Carpet can help reduce energy costs by 8-13%

The drastically increased energy prices and a heightened environmental awareness call for new and sustainable ways of heating hotels, businesses, institutions etc. – as well as innovative ways of holding on to the warmth. Research and studies show that carpet is an extremely effective insulating material as carpet fibres are natural insulators with low heat conduction values. In addition, the surface pile of carpet with its millions of tiny fibres traps air and further increases its thermal insulation. Read on to find out why and how carpet can help to reduce energy costs.

Carpet is an exceptionally good insulating material

As can be seen from below table, the thermal resistance of carpet is significantly higher than that of concrete and plywood, two common flooring materials, and similar to fiberglass insulation. In fact, the insulation value of carpet can be up to 10 times higher than that of hard floor covering.

Figure 1: Thermal resistance of materials[1]

Material	Thermal insulation* R-value (m^2K/W)
Concrete (10 cm thick)	0.07
Plywood (1 cm thick)	0.08
Carpet (1 cm thick)	0.18
Fibreglass insulation (1 cm thick)	0.22

[1] Thermal Insulation Performance of Carpet, Carpet Institute of Australia Limited (R-values converted to metric units used in Australia = m^2K/W)

* The R-value is used to measure a material's resistance to heat transfer or thermal resistance – the higher the R-value, the greater the insulating effect

The thicker, the better

The carpet thickness is the major factor determining the thermal insulation. The thicker the carpet, the greater the thermal insulation provided. So, when carpet is installed over underlay or carpet cushion further increases in thermal insulation are obtained. Though carpet thickness is the major factor determining the main insulation efficiency, bulk density and construction also have some effect.

Carpet can help to reduce energy costs in heating when there's a temperature differential between the indoor air and that under the floor. Uninsulated floors account for 10-20% of heat loss from a room and the greatest benefit from a carpet is obtained when as large an area as possible, preferably wall to wall, is covered. This is because the reduction in heat loss is proportional to the area carpeted.

The size of your energy savings

Research found that the energy savings are in the range of 8-13% as can be seen from the following table.

Figure 2: Energy savings at various carpet thicknesses[2]

Carpet	Pile height mm	Carpet thickness mm	Total weight kg/m²	Energy saving heating %
Cut pile	5	7.3	1.722	8.6
Cut pile	7	9.2	1.963	11.3
Cut pile	10	11.7	2.257	12.8

[2] Thermal Insulation Properties of Wool Carpets – Wools of New Zealand (2002)

High insulation values of Ege Carpets collections

Our carpets hold high insulation values as illustrated in below table featuring a selection of the most popular Ege Carpets collections. Based on our products' R-values and carpet thicknesses, the table clearly shows that a significant energy saving can be achieved. You'll find the exact R-value and carpet thickness for any product in the carpet specs featured alongside the specific product on egecarpets.com.

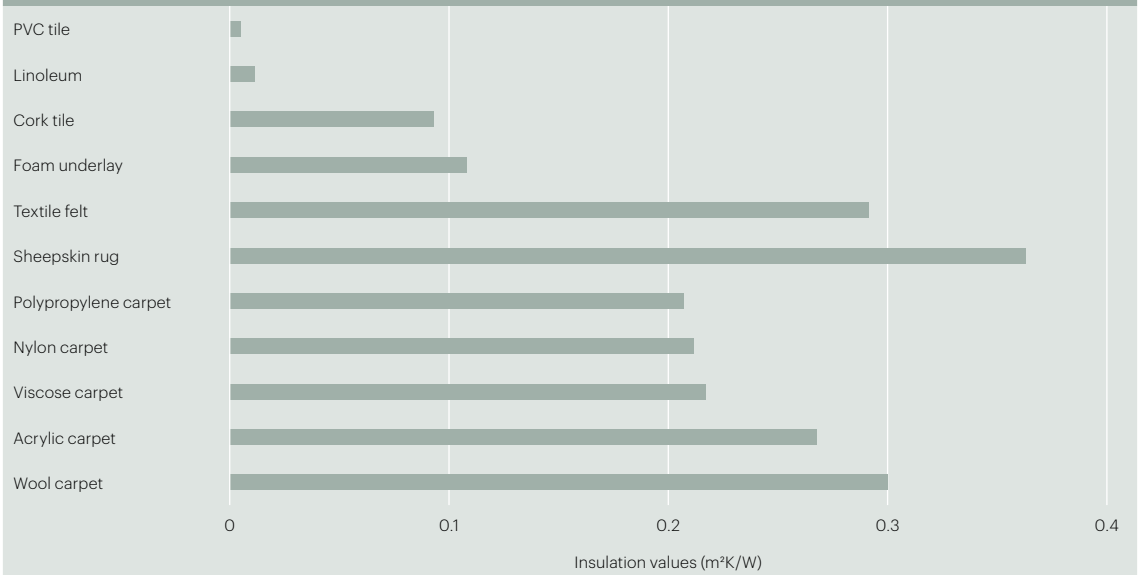
Figure 3: Insulation value of Ege Carpets collections

Collection	Carpet thickness mm	R-value (m²K/W)	Energy saving heating % (approx.)
Colortec 1500 LT	11	0.19	13.0
Epoca Classic CL	7.5	0.13	8.6
Epoca Classic ECT350	7	0.12	8.5
Highline 80/20 1100 AB	10	0.17	12.5
Highline 1100 WT	8	0.14	9
Highline 1100 AB	10.5	0.18	13
Epoca Knit WT	4	0.07	4
Epoca Knit ECT350	5.5	0.09	6
ReForm Mark of Time WT	5.5	0.09	6
ReForm Mark of Time ECT350	7	0.12	8.5
ReForm Memory WT	8	0.14	9
ReForm Memory ECT350	8.5	0.15	10

Wool is the most effective carpet fibre

Wool carpets have a higher insulation value (R-value) than comparable carpets of other fibre types, as illustrated in the figure below.

Figure 4: Insulation values of common flooring materials[3]



Insulation per 1000 g/m² of surface pile weight

[3] The Thermal Properties of Wool Carpets, AgResearch Limited, New Zealand

The millions of wool fibres in the pile of carpets trap pockets of air, creating a natural insulation barrier, while the fibres' high crimp (bulk) effectively restricts the flow of air through the pile and therefore heat loss through convection. Flattening or compacting of the carpet pile through wear will reduce its thickness and thus its insulating propensity. However, the natural resilience of wool fibres, which results from the spring-like structure of its internal proteins, gives them better recovery after compression than alternative fibres, so that the pile of wool carpet retains its height and insulating properties for longer.

More carpet advantages

The thermal properties of carpet make people feel more comfortable at a given air temperature. A carpeted floor feels warmer under foot and doesn't require the heating that a smooth surface may, adding further energy savings. It has been shown that the perceived temperature in rooms with textile floorcoverings is approximately 1-2 °C higher than in rooms with hard floorcoverings, resulting in savings of heating costs of approximately 6%. In addition, because carpet feels warmer, further energy savings can be made since heating can be switched on later in the autumn and off again earlier in the spring. Other benefits contribute to personal safety and are related to the removal of indoor air pollutants, reduction of the frequency and severity of falls – not to forget remarkably increased acoustics.

A carpeted room promotes thermal comfort, saves energy and therefore also contributes to a reduction in green house gas emissions that are a major cause of climate change. When choosing a floor covering, all these advantages should be considered along with other technical and environmental benefits and the less tangible attributes of aesthetics. Ultimately, carpet should be considered along with curtains, double glazing etc. as part of the overall thermal design.

Sources:

Thermal Insulation Performance of Carpet, Carpet Institute of Australia Limited

The Thermal Properties of Wool Carpets, AgResearch Limited, New Zealand