



# Slab floors under new H1 changes

Existing Building Code minimum construction R-value requirements for concrete slabs remain the same until 1 May 2023 when the way they are calculated also changes.

The coming year will see some big changes in the Building Code requirements around insulation. From 3 November 2022, the 5th edition amendment 1 of Acceptable Solution H1/AS1 and Verification Method H1/VM1 replace the 4th edition documents.

## Consents submitted before 1 May 2023

Where building consent applications for housing are submitted and accepted before 1 May 2023, the construction R-values for all floors (and walls and roofs) can be equivalent to the 4th edition requirements (see Table 1). Up until that date, concrete slab-on-ground floors in housing will be deemed to achieve a construction R-value of R1.3.

## Increase for all consents from 1 May 2023

From 1 May 2023, the minimum R-values required for slab floors will increase in all climate zones.

The increase in required thermal performance for unheated slab floors in the warmest four climate zones – a move from R1.3 to R1.5 – might seem very small, but it is greater than it appears. That's because the background calculation

method used for the 5th edition has changed. The increase is the equivalent of going to R2.0 under the previous approach.

## Demonstrating Code compliance

The 5th edition retains the options of using the schedule, calculation or modelling methods for demonstrating Building Code compliance. The figures in Table 1 apply when using the schedule method.

The calculation method allows greater flexibility, although for unheated floors, the R-value must still be at least 50% of the schedule method R-value. It cannot

be used to reduce the performance of slab floors with embedded heating systems.

The modelling method in H1/VM1 may also allow a designer to use an unheated floor that would not comply under the schedule method if the performance of other building elements is enhanced to compensate.

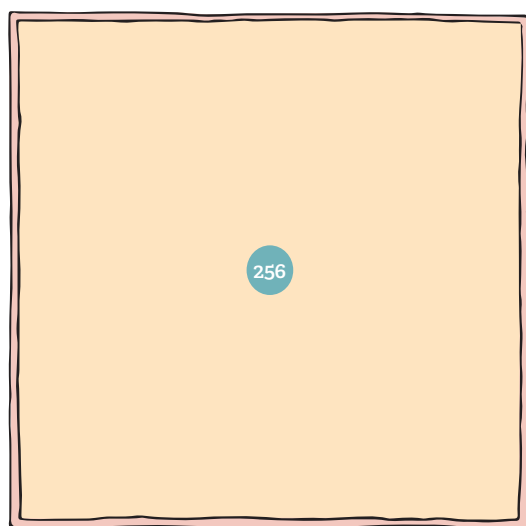
## Determining slab R-values from 1 May 2023

The 5th edition documents split the minimum R-value requirements for floors into slab-on-ground floors and other floors, which will mostly be suspended floors. ►►

**Table 1: Schedule method minimum construction R-value requirements (m<sup>2</sup>K/W) for concrete slab-on-ground floors.**

	Climate zone					
	1	2	3	4	5	6
Current minimum requirements						
Unheated slab floors	R1.3					
Heated slab floors	R1.9					
Minimum from 1 May 2023 (for housing)						
Unheated slab floors	R1.5↑				R1.6↑	R1.7↑
Heated slab floors	R2.5↑			R2.8↑	R3.0↑	

*Note: The increased R-values in H1/AS1 5th edition apply to buildings up to 300 m<sup>2</sup> other than housing from 3 November 2022.*

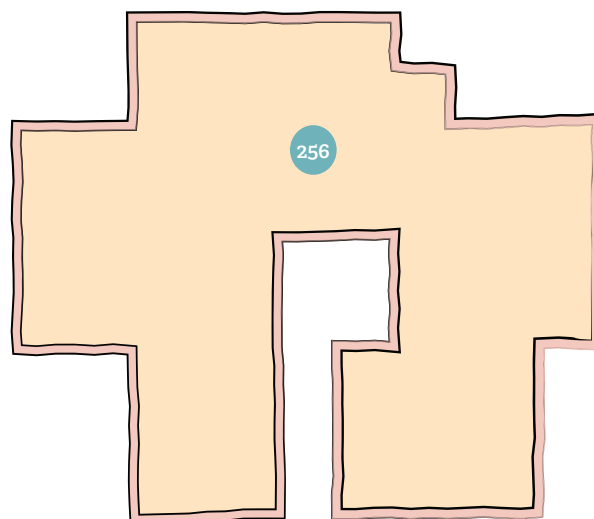


Floor area = 256 m<sup>2</sup>

Perimeter = 64 m

Area-to-perimeter ratio = 256/64 = 4

- Concrete raft foundation slab and 90 mm framed wall:  
without perimeter insulation = R1.8  
with perimeter insulation = R2.2



Floor area = 256 m<sup>2</sup>

Perimeter = 100 m

Area-to-perimeter ratio = 256/100 = 2.56

- Concrete raft foundation slab and 90 mm framed wall:  
without perimeter insulation = R1.3  
with perimeter insulation = R1.7

Figure 1: Two houses with the same floor area but very different shapes. The complex shape of the second house means its area-to-perimeter ratio is lower and perimeter insulation is needed for the floor to comply with the H1/AS1 schedule method.

Appendix F in the 5th edition of H1/AS1 and H1/VM1 gives an acceptable method for determining the construction R-values of slab-on-ground floors with extensive tables in H1/AS1 showing R-values for selected slab floor scenarios.

The tables cover different:

- floor types – slabs or concrete raft foundations
- floor insulation – no insulation, R1.0 vertical edge insulation, R1.2 or R2.4 full-cover underslab insulation, 1.2 m wide strip of R1.2 or R2.4 underslab insulation along the slab perimeter, a combination of edge and underslab insulation
- external wall types – slabs under masonry veneer walls have a step-down, giving different heat transfer characteristics than slabs under other walls, so slabs under masonry walls are treated separately.

The polystyrene pods in a concrete raft foundation floor are not considered to be insulation. Raft floors that have polystyrene pods but no edge insulation and no insulation under the concrete ribs are regarded as uninsulated.

### Using vertical edge insulation

A significant amount of the slab heat

transfer can sometimes be through its vertical edge, so H1/AS1 Appendix F tables include an option of construction with R1.0 vertical edge insulation. (BRANZ research has found that installing edge insulation beyond R1.0 has limited additional benefits.)

The insulation, typically XPS (extruded) polystyrene, is assumed to be installed on all exterior exposed vertical faces of the slab from the top edge to the bottom of the footing.

### Slab area-to-perimeter ratio

To use the tables, you need to know the slab area-to-perimeter ratio and the effective thickness of the external wall.

The area-to-perimeter ratio is the area of the slab inside the interior surfaces of the walls that form the thermal envelope divided by the inside perimeter (H1/AS1 F1.2.4) (see Figure 1).

There are two key points to bear in mind:

- Larger slabs have higher area-to-perimeter ratios and therefore higher R-values than smaller slabs of similar shape and insulation.
- The greater the area-to-perimeter ratio, the higher the slab R-value, everything else being equal.

The minimum ratio in the tables in H1/AS1 is 1.6. Houses with an area-to-perimeter ratio below this cannot use the tables and will have to use another approach such as the modelling method.

Thicker walls generally have reduced heat transfer, including through the slab, so thicker external walls mean that the slab itself has slightly better thermal performance. The thickness of the external wall is measured from the interior wall surface to the exterior concrete slab vertical edge face at floor level.

### Only use new BRANZ House insulation guide

BRANZ recently released the 6th edition of the *BRANZ House insulation guide*, and this can be used with the new H1 documents.

The 5th and earlier editions of the guide should not be used for calculating construction R-values under H1/AS1 5th edition, including for concrete slabs.

**FOR MORE** ► Download Building Code clause H1 from [www.building.govt.nz/building-code-compliance](http://www.building.govt.nz/building-code-compliance).

The *BRANZ House insulation guide* can be downloaded from [www.branz.co.nz/house-insulation-guide](http://www.branz.co.nz/house-insulation-guide). ◀