

How insulation works: The science

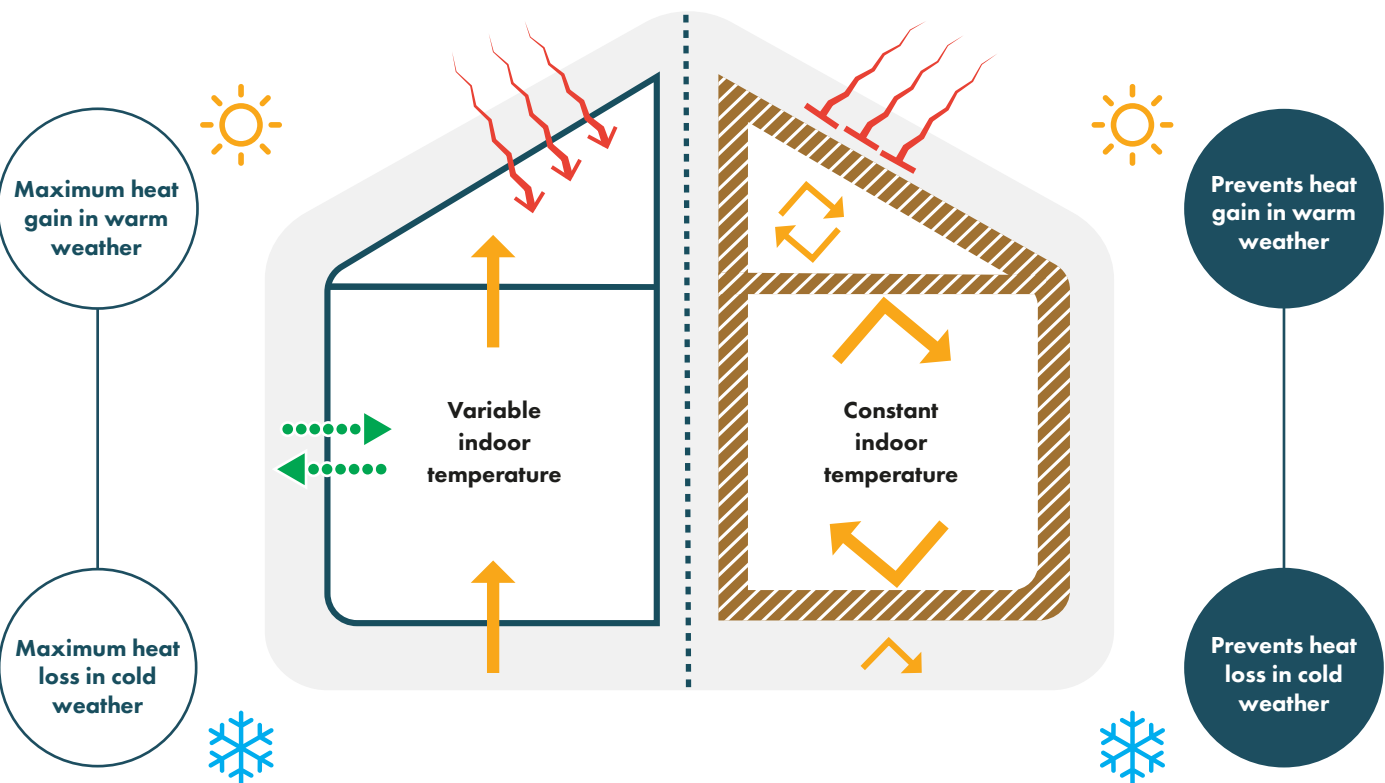
Fact: Heat always moves from areas of high temperature to areas of lower temperature.

UNINSULATED

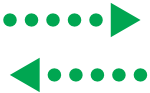
In winter heat from inside a building will try to escape, leaving the space feeling cold, and the reverse will happen in summer.

WELL INSULATED

Insulation is crucial for keeping the temperature inside a building constant throughout the year. It does this by limiting heat flow through **conduction**, **convection** and **radiation**:



CONDUCTION



The transfer of heat by direct contact, for example through the different materials in a building's exterior wall.

To reduce conduction, insulation should have a very small amount of solid material in relation to void (there are a few exceptions). The solid material should also consist of thin connecting walls, or discontinuous fibres.

CONVECTION



The rising motion of warmer gases or liquids, such as the heat that rises from radiators.

To reduce convection, insulation should contain small air pockets within which air movement is minimised.

RADIATION



The transfer of energy from a 'hot' surface to a 'cold' surface through air or a vacuum, such as the heat we feel from the sun.

Radiation is stopped when heat is absorbed into the surface of a material. However, the temperature of the material will then rise and emit its own radiant energy. For higher resistance to radiated heat loss, 'low emissivity' surfaces (e.g., metallic foil faced finish) can be added to insulation.

KNAUF INSULATION

To learn more about insulation's essential role in achieving energy efficiency and thermal comfort, visit knaufinsulation.com/better-energy-efficiency