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H1 floors refresher

Now that the full requirements for achieving compliance with clause H1 *Energy efficiency* for floors are in effect, it's a good time to go over what the new compliance methods are.

A BRANZ H1 Floors webinar demonstrated how to achieve compliance with Building Code clause H1 *Energy efficiency* for both slab-on-ground and suspended timber floors (only unheated floors were covered), using the current 5th edition amendment 1 of Acceptable Solution H1/AS1 and Verification Method H1/VM1. The Acceptable Solution and Verification Method cover energy efficiency for all housing, and buildings up to 300 m².

Compliance using Alternative Solutions

Acceptable Solutions and Verification Methods constitute a deemed-to-comply means of compliance. However, they are non-mandatory, and it is possible to prove compliance using Alternative Solutions.

When the 5th edition amendment 1 came into effect on 3 November 2022, there were concessions in place allowing lower levels of construction R-value compliance for floors with building consent applications submitted prior to 1 May 2023. Since then, the full requirements of the Acceptable Solution and Verification Method apply to floors.

R-values represent a thermal resistance measurement – each specific component of the building's exterior thermal envelope assembly has a component R-value. The construction R-value for a floor is the thermal resistance of the built assembly taking into account each of the components. It is worth noting that the construction R-value could be higher or lower than the component R-value of the insulation material used in the floor.

More climate zones

Aotearoa New Zealand is divided into six climate zones that are more representative of regional climates than the previous three climate zones. Minimum construction R-values for slab-on-ground and suspended timber floors that do not contain embedded heating systems for

each climate zone are stated in H1/AS1 Table 2.1.2.2B – see www.building.govt.nz/assets/Uploads/building-code-compliance/h1-energy-efficiency/asvm/h1-energy-efficiency-as1-5th-edition-amendment-1.pdf.

Minimum construction R-values in the table range from R1.5 to R1.7 for slab-on-ground floors and from R2.5 to R3.0 for suspended timber floors.

H1/AS1 incorporates two compliance methodologies – the schedule and calculation methods. H1/VM1 incorporates the modelling method means of compliance. The schedule method uses tabulated minimum construction R-values, while the calculation method is a simplified comparison methodology that allows the use of different R-value combinations. The modelling method is a much more comprehensive comparison methodology permitting different R-value combinations.

While the schedule method is relatively restricted by requiring the floor to meet or exceed the level of thermal performance defined as the minimum construction R-values in H1/AS1 Tables 2.1.2.2A (for heated floors) or 2.1.2.2B (for floors that do not contain embedded heating systems), the calculation and modelling methods allow greater flexibility.

The calculation method compares the thermal performance of the proposed building with a reference building (which is based on the minimum construction R-values in the schedule method). Construction R-values in the proposed building can differ from those in the reference building.

The modelling method also compares the thermal performance of the proposed building with a reference building. Using computer modelling, various construction R-values can be compared, and verification is achieved by demonstrating that the energy use of the proposed building does not exceed that of the reference building.

H1/VM1 also incorporates Appendix F, which covers methods for determining the construction R-values of slab-on-ground floors. Appendix F also references performance tables in H1/AS1 Appendix F – these tables provide construction R-values for a range of slab-on-ground floor typologies covering both slab-floor and raft foundation typologies.

To use the H1/AS1 Appendix F tables, it is necessary to know both the slab area-to-perimeter (A/P) ratio and the effective thickness of the exterior walls of the building.

BRANZ has online tools for schedule and calculation methods – see www.branz.co.nz/energy-efficiency/h1-calculation-method-tool and www.branz.co.nz/energy-efficiency/h1-schedule-method-tool/

Using the *House insulation guide*

The BRANZ *House insulation guide* can also be used to help demonstrate compliance – interactive tables in the guide can be used to find the construction R-value of a slab-on-ground or suspended timber floor assembly or to find the level of insulation required to achieve a specific construction R-value.

The *House insulation guide* is also useful in designing buildings that exceed Building Code minimum performance requirements, ensuring that we are designing and building warm, dry and healthy homes – see www.branz.co.nz/energy-efficiency/house-insulation-guide

There are several options for insulating slab-on-ground floors to reduce heat loss and provide a range of construction R-values – vertical edge, under-slab and under-footing insulation can all be considered.

Incorporating both vertical outside edge perimeter insulation and under-slab insulation deals with most of the potential heat loss through a slab-on-ground floor. Under-footing insulation adds further performance, particularly to raft foundation slabs. To achieve higher performance, slab floors require inner vertical edge insulation to gain the full benefit of under-footing insulation.

SED needed

For all slab typologies, under-footing insulation requires specific engineering design (SED). There are a range of proprietary insulated slab floor and raft foundation systems available in the market – these include top insulated slabs. Look for a BRANZ Appraisal when considering proprietary systems.

For suspended timber floors, a reasonably wide range of high component R-value insulation options are available.

There are several considerations when selecting insulation to meet a required construction R-value:

- Floor framing depth and the amount of floor framing incorporated in the assembly are important – depth to allow for required insulation thickness and minimising floor framing to limit the amount of thermal bridging that will occur through the framing.
- The durability of insulation is important. As it will be installed in a subfloor location, it could be exposed to moisture. Even though subfloor ground may look and feel dry, it is likely to be damp below the surface. An effective way to manage moisture risk in a subfloor is to completely cover the ground with 250 micron polyethylene with the joins taped.
- Accurate installation of the floor insulation is fundamental to thermal performance as is insulation retention, particularly in situations where the base of the building is not fully enclosed and the insulation may be subject to wind wash. Always follow the insulation manufacturer's details and specification.

FOR MORE For detailed information, the H1 Floors webinar is available to watch for free at www.branz.co.nz/shop/catalogue/webinar-h1-floor_1049