GOOD PRACTICES IN SME

Roof insulation

Designed by freepik

The following document was developed using European Union financing as part of the “Technical support for the promotion of energy audits and energy efficiency investments in small and medium-sized enterprises in Poland”. The opinions presented in this document should not be treated as the official stance of the European Union.

The project was financed by the European Union as part of Structural Reform Support Programme (SRSP) and realized by the Polish National Energy Conservation Agency (KAPE SA) in cooperation with the European Commission on behalf of the Ministry of Climate and Environment.

Which materials can be used to insulate the roof?

The following materials are usually used to insulate the roof:

- EPS boards (polystyrene) – light, rigid, not very absorbent, relatively cheap and easy to process.
- Mineral wool – elastic, vapor permeable, non-flammable, absorbs sounds well.
- PIR boards (polyurethane) – non-flammable, not very absorbent, water resistant.
- XPS boards (extruded polystyrene) – rigid, not very absorbent.

The defining characteristic of these materials is their thermal conductivity coefficient λ $[\frac{W}{m \cdot K}]$. The lower the coefficient, the better the material's insulating properties.

Material	EPS boards	Mineral wool	PIR boards	XPS boards
λ $[\frac{W}{m \cdot K}]$	0,031 – 0,045	0,030 – 0,043	0,023 – 0,029	0,029-0,034

Pic. 2 domoweklimaty: mineral wool insulation

Pic. 1 Lipińscy Domy: polysytyrene insulation

Pic. 4 dachy płaskie: PIR board insualtion

Pic. 3 RAVATHERM: XPS board insulation

How to choose the thickness of the insulation material?

How well a building's roof is insulated is decided by the heat transfer coefficient U $[\frac{W}{m^2 \cdot K}]$. The lower the value of the heat transfer coefficient U, the better the insulation. New buildings cannot have a heat transfer coefficient of roofs higher than 0,18 $\frac{W}{m^2 \cdot K}$. In 2021 this requirement will stricter, with a maximal value of 0,15 $\frac{W}{m^2 \cdot K}$.

The heat transfer coefficient U depends on the thickness of the insulating material and its thermal conductivity coefficient λ. This relationship is expressed by the formula: $U = \frac{\lambda}{d}$. The lower the thermal conductivity coefficient λ of the insulating material, the thinner it can be while still offering correct insulation.

For example: to ensure a coefficient U of 0,15 $\frac{W}{m^2 \cdot K}$ for a partition, we must use 30 cm of a material with a thermal conductivity coefficient λ=0,045 $\frac{W}{m \cdot K}$ or 20cm of a material with a thermal conductivity coefficient λ=0,030 $\frac{W}{m \cdot K}$.

Source: KAPE