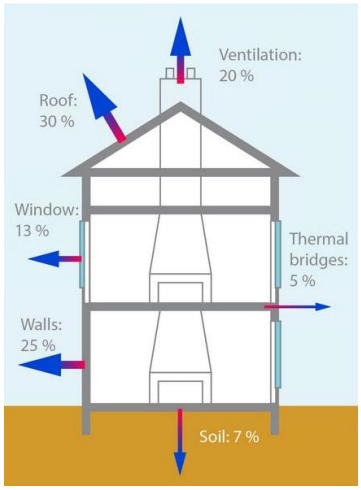
Technical Bulletin:

Heat Loss & U-Values

These days it's common to hear of "heat loss" when referring to buildings. Typically it's measured in "U-Value".

There are other values, such as "R-Value" but U-value is the most common term used to describe heat loss, or the causes of it from a building.



So what is heat loss and what is a U-value?

As we can see from this dwelling, heat typically leaches out everywhere.

25% through walls.

13% through windows.

30% out through the roof.

7% to ground

20% to natural ventilation and 5% through thermal bridges. Typically these are things like window and door frames or stone and steel lintels.

It's no surprise that the roof is the largest area of heat loss. Heat rises and a poorly insulated roof is a major source of energy leakage.

With the rising cost of fossil fuels and the ever increasing threat of global warming, the challenge is to keep heat within a dwelling or property for the maximum amount of time through a combination of modern insulating materials that can be installed after build, or newly developed building products with very low U-values.

The term U-value technically doesn't apply to heat loss from a property but rather the heat transference through a material such as brick, wood or glass.

It can be calculated for any solid substance and the lower the U-value the better the material is at resisting heat transference. In other words, a material with a low U-value will act as a better insulator than a material with a higher U-value because the rate of heat loss through the material is slower.

The main focus for insulating properties in the UK in recent year has been insulating roofs to slow down the rate of heat loss that rises up through stairwells and through plaster and lath ceilings that are characteristics of properties built in the UK since the late 1800's

Following that, properties built from about 1930 onwards were of a cavity wall construction.

Prior to 1930 it was more common to find properties built of a solid wall construction. I.e two bricks back to back with no space or cavity between.

Solid wall properties had very poor U-values as brick is a poor thermal insulator. In most cases it was also a major contributor to internal dampness from driving rain and weather exposure.

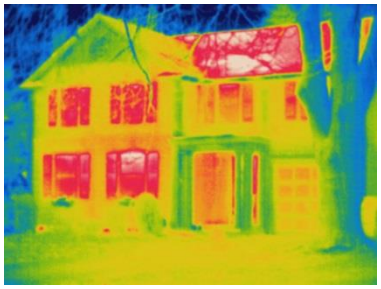
The introduction of a cavity or space between the inner brick and outer brick was a major step forward in reducing heat loss and damp transference.

Although the U-value of the brick hadn't particularly improved, the air within the cavity acted as a thermal barrier, plus water ingress through the outer brick could drain into the cavity and away through the ground.

Recently, improvements in wall insulation and its application has meant that thousands of homes with cavity walls have benefitted massively from cavity wall insulation with its very low U-value.

In other words the internal warmth of a property can now be contained within the walls thanks to the very low heat transference or U-value of wall insulation and roof insulation.

So what about windows?



Windows and glass have improved dramatically over the past few years with manufacturers rising to the challenge of improving the U-value and energy leakage of their products from draughts to cold surfaces.

Prior to the 1970's most properties in the UK were fitted with single glazed windows with soft wood or aluminium frames.

Neither option offered much level of comfort or warmth suffering from draughts, freezing over in the winter and poor levels of security.

The oil crises in the 1970's forced designers and manufacturers to think about energy loss through glazing and the poor U-values of both the glazing and the frames.

As wooden single glazed casement windows were almost on par with having a hole in the wall in terms of energy leakage, the thinking of the day was to reduce the size of the window.

This is why many 1970's built UK houses have small windows that look out of keeping with the surrounding properties. It was a trend that didn't last too long as people found them to be dark inside, particularly during the winter. Plus they required more heating because of their inability to capture and benefit from the natural radiant heat of sunshine during the day.

Technology in glass and frame design means that even single glazing in the form of toughened or laminated now benefits massively from capturing and retaining radiant heat, while allowing maximum light to flow into any area.

When you consider double glazed units with heat retaining Argon filled cavities, reflective coated glass, warm edges and thermally enhanced frames the U-value of a window as a whole drops dramatically compared with what it once was.

	U values
Single glazing	0.94
Double glazing	
Single plane plus storm	0.48
Double pane	0.48
Double pane (wavelength-selective sealed film or glass, 1/2" argon gas-filled)	0.39
Triple glazing	
Double pane plus storm	0.38
Triple pane	0.38
Triple pane (wavelength-selective sealed film or glass, 1/2" argon gas-filled)	0.27

As the table shows, just considering the glass options makes a significant difference in heat loss transfer (U-value) even without taking the frame into consideration.

Not only will property owners see a huge reduction in fuel bills by considering the thermal options available when choosing windows, but comfort levels will be massively increased from retained heat, increased light and reduced acoustic levels.

When considering options for your commercial or retail premises you need to talk to somebody who knows and understands your requirements.

Contact the Shopfront Group today.

0161 884 0131

shopfrontgroup.co.uk
COMMERCIAL WINDOWS & ROLLER SHUTTERS