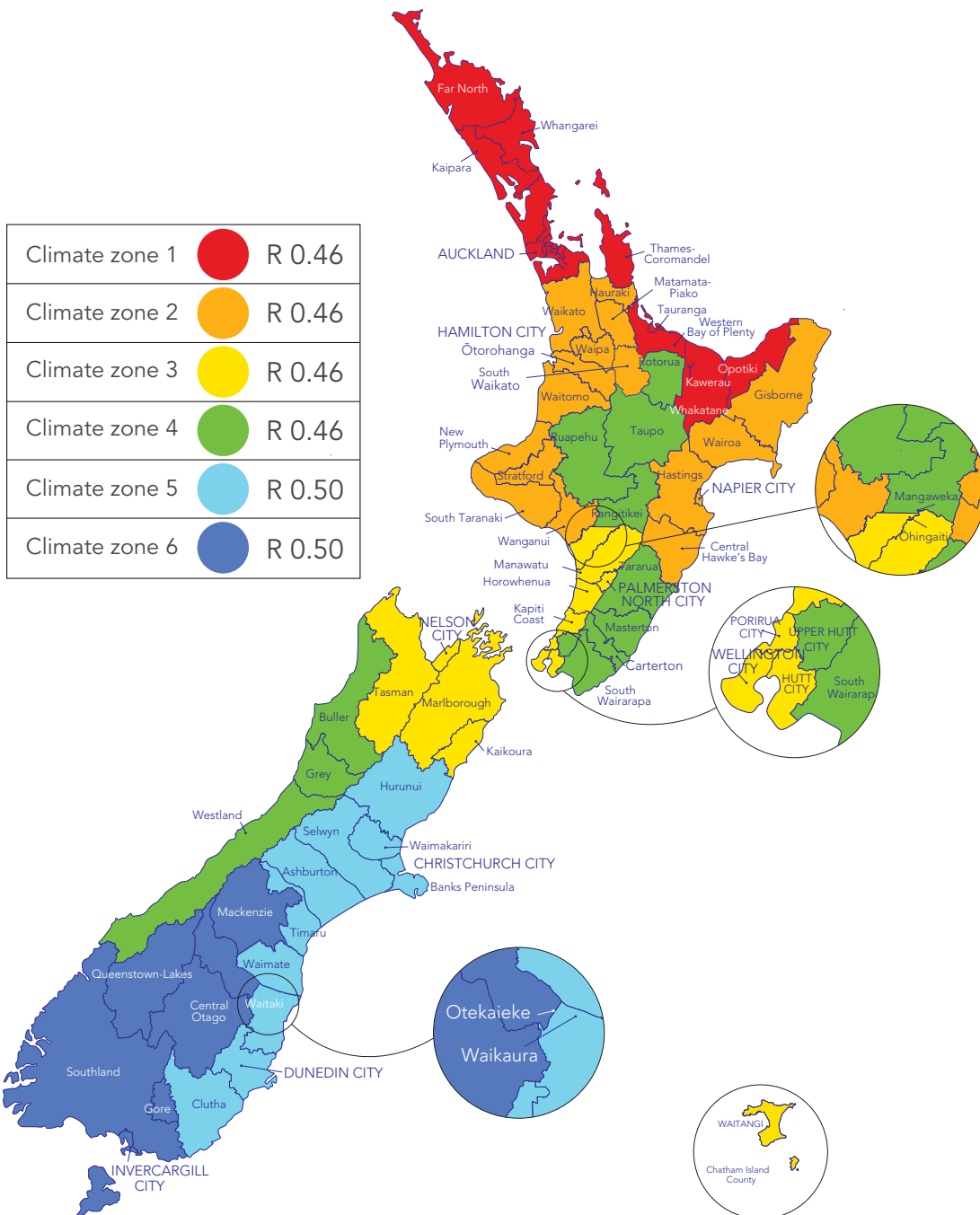




**H1 ENERGY EFFICIENCY**  
Thermal Envelope Doors - H1/AS1

**NZ Building Code H1/AS1** thermal performance requirements relate to all housing, and buildings up to 300m<sup>2</sup>. It affects not only exterior doors but all doors between controlled areas (such as living room, bedrooms, passage, etc) and uncontrolled areas (non-heated areas such as an internal garaging), referred to as the Thermal Envelope.

The required thermal resistance rating, or R-Value, for building thermal envelope doors under H1/AS1 varies depending on where you are in the country:



## Thermal Rating of Hallmark Doors

Hallmark doors meet/exceed the R-values required by H1/AS1 as per the below table. R-values in m<sup>2</sup>·K/W were independently calculated by Sustainable Engineering Ltd with ISO 10077-1 using ISO 10077-2 and ISO 6946 and the below R-values in m<sup>2</sup>·K/W are determined for 38mm thick flush panel door leaf (ie, without glazing) with standard 4.75mm MDF skins.

<b>HALLMARK DOORS THERMAL RATINGS (R-VALUES)</b>					
Door Dimension (38mm thick)	<b>Hollow Core</b> Suitable for regions 1-4	<b>Polystyrene Core</b> Suitable for all regions 1-6	<b>Solid (MDF) Core</b> Suitable for all regions 1-6	<b>Polycore Steel reinforced x 1</b> Suitable for all regions 1-6	<b>Polycore Steel reinforced x 2</b> Suitable for all regions 1-6
1980mm x 810mm	R0.46	R0.82	R0.53	R0.65	R0.60
1980mm x 910mm	R0.46	R0.83	R0.54	R0.66	R0.62
1980mm x 1210mm	R0.46	R0.75	R0.52	-	R0.66
2200mm x 810mm	R0.46	R0.80	R0.53	R0.65	R0.60
2200mm x 910mm	R0.46	R0.81	R0.53	R0.67	R0.62
2200mm x 1210mm	R0.46	R0.75	R0.53	-	R0.67
2400mm x 810mm	R0.46	R0.81	R0.53	-	R0.60
2400mm x 910mm	R0.46	R0.82	R0.53	-	R0.62
2400mm x 1210mm	R0.46	R0.76	R0.53	-	R0.67
2700mm x 810mm	R0.46	R0.72	R0.52	-	R0.60
2700mm x 910mm	R0.46	R0.73	R0.52	-	R0.62
2700mm x 1210mm	R0.46	R0.76	R0.53	-	R0.67

Figure 1: R-values of Hallmark door leaf calculated with ISO 10077-1 using ISO 10077-2 and ISO 6946

## What about framed doors?

As a suggested set-up, we also modeled a 1980 x 810 Polycore Steel x 2 door with a timber (pine) jamb and the overall R-value was 0.60 m<sup>2</sup>·K/W, the same as the door panel alone.

The 1980 x 810 Polycore Steel 2 variant was modeled in Flixo Pro since it has the lowest R-Value among the doors with similar size and framing construction.

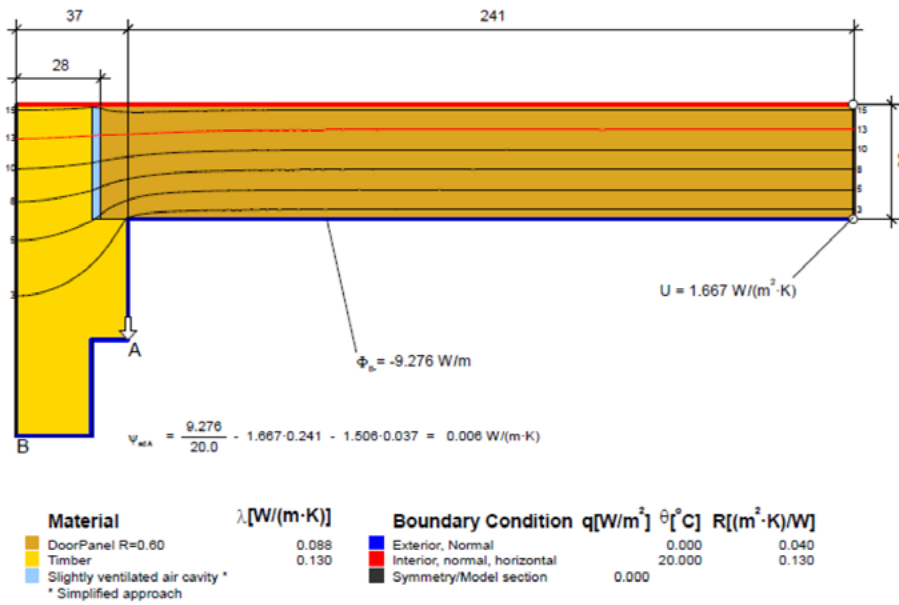


Figure 2: Flixo Model of framed 1980 x 810 Polycore Door.

The U-value and the Psi-Value from Figure 2 was entered into PHPP and the resulting U installed value in Figure 3 (1.670 W/ m<sup>2</sup>·K) was calculated, note the overall R-value is R0.60 (1/U = 1/1.670 = 0.60 m<sup>2</sup>·K/W). PHPP and Flixo use ISO10077-1 and ISO10077-2 as required by H1/AS1 and AS2. Values calculated per these standards can be used to show compliance by any method including H1/VM1 VM2.

Results				
Overall door area	Door leaf area	Door fraction	U	U installed
m <sup>2</sup>	m <sup>2</sup>	%	W/(m <sup>2</sup> ·K)	W/(m <sup>2</sup> ·K)
1.739	1.6	90%	1.670	1.670

Figure 3: Overall door performance (1/R)

### In Plain English...

OK, the above is all a bit complex, but the simple interpretation is that you could use the R-values in Figure 1 for Hallmark doors installed, this is because the door framing is generally made of the same material and has the same overall thickness as the door, giving them approximately the same R-values.

The full detailed report from Sustainable Engineering showing all calculations and methodology is available upon request.

## NEW ZEALAND CLIMATE ZONES BY TERRITORY

### North Island

	Climate Zone
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)	4
Rangitikei District (south of 39°50'S)	3
Manawatu District	3
Palmerston North City	3
Tararua District	4
Horowhenua District	3
Kapiti Coast 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

	Climate Zone
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

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