



SHEEP'S WOOL INSULATION

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Background

For thousands of years wool has been used by humans for warmth, and using it for insulating houses is not a new idea – there is evidence of it having been used in Wales, and elsewhere, for many centuries.

More recently, wool insulation had been available to buy in the UK for some years, but only from Austria or New Zealand. With so much UK wool available, it seemed obvious that the development of locally produced insulation would be beneficial on many levels. Wool has lots of outstanding physical properties and environmental benefits:

- Strong, durable and easy to handle and install
- Good thermal performance
- A local, renewable resource
- Low embodied energy - very little energy used in the manufacturing process
- Reusable and recyclable
- Naturally resistant to fire
- Can be made resistant to fungal/insect attack
- Helps to regulate moisture levels in buildings

Welsh hill sheep have coarse, rough wool that is mainly used in the carpet industry because of its strength and thickness. However this has less value than wool used for clothing, and wool prices have been very low in recent years. All wool is bought and sold through the British Wool Marketing Board, and 75% is currently exported.

Using wool in CAT's Information Centre

We wanted to use locally sourced wool as insulation because of its enormous environmental advantages, and because it gave us the chance to test and demonstrate it in a real-life situation.

The wool was obtained from the British Wool Marketing Board and had already been scoured (washed three or four times to clean it and remove the lanolin) and carded (teased and thinned out). The wool was delivered to us in hanks and we installed it in the wall cavity, at a density of around 25kg per cubic metre. The wool was sprayed with Borax, a salt based solution derived from the naturally occurring mineral salt, boron, which increases its resistance to fire, moths, and other insects. We used a 10:1 mix of water and boron.

Suitability of wool insulation

Wool has good insulating properties and can be used to insulate lofts and sloping ceilings, timber frame walls and suspended timber floors.

Like all other fibre based quilts, it is only suitable as an insulation material where it can be kept dry, as if wet the extra weight will cause it to slump and sag, eliminating air pockets and so affecting its insulating value.

We used it in cavity walls as part of a timber frame 'breathing' wall construction, allowing moisture to pass through rather than becoming trapped within the construction.

Sheep dips

One of the few problems with promoting wool as an insulation product is in the routine use of sheep dips in the UK. Tests were done to determine whether any chemical residues were present in washed and unwashed wool, and in general levels of chemical contamination were found to be extremely low and not of concern.

However, there are wider implications from the use of sheep dip, concerning disposal and health risks to farmers, which need to be considered. Not all sheep are dipped – it may be possible to source wool from organic flocks or from farms that don't do it.

Feasibility of a commercial product

CAT produced a technical report on the suitability of local wool as a commercial insulation product. The study was carried out in partnership with Newidiam in Aberystwyth, commissioned by Cymad (see below) and financially supported by the European Leader II programme.

The study concluded that wool was inherently a good insulator with certain health advantages over other materials, and that the establishment of a local wool processing centre, adding value to local wool, could be viable. In fact, since we used wool in our information centre, some companies have started producing sheep's wool insulation products (see below for contact details).

Cost

As it is still a 'niche' product made on a fairly small scale, ready made wool insulation is likely to be many times more expensive than conventional materials such as mineral wool. However, with so many advantages for health, the local economy and the wider environment, it is well worth considering. The energy used to manufacture sheep's wool insulation is only about 15% of that used to make conventional glass-fibre insulation.

DIY wool insulation

Manufactured insulation materials have been tested for their properties, and so have certification to show they satisfy standards such as fire retardancy. As long as the material is installed in the way laid out in the certificate, its use will be accepted by Building Control.

If you want to use sheep's wool for insulation in a DIY way, it's basically up to you to convince Building Control that your material and approach will be suitable to satisfy their concerns - as opposed to having a certified product which does that work for you. This should not be a problem but will involve extra work and time. Building Control's main interest will be twofold:

Firstly, ensuring that the requirements of Part L, (relating to thermal performance) of the Building Regulations are met. This is certainly technically possible as sheep's wool has a similar thermal performance to other fibrous insulation materials, and provided there is the thickness necessary to achieve the values needed for current Building Regulations the requirement should be met. But the onus is on you to demonstrate this to your Building Control officer - installing more than the minimum thickness required is a good start.

Secondly, you need to show Building Control how the material you've chosen will perform in relation to other aspects, such as fire safety. You can read more about Building Regulations and Building Control at www.planningportal.gov.uk

You do need to be much more careful with a DIY approach. As the wool we used was cleaned and sprayed thoroughly with borax and installed in a sealed cavity, we haven't experienced any problems with it, but we have heard of sheep's wool in lofts becoming infested with moths, possibly because it wasn't sprayed well with borax. Action to address any problems would be disruptive (i.e. opening the construction to treat the wool again or remove it altogether).

Further Information

The 'AtEIC photo diary' at www.cat.org.uk/media contains images showing the construction of our information centre and shop building. You can also visit us in mid-Wales to see this building and other examples of low-impact and low-carbon techniques and materials: www.cat.org.uk/visitus

For detailed information about choosing building materials and designing a healthy, efficient, and low-impact home, see our publication **The Whole House Book** (by Cindy Harris and Pat Borer).

We also publish an **Insulation tipsheet** (50p) explaining the use of different insulation materials, and an **Environmental Building Factsheet** (£3) looking at many eco-friendly building methods.

For details of all these publications, see our publications leaflet or visit www.cat.org.uk/catpubs

CAT by mail order supply many other books on eco-building and energy efficiency.
<http://store.cat.org.uk> or tel: 01654 705959

CAT runs many residential courses, including on environmental building and refurbishment.
www.cat.org.uk/courses or Tel: 01654 705981

Contacts

Second Nature UK Tel: 01768 486285;
Web: www.secondnatureuk.com

Manufacture and supply Thermafleece insulation from British sheep's wool.

Black Mountain Insulation Tel: 01745 361 911;
Website: www.blackmountaininsulation.com
Manufacture sheep's wool insulation at their factory in North Wales, using British fleeces.

Excel Industries
Tel: 01685 845 200; Web: www.excellfibre.com
Not wool insulation, but Warmcel cellulose fibre insulation, made from recycled newspaper.

British Wool Marketing Board
Tel: 01274 688666; Web: www.britishwool.org.uk
Centrally arranges collection, grading, sales and promotion of British wool.

CYMAD
Tel: 01766 512300; Web: www.cymad.org
Community development organisation. Have been researching the use of sheep's wool as insulation.

Please note: mention of a company does not necessarily constitute a recommendation. Potential customers are advised to contact several companies to compare products, services and prices.