

Effectiveness of underfloor insulation products

A study was undertaken in 2015 by Dr. Mark Dewsbury from the University of Tasmania which investigated the performance of various insulation products used to insulate suspended particleboard flooring in Australian homes. The study was published as “Improving Thermal Efficiency in Lightweight Construction: Subfloor Insulation” and it was prepared for Forest & Wood Products Australia. The report can be found on the FWPA website (<http://www.fwpa.com.au/resources/market-access/905-improving-thermal-efficiency-in-lightweight-construction-subfloor-insulation.html>).

WHY INSULATE SUSPENDED TIMBER FLOORS

The reason for insulating suspended timber flooring in Australian homes is two-fold. Suspended floors form part of the building envelope and insulation helps to reduce heat transfer in the same way as through external walls, windows

and ceilings. Insulation applied to suspended flooring helps maintain winter heat within the home and to keep unwanted heat out during summer months thereby improving the homes energy efficiency. This is why in many parts of Australia insulating suspended flooring is a requirement of the Building Code of Australia (BCA).

The effectiveness of any insulation will depend on two main factors – the inherent properties of the insulation product and the ability for it to be installed so that it functions effectively. Some insulation products such as bulk insulation (glasswool, rockwool, polyester, PIR and other foams) have inherent insulating properties which can be independently measured and are represented as the material’s R_M Value or Material R-Value. The higher the R_M Value, the better the insulation ability. Other insulation products, such as those that feature reflective facings, rely on a “building system” to deliver their insulation properties as it’s not the product itself but rather the reflective air space alongside the product that provides the insulation properties. With these products the ability to install it properly to create the necessary building system is critical to performance.



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MEASUREMENT

The study prepared for FWPA aims to measure the actual performance of subfloor insulation and compare this to the expected performance quoted by the manufacturer. If the performance of insulation in practice does not match the value used to meet the BCA energy efficiency requirements, new homes will be non-compliant, homeowners will be disadvantaged in paying for products that are not performing as required and homes will use more energy to heat in winter which is a burden on society and costly for household budgets.

STUDY METHODOLOGY

The study undertaken by the University of Tasmania was extensive and included twelve different experiments, each running for a minimum of twenty days. It assessed the performance of three main subfloor insulation systems:

1. A thermo-reflective product installed as per standard contractor practice;
2. A thermo-reflective product installed by the manufacturer and
3. A glasswool batt product installed as per standard contractor practice.

These systems were assessed in actual test buildings, rather than in a lab, and data sets were acquired for measured temperatures at various points within the test building. Data sets were acquired through an array of sensors in the subfloor for temperatures at various points, energy used and specific site weather recorded data. The measured data was also compared to simulated temperature and energy use data to assess the effectiveness of insulation to deliver the energy performance predicted by energy rating software in real life.

THE RESULTS

The results of the testing are significant. It is recommended that if this topic is of interest that a full copy of the report be read. The findings raise an important issue of the sensitivity of an insulation product to workmanship. However, the key findings are as follows:

- “The quality of contemporary installation practice for reflective subfloor insulation was inadequate and does not appear to follow manufacturer’s specified methods”.
- “The incorrect installation practices (for contractor installed reflective insulation) provide an R-Value of 0.72 instead of the marketed 3.0 and would significantly impact on the unwanted heat loss and/or heat gain in a house.”
- The measured performance of reflective insulation correctly installed was much better (R2.39 for a system marketed as R3.0), but “the time taken to install the reflective subfloor insulation correctly was much longer than expected... and would impact on the cost of house construction”. The report quotes “the task identified a gap in product knowledge for builders and product installers. The final installer spent considerable time clarifying installation needs with the national representatives of the product manufacturer”.
- “In stark contrast to the reflective subfloor installation tasks... the first attempt to install the bulk subfloor batt system was completed adequately. This method would achieve the marked R-Value for this system”.

CSR Bradford can confirm that the glasswool batt sub-floor insulation used was Optimo Underfloor insulation which was supplied for this study.



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