

What Does Insulation Do?

Different materials have different abilities to conduct heat. Insulating materials work by having a low thermal conductivity. This means that they slow down heat moving through the material. The lower the conductivity of an insulation and the thicker the insulation, the slower the heat passes through. Some insulation materials perform better than others, so can achieve better performance with the same thickness. The thickness of a material combined with its conductivity is used to calculate its thermal resistance.

A wall is made up of a series of layers, for example a cavity wall might have internal plaster, a block wall, a layer of insulation, an air gap and finally a brick wall. Each of these layers has their own thermal resistance. All of these thermal resistances in the wall are combined to calculate the U-value.

The U-value is probably the term you will hear most when talking about the energy efficiency of buildings. The U-value is the measure of the rate of heat transfer through a building element, e.g. window, wall, roof or floor.

The lower the U-value, the lower the rate of heat transfer through that element. Therefore designers and builders are striving for lower U-values to improve the energy performance of a building. If the U-value is improved your costs will be reduced.

Continuous Insulation

In order to be effective, insulation needs to be continuous and wrap around the whole building without any breaks. You can see, in the illustration to the right, how the insulation forms a continuous line inside the house. While the illustration shows insulation installed internally, external wall insulation can also be installed.

This continuous thermal barrier will reduce the heat loss from the building as long as the insulation has a minimal amount of gaps. When insulation is maintained around the building, then heat loss is minimised.

Think about how you wrap a jumper around you to keep warm, and any hole in your jumper will provide a draught which leads to discomfort and loss of heat. This also applies to a building.

So how do we achieve this continuous insulation?

There are 3 important points to remember when achieving continuous insulation

- Properties of Materials - choose adequate and correct insulation on all parts of the external building envelope
- Detailing - Eliminate thermal bridging
- Best Practice - Eliminate any gaps and holes in the insulation

Failure to achieve continuous insulation will give rise to heat loss and thermal bridging.



Continuous insulation shown by the orange line eliminates heat loss through the envelope