

Insulation – U-values and Building Regulations Requirements

When a roof is being refurbished – that is when more than 50% of the roof waterproofing is being stripped off – the Building Regulations require that the thermal efficiency of the roof be brought up to current standard should it fall below what is termed a threshold limit, the efficiency being measured as the “U value” of the roof.

U-values, therefore, directly relate to the thermal efficiency of a particular thermal element; a thermal element being a roof, wall, window or floor separating a conditioned (i.e. heated space) from the outside air. For example, the plasterboard, ceiling joists, insulation of a roof all add up to a total U-value for a roof element. The required U-value of the element will, in general terms, determine the thickness of extra insulation needed to bring that element up to par with the current requirements of the Building Regulations if it is worse than the threshold value.

When refurbishing a roof, the contractor will examine what insulation is already in place – its type and thickness. This would give a U-value – if it is worse than the threshold (currently 0.35 W/m²K) the contractor will be required to top it up to ensure the new value is 0.16 or 0.18 W/m²K. If the total U-value already meets requirements, then the insulation does not need to be upgraded.

It's not just the Building Regulations which the client should take an interest in, but also the fact that selling a house requires an Energy Performance Certificate as well as a BRCC (see <https://www.gov.uk/buy-sell-your-home/energy-performance-certificates>)

U-values are thermal values measured in **watts per metre squared Kelvin**, a measure of thermal conductivity. The lower the U-value number, the more thermally efficient that element is. The table below is a broad guide as to how much of each type of insulation would be needed to make up the total U-values, examples of which are listed in the table:-

U-value W/m ² .K (threshold)	Insulation Material	Thickness (approx)
0.35	Mineral wool	140mm
0.35	Rigid foam board	70mm
0.35	Fibreglass quilt	140mm

Mineral wool is less thermally efficient than foam rigid board, which is why a thicker layer is needed to achieve the required value.

Building types are broken down into dwellings, commercial, and other. Other usually means swimming pools, church buildings or industrial sheds/warehouses.

All buildings which are heated by fixed heating need to be insulated regardless of the type of building. As would be expected, there are some exceptions to this, such as churches themselves but not church halls or offices which do fall within the requirement.

Building Regulations version.	Approximate date of construction	Approx. U-value W/m ² .K compliant at new building design date
Part F	1979 to 1985	0.35 dwellings
Part L	1985 to 1990	0.70 heated industrial 0.60 other heated
Part AD-L :1990	1990 to 1995	
Part AD-L :1995	1995 to 2002w	0.35 Residential 0.45 heated building with integral insulation, (ignoring thermal bridge calculations).
Any metal roof type with integral insulation	After 1996 to 2002	0.35 Residential 0.45 U-value but including thermal bridging in calculation
Part AD-L1: 2002 Part AD-L2: 2002	2002 to 2006	0.20 Pitched roof with insulation between rafters 0.16 Pitched roof with insulation between joists 0.25 Flat roof or roof with integral insulation Metal systems include thermal bridging by finite element analysis (FEA)

Each row of the table above shows what level of insulation was required and expected for each time period according to the Building Regulations of that time.

This is the reason why the age of the structure can help determine the current thermal efficiency of a roof because older buildings were required to be less thermally efficient than newer buildings, because the Building Regulations at the time had lower standards.

Of course simply adding extra insulation may not be possible because of technical reasons particularly for instance in flat roofing where increasing thickness of a roof build up will compromise thresholds and up-stands. In these cases the roof is insulated to the best practical level.

For further information or advice please visit www.competentroofer.co.uk or call us on 0844 318 8888.