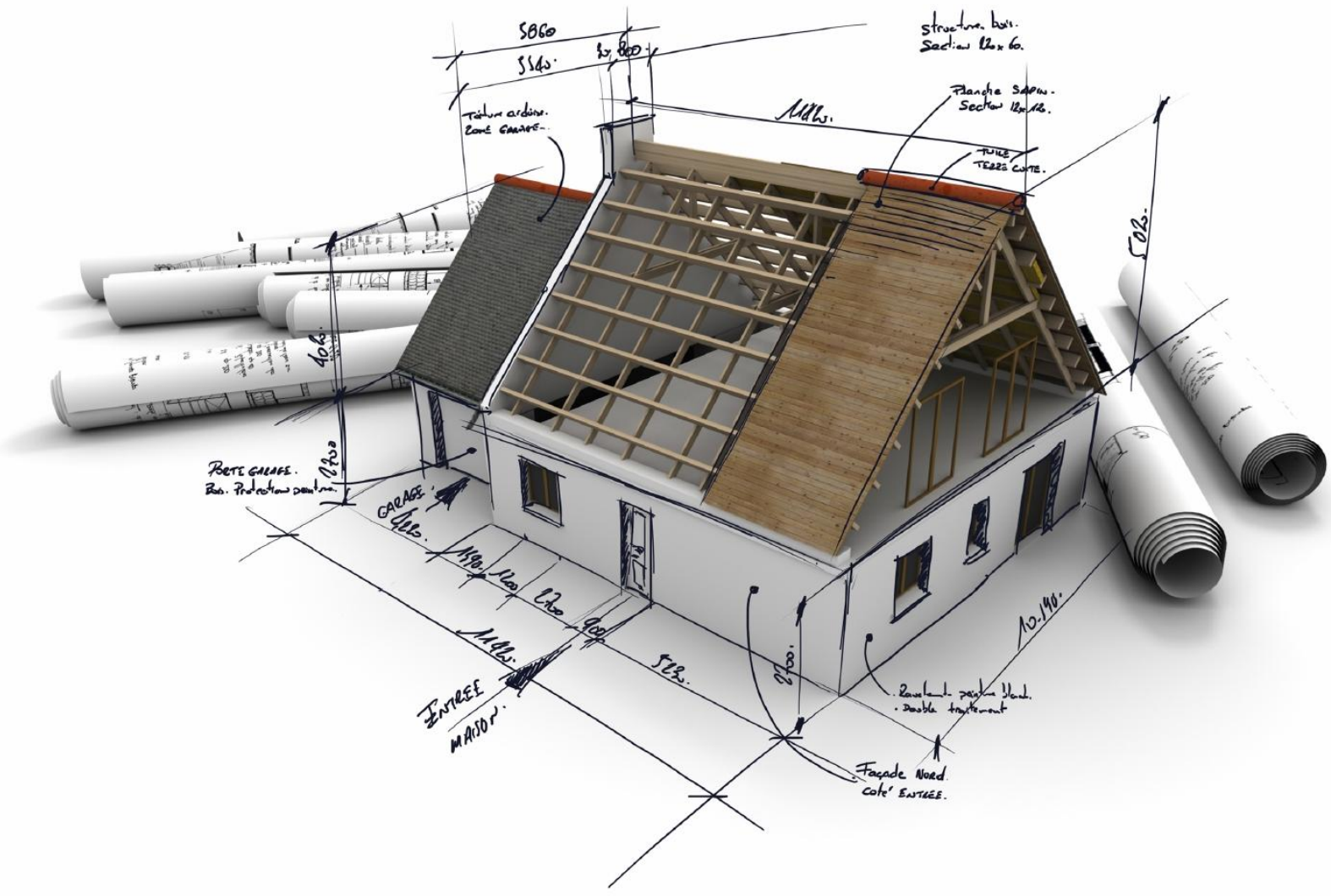
pink® batts®

MORE THAN COMFORT

NZBC H1 - Energy Efficiency Guide



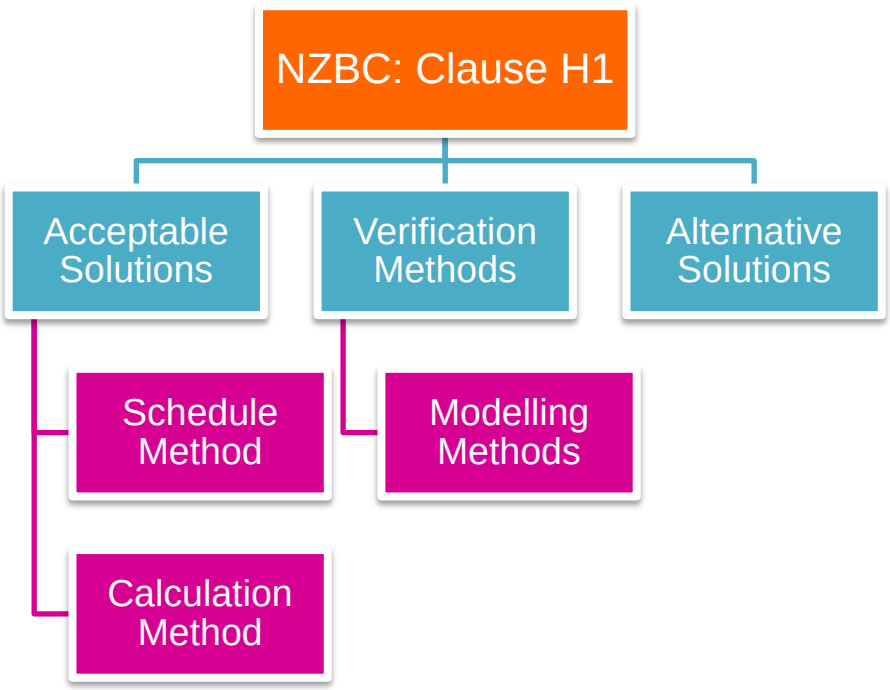
Contents

1.0 Introduction

The main objective of clause H1 in the New Zealand building code is to facilitate efficient use of energy. It applies to all residential dwellings and all other buildings less than 300m2 . The change in the code now sees us building more sustainable homes with higher levels of insulation than we have ever had. This higher level of insulation reduces heat lost when heating, and heat gain when cooling buildings.

2.0 Compliance

There are several methods with which compliance can be met as show below:



Using an ***Acceptable Solution*** will automatically comply with the building code.

The ***Verification method*** will provide a means of verifying a building complies with the Building Code.

An ***Alternative solution*** allows designers to offer an alternative means of showing compliance. For example use of an international standard that is proven to be equivalent to the NZBC requirements.

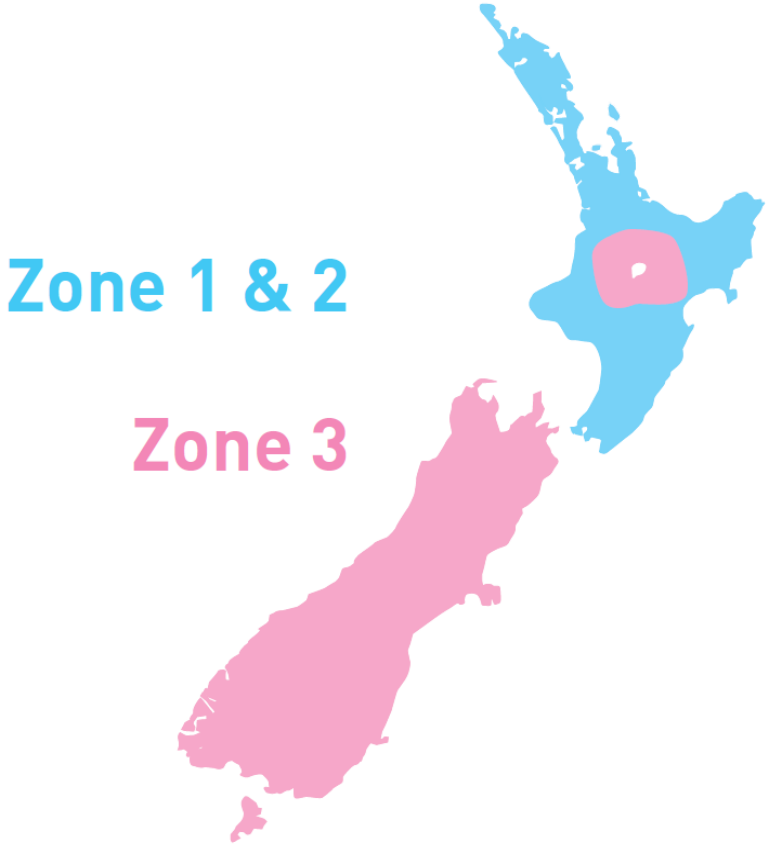
3.0 NZBC Clause H1 and Climate Zones

The NZBC: Clause H1 divides New Zealand into 3 different climate zones as shown below-

Climate zone 1 - specified Northland, Auckland, and the Thames-Coromandel districts in the North Island, the Kermadec Group of Islands, and other land territories, islands, and islets north of the 42nd parallel.

Climate zone 2 - land territories, islands, and islets within the internal waters of New Zealand but not in climate zone 3 or climate zone 1.

Climate zone 3 - the South Island, the Taupo and Ruapehu Districts, the Rangitikei District from just north of the 40th parallel, the Chatham Islands, Stewart Island, and other land territories, islands, and islets south of the 42nd parallel.



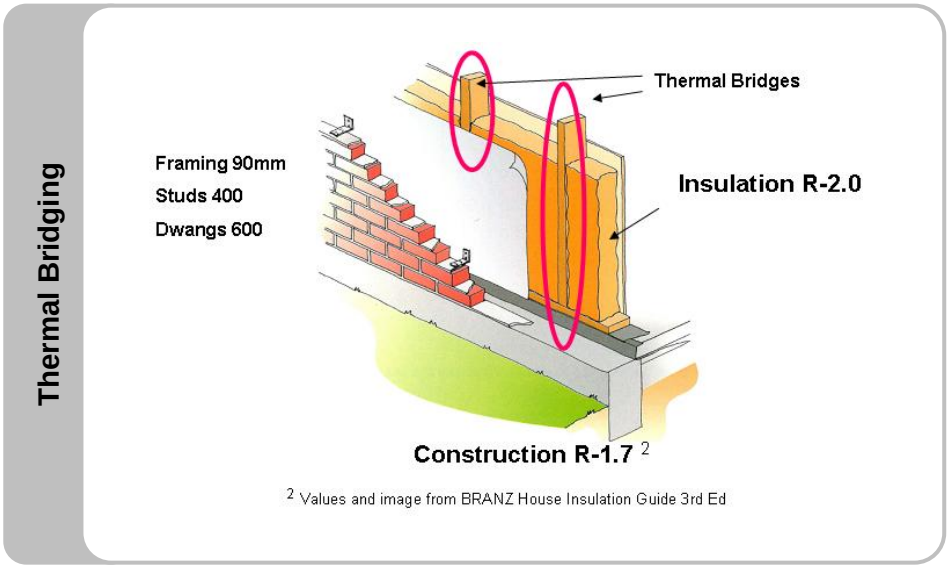
The NZBC Clause H1 Table1 details the construction R-value for each climate zone to meet the requirement of the NZBC. Construction R-values, take into account thermal bridging, cladding materials and other factors, and as shown below **the R-value of the insulation itself is *not* the same as the final construction R-value.**

Replacement Table 1:	**Non-solid construction – minimum R-values for schedule method (only where area of glazing is 30% or less of total wall area)**		
Building thermal envelope component	**Minimum R-values (m^2 °C/W)**		
	Climate zone 1	**Climate zone 2**	**Climate zone 3**
Roof	R 2.9	R 2.9	R 3.3
Wall	R 1.9	R 1.9	R 2.0
Floor	R 1.3	R 1.3	R 1.3
Glazing (vertical)	R 0.26	R 0.26	R 0.26
Glazing (skylights)	R 0.26	R 0.26	R 0.31

Table 1

To download the clause including all the tables and associated notes *visit* www.dbh.govt.nz.

Thermal bridging and Construction R-values
Thermal bridging occurs where building elements with a low thermal resistance reduce the effect of the overall R-value of the building construction insulation the diagram below shows how timber framing provides a thermal bridge. Construction R-values takes thermal bridging into account to provide an accurate R-value of the entire system



4.0 Compliance Methods

The following sections explain each of the Acceptable solutions (Schedule and Calculation) and the Verification method (Modelling) in greater detail.

A. Acceptable solution: Schedule Method

This section explains in greater detail how compliance may be met using the Schedule method.

The Schedule method can be used to meet minimum construction R-values and take into account:

- Climate zone
- Construction method
- Insulation material R-value
- Thermal bridging

The tables of the following pages have been developed to assist in determining insulation R-values based on the schedule method and should be read in conjunction with NZBC Clause H1 and NZS 4218:2009.

The R-value listed in each of the following tables are the insulation R-values required to achieve compliance for each common construction type. It has been determined by taking into account all the typical variations of that particular construction type. The R-value stated will assist in meeting compliance with the NZBC Clause H1 for any of the typical variants. Please note this is a guide only. Exact R-values can be calculated according to NZS 4214:2006.

ROOF – Insulation R-values required for various claddings and climate zones

Roof Cladding Details		Zone 1 & 2 (non solid wall) (Minimum Construction R-value = R 2.9)	Zone 3 (non solid wall) (Minimum Construction R-value = R 3.3)	Zone 3 (solid wall) (Minimum Construction R-value = R 3.5)
Profiled Steel	Pitched	R 3.2	R 3.8*	R 4.2
	Skillion	R 3.2	R 3.6	R 3.8
	Low Slope Timber Frame	R 3.2	R 3.6	R 3.8
Concrete / Clay Tiles	Pitched	R 3.2	R 3.8*	R 4.2
	Skillion	R 3.0	R 3.4	R 3.6
	Low Slope Timber Frame	-	-	-
Membrane	Pitched	-	-	-
	Skillion	-	-	-
	Low Slope Timber Frame	R 3.0	R 3.4	R 3.8

NOTES- (The following is based on 2007 information. Refer to NZS 4218:2009 for the latest information to be taken into consideration)

These insulation guidelines take into consideration Timber Framed Building designs (NZS 3604) and their respective framing spacing and cladding types to assist in meeting the minimum NZBC H1 Energy Efficiency (2007) requirements. To achieve higher performance, reference can be made to the better/best classification of PAS 4244.

This information is applicable if:

- the total glazing area is 30% or less than the total wall area,
- the sum of the glazing area is 30% or less than the external west, east and south facing wall area,
- total skylight area is less than 1.2m^2,
- all residential buildings and building up to 300m^2,
- non CA rated downlights used are less than 1 per 5m^2 of ceiling,
- insulation installed to NZS 4246.

If these criteria are not met, please consult with your building designer for Calculation and Modelling method (NZS 4218) to ensure compliance to the NZ Building Code. The R-value guidelines determined from the Schedule Method (NZS 4218) are **minimum** insulation levels recommended by Tasman Insulation New Zealand to cover a **range of similar framing systems**.

Lower levels of insulation R-value than those indicated may apply for some framing systems. **We strongly recommend a detailed analysis specific to your construction is carried out by a building designer, or alternatively use the table above to select insulation R-values to ensure compliance to the NZ Building Code.**

* While Pink® Batts® insulation is manufactured in an extensive range of R-values it is not possible to cover all specific designs. In some instances a higher R-value than indicated may need to be specified.

WALL- Insulation R-values required for various claddings and climate zones

Wall Cladding Details		Zone 1 & 2 (Minimum Construction R-value = R 1.9)	Zone 3 (Minimum Construction R-value = R 2.0)
Brick	Masonry Veneer	R 2.6	R 2.8
Weatherboard	Bevel Back Rusticated Fibre Cement (direct fixed only)	R 2.6	R 2.8
Monolithic	Stucco with Rigid Backing (cavity only)	R 2.8	R 2.8
	EIFS Direct fixed and Cavity	R 1.8*	R 1.8*
Metal	Vertical Profile (direct fixed only) Horizontal Profile (cavity only)	R 2.6	R 2.8
Sheet Cladding	Non Metal (direct fixed only)	R 2.8	R 2.8

NOTES - (The following is based on 2007 information. Refer to NZS 4218:2009 for the latest information to be taken into consideration)
These insulation guidelines take into consideration Timber Framed Building designs (NZS 3604) and their respective framing spacing and cladding types to assist in meeting the minimum NZBC H1 Energy Efficiency (2007) requirements. To achieve higher performance, reference can be made to the better/best classification of PAS 4244.
This information is applicable if:
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- all residential buildings and building up to 300m^2,
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The R-value guidelines determined from the Schedule Method (NZS 4218) are minimum insulation levels recommended by Tasman Insulation New Zealand to cover a range of similar framing systems.
Lower levels of insulation R-value than those indicated may apply for some framing systems. **We strongly recommend a detailed analysis specific to your construction is carried out by a building designer, or alternatively use the table above to select insulation R-values to ensure compliance to the NZ Building Code.**
*EIFS used with R 1.8 Insulation will generally result in construction R-values above the minimum; EIFS typically have a R-value higher than most common cladding types.

BRANZ House Insulation Guide

Alternatively ***the BRANZ House Insulation Guide*** provides in greater detail the ***Insulation R-values*** required to achieve ***Construction R-values.*** Visit http://www.branz.co.nz/H1_support for further information.

B. Acceptable solution: Calculation Method

The Calculation method:

- Allows for buildings with mixed construction types.
- Uses reference building to calculate minimum construction R-values.

$$\mathrm{HL} = \frac{\mathrm{A_{ROOF}}}{\mathrm{R_{ROOF}}} + \frac{\mathrm{A_{WALL}}}{\mathrm{R_{WALL}}} + \frac{\mathrm{A_{FLOOR}}}{\mathrm{R_{FLOOR}}} + \frac{\mathrm{A_{GLAZING}}}{\mathrm{A_{GLAZING}}}$$

An easy to use spreadsheet can be downloaded from BRANZ
http://www.branz.co.nz/H1_support#calculation

The Heat Loss (*HL*) of the proposed building must be less than the ***HL*** of the reference building.
Where ***A*** is the area of the building element and ***R*** is the ***Construction R-value.***

Refer to ***NZS4218:2009 Thermal Insulation- Housing and Small Buildings*** for further details and worked examples.

C. Verification Method: Modelling Method

The modelling method can be used to verify your design complies with the requirement of NZBC Clause H1. The software used must meet the requirements set out in NZS 4218

- The software programmes take into account many factors including the building design, location, environment, orientation, heating loads etc.
- Modelling is required for complicated designs and where glazing is > 50% of total wall area.
- Examples of modelling programmes are:
    - SUNREL
    - BRANZ ALF Method (Annual Loss Factor) software programme

Still not sure about these changes

Email **pinkbatts@pinkbatts.co.nz** with H1 in the subject heading

or

Phone **0800 PINKBATTS** and ask for the H1 helpdesk

For further product information please visit **www.pinkbatts.co.nz**

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