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LOWER STANDARDS

Ian Knight looks at new insulation standards (lower maximum U-values) proposed for the next Building Regulations, and how to achieve them.

We hear a lot about the 'New Building Regulations', and read about them in the trade press, but what actually are they? Do we mean the 'new regulations we talked about two years ago, or are these 'newer' new regulations?

For the last two years, the Department of the Environment and the Scottish Development Department have been looking to improve standards in the parts of the Building Regulations dealing with the Conservation of Fuel and Power.

This is now at the 'consultative document' stage – after much consultation with the professions and with industry, a final consultative document was issued in July 1988 and reactions to it by the various professions and organisations are being fed back to the DoE, who will finalise the requirements.

The U-values – that is, the measurement of heat loss through the structure of the building, measured in W/m^2K – proposed in the July consultative document are the same ones which appeared in earlier consultative documents, so it is a reasonable assumption that these will be the ones finally adopted when the wording of the legislation is finalised later this year.

The main changes proposed are:

- The prescribed U-values for external walls and roofs will be considerably upgraded.
- For the first time, a maximum U-value will be prescribed for ground floors.

The table shows the current, and proposed, maximum U-values of the Building Regulations.

Building type	Maximum U-value (W/m^2K)					
	Wall		Roof		Ground floor	
	Current	*Proposed*	Current	*Proposed*	Current	*Proposed*
Dwellings	0.60	*0.45*	0.35	*0.25*	none	*0.45*
Industrial buildings	0.70	*0.45*	0.70	*0.45*	none	*0.45*
Other buildings (eg offices)	0.60	*0.45*	0.60	*0.45*	none	*0.45*

These new U-values are a very welcome development in the nation's bid to ensure better standards of energy efficiency in our next generation of buildings. Eurisol, together with other organisations, has been pressing for a rise in standards for many years – especially as the old standards were well behind those of most other countries in Europe.

Now Britain is catching up – but what will it mean in terms of construction methods, specification of materials and running a building?

Well, it doesn't mean that current building methods will have to be altered. In fact, the proposed insulation levels have already been achieved by many designers and builders for some considerable time – and not just in experimental low-energy developments.

Established insulation materials are available which involve standard construction methods and familiar design details.

Cavity insulation is an obvious and easy way to achieve the new wall U-values. There are well proven ways of meeting the new standards for roofs and floors.

For example, the proposed U-value for walls for both domestic and commercial buildings is $0.45\ W/m^2K$. The amount of insulation required depends on the density of block used on the inner leaf of the wall; but for a wall with inner leaf of 100mm, medium density block ($600\ kg/m^3$), 50mm of mineral wool full fill cavity batts will result in a U-value of $0.45\ W/m^2K$.

For industrial buildings and offices, the roof U-value requirement is $0.45\ W/m^2K$, which is easily met using mineral wool insulation as for a domestic pitched roof – but a commercial building will not necessarily have a pitched roof.

Solid concrete roofs can also provide excellent 'heat stores' – as can masonry walls.

Because it minimises air temperature fluctuations within a building, the use of the heat store principle places less demand on the heating method used to bring room temperatures to the desired level. This results in lower running costs, smaller and simpler heating installations and improved comfort for occupants of the building.

Mineral wool is eminently suitable for use in the design of high mass constructions which exploit the heat store concept. The principle of applying insulation to the upper surface of flat roofs (warm roof construction) has been recognised for a long time as a practical and cost-effective design solution to flat roof insulation.

Taking a 150mm concrete deck, with 13mm dense plaster, a 50mm thick layer of mineral wool insulation slab will give a U-value of $0.55\ W/m^2K$; a 100mm slab of mineral wool will give $0.30\ W/m^2K$; whilst 150mm will give $0.21\ W/m^2K$.

Floors next to the ground are a serious source of heat loss from any building, and the proposed new regulations require that a U-value of $0.45\ W/m^2K$ should apply to ground floors in both commercial and industrial buildings, and dwellings. Previously, no required U-value has been given for floors.

Calculating the U-value of ground floors is complicated – it depends more on the size and shape of the floor than its composition. However, the new 'U-Value Manual' being published by Eurisol during this month gives graphs from which the U-value of a known floor area can be calculated.

In the case of solid concrete ground floors, the incorporation of an insulation layer below the slab – or below the screed – will not only reduce heat losses, but will put the slab to use as a heat store.

Taking a ground floor 25m × 9m, incorporating a 25mm thick mineral wool slab between the concrete floor slab and a 65mm reinforced screed will give a U-value of $0.36\ W/m^2K$. A 40mm mineral wool slab will reduce this to 0.31; 50mm will reduce it further to $0.28\ W/m^2K$.

To improve the U-value of an existing ground floor which does not have any insulation, a mineral wool layer can be laid on top of the floor slab, and this covered with chipboard. Or, of course, a suspended timber floor can be installed.

Not only are the new insulation requirements set out in the consultative document easy to achieve – they are to be positively welcomed as a step in the right direction for the UK. We at Eurisol, and others, feel that if anything, it would have been an appropriate time to raise the standard for walls even higher to go nearer to achieving the Government's and the EEC's stated energy savings target of 20%, whilst still not requiring any technical change to current building practices.

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