window & glass
association nz

Quick reference guide:
Improved Window Performance Requirements

An overview of the recently updated H1 requirements and transition periods
As at 22 July 2022 – updated 4 August

Contents (click to link direct to page):

Please note: This document is intended as a convenient overview. Please refer to MBIE's official documentation for more detail.

Key background

- The H1 Clause of the Building Code regulates the energy efficiency of our built environment – covering wall, floor and roof insulation as well as the thermal performance of windows and doors.
- Proposed changes to the Clause were consulted on last year, and published and implemented in November 2021, with two transition periods effective from 3 November 2022 and 2 November 2023.
- **A recent change to the transition periods for housing*** provides a six-month extension to the initial transition period for roof, wall and floor requirements. **However, window and door implementation phasing-in begins on the original date of 3 November 2022, with an additional transition period in May 2023. All requirements will be in effect as of 2 November 2023.** The details of the decision relating to transition periods for housing can be found **here**.
- More information on H1 is available **here**. Please note: Amended Fifth Editions of H1/AS1 and H1/VM1 (the compliance pathways that will reflect the new transition periods and requirements, as pictured) have now been published by MBIE in August 2022.
- **The new standards apply based on the date of the building consent application, however these higher standards can be used from now.**

**These changes apply to Housing only. For implementation details for other buildings, refer to the documentation published by MBIE in November 2021.*

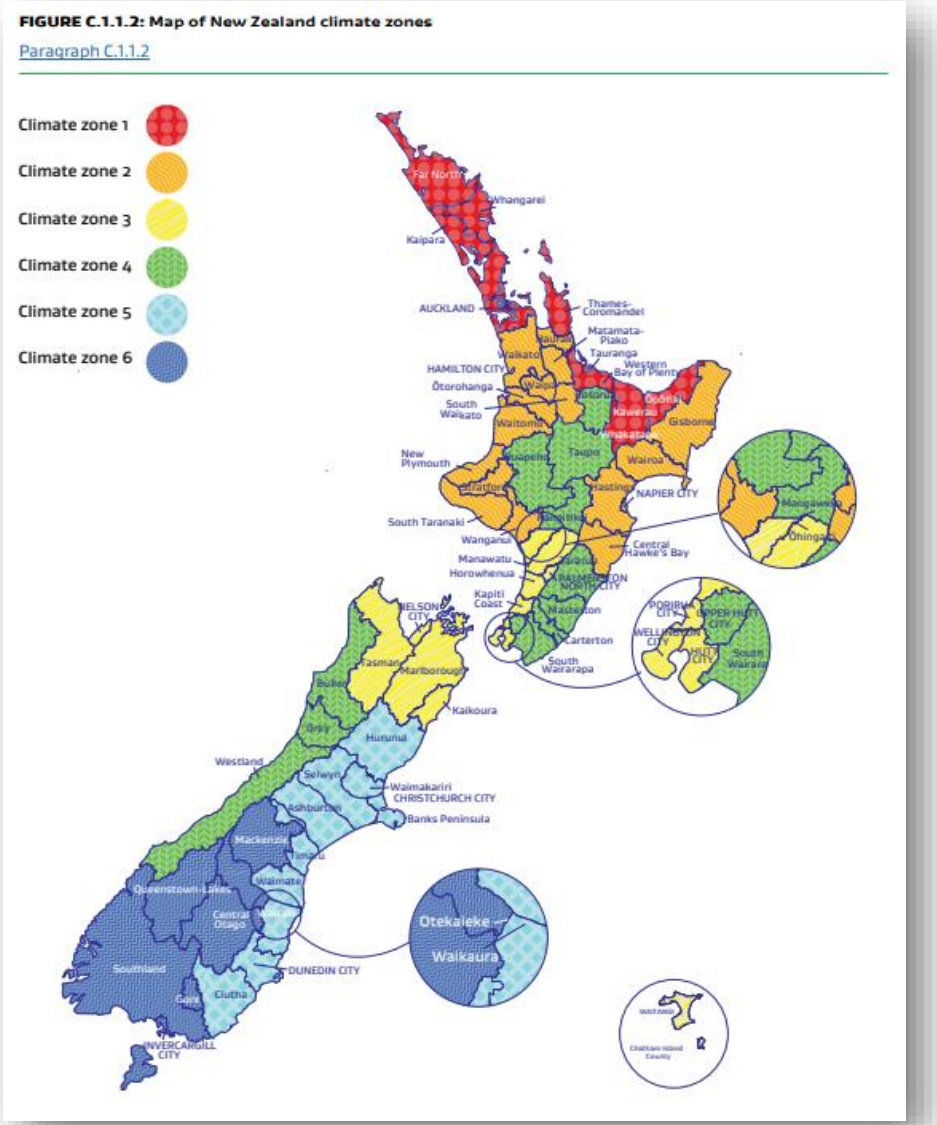
Please note: This Guide focuses on ALL Housing but looks at vertical window solutions ONLY.

Key contextual changes

- Energy efficiency is top of mind, with the update being one of the first steps in the Government's Building for Climate Change programme.
- There are major increases in thermal performance requirements across the building envelope. Some of the most significant changes are to window frame and glass solutions.
- The introduction of new Climate Zones.
- In the background, there's been a shift in R-value calculation methodology from a single window philosophy to the weighted average of a modern house lot of windows and doors,. This informed the minimum R-values table in H1/AS1 (link to more on page 5).

New Climate Zones:

- There are now six Climate Zones based on the average climate of each area.
- **Zones are paired for windows and doors into Zones 1 & 2, Zones 3 & 4 and Zones 5 & 6.**
- **A building's Zone is dictated by the building's site address** (not the client's base or supply area).
- More detailed information is available **here*** – you can find a **Table of Zones by Territorial Authority** in Appendix C on page 23 and the **map** on page 24.



Overview of requirements & transition periods

The time to comply with roof, wall and floor insulation requirements has been extended by six months to 1 May 2023.

The new implementation plan for windows and doors sees all Zones move to R0.37 on 3 November 2022. This enables an improvement in energy efficiency to be achieved sooner through the use of **Low E IGUs (Insulated Glass Units)**.

The second phase of transition comes into effect six months later on 1 May 2023.

The final requirements are in effect as of 2 November 2023.

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone					
	1	2	3	4	5	6
Roofs						
Current minimum requirements	R2.9		R2.9/3.3		R3.3	
1 May 2023	R6.6↑					
Walls						
Current minimum requirements	R1.9		R1.9/2.0		R2.0	
1 May 2023	R2.0↑					
Floors						
Current minimum requirements	R1.3					
Slab-on-ground floors 1 May 2023	R1.5↑	R1.5↑	R1.5↑	R1.5↑	R1.6↑	R1.7↑
Other floors 1 May 2023	R2.5↑			R2.8↑	R3.0↑	
Windows and doors						
Current minimum requirements	R0.26					
3 November 2022	R0.37↑		R0.37↑		R0.37↑	
1 May 2023	R0.37		R0.46↑		R0.50↑	
2 November 2023	R0.46↑		R0.46		R0.50	

Overview of construction R-values

- This table from H1/AS1 shows the R-values for various glass and framing combinations for vertical windows.
- The table is used as a part of the schedule method when demonstrating compliance of a frame and glazing combination. It can also be referenced in the calculation method. Other configurations (e.g. opaque doors, doors with a cat/dog door, louvres, colonial bars etc) will require individual calculations and/or modelling.

Full table can be found here in Appendix E, page 26

- **Thermally improved** in the Glass Column refers to a spacer between panes that meets the definition in ISO 10077-1 Annex G.
- The examples provided are **informative descriptions only of the insulated glazing unit (IGU) types** that might be used to deliver the nominated U_g -values. When using this table, R_{window} shall be determined based on U_g, spacer type and frame type.
- The properties of each of the glass panes within the IGU are provided and separated by **'/'. 'Clear' refers to clear float glass**. **Low E_1, Low E_2, Low E_3, and Low E_4** refer to glass with low emissivity coatings at different performance levels.
- Background information on **Thermally broken aluminium frames** can be found on the Association's website here.

These columns relate to Glazing | **These columns relate to Framing**

TABLE E.1.1.1: Construction R-values (R_{Window}) of selected generic vertical windows and doors

Paragraph E.1.1.1 a)

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m^2·K/W) for different frames			
				Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air	R0.26	R0.32	R0.40	R0.44
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon	R0.30	R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon	R0.33	R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon	R0.35	R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

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Zones 1 & 2, 3 Nov 2022 to 1 Nov 2023

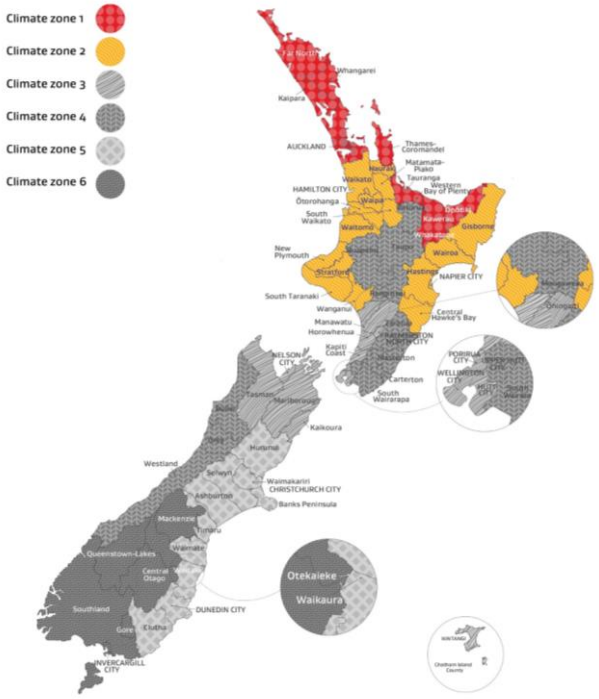

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 1	Climate zone 2		
Windows and doors				
Current minimum requirements				
3 November 2022	R0.37↑			
1 May 2023	R0.37			
2 November 2023				

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m²·K/W) for different frames: Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air			R0.40	R0.44
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon		R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon		R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

- **The transitional R-value during this period is R0.37**
- Minimum compliance can be achieved through the use of double-glazed Low E IGUs in Aluminium frames. *(Note: The R-values of non-compliant solutions have been blanked from the table for demonstrative purposes.)*
- Thermally broken aluminium, uPVC and Timber frames with double-glazed Low E IGUs already meet or exceed the standard.
- Of course, higher spec solutions can be used earlier and will result in a more thermally efficient home.

Zones 1 & 2, from 2 Nov 2023 onwards

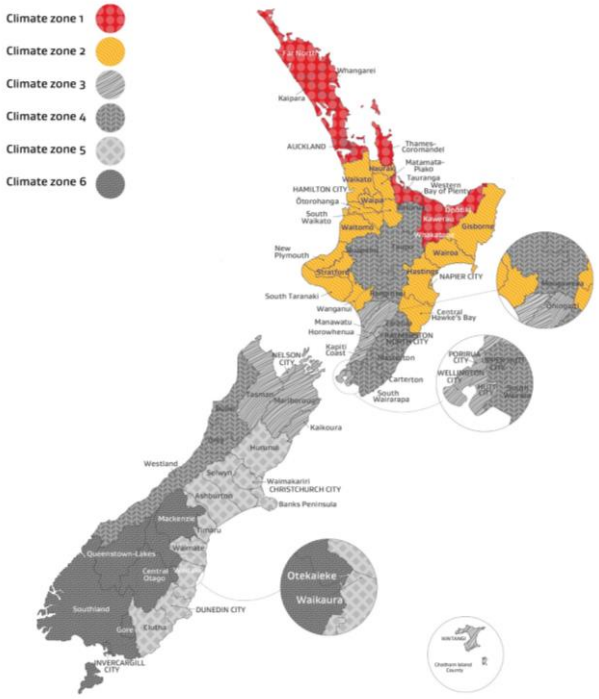

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 1	Climate zone 2
Windows and doors		
Current minimum requirements		
3 November 2022		
1 May 2023		
2 November 2023	R0.46↑	

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m^2·K/W) for different frames			
				Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air				
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon			R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon			R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon		R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton		R0.54	R0.76	R0.85

- **The required R-value will become R0.46**
- Compliance requires double-glazed Low E IGUs combined with:
  - Thermally broken aluminium frames;
  - uPVC frames; or
  - Timber frames.

(Note: The R-values of non-compliant solutions have been blanked from the table for demonstrative purposes.)

Zones 3 & 4, from 3 Nov 2022 to 30 April 2023

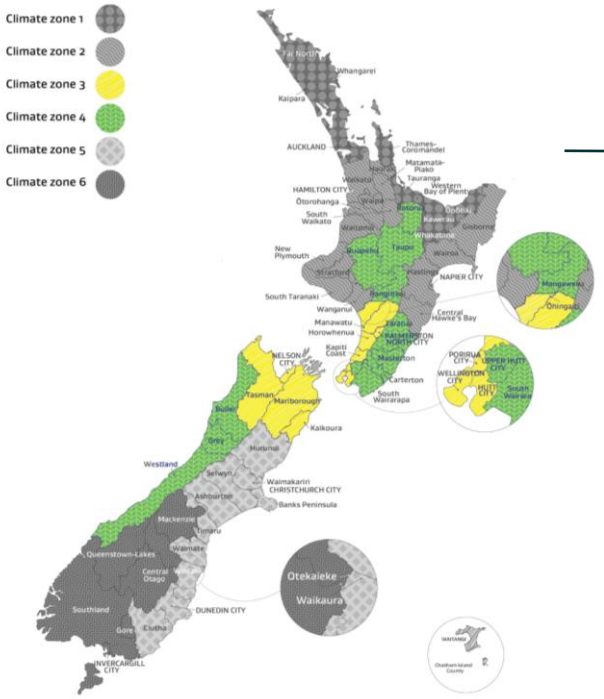

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 3	Climate zone 4
Windows and doors		
Current minimum requirements		
3 November 2022	R0.37↑	
1 May 2023		
2 November 2023		

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m²·K/W) for different frames: Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air			R0.40	R0.44
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon		R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon		R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

- **The transitional R-value during this period is R0.37**
- Minimum compliance can be achieved through the use of double-glazed Low E IGUs in Aluminium frames. *(Note: The R-values of non-compliant solutions have been blanked from the table for demonstrative purposes.)*
- Thermally broken aluminium, uPVC and Timber frames with double-glazed Low E IGUs already meet or exceed the standard.
- Of course, higher spec solutions can be used earlier and will result in a more thermally efficient home.

Zones 3 & 4, from 1 May 2023 onwards

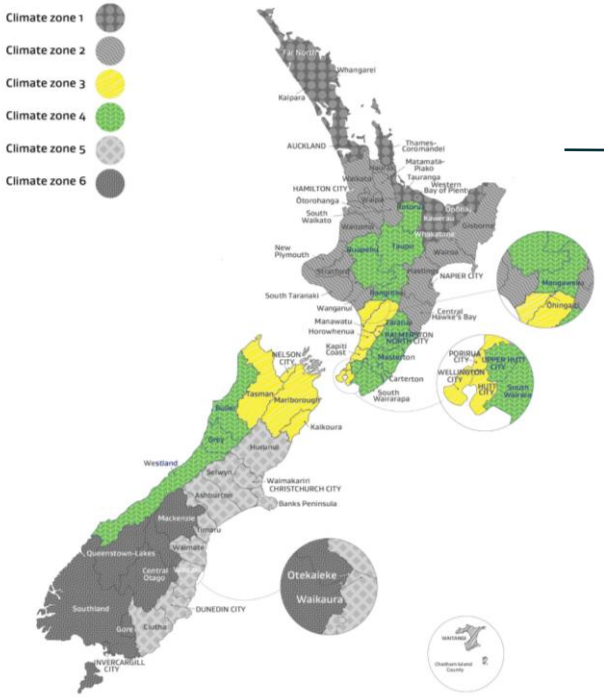

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 3	Climate zone 4
Windows and doors		
Current minimum requirements		
3 November 2022		
1 May 2023		R0.46↑
2 November 2023		R0.46

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m²·K/W) for different frames			
				Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air				
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon			R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon			R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon		R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton		R0.54	R0.76	R0.85

- **The required R-value will become R0.46**
- Compliance requires double-glazed Low E IGUs combined with:
  - Thermally broken aluminium frames;
  - uPVC frames; or
  - Timber frames.

(Note: The R-values of non-compliant solutions have been blanked from the table for demonstrative purposes.)

Zones 5 & 6, from 3 Nov 2022 to 30 April 2023

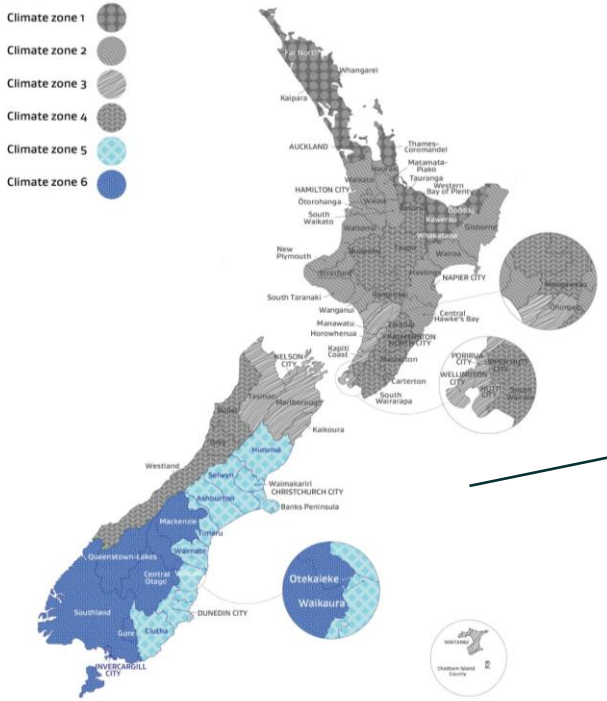

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 5	Climate zone 6
Windows and doors		
Current minimum requirements		
3 November 2022		R0.37↑
1 May 2023		
2 November 2023		

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m²·K/W) for different frames: Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air			R0.40	R0.44
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon		R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon		R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

- **The transitional R-value during this period is R0.37**
- Minimum compliance can be achieved through the use of double-glazed Low E IGUs in Aluminium frames. *(Note: The R-values of non-compliant solutions have been blanked from the table for demonstrative purposes.)*
- Thermally broken aluminium, uPVC and Timber frames with double-glazed Low E IGUs already meet or exceed the standard.
- Of course, higher spec solutions can be used earlier and will result in a more thermally efficient home.

Zones 5 & 6, from 1 May 2023 onwards

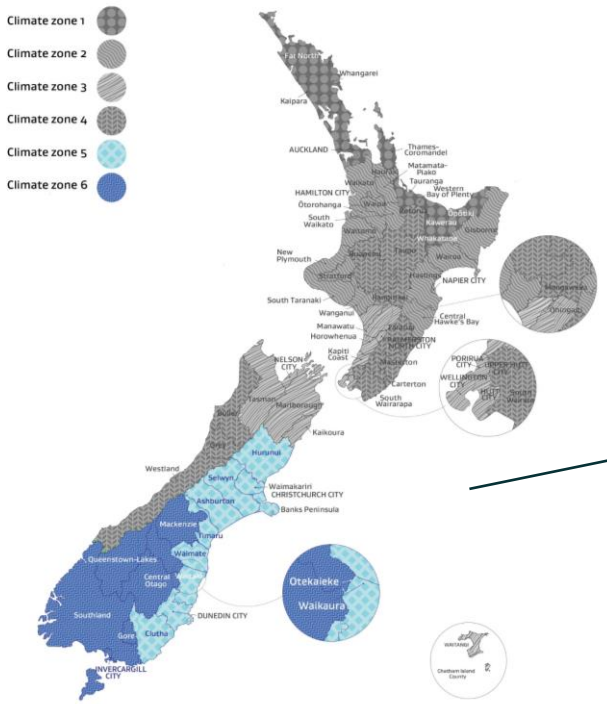

TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

Options	Climate zone 5	Climate zone 6
Windows and doors		
Current minimum requirements		
3 November 2022		
1 May 2023		R0.50↑
2 November 2023		R0.50

Type of glazing	U_g [1]	Spacer type [2]	Example IGU [3], [4] (informative)	R_{window} (m²·K/W) for different frames: Aluminium frame	Thermally broken aluminium frame	uPVC frame	Timber frame
Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air				
	1.90	Aluminium	Glass: Low E_1/Clear Gas: Argon			R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_2/Clear Gas: Argon			R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_3/Clear Gas: Argon			R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_4/Clear Gas: Argon		R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_4/Clear Gas: Krypton		R0.54	R0.76	R0.85

- **The required R-value will become R0.50**
- Compliance requires double-glazed Low E IGUs combined with:
  - Thermally broken aluminium frames;
  - uPVC frames; or
  - Timber frames.

(Note: The R-values of non-compliant solutions have been blanked from this table for demonstrative purposes.)

Further resources

- If you'd like further information or support from the Window & Glass Association, please **contact us**.
- Or find more resources on the **Association's website**. The *Industry Resources and Standards page* will be regularly updated over the coming months.
- All official documentation relating to H1 can be found at MBIE's website **here**.

Glossary of terms

- **Climate Zone** – One of six climate zones in New Zealand (as identified in the requirements) that dictate when and what R-values are required based on a building's physical address.
- **H1** – The Clause of the Building Code covering energy efficiency of buildings, specifically insulation requirements.
- **H1/AS and H1/VM** – These documents cover the compliance pathways via either Acceptable Solutions or a Verification Method.
- **IGU** – Stands for Insulated Glass Unit, essentially the glazing within a window, which is two or more panes of glass, spaced apart and sealed with air or gas inside the cavity between the panes.
- **Low E** – Low E Glass is low emissivity glass. Emissivity is the rate at which heat leaves a building, therefore, Low-E glass has a lower rate of heat-loss compared to glass that is not. Further information can be found **here.**
- **Thermally broken aluminium frames** – More background information can be found **here**.

Please note: This document is intended as a convenient overview. Please refer to MBIE's official documentation for more detail.