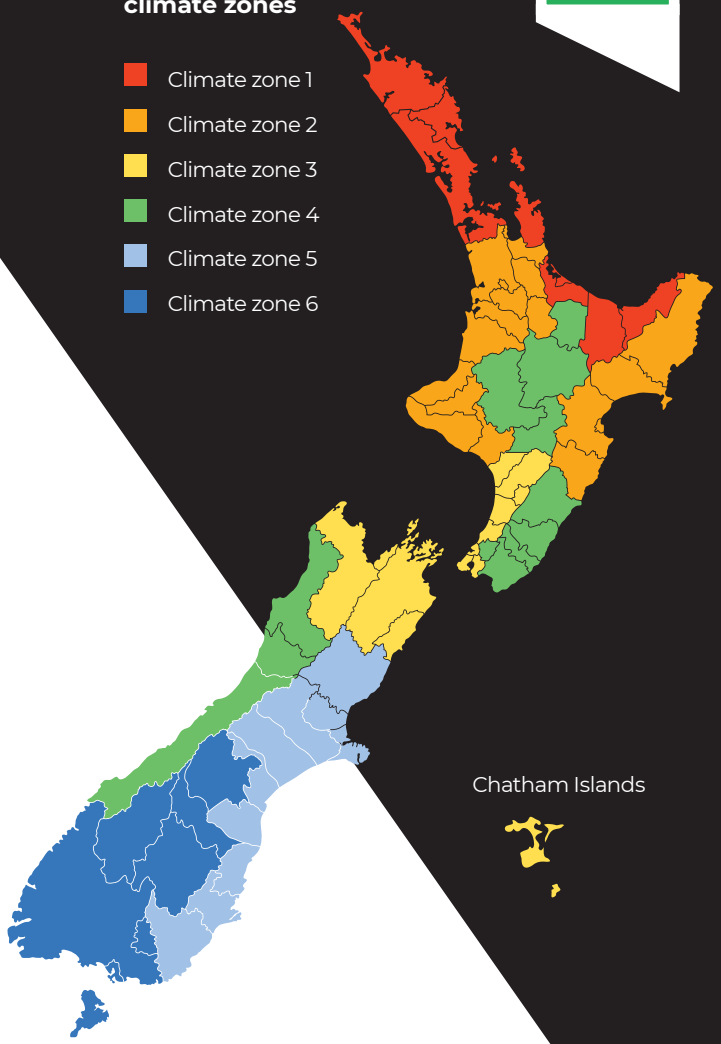
# H1 Energy Efficiency

## Acceptable Solution H1/AS1

**Acceptable Solution H1/AS1 Energy efficiency for all housing, and buildings up to 300 m²**




## Changes to the New Zealand Building Code[1]

November 2022 sees a raft of changes introduced to section H1 of the New Zealand Building Code. H1 is the clause within the Code which sets out the energy efficiency performance levels that all new houses must meet, and many of the changes are related to windows and doors.

Here we highlight several areas that you need to be aware of when discussing your next building project with your window and door fabricator to ensure you achieve a compliant outcome.

## Climate Zone

H1 splits New Zealand into six different climate zones. The table and map below are designed to help you identify which zone your project sits in. This is important because each zone has its own specific R-value requirements. And you need to know what value you are working to in order to achieve compliance.

[1] All building work in New Zealand must comply with the Building Code, a collection of rules and regulations designed to ensure that buildings are safe and fit for purpose. The code itself is split into more manageable chunks known as 'clauses'. Each clause sets out the performance standards for a specific aspect of a completed building. There are eight clauses, each identified by a letter, A through to H:

**A** - General provisions
**B** - Stability
**C** - Protection from fire
**D** - Access
**E** - Moisture
**F** - Safety of users
**G** - Services and facilities
**H** - Energy efficiency

The Ministry of Business, Innovation and Employment (MBIE) is responsible for maintaining the Code as well as ensuring the outcomes it delivers are beneficial to society.

# The best frame and glass mix for your project

**Once you have identified your climate zone requirements, the next step is to understand which frame and glass mix will work best for your project. There are three ways to demonstrate compliance:**

## a. Schedule Method

The Schedule Method is the simplest way to demonstrate compliance with the Building Code clause H1. It can only be used in cases where the glazing area of a building is 30% or less of the building's total wall area. The Schedule is literally a table that sets out the minimum R-values that can be obtained using various frame and IGU combinations. Locate the R-value relevant to your climate zone to identify which combination will ensure your compliance.

## b. Calculation Method

The Calculation Method is typically used in cases where the glazing area of a building is 40% or less of the total wall area of the building in question.

## c. Modelling Method

The Modelling Method is used in cases where the glazing area is more than 40% of the building's total wall area. With this method there is no upper limit to the amount of glazing as a percentage of the total wall area.

Notes:

(1) Thermal transmittance of the glazing determined using BS EN 673. Where the $U_g$-value of the proposed glazing is different from the values included in the table, $R_{window}$ shall be determined based on the nearest $U_g$-value in the table that is greater than the $U_g$-value of the proposed glazing.

(2) 'Thermally improved' refers to a spacer that meets the definition of thermally improved spacer in ISO 10077-1 Annex G.

(3) 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.

(4) 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.

# General guide

From November 2022 achieving the required R-value from the windows and doors on your project will depend on you and your fabricator selecting the most appropriate combination of spacers, frames, glass and gas. The table on the left is designed as a guide to help you find this best combination easily and quickly. It aligns our window and door systems with the R-value requirements of each climate zone and the timings involved in the changes.

**Please note**

- The timing of the application of the R-values is determined by the date a consent is lodged, not the date of construction
- These changes only apply to houses – residential buildings up to 300m² in size

| | Former Systems | New go forward range |
|---|---|---|
| **NTB (Non Thermally Broken Frame)** | Pacific Residential, Smartfit, Sovereign Series, Weathertight | Tasman35™ |
| | 41Architectural, Pacific Architectural | Pacific41™ |
| | | Atlantic48™ |
| **TB (Thermally Broken Frame)** | All Seasons | Southern41™ Thermal |
| | Pacific Thermal | Pacific52™ & Pacific60™ Thermal |

| Applicable Altus Window System* | For Building Consents Submitted 03.11.22 - 30.04.23 | |
|---|---|---|
| **NZ Climate Zones 1 & 2** | **Minimum R-value 0.37** | |
| | **Joinery System** | **Glass Minimum Requirements** |
| | Tasman35™ | **U-vlaue of 1.10** IGU: Low E4/Argon/Clear, Thermal Spacer |
| | Pacific41™ | |
| | Atlantic48™ | |
| | Southern41™ Thermal | **U-vlaue of 1.90** IGU: Low E1/Argon/Clear, Aluminium Spacer |
| | Pacific52™ & Pacific60™ Thermal | |
| **NZ Climate Zones 3 & 4** | **Minimum R-value 0.37** | |
| | **Joinery System** | **Glass Minimum Requirements** |
| | Tasman35™ | **U-vlaue of 1.10** IGU: Low E4/Argon/Clear, Thermal Spacer |
| | Pacific41™ | |
| | Atlantic48™ | |
| | Southern41™ Thermal | **U-vlaue of 1.90** IGU: Low E1/Argon/Clear, Aluminium Spacer |
| | Pacific52™ & Pacific60™ Thermal | |
| **NZ Climate Zones 5 & 6** | **Minimum R-value 0.37** | |
| | **Joinery System** | **Glass Minimum Requirements** |
| | Tasman35™ | **U-vlaue of 1.10** IGU: Low E4/Argon/Clear, Thermal Spacer |
| | Pacific41™ | |
| | Atlantic48™ | |
| | Southern41™ Thermal | **U-vlaue of 1.90** IGU: Low E1/Argon/Clear, Aluminium Spacer |
| | Pacific52™ & Pacific60™ Thermal | |

## Table 2: Construction R-values ($R_{window}$) of selected generic vertical windows and doors

| 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<br>Gas: Air | R0.26 | R0.32 | R0.40 | R0.44 |
| | 1.90 | Aluminium | Glass: Low E1/Clear<br>Gas: Argon | R0.30 | R0.39 | R0.50 | R0.56 |
| | 1.60 | Thermally improved | Glass: Low E2/Clear<br>Gas: Argon | R0.33 | R0.42 | R0.56 | R0.63 |
| | 1.30 | Thermally improved | Glass: Low E3/Clear<br>Gas: Argon | R0.35 | R0.46 | R0.63 | R0.71 |
| | 1.10 | Thermally improved | Glass: Low E4/Clear<br>Gas: Argon | R0.37 | R0.50 | R0.69 | R0.77 |
| | 0.90 | Thermally improved | Glass: Low E4/Clear<br>Gas: Krypton | R0.40 | R0.54 | R0.76 | R0.85 |
| Triple pane | 1.89 | Thermally improved | Glass: Clear/Clear/Clear<br>Gas: Air | | R0.38 | R0.50 | R0.56 |
| | 1.20 | Thermally improved | Glass: Low E2/Clear/Clear<br>Gas: Argon | | R0.48 | R0.66 | R0.74 |
| | 1.00 | Thermally improved | Glass: Low E3/Clear/Clear<br>Gas: Argon | | R0.52 | R0.73 | R0.81 |
| | 0.70 | Thermally improved | Glass: Low E3/Low E3/Clear<br>Gas: Argon | | R0.59 | R0.86 | R0.95 |
| | 0.60 | Thermally improved | Glass: Low E4/Low E4/Clear<br>Gas: Argon | | R0.62 | R0.91 | R1.01 |

PLEASE NOTE – This table is a reproduction of Table E1.1.1, taken from H1 Energy Efficiency - Acceptable Solution H1/AS1 Energy efficiency for all housing, and buildings up to 300m2 (5th Edition, Amendment 1, 4 August 2022)

### For Building Consents Submitted 01.05.23 - 01.11.23

| | |
|---|---|
| Tasman35™ | Min R-value not achievable under the Schedule Method |
| Pacific41™ | |
| Atlantic48™ | |
| Southern41™ Thermal | **U-vlaue of 1.30** IGU: Low E3/Argon/Clear, Thermal Spacer |
| Pacific52™ & Pacific60™ Thermal | |

**Minimum R-value 0.50**

| Joinery System | Glass Minimum Requirements |
|---|---|
| Tasman35™ | Min R-value not achievable under the Schedule Method |
| Pacific41™ | |
| Atlantic48™ | |
| Southern41™ Thermal | **U-vlaue of 1.10** IGU: Low E4/Argon/Clear, Thermal Spacer |
| Pacific52™ & Pacific60™ Thermal | |

### For Building Consents Submitted from 02.11.23

**Minimum R-value 0.46**

| Joinery System | Glass Minimum Requirements |
|---|---|
| Tasman35™ | Min R-value not achievable under the Schedule Method |
| Pacific41™ | |
| Atlantic48™ | |
| Southern41™ Thermal | **U-vlaue of 1.30** IGU: Low E3/Argon/Clear, T hermal Spacer |
| Pacific52™ & Pacific60™ Thermal | |

***Notes:**

(1) General Guide table is based on the Schedule Method by Climate Zone, R-value and U-value as set out in H1 Energy Efficiency - Acceptable Solution H1/AS1 Energy efficiency for all housing, and buildings up to 300m² (5th Edition, Amendment 1, 4 August 2022).

(2) General Guide table relates to the Schedule Method only and is based on a 30% glazed area. The information presented is not compliant under the Calculation Method (up to 40% glazed area) or Modelling Method (no upper limit for glazing).

(3) Applicable dates based on consent submission, not construction dates.

(4) As a result of the H1 changes Altus Window Systems is consolidating their residential range, the impacts of which will come into effect from November 2022. See table on pg. 8 for system updates.

## R-value of your windows and doors

The R-value is a measure of how well a product is able to resist the transference of heat; in other words how well it insulates. Therefore the larger the R-value, the greater the resistance and the greater the product's insulation properties. So, the higher the R-value of your windows and doors the better they'll be at keeping your house warm during the winter – that is, not letting the heat escape.

The R-value of your windows and doors is made up of two important factors:

- The R-value of the frame and
- The Ucog value of the glass

Architects and engineers use these values to calculate the thermal efficiency of your windows and doors. H1 sets out the R-values that your windows and doors must meet in order to comply with New Zealand building standards.

Pairing different frame types (and their differing R-values) with different glass formats (and their differing Ucog values) will enable you to achieve the values you require for your individual project.

## The frame and its R-value

Window systems including the frames within them are responsible for 35%-50% of heat lost from your home, so any improvement you make to these systems will have a big impact on the overall thermal performance of your building. Choosing a thermally efficient frame, like the thermally broken frames found in our Southern41™ and Pacific52™ Systems or our uPVC Systems can enhance performance even more.

## The glass and its Ucog value

As you would imagine, glass plays an important role in the thermal performance of your windows. Low-emissivity (Low-E) glass has a transparent coating on the inside of the IGU (insulated glass unit) that reduces the amount of heat that can pass through the unit while still letting light through. Low-E coatings can be tailored to maximise or minimise the amount of energy from the sun that enters a building making them a popular choice for improving the thermal performance of home builds. Choosing to fill the double or triple glazing unit with an inert gas such as argon or krypton can further slow the flow of heat in and out of a house.

The amount of heat conducted or transferred through the glass unit is known as its Ucog or U-value. A lower U-value indicates less conductivity therefore better insulation properties, so for better thermal efficiency you'll want to choose glass products that have a low U-value to bring down the overall U-value of your home.

Consult your architect or fabricator to learn more about these values in relation to specific products or your build.

Your Local Fabricator:

| Territorial authority | Climate zone |
|---|---|
| **North Island/Te Ika-a-Māui** | |
| Far North District | 1 |
| Whangarei District | 1 |
| Kaipara District | 1 |
| Auckland | 1 |
| Thames-Coromandel district | 1 |
| Hauraki District | 2 |
| Waikato District | 2 |
| Matamata-Piako District | 2 |
| Hamilton City | 2 |
| Waipa District | 2 |
| Ōtorohanga District | 2 |
| South Waikato District | 2 |
| Waitomo District | 2 |
| Taupo District | 4 |
| Western Bay of Plenty District | 1 |
| Tauranga City | 1 |
| Rotorua District | 4 |
| Whakatane District | 1 |
| Kawerau District | 1 |
| Ōpōtiki District | 1 |
| Gisborne District | 2 |
| Wairoa District | 2 |
| Hastings District | 2 |
| Napier City | 2 |
| Central Hawke's Bay District | 2 |
| New Plymouth District | 2 |
| Stratford District | 2 |
| South Taranaki District | 2 |
| Ruapehu District | 4 |
| Whanganui District | 2 |
| Rangitikei District (north of 39°50'S (-39.83)) | 4 |
| Rangitikei District (south of 39°50'S (-39.83)) | 3 |
| Manawatu District | 3 |
| Palmerston North City | 3 |
| Tararua District | 4 |
| Horowhenua District | 3 |
| Porirua City | 3 |
| Upper Hutt City | 4 |
| Lower Hutt City | 3 |
| Wellington City | 3 |
| Masterton District | 4 |
| Carterton District | 4 |
| South Wairarapa District | 4 |
| **South Island/Te Waipounamu** | |
| Tasman District | 3 |
| Nelson City | 3 |
| Marlborough District | 3 |
| Kaikoura District | 3 |
| Buller District | 4 |
| Grey District | 4 |
| Westland District | 4 |
| Hurunui District | 5 |
| Waimakariri District | 5 |
| Christchurch City | 5 |
| Selwyn District | 5 |
| Ashburton District | 5 |
| Timaru District | 5 |
| Mackenzie District | 6 |
| Waimate District | 5 |
| Chatham Islands | 3 |
| Waitaki District (true left of the Otekaieke river) | 6 |
| Waitaki District (true right of the Otekaieke river) | 5 |
| Central Otago District | 6 |
| Queenstown-Lakes District | 6 |
| Dunedin City | 5 |
| Clutha District | 5 |
| Southland District | 6 |
| Gore District | 6 |
| Invercargill City | 6 |

**Table 1: Climate zones by territorial authority**

# Sharing your vision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