DESIGN RIGHT

Building Code changes 2021

BY DAVID HINDLEY,
FREELANCE TECHNICAL WRITER

MBIE recently released energy efficiency changes to the Building Code to help make new homes and buildings warmer, drier and healthier. These include increased minimum insulation requirements for roofs, windows and floors.

UPDATES TO New Zealand Building Code Acceptable Solutions and Verification Methods were announced on 29 November 2021. In some areas, the changes are the biggest in decades. There is a transition period of 1 year ending on 3 November 2022 (with one slight difference for construction R-values for windows – see H1 changes below).

The updates include changes to clauses H1 *Energy efficiency*, G7 *Natural light*, E2 *External moisture* and B1 *Structure*.

H1 – Energy efficiency changes

H1/AS1 and H1/VM1 now apply to all housing, including all multi-unit housing, and buildings up to 300 m².

NZS 4218:2009 *Thermal insulation – Housing and small buildings* is no longer referenced. All the requirements are now in H1/AS1 – including the schedule and calculation methods. H1/VM1 outlines the modelling method.

The documents include new calculation methods for determining the thermal performance of windows, doors, skylights and slab-on-ground floors.

Calculating the building performance index (BPI) by itself will no longer be sufficient to demonstrate compliance with Building Code clause H1.3.1(a) (that the building envelope provides adequate thermal resistance).

Six climate zones

The three climate zones will be replaced by six (see Figure 1). These follow territorial authority boundaries – except for Rangitikei and Waitaki, which each straddle two zones.

Construction R-values for housing and small buildings

Minimum construction R-values in new building work have been significantly increased for roofs (now R6.6 for all climate zones) and windows, with increases too for floors (see Figure 2). The floor requirements are now split into two for slab-on-ground floors and other types. The minimum requirements around wall insulation are little changed in this update.

The new minimum requirements for windows have a two-step increase for the warmest areas – the new climate zones 1 and 2, including Auckland. The first upgrade to R0.37 has a transition period ending 2 November 2023. A second increase, to R0.46, applies from 3 November 2023. By the end of 2023, all parts of the country will have similar minimum window insulation requirements.

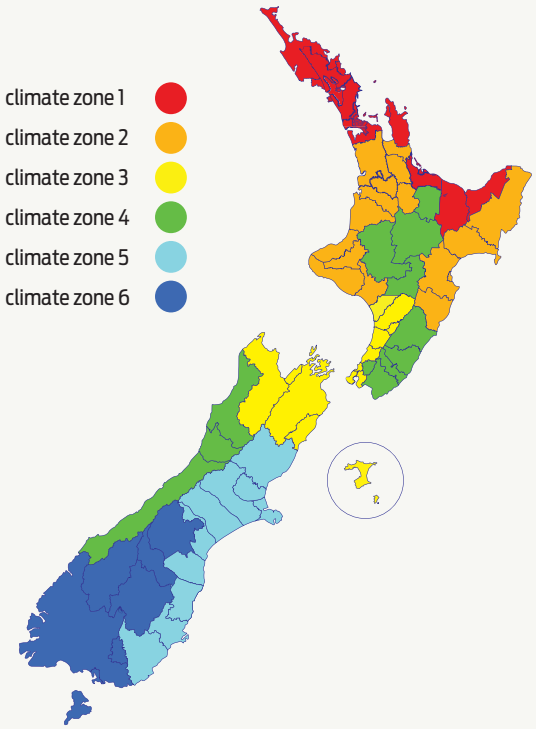

Figure 1 **The six new climate zones in H1 5th edition.**

Large buildings

For buildings over 300 m² (excluding housing and purely industrial buildings), there is a brand-new H1/AS2 and H1/VM2. The six new climate zones apply.

Minimum construction R-values have been increased – the biggest change in 20 years. H1/AS2 introduces minimum thermal performance requirements for windows/glazing in these buildings for the first time.

There is a new Verification Method H1/VM3 that sets minimum requirements around HVAC systems in commercial buildings (offices and retail spaces) if these systems are installed.

MBIE has indicated that, as part of its *Building for climate change* programme, in the period 2024–2029, it proposes to introduce requirements for mandatory disclosure of the embodied carbon in new buildings. A phased introduction of caps on embodied carbon in new buildings is also proposed.

Roofs

	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5	Climate zone 6
4th edition	2.9			3.3		
New 5th edition						
H1/AS1, H1/VM1	6.6[1]					

Windows and doors

	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5	Climate zone 6
4th edition	0.26					
New 5th edition						
Windows and doors	0.37/0.46[2]		0.46		0.50	
Skylights	0.46		0.54		0.62	

Note 1: Where there is insufficient space on a horizontal ceiling, the roof R-value may be reduced to R3.3 for up to 500 mm from the outer edge of the ceiling perimeter.

Note 2: There is a 2-step increase for windows and doors in the new climate zones 1 and 2. See text for details.

Floors

	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5	Climate zone 6
4th edition	1.3					
New 5th edition						
Slab on ground	1.5				1.6	1.7
Other floors	2.5		2.8		3.0	

Walls

	Climate zone 1	Climate zone 2	Climate zone 3	Climate zone 4	Climate zone 5	Climate zone 6
4th edition	1.9			2.0		
New 5th edition						
H1/AS1, H1/VM1	2.0					

Figure 2 **The new minimum construction R-values for housing and buildings up to 300 m² compared with existing minimums.**

G7 – Natural light for higher-density housing

The new Acceptable Solutions and Verification Method for G7 have been introduced to provide compliance pathways for higher-density housing.

G7/AS1 now only applies to simple buildings up to 3 storeys – low-density, low-rise buildings such as detached houses and attached side-by-side multi-unit buildings including townhouses. It excludes those with rooms relying on borrowed daylight. Consideration of awareness of the outside is now found in all G7 compliance documents.

A new Acceptable Solution G7/AS2 applies to simple buildings in low, medium and high-density developments (suitable for higher-rise buildings and apartments) and again excludes those with rooms that rely on borrowed daylight.

G7/VM1 applies to all buildings, including complex buildings and apartments and those that contain rooms that borrow daylight from other spaces. This option provides the most freedom and flexibility in design.

The earlier version of G7/VM1 has been replaced with a new Verification Method that requires knowledge of daylight computer modelling. In the consultation documents, this was referred to as G7/VM2, but it has been renamed G7/VM1. For demonstrating compliance, the BRE calculation methods have been replaced with a new computer modelling method. Alternative solutions are also an option.

The requirement of G7.2 (that habitable spaces shall provide adequate openings for natural light and for a visual awareness of the outside environment) applies only to residential buildings, early childhood centres and aged care facilities, rest homes and retirement complexes, and this is unchanged.

E2 – Testing for higher-density housing

There is a change to weathertightness testing for higher-density housing. The new edition of E2/VM2 now cites BRANZ EM7 *Performance of mid-rise cladding systems* v3 (June 2020) as the primary means for demonstrating compliance.

Retesting is not required for wall cladding systems that passed testing under the previous version of E2/VM2. However, any verification certificates issued under E2/VM2 after 2 November 2022 must be under E2/VM2 2nd edition.

B1 – Reference changes

The B1 Acceptable Solutions and Verification Methods now reference the new versions of:

- AS/NZS 4671:2019 *Steel for the reinforcement of concrete*
- AS/NZS 5131:2016 *Structural steelwork – Fabrication and erection*
- AS/NZS 2327:2017 *Composite structures – Composite steel-concrete construction in buildings*
- New Zealand Geotechnical Society Inc., *Field description of soil and rock – Guideline for the field classification and description of soil and rock for engineering purposes*, December 2005.

There are also minor editorial changes to clarify some of the B1/AS1 geotechnical requirements.

Less than expected by many

MBIE has said the changes go as far and as fast as is achievable using current insulation products and construction practices and move us towards the goal of better-quality homes and buildings for New Zealand with less impact on the environment.

In some areas, such as wall insulation, the changes fall well short of the options proposed in MBIE's *Consultation document Building Code update 2021. Issuing and amending Acceptable Solutions and Verification Methods*. Expect more changes in the future as MBIE moves forward with its *Building for climate change* programme. BRANZ research will continue to help inform these changes.

For more The updated documents and an explanation behind the decisions are available at www.building.govt.nz/building-code-compliance.