

Quick reference guide: Improved Window Performance Requirements For Housing

An overview of the recently updated H1 requirements and transition periods, August 2022



window & glass
association nz

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

About this Guide

- **This guide applies to all ‘Housing’** (regardless of size). ‘Housing’ includes detached dwellings, multi-unit dwellings e.g. an apartment building, and group dwellings e.g. a wharenui.
- More information about how buildings are classified is available in Clause A1 of the Building Code [here](#).
- Please note this guide looks at vertical windows only.

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Housing



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 in November 2021. There are a range of requirements, and transition and implementation periods, depending on building type, construction element, and Climate Zone.
- **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 step in the 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.**



Key contextual changes

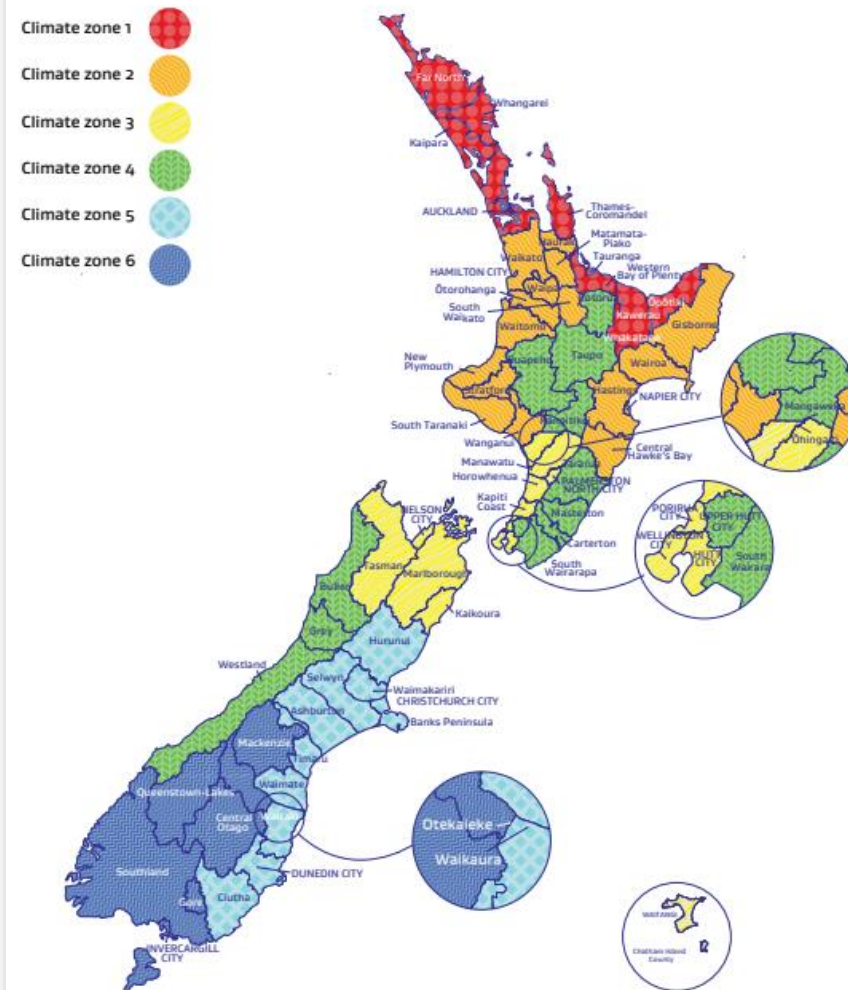
- Energy efficiency is top of mind, with the update being one of the first steps in the Government's Building for Climate Change programme.
- There are major increases in thermal performance requirements across the building envelope. Some of the most significant changes are to window frame and glass 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.

FIGURE C.1.1.2: Map of New Zealand climate zones

Paragraph C.1.1.2



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 E₁, Low E₂, Low E₃, and Low E₄** 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](#).

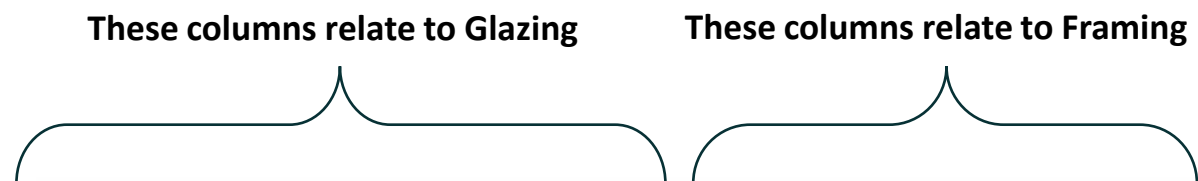
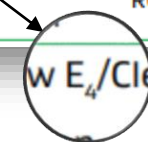


TABLE E.1.1.1: Construction R-values (R_{Window}) of selected generic vertical windows and doors

[Paragraph E.1.1.1 a\)](#)

Type of glazing	$U_g^{(1)}$	Spacer type ⁽²⁾	Example IGU ^{(3), (4)} (informative)	R_{window} ($m^2 \cdot K/W$) 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



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

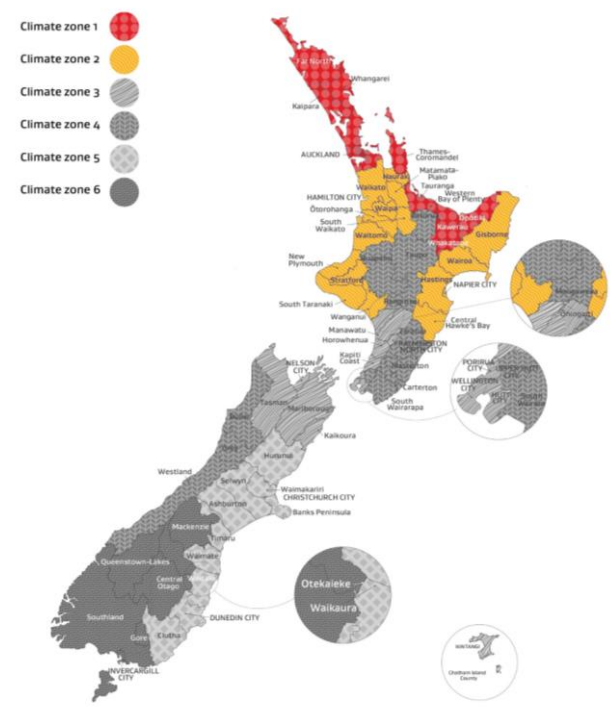


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.

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			R0.40	R0.44
	1.90	Aluminium	Glass: Low E _s /Clear Gas: Argon		R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E _s /Clear Gas: Argon		R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E _s /Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E _s /Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E _s /Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

Zones 1 & 2, from 2 Nov 2023 onwards

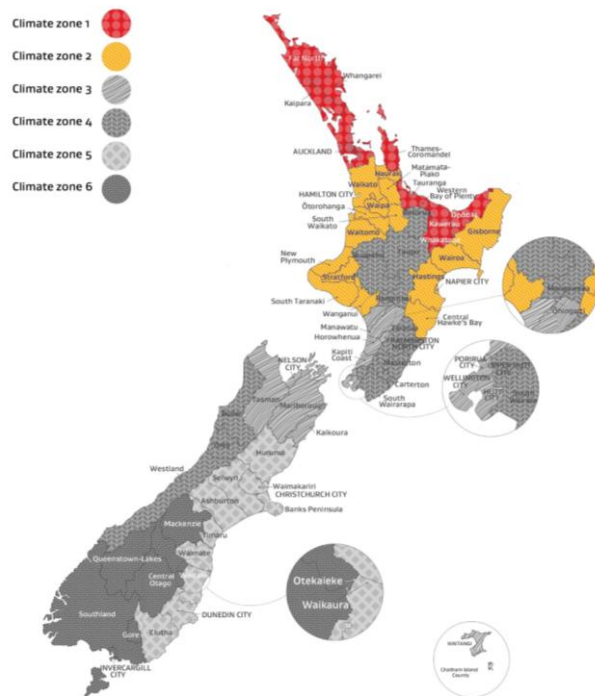


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.)

Type of glazing	$U_g^{(1)}$	Spacer type ⁽²⁾	Example IGU ^{(3), (4)} (informative)	R_{window} ($m^2 \cdot K/W$) 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_g /Clear Gas: Argon			R0.50	R0.56
	1.60	Thermally improved	Glass: Low E_g /Clear Gas: Argon			R0.56	R0.63
	1.30	Thermally improved	Glass: Low E_g /Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E_g /Clear Gas: Argon		R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E_g /Clear Gas: Krypton		R0.54	R0.76	R0.85

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

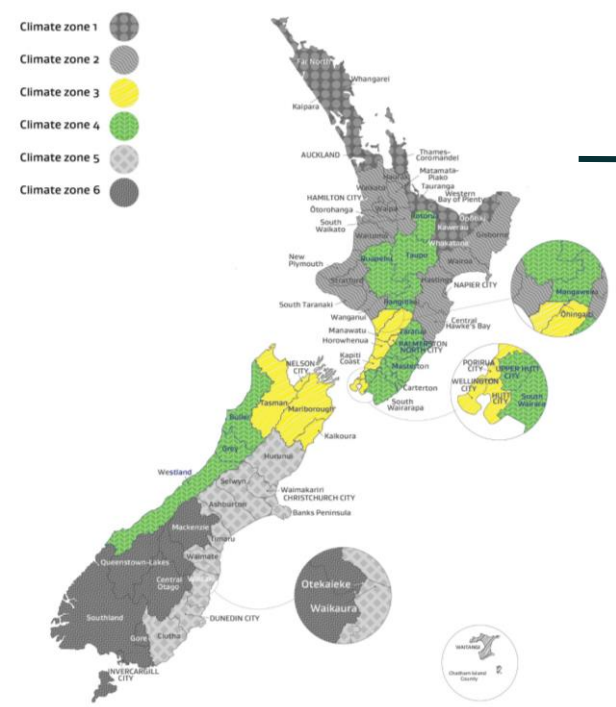


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.

Type of glazing	U _g ⁽¹⁾	Spacer type ⁽²⁾	Example IGU ^{(3), (4)} (informative)	R _{window} (m ² ·K/W) for different frames			
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Double pane	2.63	Aluminium	Glass: Clear/Clear Gas: Air			R0.40	R0.44
	1.90	Aluminium	Glass: Low E _s /Clear Gas: Argon		R0.39	R0.50	R0.56
	1.60	Thermally improved	Glass: Low E _s /Clear Gas: Argon		R0.42	R0.56	R0.63
	1.30	Thermally improved	Glass: Low E _s /Clear Gas: Argon		R0.46	R0.63	R0.71
	1.10	Thermally improved	Glass: Low E _s /Clear Gas: Argon	R0.37	R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E _s /Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

Zones 3 & 4, from 1 May 2023 onwards

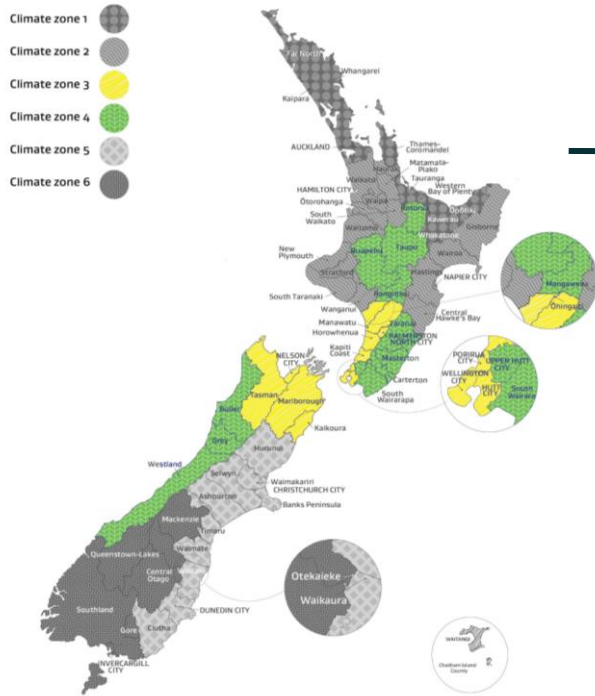


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.)

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 _s /Clear Gas: Argon			R0.50	R0.56
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	1.10	Thermally improved	Glass: Low E _s /Clear Gas: Argon		R0.50	R0.69	R0.77
	0.90	Thermally improved	Glass: Low E _s /Clear Gas: Krypton		R0.54	R0.76	R0.85

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

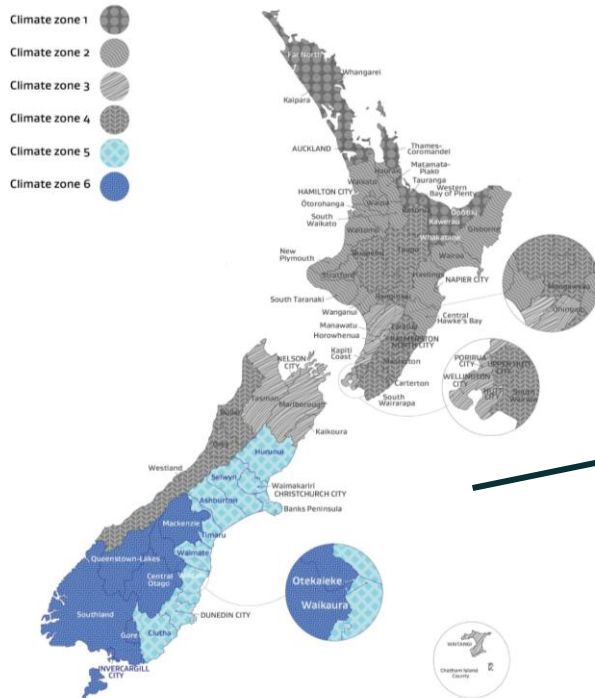


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.

Type of glazing	$U_g^{(1)}$	Spacer type ⁽²⁾	Example IGU ^{(3), (4)} (informative)	R_{window} (m ² ·K/W) for different frames			
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	0.90	Thermally improved	Glass: Low E _s /Clear Gas: Krypton	R0.40	R0.54	R0.76	R0.85

Zones 5 & 6, from 1 May 2023 onwards

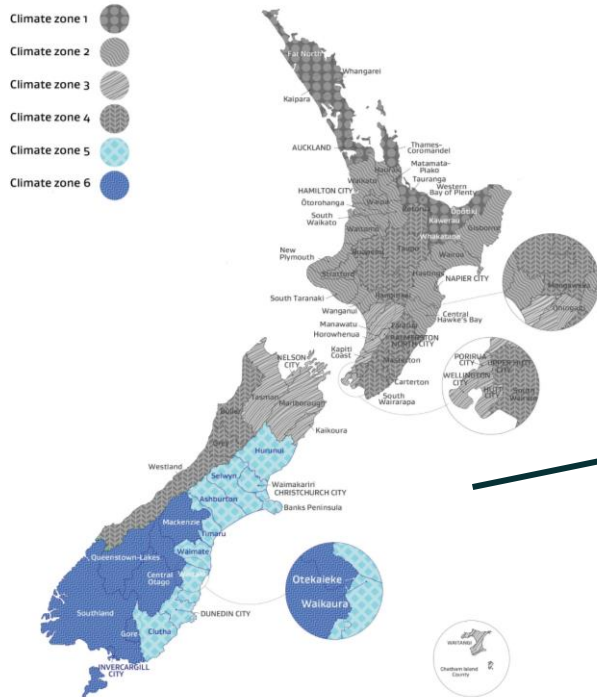


TABLE 1.4: Minimum R-values for each building element for housing in H1/AS1 and H1/VM1

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

- 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.)

Type of glazing	$U_g^{(1)}$	Spacer type ⁽²⁾	Example IGU ^{(3), (4)} (informative)	R_{window} ($m^2 \cdot K/W$) for different frames			
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	0.90	Thermally improved	Glass: Low E _s /Clear Gas: Krypton		R0.54	R0.76	R0.85

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/AS1 and H1/VM1** – 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](#).