2	65±1
Flat-length, mm	40±2	65±1
Stud size, mm	40±2	78.5±1
Packaging	200 pcs. / box	100 pcs. / box



EXTRUDED POLYSTYRENE

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 putty knife. 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	VALUE
Strength of adhesion to the surface, Mpa with concrete with metal	 0.1 0.1
Mass fraction of nonvolatile substances, %	75-80
Shear strength of glued bond, kN/m	0.1
Heat endurance, °C	+90

EXTRUDED POLYSTYRENE

EXPANDING FOAM GLUE TECHNONICOL FOR POLYSTYRENE

Expanding Foam Glue TECHNONICOL 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 during the warming of walls, interior partitions, balconies and loggias
- for thermal insulation of façade, basement or/and foundation

Also it is used for:

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

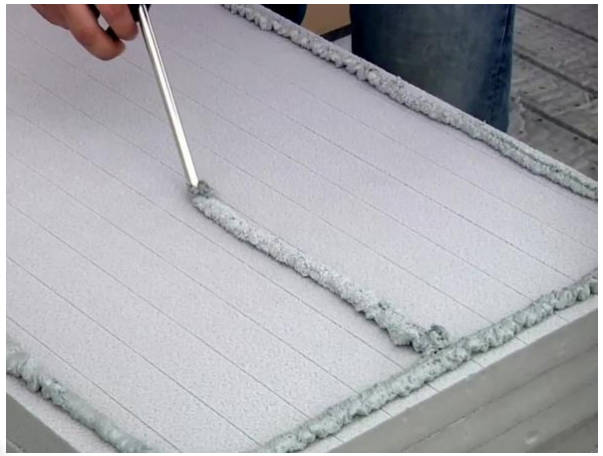
PROPERTIES	VALUE
Time of the polymerization start, min	⩽ 15
Curing time (at 20 °C and relative humidity over 50%), h	⩽ 2
Adhesion strength with a concrete, MPa	⩾ 0.4
Adhesion strength with expanded polystyrene, MPa	⩾ 0.09

EXTRUDED POLYSTYRENE

INSTALLATION WITH FOAM GLUE

For installation of XPS TECHNONICOL, use FOAM GLUE TECHNONICOL for extruded polystyrene

- Minimal expansion
- Consumption: 1 cartridge of foam glue per 10-12 m^2 – efficient
- Reliable fastening of slabs to any material

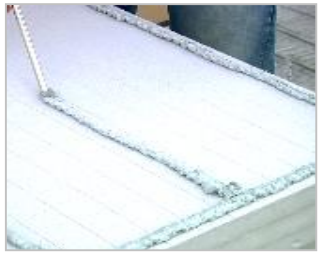


EXTRUDED POLYSTYRENE

INSTALLATION WITH FOAM GLUE

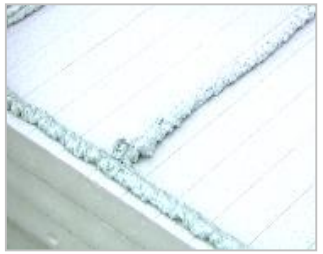
Step 1

- Shake the cartridge



Step 2

- Apply foam glue TECHNONICOL PROFESSIONAL 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

Step 4

- Stick the slabs to the surface

Step 5

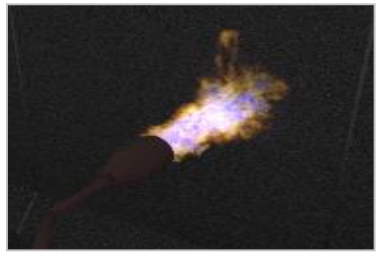
- Seal the junctions

Step 6

- Clean the gun from the foam

EXTRUDED POLYSTYRENE

INSTALLATION ON WATERPROOFING MATERIAL

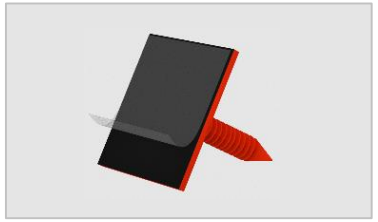


Step 1

- Heat the waterproofing bitumen material in the attachment points

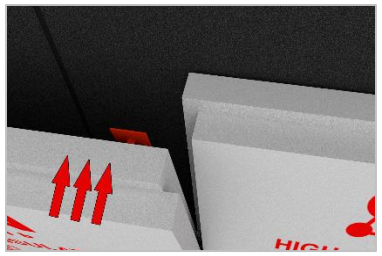
Step 2

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



Step 3

- Remove protective film from the mastic side of the fastener



Step 4

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

Step 5

- Backfill

EXTRUDED POLYSTYRENE

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.

EXTRUDED POLYSTYRENE

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.

EXTRUDED POLYSTYRENE

SURFACE REINFORCEMENT

Step 1

- A grid to be installed in small sections (not more than 1 m^2). 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.

TECHNONICOL

CONSTRUCTION SOLUTIONS

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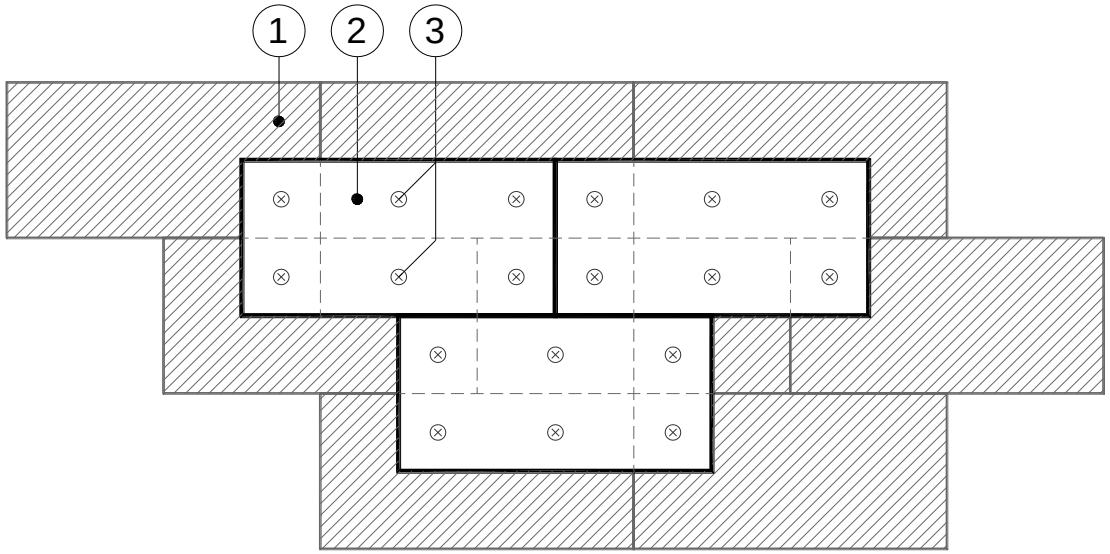
INSTALLATION OF THERMAL INSULATION



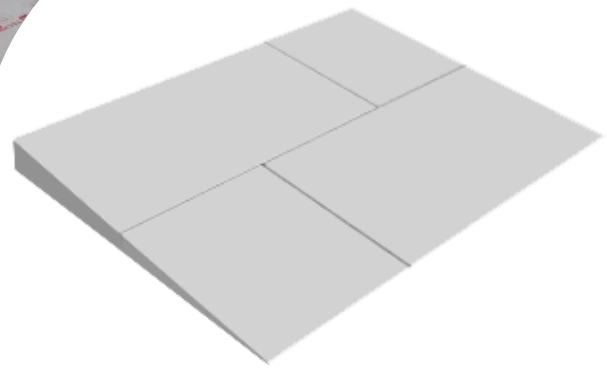
Thermal insulation slabs of one layer are recommended to be installed with a half-length displacement in relation to junctions in adjacent rows.

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

EXTRUDED POLYSTYRENE

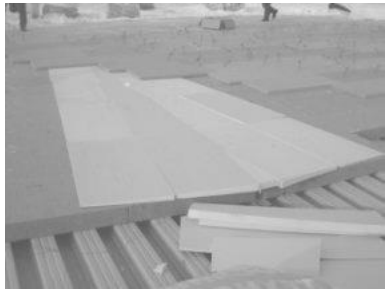
ARRANGEMENT OF A ROOF SLOPE

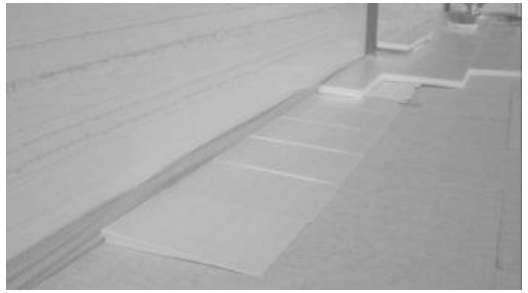


XPS ТЕХНОНИКОЛЬ CARBON PROF SLOPE – is a set of slabs for arrangement of roofing slopes. CARBON PROF SLOPE slabs help to solve the problem of stagnant zones associated with:

- 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)

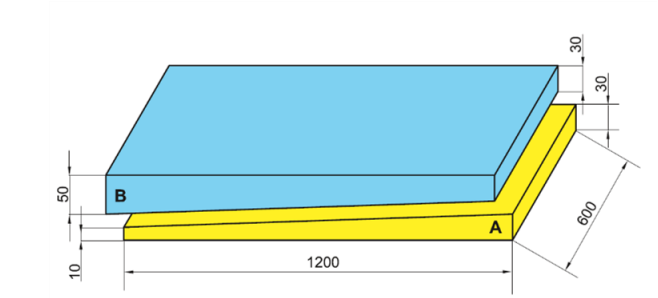
For valley slopes, water runoff from the aprons, roof lights, elevator shafts, roof vents, and expansion of the slope near the apron, XPS TECHNONICOL CARBON PROF SLOPE 3,4% or 8,3% slabs are used (J and K or M slabs).

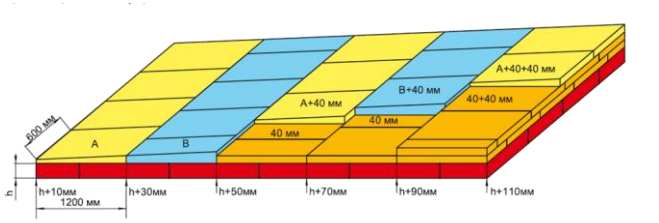


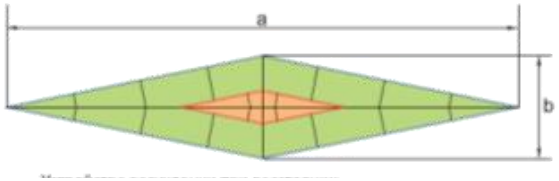


EXTRUDED POLYSTYRENE

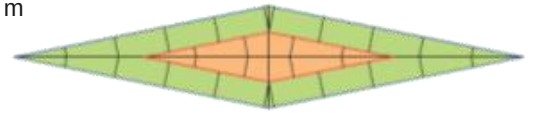
ARRANGEMENT OF SLOPES BETWEEN FUNNELS



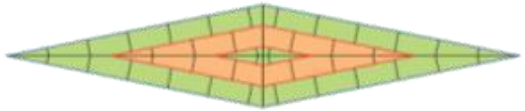




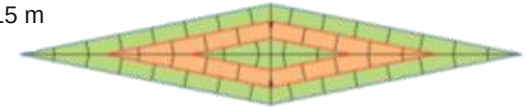
Arrangement of slopes with a 9 m distance between the funnels



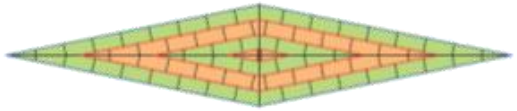
Arrangement of slopes with a 12 m distance between the funnels



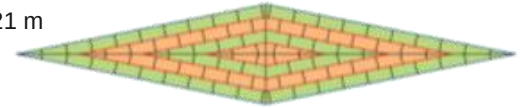
Arrangement of slopes with a 15 m distance between the funnels



Arrangement of slopes with an 18 m distance between the funnels

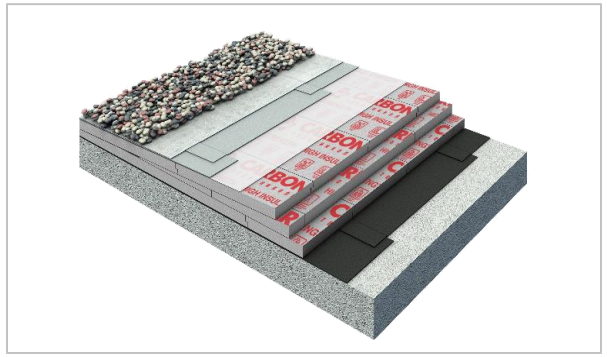


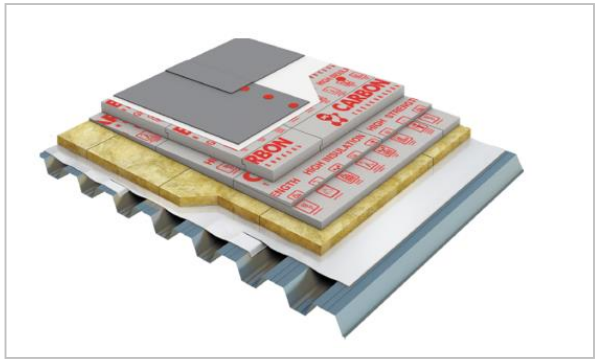
Arrangement of slopes with a 21 m distance between the funnels



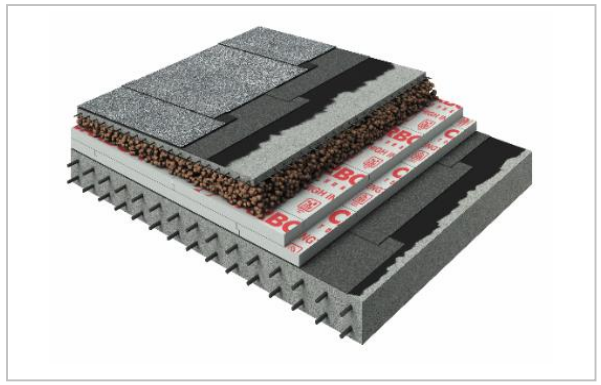
EXTRUDED POLYSTYRENE

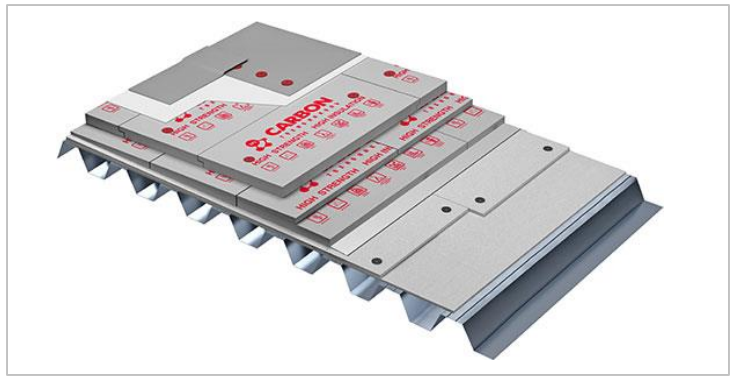
CONSTRUCTION SOLUTIONS:





NOTE!
It is necessary to use a SEPARATION LAYER between PVC membrane and XPS
(for instance, glass fibre, ≥100 g/m^2)



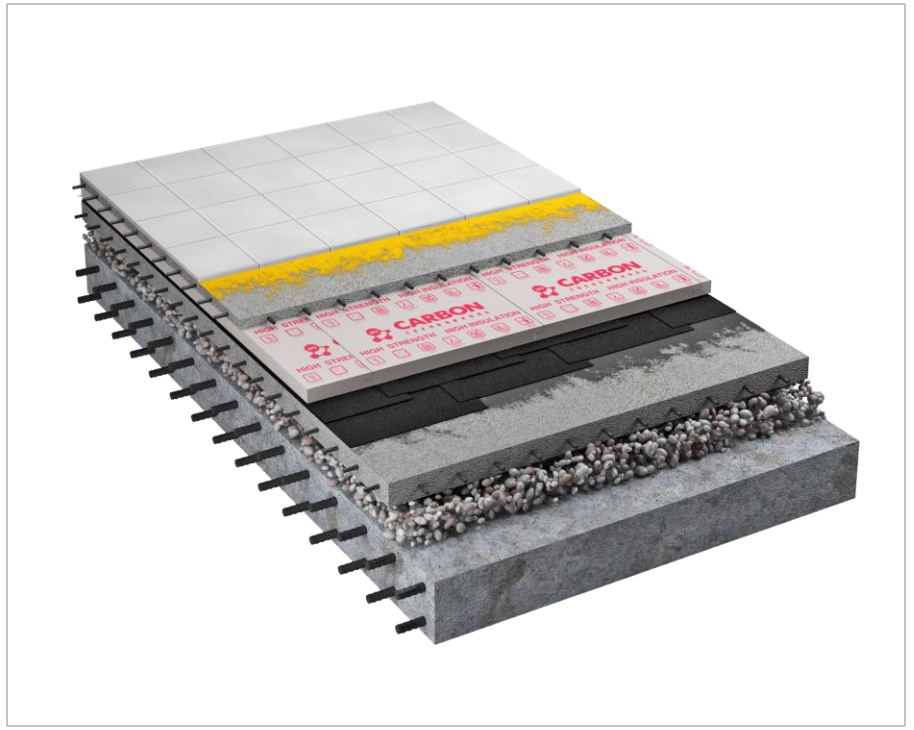


EXTRUDED POLYSTYRENE

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)

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



EXTRUDED POLYSTYRENE

CONSTRUCTION SOLUTIONS:

THANK YOU FOR ATTENTION!

Name
Position