



# XPS TECHNOMICOL

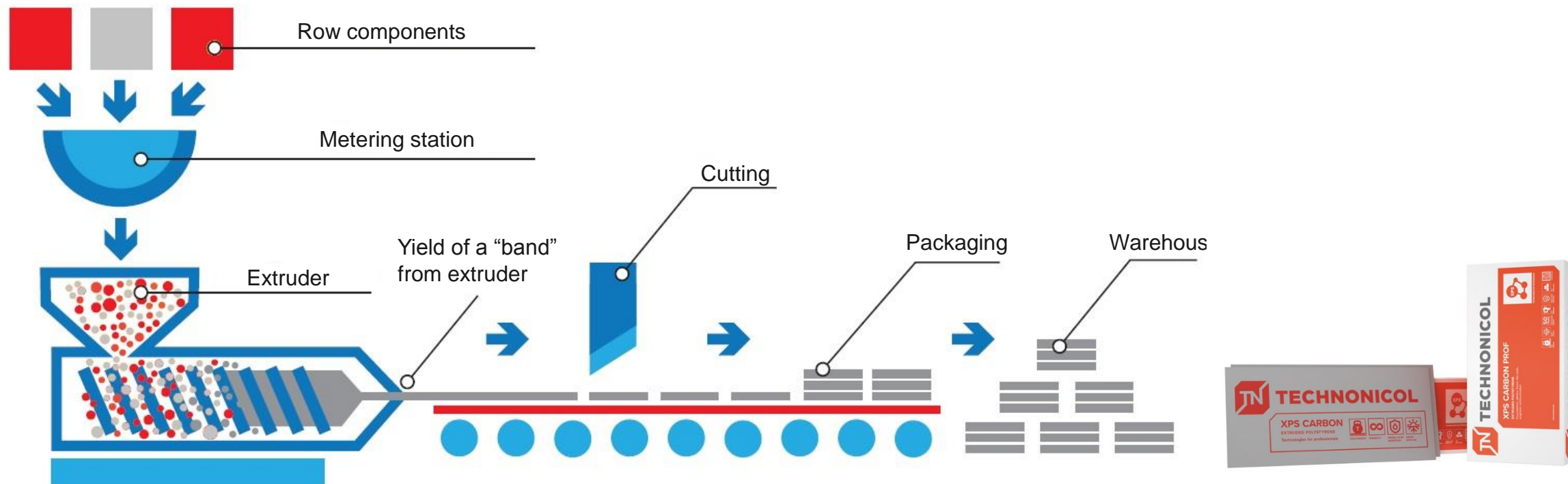
EXTRUDED POLYSTYRENE

KNOWLEDGE. EXPERIENCE. CRAFTSMANSHIP.

[WWW.TECHNONICOL.EU](http://WWW.TECHNONICOL.EU)

# EXTRUDED POLYSTYRENE

## XPS PRODUCTION PRINCIPLE:



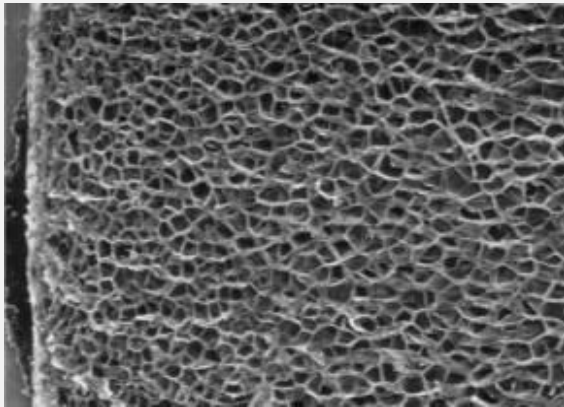
# EXTRUDED POLYSTYRENE

## STRUCTURE OF XPS:

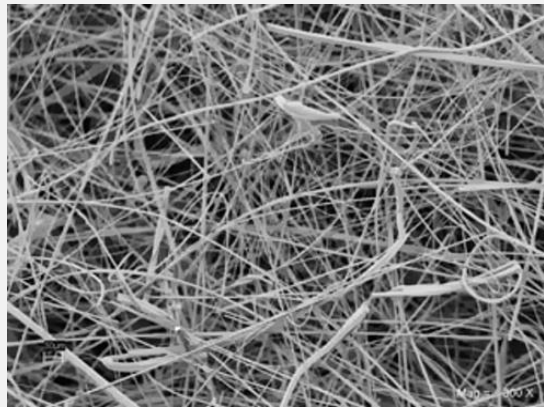
High-quality extruded polystyrene possesses closed-pore structure with equal cells throughout the material.

### Comparison of structure of various thermal insulation

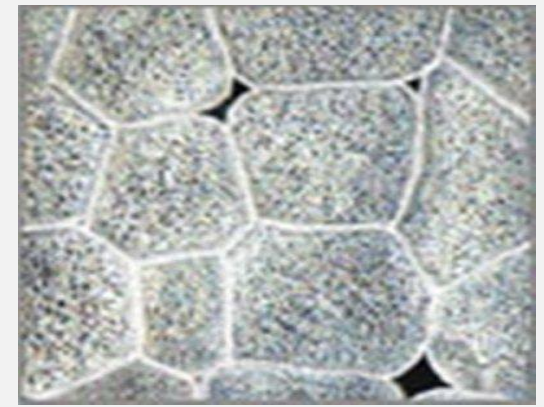
**XPS**



**STONE WOOL**

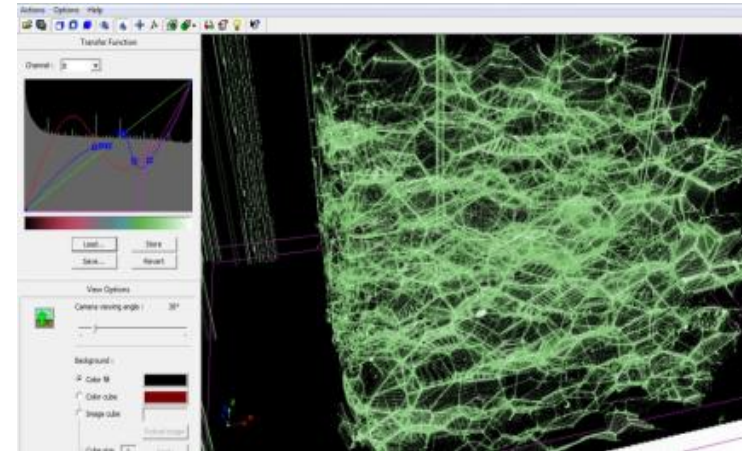
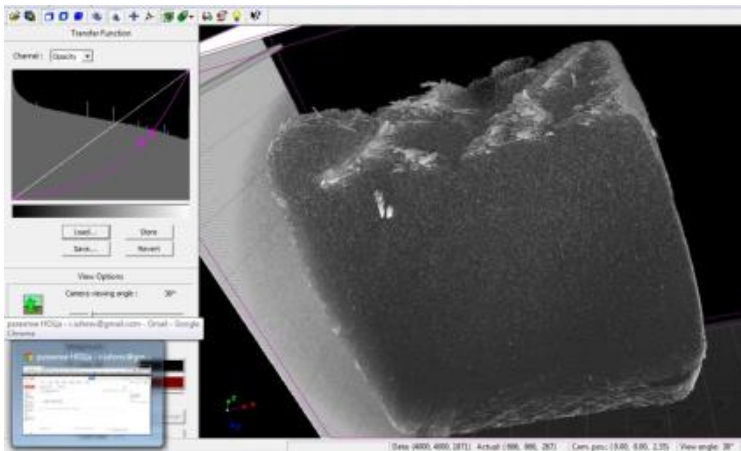


**EPS**



# EXTRUDED POLYSTYRENE

## STRUCTURE: MICROTOMOGRAPHY - COMPARISON OF STRUCTURE OF VARIOUS XPS



### XPS TECHNOMICOL

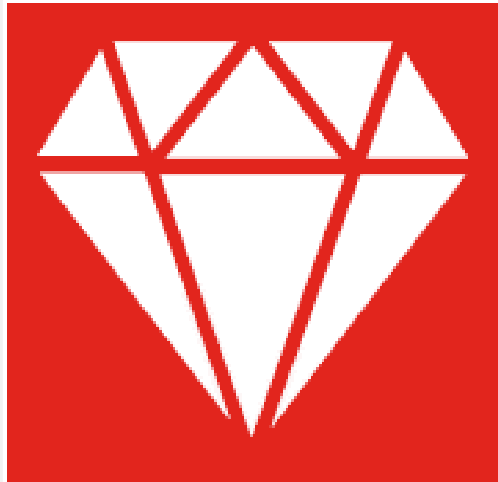
- Uniform structure
- Minimal size of the cells of 0.1-0.2 mm provides low water absorption and high strength of the material
- Long-life material

### ANOTHER XPS

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

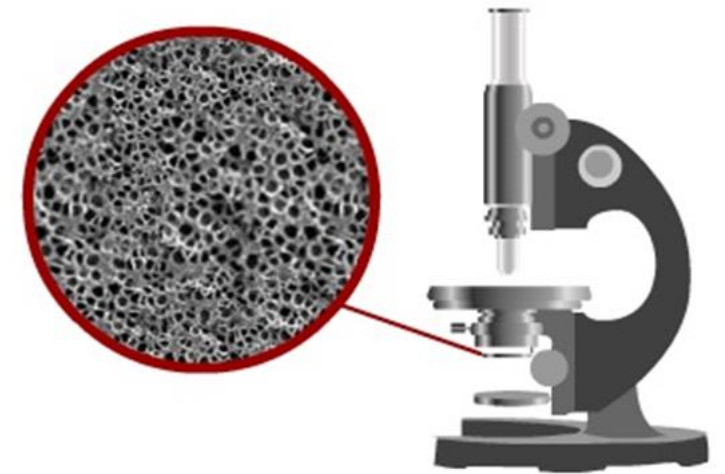
# EXTRUDED POLYSTYRENE

## 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.

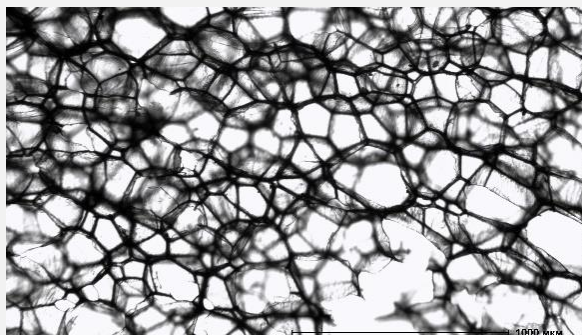
According to the results of the trials, thermal conductivity coefficient of XPS TECHNONICOL is  $0.029\text{--}0.032$  ( $25\pm 5$ ) °C, W/(m\*K).

Moreover, this value almost does not alter during operation.

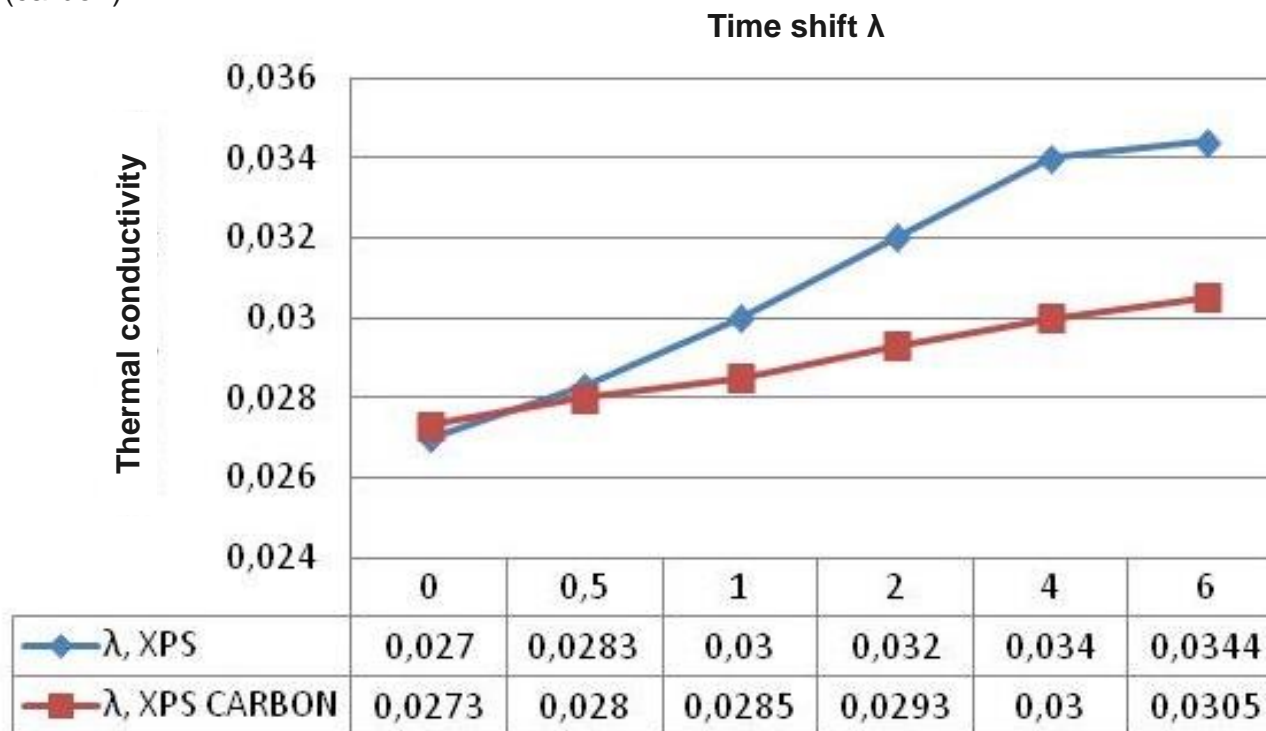
Due to low thermal conductivity coefficient XPS TECHNONICOL is an efficient thermal insulation.

# PROPERTIES OF EXTRUDED POLYSTYRENE

## ENERGY EFFICIENCY



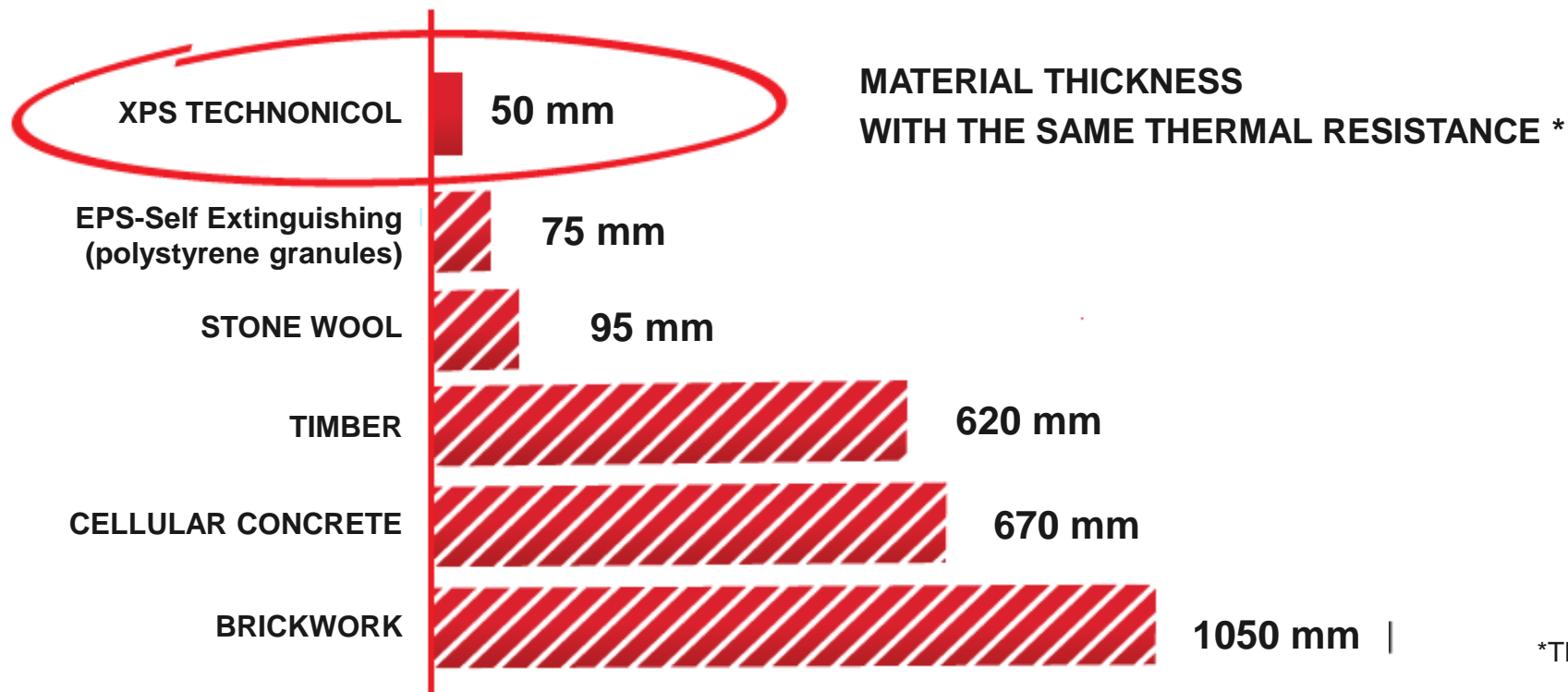
Thermal conductivity comparison of XPS TECHNONICOL and another XPS without graphite (carbon).



# 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 m<sup>2</sup>**



High strength enables using of XPS TECHNONICOL in loaded constructions:

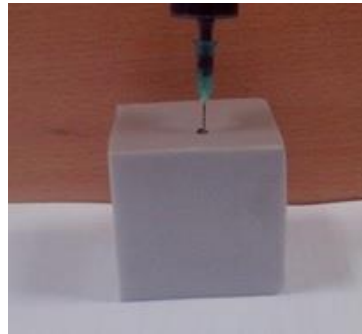
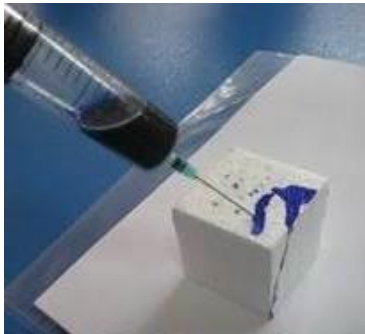
- Foundations
- Stylobate;
- Load-bearing roofs;
- Road construction

TYPES OF STRENGTH:

- Compression strength at 10% deformation
- Bending strength

# PROPERTIES OF EXTRUDED POLYSTYRENE

## MINIMAL WATER ABSORPTION



XPS TECHNOMICOLS possesses almost zero water absorption coefficient.

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



**EPS**



**XPS TECHNOMICOL**



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

# PROPERTIES OF EXTRUDED POLYSTYRENE

## ENVIRONMENT-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 nutrient for gnawers (proved by Institute for Disinfectology).

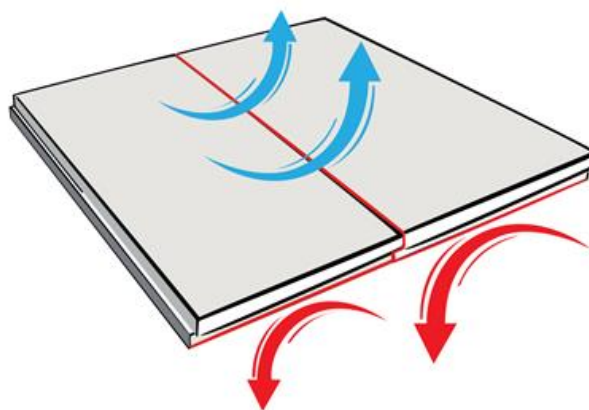
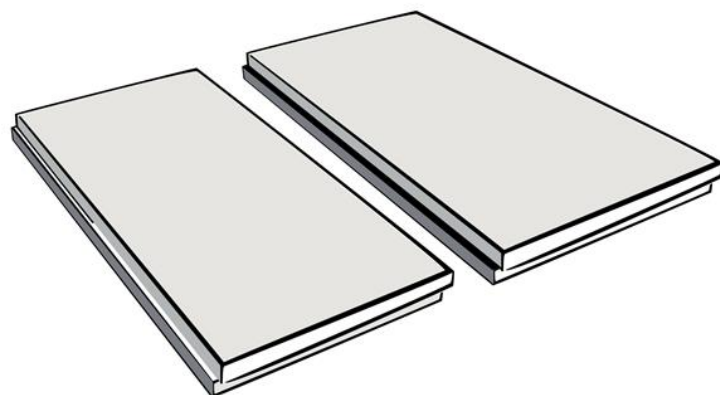
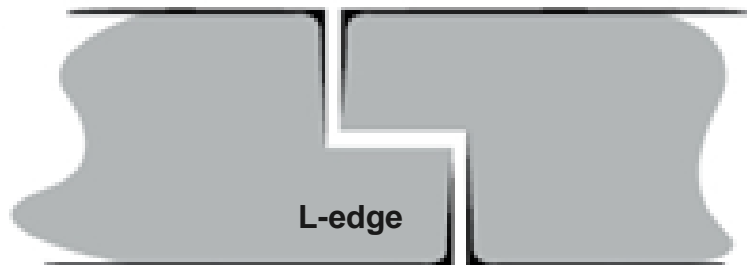


XPS is produced from general-purpose polystyrene.  
Food containers are also produced from such polystyrene.



# 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!





# MATERIALS 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 <sub>D</sub> , m <sup>2</sup> *K/W | λ <sub>D</sub> , W/( m*K) |                                    | Immersion                     | Diffusion |
| 20            | 0.571                                | 0.034                     | 200                                | 0.7                           | 0.3       |
| 30            | 0.857                                |                           |                                    |                               |           |
| 30            | 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 <sub>D</sub> , m <sup>2</sup> *K/W | λ <sub>D</sub> , 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 <sub>D</sub> , m <sup>2</sup> *K/W | λ <sub>D</sub> , 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, % |           |
|---------------|-------------------|----------------------|------------------------------------|-------------------------------|-----------|
|               | $R_D, m^2K/W$     | $\lambda_D, W/(m*K)$ |                                    | Immersion                     | Diffusion |
| 50            | 1.428             | 0.034                | 300                                | 0.7                           | 0.3       |

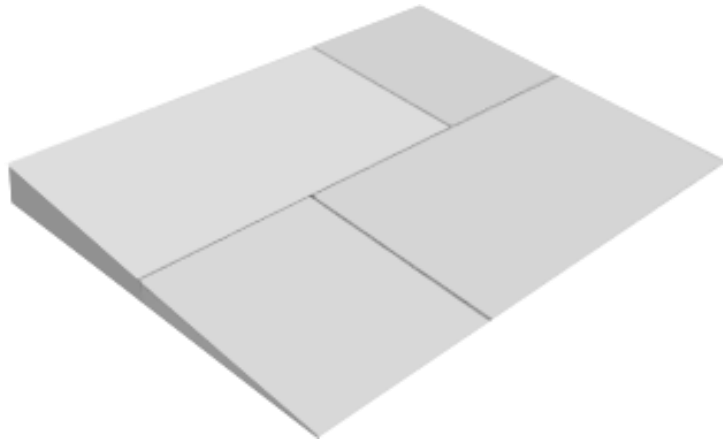


### DIMENSION:

- 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.

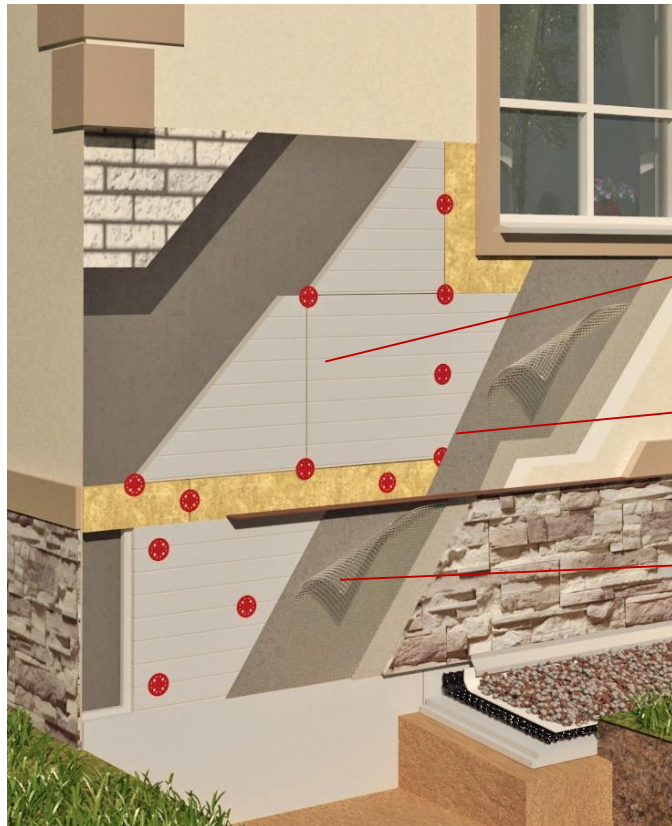


### **DRAINAGE**

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**

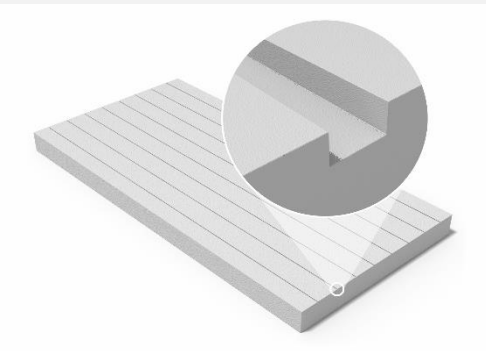
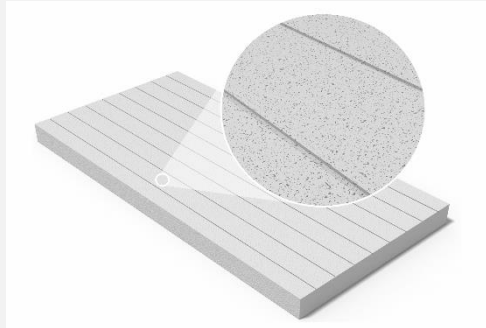
- Panel saw, or metal brush

**Disadvantage – labor-consuming**

**MANUAL TREATMENT OF THERMAL INSULATION SLABS IS INEFFICIENT**

# EXTRUDED POLYSTYRENE

## HIGH ADHESION TO THE SURFACE



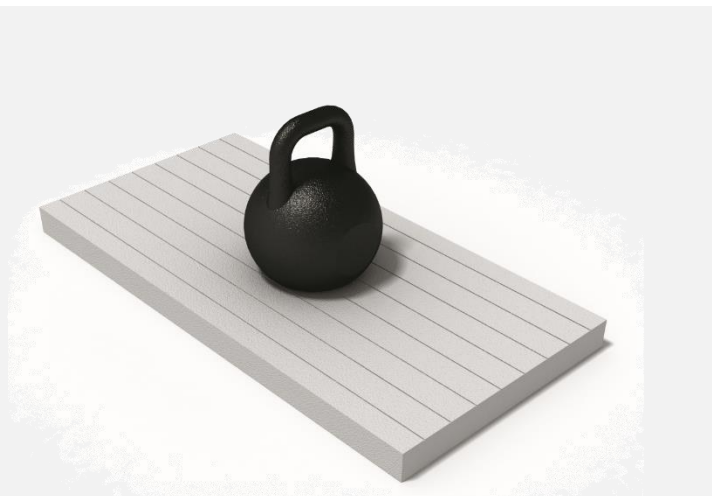
Special XPS CARBON ECO F slabs surface manufacturing milling technology

:

- 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 m<sup>2</sup>**



Low-strength thermal insulant



High-strength thermal insulant



# INSTALLATION

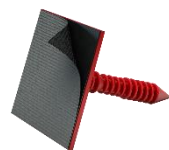


# EXTRUDED POLYSTYRENE

## CHOOSING OF INSTALLATION METHOD



Fastening XPS to waterproofing



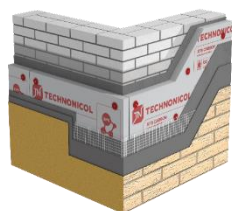
Fasteners TECHNOMICOL  
Consumption 4 pcs/m<sup>2</sup>



Mastic TECHNOMICOL No.27  
Consumption 0,6×1 kg/m<sup>2</sup>



Foam glue TECHNOMICOL  
Consumption 1 cartridge per 10-12 m<sup>2</sup>



Fastening XPS on basement to decking

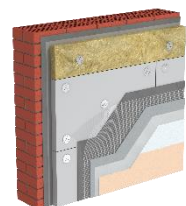
Adhesive compound for XPS  
Consumption 5-6 kg/m<sup>2</sup>



Disk-shaped façade anchor.  
Consumption 5-7pcs/m<sup>2</sup>



Foam glue TECHNOMICOL  
Consumption 1 cartridge per 10-12 m<sup>2</sup>



Fastening XPS on facade to decking

Adhesive compound for XPS  
Consumption 5-6 kg/m<sup>2</sup>



Disk-shaped façade anchor.  
Consumption 5-7pcs/m<sup>2</sup>

# EXTRUDED POLYSTYRENE

## FASTENERS TECHNOMICOL - 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.

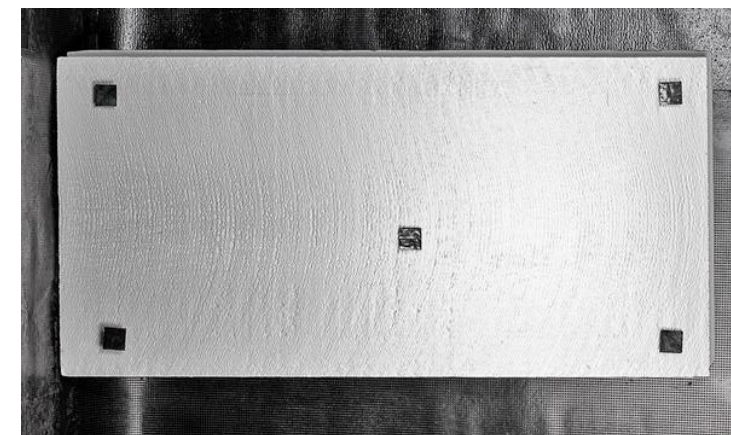
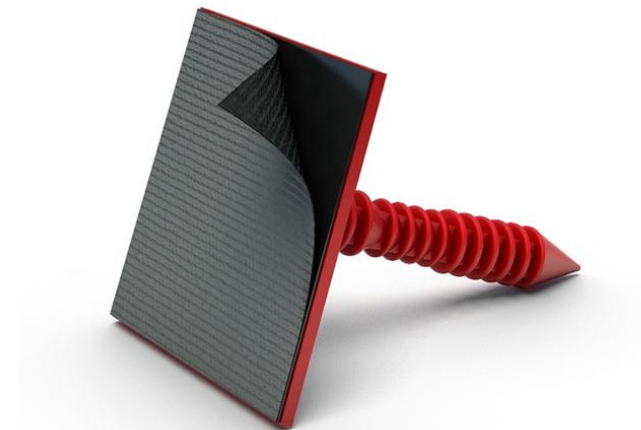
At this it is recommended to finish a backfilling within 3-5 days.

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  $\geq +10\text{ }^{\circ}\text{C}$

Consumption of fasteners - 4 pcs / m<sup>2</sup>

| 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                              | 0.1   |
| with metal                                 | 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 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 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                    | $\leq 15$   |
| Curing time (at 20 °C and relative humidity over 50%), h | $\leq 2$    |
| Adhesion strength with a concrete, MPa                   | $\geq 0.4$  |
| Adhesion strength with expanded polystyrene, MPa         | $\geq 0.09$ |



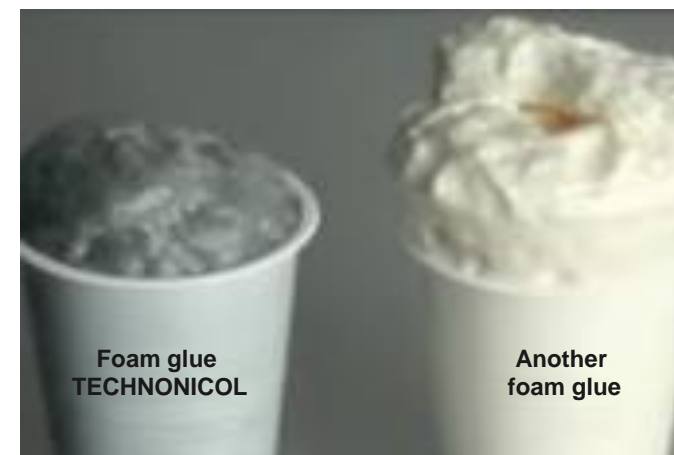
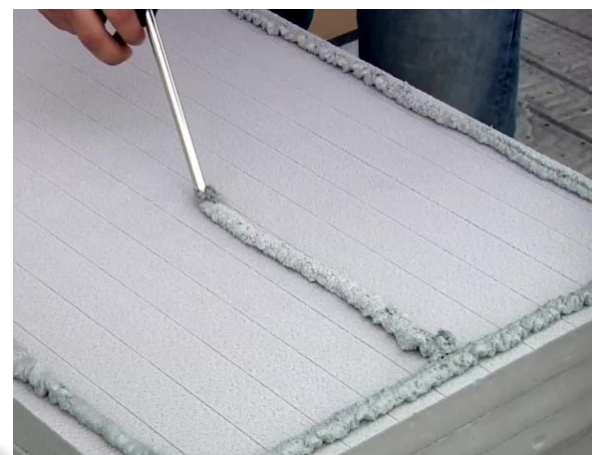
# EXTRUDED POLYSTYRENE

## 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 m<sup>2</sup> – efficient
- Reliable fastening of slabs to any material



# EXTRUDED POLYSTYRENE

## INSTALLATION WITH FOAM GLUE



### Step 1

- Shake the cartridge



### Step 2

- Apply foam glue TECHNOMICOL 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.

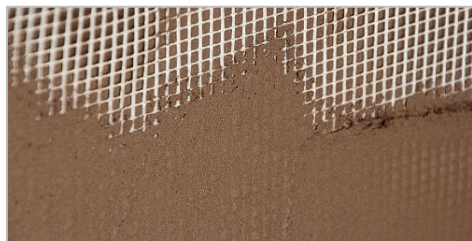
# EXTRUDED POLYSTYRENE

## SURFACE REINFORCEMENT



### Step 1

- A grid to be installed in small sections (not more than 1 m<sup>2</sup>). 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.

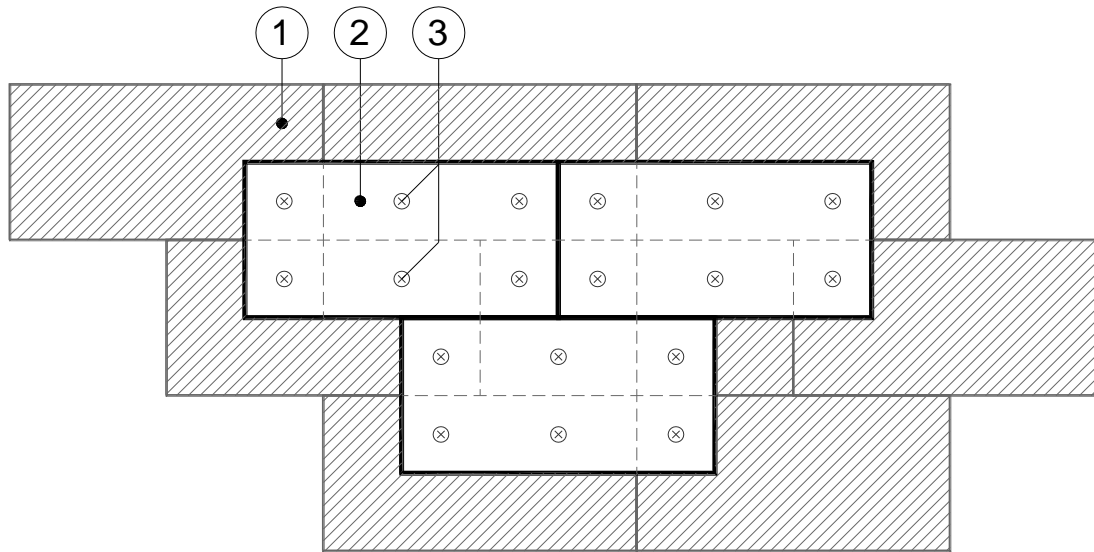


- Decorative plaster to be applied in one movement determined by desired texture.
- When needed, one can apply paint on the plaster layer with a roller.



# CONSTRUCTION SOLUTIONS

## INSTALLATION OF THERMAL INSULATION



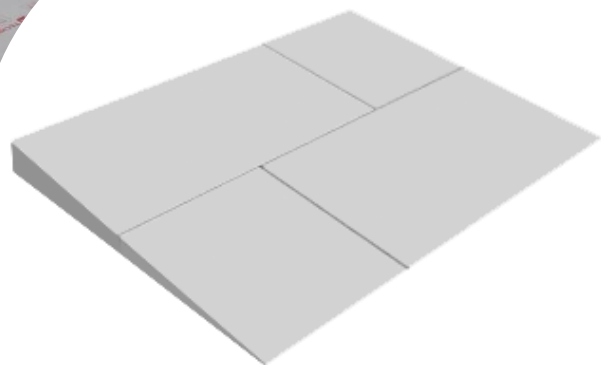
Thermal insulation slabs of one layer are recommended to be installed with a half-length displacement in relation to junctions in adjacent rows.

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

# EXTRUDED POLYSTYRENE

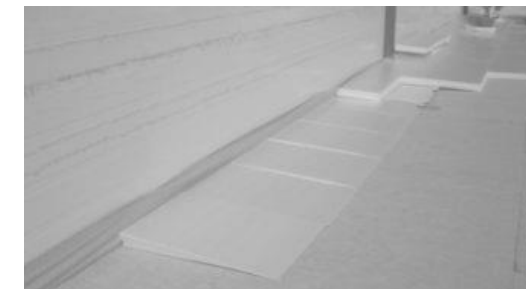
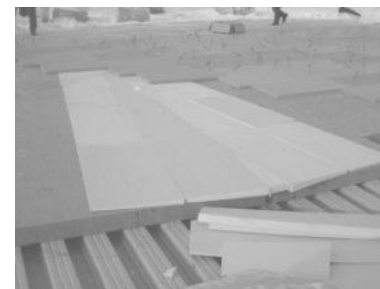
## ARRANGEMENT OF A ROOF SLOPE



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:

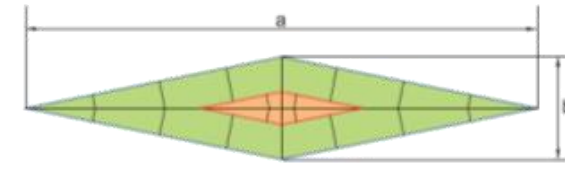
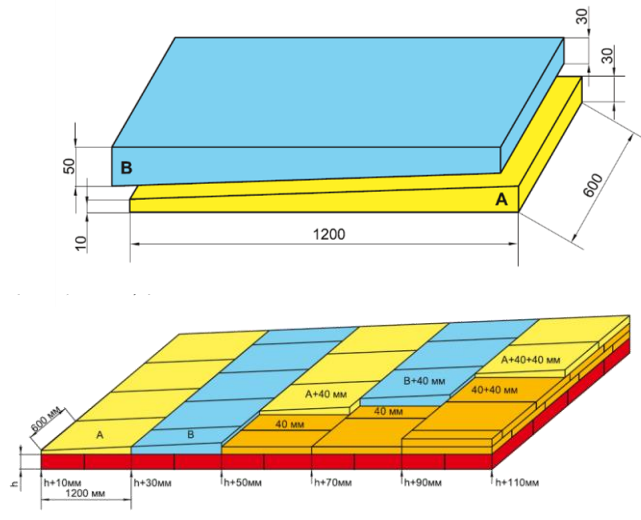
- Arrangement of a slope on the roof, expansion of slope, or change of water runoff direction
- Arrangement of valley sloping in direction of water funnels, gutters near airshafts and roof-lights
- Arrangement of an additional slope for water runoff from the apron (counter slope)

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

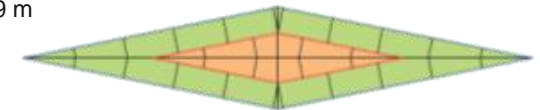


# EXTRUDED POLYSTYRENE

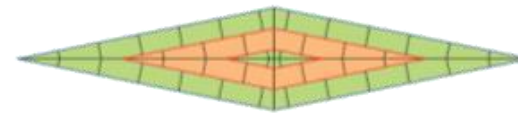
## ARRANGEMENT OF SLOPES BETWEEN FUNNELS



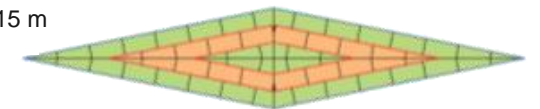
Arrangement of slopes with a 9 m distance between the funnels



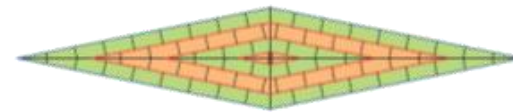
Arrangement of slopes with a 12 m distance between the funnels



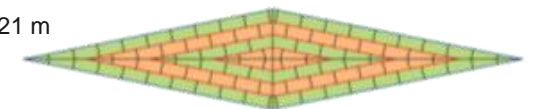
Arrangement of slopes with a 15 m distance between the funnels



Arrangement of slopes with an 18 m distance between the funnels

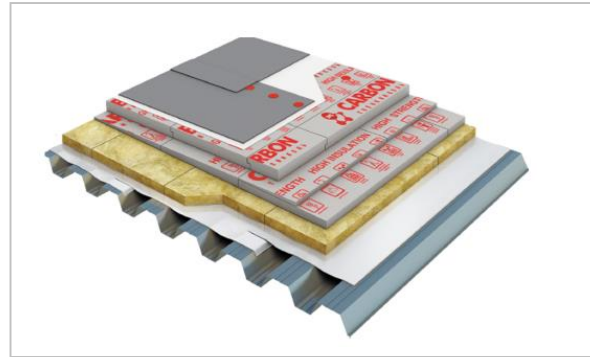
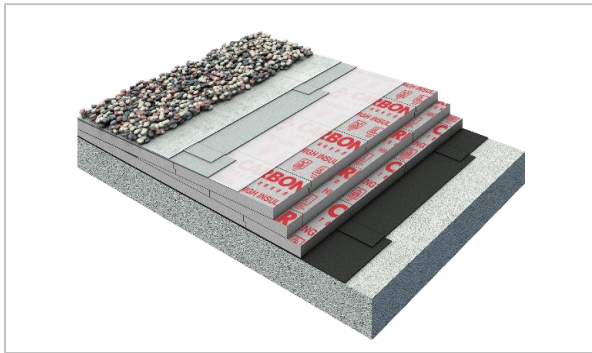


Arrangement of slopes with a 21 m distance between the funnels



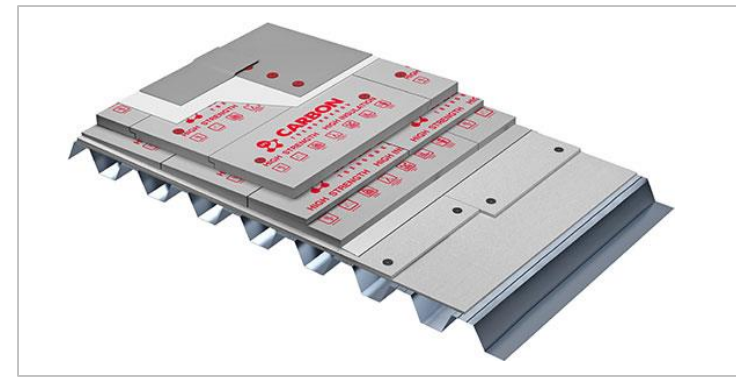
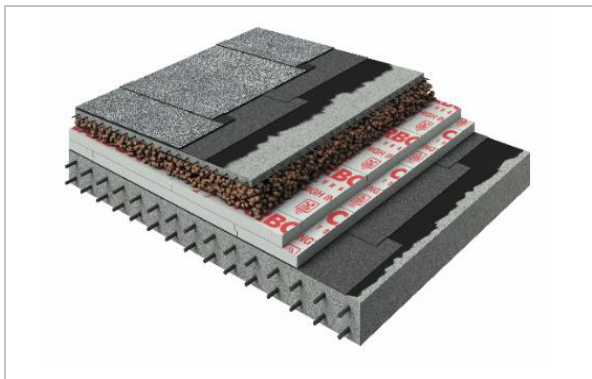
# EXTRUDED POLYSTYRENE

## CONSTRUCTION SOLUTIONS:



### NOTE!

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

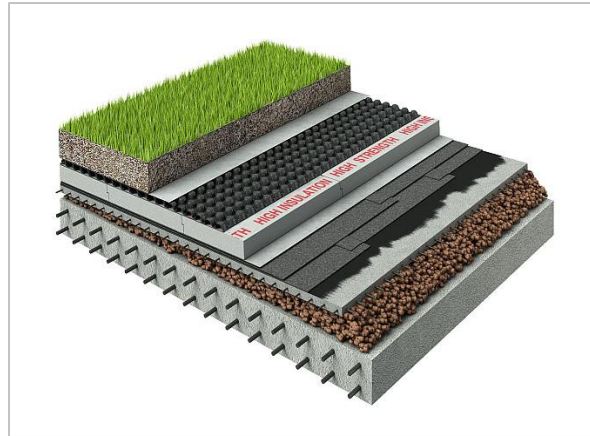


# EXTRUDED POLYSTYRENE

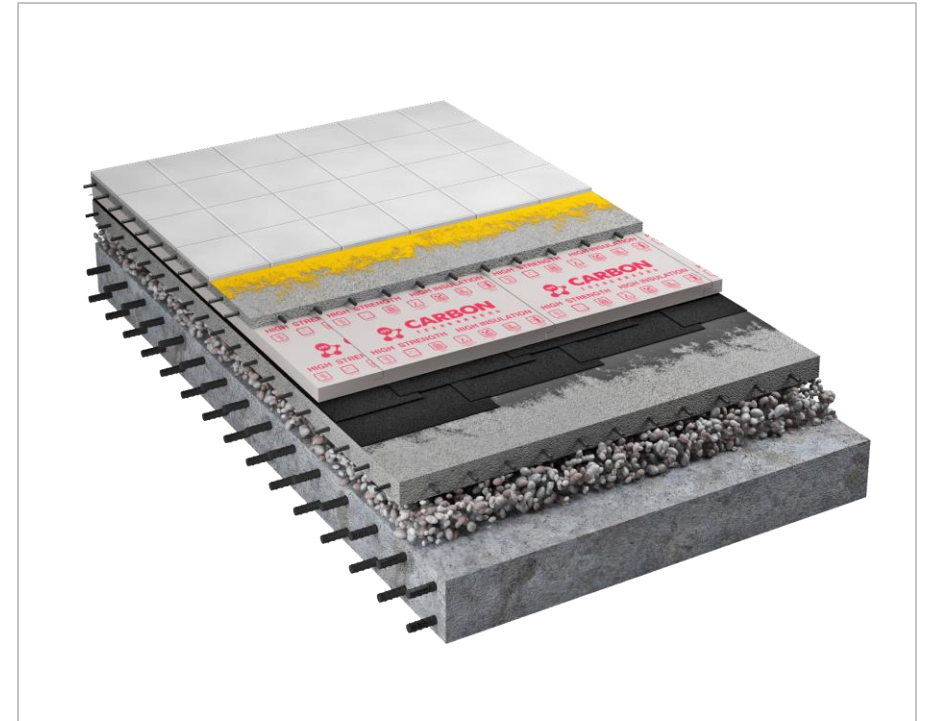
## CONSTRUCTION SOLUTIONS:



**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

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