BUILDING PERFORMANCE

H1

# H1 Energy Efficiency

## Acceptable Solution H1/AS2

### Energy efficiency for buildings greater than 300 m²

SECOND EDITION | EFFECTIVE 27 NOVEMBER 2025

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government

# Preface

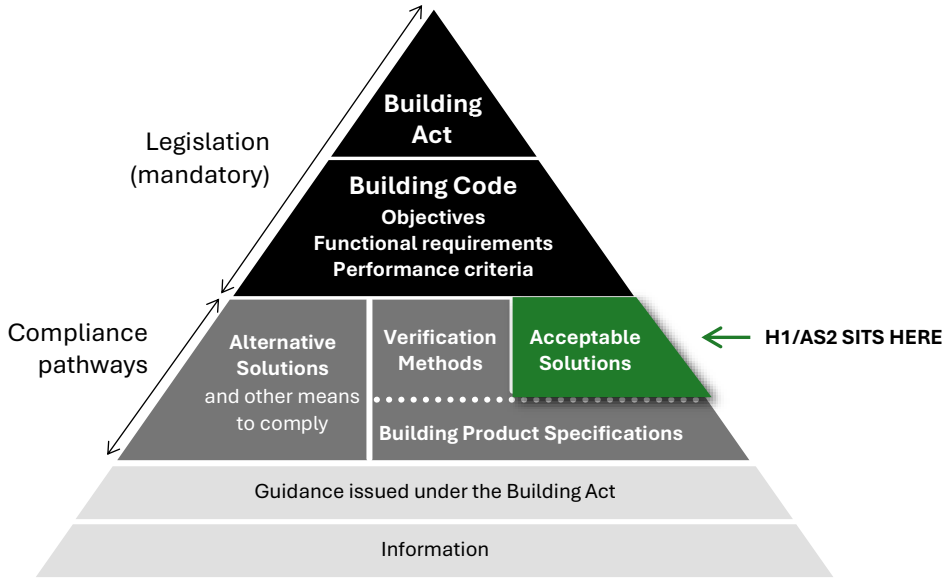
## Document status

This document (H1/AS2 Second Edition) is an acceptable solution issued under section 22 (1) of the Building Act 2004 and is effective on 27 November 2025. It does not apply to building consent applications submitted before 27 November 2025. The previous Acceptable Solution H1/AS2 First Edition, as amended, can be used to show compliance until 26 November 2026 and can be used for building consent applications submitted before 27 November 2026.

## Building Code regulatory system

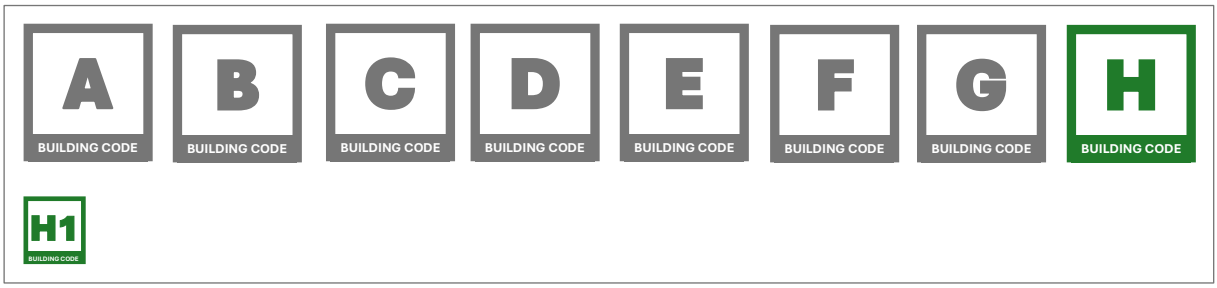
Each acceptable solution outlines the provisions of the Building Code that it relates to. Complying with an acceptable solution or verification method are ways of complying with that part of the Building Code. Other options for establishing compliance are listed in section 19 of the Building Act.

### Schematic of the Building Code system




A building design must take into account all parts of the Building Code. The Building Code is located in Schedule 1 of the Building Regulations 1992 and available online at www.legislation.govt.nz.

The part of the Building Code that this acceptable solution relates to is clause H1 Energy Efficiency. Information on the scope of this document is provided in Part 1. General.




Further information about the Building Code, including objectives, functional requirements, performance criteria, acceptable solutions, and verification methods, is available at www.building.govt.nz.

# Main changes in this version

This acceptable solution is the second edition of H1/AS2. The main changes from the previous first edition amendment 1 are:

- The schedule method has been removed from the acceptable solution.
- The calculation method has been amended to provide flexibility for the construction R-values of all building elements of a proposed building's thermal envelope. The minimum construction R-values for roofs and floors have been removed.
- For mixed-use buildings, the building may now be treated as having either a single thermal envelope, or multiple thermal envelopes, when demonstrating compliance using the calculation method.
- The citation of NZS 4214 has been modified to enhance clarity of requirements for determining the thermal resistance of building elements containing thermal bridges.
- The method for determining the thermal resistance of framed walls has been revised to better address typical levels of thermal bridging caused by wall framing members. As a consequence, the wall R-value in the reference building heat loss equations has also been reduced.
- The application of minimum construction R-values of heated ceilings, heated walls and heated floors has been clarified, and these minimum construction R-values no longer apply where heated ceilings, heated walls or heated floors are installed solely in rooms that contain a shower, bath or toilet.
- The method for determining the areas of roofs, walls and floors now requires the overall internal dimensions to be used.
- References have been revised to reflect the documents cited in this acceptable solution in Appendix A.
- Definitions have been revised to reflect the terms used in this acceptable solution in Appendix B.
- Appendix E. Thermal resistance of slab-on-ground floors has been revised to address buildings that have a mix of cladding types and buildings with slab edge insulation that does not cover the entire floor perimeter. The performance tables have also been expanded to include a greater range of slab area-to-perimeter ratios.
- The acceptable solution now refers to the Building Product Specifications for determining the thermal resistance of insulation materials. As a consequence, reference to AS/NZS 4859.1 has been removed from the acceptable solution with the applicable specifications located within the Building Product Specifications.
- Portions of text have been re-written to enhance clarity in the document and provide consistent language with other acceptable solutions and verification methods.
- Minor amendments have been made to correct typos, grammar, cross-references, punctuation, wording, and formatting of the document. This includes changes to headings, paragraphs, tables and figures, table and figure notes, and definitions. These amendments do not affect the level of performance required in the document but may assist in the interpretation of the requirements.

People using this document should check for amendments on a regular basis. The Ministry of Business, Innovation and Employment may amend any part of any acceptable solution or verification method at any time. Up-to-date versions of acceptable solutions or verification methods are available from www.building.govt.nz.

# Features of this document

- For the purposes of Building Code compliance, the standards and documents referenced in this acceptable solution must be the editions, along with their specific amendments listed in Appendix A.
- Words in *italic* are defined at the end of this document in Appendix B.
- Hyperlinks are provided to cross-references within this document and to external websites and appear with a blue underline.
- Appendices to this acceptable solution are part of, and have equal status to, the acceptable solution. Figures are informative only and the wording of the paragraphs takes precedence. Text boxes headed 'COMMENT' occur throughout this document and are for guidance purposes only.
- A consistent number system has been used throughout this document. The first number indicates the Part of the document; the second indicates the Section in the Part; the third is the Subsection; and the fourth is the Paragraph. This structure is illustrated as follows:

| | |
|---|---|
| 2 | Part |
| 2.5 | Section |
| 2.5.3 | Subsection |
| 2.5.3.1 | Paragraph |
| 2.5.3.1(a) | Paragraph (as a portion of the relevant paragraph) |
| 2.5.3.1(a)(i) | Paragraph (as a portion of the relevant paragraph) |

- Classified uses for *buildings*, as described in clause A1 of the Building Code, are printed in bold in this document. These requirements are also denoted with classified use icons.

H **Housing**

Com **Commercial**

Out **Outbuildings**

CR **Communal residential**

Ind **Industrial**

Anc **Ancillary**

CN **Communal non-residential**

# Contents

# Part 1. General

## 1.1 Introduction

### 1.1.1 Scope of this document

1.1.1.1 This document applies to *buildings* other than **housing** with an area of *occupied space* greater than 300 $m^2$.

H 1.1.1.2 For all **housing**, and *buildings* other than **housing** with an area of *occupied space* less than 300 $m^2$, refer to the Acceptable Solution H1/AS1 or Verification Method H1/VM1 as a means to demonstrate compliance or use an alternative solution to demonstrate compliance.

> COMMENT:
>
> 1. **Housing** includes detached dwellings, multi-unit dwellings such as *buildings* which contain more than one separate *household unit* or family (such as an apartment *building*), and group dwellings (such as a *wharenui)*.
> 2. For mixed-use *buildings* that include **housing**, this document does not apply to the parts of the *building* containing **housing**. This document applies to other parts of the *building* where their combined area of *occupied space* is greater than 300 $m^2$. Acceptable Solution H1/AS1 or Verification Method H1/VM1 may be used for any parts of the building containing **housing**, and for parts of the *building* other than **housing** where their combined area of *occupied space* is less than or equal to 300 $m^2$.

### 1.1.2 Items outside the scope of this document

1.1.2.1 This acceptable solution does not apply to *buildings* with *foil insulation*.

1.1.2.2 This acceptable solution does not apply to *buildings* with *curtain walling*. For these, use Verification Method H1/VM2 or use an alternative means to demonstrate compliance.

### 1.1.3 Compliance pathway

1.1.3.1 This acceptable solution is one option that provides a means of establishing compliance with the functional requirements and some of the performance criteria in Building Code clause H1 Energy Efficiency. It can be used to demonstrate compliance with clauses:

a) H.1.3.1 for the *adequate thermal resistance* of the *building envelope,* and for limiting uncontrollable airflow; and

b) H1.3.3 for the physical conditions to be taken into account for the energy performance of *buildings* including:

   i) the *thermal mass* of *building elements*, and

   ii) the *building* orientation and shape, and

   iii) the airtightness of the *building envelope*, and

   iv) the heat gains from services, processes, and occupants, and

   v) the local climate, and

   vi) heat gains from solar radiation; and

c) H1.3.4(a) and (b) for the heating, storage, distribution of hot water to and from *sanitary fixtures* and *sanitary appliances*; and

CN Com d) H1.3.5 for artificial lighting in **communal non-residential** and **commercial** *buildings*.

1.1.3.2 For **commercial** *buildings*, this acceptable solution does not include requirements to comply with clause H1.3.6 of the Building Code for the energy efficiency of *HVAC systems*. For this clause, use Verification Method H1/VM3 or use an alternative means to demonstrate compliance.

## 1.2 Using this acceptable solution

### 1.2.1 Determining the classified use

1.2.1.1 Classified uses for *buildings* are described in clause A1 of the Building Code. Where a specific classified use is mentioned within a subheading and/or within the text of a paragraph, this requirement applies only to the specified classified use(s) and does not apply to other classified uses.

### 1.2.2 Determining the area of the building

1.2.2.1 To determine the area of the *building*, calculate the area based on the *occupied space* of the *building* but exclude any parts with a classified use of **housing**, **industrial, communal non-residential** (assembly service), **outbuildings**, or **ancillary**.

### 1.2.3 Building Product Specifications

1.2.3.1 This acceptable solution refers to the Building Product Specifications for *building* product standards and specifications in relation to their manufacture, fabrication, testing, quality control, physical properties, performance, installation, and/or maintenance.

1.2.3.2 The Building Product Specifications cannot be used in isolation to demonstrate compliance with any requirements of the Building Code. To comply with H1/AS2, *building* products conforming to the Building Product Specifications must be used within the scope, limitations, and other applicable requirements set out in this acceptable solution.

# Part 2. Building thermal envelope

## 2.1 Thermal resistance

### 2.1.1 Overview

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2.1.1.1 To provide *adequate thermal resistance*, the *thermal envelope* of *buildings* or parts of *buildings* with classified uses of **communal residential**, **communal non-residential** (assembly care), and **commercial** shall meet the requirements of either:

a) the calculation method in Subsection 2.1.2; or

b) the modelling method in Verification Method H1/VM2.

> COMMENT:
>
> 1. For mixed-use *buildings* that include **housing**, the calculation method in Acceptable Solution H1/AS1 or the modelling method in Verification Method H1/VM1 may be used for the parts of the *building* containing **housing**.
> 2. For **communal residential** *buildings*, to satisfy the Building Code performance requirement E3.3.1 for internal moisture, it may be necessary to provide more insulation (a greater *R-value*) than that required to satisfy H1 energy efficiency provisions alone.

2.1.1.2 The requirements for the calculation method are prescribed according to the relevant climate zone of the *building*. A list of the New Zealand climate zones is provided in Appendix C.

2.1.1.3 The *construction R-values* of individual *building elements* shall be determined in accordance with Subsection 2.1.3.

2.1.1.4 Insulation materials shall be installed in a way that achieves the intended thermal performance in *buildings* without compromising the durability and safety of insulation or *building elements* and the health and safety of installers and *building* occupants. Gaps, tucks, folds, and over compaction of insulation material shall be avoided.

### 2.1.2 Calculation method

2.1.2.1 This method compares the proposed *building* with a reference *building*.

2.1.2.2 For *buildings* containing multiple classified uses that require a *thermal envelope* with *adequate thermal resistance* (refer Paragraph 2.1.1.1), the *building* may either be treated as having a single *thermal envelope*, or as having multiple *thermal envelopes*, with different classified uses having their own *thermal envelopes*.

> COMMENT: Where a *building* is treated as having multiple *thermal envelopes*, the calculation method is used separately for each *thermal envelope* as if they were separate *buildings*.

2.1.2.3 The *thermal envelope* shall not include any walls and floors/ceilings that separate adjoining *conditioned spaces*, including between adjoining *building* parts with different classified uses.

COMMENT: Any walls and floors/ceilings that are common between *conditioned spaces,* including between adjoining *building* parts with different classified uses:

1. do not require *construction* that provides *adequate thermal resistance*; and
2. are not included in the areas when determining compliance with Paragraph 2.1.2.4; and
3. are not included in the areas of the heat loss equations for the proposed and reference *buildings* in Paragraphs 2.1.2.6 and 2.1.2.7.

2.1.2.4 The solar aperture (V) of the proposed *building*, as given by Equation 2.1, shall be less than or equal to 0.4.

Equation 2.1: $V = \frac{\sum_{i=1}^{n}(SHGC_{glazing,i} \cdot A_{glazing,i})}{A_{grosswall}}$

where:

V is the solar aperture; and

$SHGC_{glazing,i}$ is the individual *solar heat gain coefficient* of each window and door that is part of the proposed *building's wall glazing area*; and

$A_{glazing,i}$ is the individual area of each window and door that is part of the proposed *building's wall glazing area* ($m^2$); and

n is the total number of windows and doors that are part of the proposed *building's wall glazing area*; and

$A_{grosswall}$ is the *gross wall area* ($m^2$).

2.1.2.5 The temperature-specific heat loss of the proposed *building* ($HL_{proposed}$) shall be less than or equal to the temperature-specific heat loss of the reference *building* ($HL_{reference}$) for the relevant climate zone.

2.1.2.6 The temperature-specific heat loss (HL) through the *thermal envelope* shall be determined using:

a) for the proposed *building*, Equation 2.2 using the areas and *R-values* for the *proposed building*; and

b) for the reference *building*, Equation 2.3 using the areas from Equation 2.4 and the relevant *construction R-values* from Table 2.1.2.8.

Equation 2.2:

$$HL_{proposed} = \frac{A_{roof}}{R_{roof,proposed}} + \frac{A_{wall,proposed}}{R_{wall,proposed}} + \frac{A_{floor}}{R_{floor,proposed}} + \frac{A_{window,proposed}}{R_{window,proposed}} + \frac{A_{door,proposed}}{R_{door,proposed}} + \frac{A_{skylight}}{R_{skylight,proposed}}$$

Equation 2.3:

$$HL_{Reference} = \frac{A_{roof} + A_{skylight}}{R_{roof,reference}} + \frac{A_{wall,reference}}{R_{wall,reference}} + \frac{A_{floor}}{R_{floor,reference}} + \frac{A_{window+door,reference}}{R_{window,reference}}$$

where:

$HL_{proposed}$ is the temperature-specific heat loss of the proposed *building* (W/K); and

$HL_{reference}$ is the temperature-specific heat loss of the reference *building* (W/K); and

$A_{roof}$ is the *net roof area* ($m^2$) of the proposed *building*; and

$A_{wall,proposed}$ is the *net wall area* ($m^2$) of the proposed *building*; and

$A_{floor}$ is the *thermal envelope floor area* ($m^2$) of the proposed *building*; and

$A_{window,proposed}$ is the *window area* ($m^2$) of the proposed *building*; and

$A_{door,proposed}$ is the *door area* ($m^2$) of the proposed *building*; and

$A_{skylight}$ is the *skylight area* ($m^2$) of the proposed *building*; and

$A_{wall,reference}$ is the *net wall area* ($m^2$) of the reference *building* as per Equation 2.4; and
$A_{window+door,reference}$ is the sum of the *window area* ($m^2$) and *door area* ($m^2$) of the reference *building* as per Equation 2.4; and

$R_{roof,proposed}$, $R_{wall,proposed}$, $R_{floor,proposed}$, $R_{window,proposed}$, $R_{door,proposed}$ and $R_{skylight,proposed}$ are the *R-values* ($m^2$·K/W) of the corresponding *thermal envelope* components for the proposed *building* determined in accordance with Subsection 2.1.3; and

$R_{roof\ reference}$, $R_{wall,reference}$, $R_{floor,reference}$, and $R_{window,reference}$ are the *R-values* ($m^2$·K/W) of the corresponding *thermal envelope* components for the reference *building* using the relevant *construction R-values* from Table 2.1.2.8.

2.1.2.7 The reference *building's net wall area*, and the sum of its *window area* and *door area* shall be determined using Equation 2.4.

Equation 2.4:

If $(A_{window,proposed} + A_{door,proposed}) \leq A_{wall,proposed}$ then:

$A_{wall,reference} = A_{wall,proposed}$

$A_{window+door,reference} = A_{window,proposed} + A_{door,proposed}$

Otherwise,

$A_{wall,reference} = ½\ A_{grosswall,proposed}$

$A_{window+door,reference} = ½\ A_{grosswall,proposed}$

where:

$A_{wall,reference}$ is the *net wall area* ($m^2$) of the reference *building*; and

$A_{wall,proposed}$ is the *net wall area* ($m^2$) of the proposed *building*; and

$A_{window+door,reference}$ is the sum of the *window area* and *door area* ($m^2$) of the reference *building*; and

$A_{window,proposed}$ is the *window area* ($m^2$) of the proposed *building*; and

$A_{door,proposed}$ is the *door area* ($m^2$) of the proposed *building*; and

$A_{grosswall,proposed}$ is the *gross wall area* ($m^2$) of the proposed *building*.

2.1.2.8 The *R-values* ($m^2$·K/W) of the *thermal envelope* components for the reference *building* shall comply with Table 2.1.2.8.

**Table 2.1.2.8: Reference building construction R-values**

Paragraphs 2.1.2.6, 2.1.2.8, and Equation 2.3

| Building element | Climate zone 1 (1), (2) | Climate zone 2 (1), (2) | Climate zone 3 (1), (2) | Climate zone 4 (1), (2) | Climate zone 5 (1), (2) | Climate zone 6 (1), (2) |
|---|---|---|---|---|---|---|
| *Roof* | R3.5 | R4.0 | R5.0 | R5.4 | R6.0 | R7.0 |
| Wall | R1.9 | R2.0 | R2.1 | R2.3 | R2.3 | R2.4 |
| Floor | R2.2 | R2.2 | R2.2 | R2.4 | R2.5 | R2.6 |
| Windows and doors | R0.33 | R0.33 | R0.37 | R0.37 | R0.40 | R0.42 |

**Notes:**
(1) The *R-values* shown are *construction R-values* measured in $m^2$·K/W.
(2) Climate zone boundaries are shown in Appendix C.

2.1.2.9 Where a *building element* is proposed to have parts with different *thermal resistances* (for example walls with different *construction R-values*), the corresponding term in Equation 2.2 shall be expanded to suit. For example:

$$\frac{A_{wall}}{R_{wall}} \text{ becomes } \frac{A_{wall(1)}}{R_{wall(1)}} + \frac{A_{wall(2)}}{R_{wall(2)}}$$

2.1.2.10 For the *net roof area*, *thermal envelope floor area*, and *net wall area*, use overall internal dimensions, measured on the finished internal face of all relevant *building elements*, including the thickness of any internal partitions.

2.1.2.11 *Heated ceilings, heated walls and heated floors* that are part of the *thermal envelope* shall have *construction R-values* no less than those in Table 2.1.2.11. They do not apply where *heated ceilings*, *heated walls* or *heated floors* are installed solely in rooms that contain a shower, bath or toilet.

**Table 2.1.2.11: Minimum construction R-values for heated ceilings, heated walls, and heated floors**

Paragraph 2.1.2.11

| Building element | Climate zone 1 (1), (2), (3) | Climate zone 2 (1), (2), (3) | Climate zone 3 (1), (2), (3) | Climate zone 4 (1), (2), (3) | Climate zone 5 (1), (2), (3) | Climate zone 6 (1), (2), (3) |
|---|---|---|---|---|---|---|
| *Heated ceiling*(4) | R6.6 | R6.6 | R6.6 | R6.6 | R6.6 | R7.0 |
| *Heated wall* | R2.9 | R2.9 | R3.0 | R3.2 | R3.4 | R3.6 |
| *Heated floor*(5) | R2.9 | R2.9 | R2.9 | R3.0 | R3.2 | R3.4 |

**Notes:**
(1) The *R-values* shown are *construction R-values* measured in $m^2 \cdot K/W$.
(2) No thermal insulation shall be placed between the heated plane and the inside air.
(3) Climate zone boundaries are shown in Appendix C.
(4) In *roofs* with a roof space, where the insulation is installed over a horizontal ceiling, the *roof R-value* of the proposed *building* may be reduced to R3.3 for a distance of up to 500 mm from the outer edge of the ceiling perimeter where space restrictions do not allow full-thickness insulation to be installed.
(5) Floor coverings, for example carpet or cork, will reduce the efficiency of the *heated floor*.

2.1.2.12 Where the *construction R-value* of a *building element* is not known, default *construction R-values* of 0.18 $m^2 \cdot K/W$ for an opaque *building element* and 0.15 $m^2 \cdot K/W$ for windows shall be used in the heat loss equation for the proposed *building*.

### 2.1.3 Determining the thermal resistance of building elements

2.1.3.1 The *construction R-values* of *building elements* shall be determined by:

a) for walls, *roofs,* and floors other than *slab-on-ground floors*, using NZS 4214 as modified by Paragraph 2.1.3.2; and
   i) for framed walls, a *wall framing fraction* of no less than 38% shall be assumed unless it can be demonstrated that a lower *wall framing fraction* is appropriate for the *building*, and
   ii) for floors other than *slab-on-ground floors*, ignoring the effect of floor coverings (including carpets), and
b) for windows, doors and *skylights*, using Appendix D. Windows, doors and skylights; and
c) for *slab-on-ground floors*, using Appendix E. Thermal resistance of slab-on-ground floors.

2.1.3.2 In NZS 4214, replace clause 5.7.1 a) with:

"(a) The bridged portion of a building envelope component encloses the layers within which thermal bridging occurs. Where multiple bridged layers are immediately adjacent, they shall all be included in the bridged portion. Where multiple bridged layers are separated by homogenous

layer(s) other than pliable membranes and pliable underlays, they shall be treated as separate bridged portions.

On each side, a bridged portion is defined to end at the nearest face of the next homogenous layer (parallel to the plane of the building envelope component), except where:

i) that next homogenous layer is an insulation material or air cavity, in which case the insulation material or air cavity is to be included in the bridged portion, or

ii) that next homogenous layer is in between two bridged layers, in which case half of the intermediary homogenous layer is included in each of the adjacent bridged portions, or

iii) that next homogenous layer is a pliable membrane or pliable underlay, in which case the pliable membrane or pliable underlay shall be treated as if it was not present".

2.1.3.3 The *thermal resistance (R-values)* of insulation materials shall be determined by using the methods in Subsection 4.5.1 of the Building Product Specifications for the given type of insulation.

2.1.3.4 The *R-value* of an unconditioned airspace between the *thermal envelope* and the *building envelope* may be included in the *construction R-value*. This can include a subfloor, *roof* space, garage, and/or conservatory.

> COMMENT: Garages should form part of the *unconditioned space* of a *building*, that is, they should be outside the *thermal envelope*. Any *building elements* between attached garages and the *conditioned spaces* of a *building* form part of the *thermal envelope* and should therefore be insulated.

## 2.2 Airflow

### 2.2.1 Control of airflow

2.2.1.1 **Communal residential**, **communal non-residential** (assembly care), and **commercial** *buildings* shall have windows, doors, vents or other *building elements* that allow significant movement of air, to be *constructed* in such a way that they are capable of being fixed in the closed position.

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COMMENT:

1. Acceptable Solution G4/AS1 provides for the supply of outdoor air for ventilation by way of windows and doors that can be fixed in the open position.
2. Measures should be taken to limit the amount of moisture that can migrate from *occupied spaces* into the *roof* or roof space. This includes limiting the air permeability of ceilings, including through ceiling linings and penetrations such as recessed luminaires, electrical and plumbing services, and ceiling access hatches.

## 2.3 Solar heat gains

### 2.3.1 Control of solar heat gains

2.3.1.1 Requirements to account for heat gains from solar radiation are satisfied by complying with the requirements for *thermal resistance* in Section 2.1.

COMMENT: Passive measures to prevent overheating from excessive solar heat gains through the *building envelope* should be taken to reduce dependence on active cooling systems. Such measures should include a combination of:

1. providing *adequate thermal resistance* to the *thermal envelope* of the *building*; and
2. avoiding excessive window *areas* (particularly on the east, north, and west facing facades); and
3. avoiding excessive *skylight areas*; and
4. selecting glass types with appropriate *solar heat gain coefficients* (*SHGC*); and
5. providing external shading for windows and *skylights*; and
6. providing the ability to ventilate the *building* at a sufficient rate to maintain comfortable indoor temperatures in summer.

# Part 3. Building services

## 3.1 Hot water systems

### 3.1.1 Hot water systems for sanitary fixtures and sanitary appliances

3.1.1.1 Hot water systems for *sanitary fixtures* and *sanitary appliances* having a storage water heater capacity of up to 700 litres shall comply with NZS 4305.

COMMENT:

1. NZS 4305 deals with domestic type electrical and gas systems having a storage water heater capacity of up to 700 litres. Larger systems and their associated piping are not controlled by the Building Code.
2. The manufacture and sale of hot water cylinders and gas water heaters are covered by the Energy Efficiency (Energy Using Products) Regulations 2002. The associated NZ Minimum Energy Performance Standards for electric storage water heaters (MEPS as defined in NZS 4606.1 and the relevant NZ section of AS/NZS 4692.2) are equivalent to the requirements in this acceptable solution (see NZS 4305 clause 2.1.1). Electric storage water heaters that do not comply with NZ MEPS do not comply with this acceptable solution.

## 3.2 Artificial lighting

### 3.2.1 Communal non-residential and commercial buildings

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3.2.1.1 Artificial lighting in **communal non-residential** and **commercial** *buildings* that have an area of *occupied space* greater than 300 $m^2$ shall comply with NZS 4243.2 section 3.3.

# Appendix A. References

For the purposes of Building Code compliance, the standards and documents referenced in this acceptable solution must be the editions, along with their specific amendments, listed below.

| **Standards New Zealand** | | **Where quoted** |
|---|---|---|
| NZS 4214:2006 | Methods of determining the total thermal resistance of parts of buildings | 2.1.3.1, 2.1.3.2 |
| NZS 4243.2:2007 | Energy efficiency – large buildings – Part 2 Lighting Amendment 1 | 3.2.1.1 |
| NZS 4305:1996 | Energy efficiency – domestic type hot water systems | 3.1.1.1 |
| NZS 4606.1:1989 | Storage water heaters – Part 1: General requirements | 3.1.1.1 Comment |
| AS/NZS 4692.2:2005 | Electric water heaters – Part 2: Minimum Energy Performance Standards (MEPS) requirements and energy labelling | 3.1.1.1 Comment |

These standards can be accessed from www.standards.govt.nz.

| **British Standards Institute** | | **Where quoted** |
|---|---|---|
| BS EN 673:2011 | Glass in building – Determination of thermal transmittance (U value) – Calculation method | D.1.2.2a), D.1.2.4a), D.2.1.2(a) |

This standard can be accessed from www.standards.govt.nz.

| **International Organization for Standardization** | | **Where quoted** |
|---|---|---|
| ISO 10077-1:2017 | Thermal performance of windows, doors and shutters - Calculation of thermal transmittance – Part 1: General | D.1.2.2, D.1.2.4, Equation D.3, D.2.1.2 |
| ISO 10077-2:2017 | Thermal performance of windows, doors and shutters - Calculation of thermal transmittance – Part 2: Numerical method for frames | D.1.2.2b), D.1.2.4b), D.2.1.2(b) |
| ISO 13370:2017 | Thermal performance of buildings – Heat transfer via the ground – Calculation methods | E.1.2.1 Comment |

These standards can be accessed from www.standards.govt.nz.

| **BRANZ** | **Where quoted** |
|---|---|
| BRANZ House Insulation Guide (6th Edition), August 2025 | E.1.1.1 Comment |
| Cox-Smith, I. (2016). Perimeter insulation of concrete slab foundations. Study Report SR352, BRANZ Ltd, Judgeford, New Zealand. | E.1.2.1 Comment |

These documents can be accessed from www.branz.co.nz.

| **New Zealand Legislation** | **Where quoted** |
|---|---|
| Energy Efficiency (Energy Using Products) Regulations 2002 | 3.1.1.1 Comment |

This document can be accessed from www.legislation.govt.nz.

# References

# Appendix B. Definitions

These definitions are specific to this acceptable solution. Other defined terms italicised within the definitions are provided in clause A2 of the Building Code.

| Term | Definition |
|---|---|
| **Adequate** | Adequate to achieve the objectives of the Building Code. |
| **Building** | Has the meaning given to it by sections 8 and 9 of the Building Act 2004. |
| **Building element** | Any structural and non-structural component or assembly incorporated into or associated with a *building*. Included are *fixtures*, services, *drains*, permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports. |
| **Building envelope** | A *building's thermal envelope* plus the exterior surface of any spaces not requiring conditioning, e.g. garage, floor space (below insulating layer), roof space (above any outer surface defining an attic or when there is no attic above the insulating layer). |
| **Conditioned space** | That part of a *building* within the *thermal envelope* that may be directly or indirectly heated or cooled. It is separated from *unconditioned space* by *building elements* (walls, windows, *skylights*, doors, *roof*, and floor) to limit uncontrolled airflow and heat transfer. |
| **Construct** | In relation to a *building*, includes to design, build, erect, prefabricate, and relocate the *building*; and construction has a corresponding meaning. |
| **Construction R-value** | The *total thermal resistance (R-value)* of a typical area of a *building element*. |
| **Curtain walling** | Part of the *building envelope* made of a framework usually spanning multiple floors and consisting of horizontal and vertical profiles, connected together and anchored to the supporting structure of the *building*, and containing fixed and/or openable infills, which provides all the required functions of an internal or *external wall* or part thereof, but does not contribute to the load bearing or the stability of the structure of the *building*. |
| **Door area ($A_{door}$)** | The total area of doors in the *thermal envelope*, including frames and opening tolerances, and including any opaque panels, glazing, decorative glazing and louvres. |
| **External wall** | Any exterior face of a *building* within 30° of vertical, consisting of primary and/or secondary elements intended to provide protection against the outdoor environment. |
| **Foil insulation** | Material that includes a thin layer of heat-reflecting metallic foil (usually aluminium). |
| **Gross roof area** | The *net roof area* ($A_{roof}$) plus the *skylight area* ($A_{skylight}$). |
| **Gross wall area** | The sum of the following:<br>a) the *net wall area* of the *building*; and<br>b) the *wall glazing area* of the *building*; and<br>c) the *opaque door area* of the *building*. |
| **Habitable space** | A space used for activities normally associated with domestic living, but excludes any bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, clothes-drying room, or other space of a specialised nature occupied neither frequently nor for extended periods. |

# Definitions

| Term | Definition |
|---|---|
| **Heated ceiling, heated wall, heated floor** | Any ceiling, wall, or floor incorporating, within the *building element* or its finishes, pipes, electrical cables, or similar means of raising its temperature. Common examples are floors with underfloor heating or undertile heating. |
| **Household unit** | a) means a *building* or group of *buildings*, or part of a *building* or group of *buildings*, that is—<br>i) used, or intended to be used, only or mainly for residential purposes; and<br>ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but<br>b) does not include a hostel, boarding house, or other specialised accommodation. |
| **HVAC system** | For the purposes of Building Code performance clause H1.3.6 and in relation to a *building*, means a mechanical, electrical, or other system for modifying air temperature, modifying air humidity, providing ventilation, or doing all or any of those things, in a space within the *building*. |
| **Intended use** | In relation to a *building* –<br>a) includes any or all of the following:<br>i) any reasonably foreseeable occasional use that is not incompatible with the intended use;<br>ii) normal maintenance;<br>ii) activities undertaken in response to *fire* or any other reasonably foreseeable emergency; but<br>b) does not include any other maintenance and repairs or rebuilding. |
| **Net roof area ($A_{roof}$)** | The area of the *roof* that is part of the *thermal envelope*, excluding the *skylight area,* measured using overall internal dimensions. |
| **Net wall area** | The area of walls that are part of the *thermal envelope*, excluding the *opaque door area* and the *wall glazing area,* measured using overall internal dimensions. |
| **Occupied space** | Any space within a *building* in which a person will be present from time to time during the *intended use* of the *building*. |
| **Opaque door area ($A_{door,opaque}$)** | The total area of opaque doors and opaque panels of doors in the *thermal envelope*, including frames and opening tolerances. |
| **R-value** | The common abbreviation for describing the values of both *thermal resistance* and *total thermal resistance*. |
| **Roof** | Any roof/ceiling combination where the exterior surface of the *building* is at an angle of 60° or less to the horizontal and has its upper surface exposed to the outside. |
| **Sanitary appliance** | An appliance which is intended to be used for *sanitation*, but which is not a *sanitary fixture*. Included are machines for washing dishes and clothes. |
| **Sanitary fixture** | Any *fixture* which is intended to be used for *sanitation*. |
| **Sanitation** | The term used to describe the activities of washing and/or excretion carried out in a manner or condition such that the effect on health is minimised, with regard to dirt and infection. |
| **Skylight** | Translucent or transparent parts of the *roof*, including frames and glazing. |

# Definitions

| Term | Definition |
|---|---|
| **Skylight area ($A_{skylight}$)** | The area of *skylights* that are part of the *thermal envelope*, including frames and opening tolerances. |
| **Slab-on-ground floor** | Floor *construction* consisting of a concrete slab or concrete raft foundation in contact with the ground over its whole area. |
| **Solar heat gain coefficient (SHGC)** | The total solar energy transmittance through a glazed element, that is the sum of the solar direct transmittance plus the secondary heat transfer factor of the glazing towards the inside, the latter resulting from inwards re-radiation of heat from solar radiation that is absorbed by the glass. The SHGC is also known as the solar factor (SF) or g-value. |
| **Thermal envelope** | The *roof*, wall, window, *skylight*, door, and floor *construction* between *conditioned spaces* and *unconditioned spaces,* the ground or the outdoor environment. |
| **Thermal envelope floor area ($A_{floor}$)** | The area of the floor that forms part of the *thermal envelope* measured using overall internal dimensions. |
| **Thermal mass** | The heat capacity of the materials of the *building* affecting the *building's heating load* and *cooling load* by storing and releasing heat as the interior and/or exterior temperature and radiant conditions fluctuate. |
| **Thermal resistance** | The resistance to heat flow of a given component of a *building element*. It is equal to the air temperature difference (K) needed to produce unit heat flux (W) through unit area ($m^2$ ) under steady conditions. The units are $m^2$·K/W. |
| **Total thermal resistance** | The overall air-to-air *thermal resistance* across all components of a *building element* such as a wall, *roof*, or floor, including the surface resistances. |
| **Unconditioned space** | Space within the *building envelope* that is not *conditioned space*. For example, this may include a garage, conservatory, atrium, attic, subfloor, and so on. However, where a garage, conservatory, or atrium is expected to be heated or cooled these spaces shall be included in the *conditioned space*. |
| **Wall framing fraction** | The percentage of the *net wall area* taken up by framing, such as timber or steel framing, considering all framing members that are in the same plane as thermal insulation. Walls with multiple framing layers may have a different wall framing fraction for each layer. |
| **Wall glazing area ($A_{wallglazing}$)** | The total area of windows, and doors that include glazing, in walls of the *thermal envelope*, including transparent or translucent glazing, frames and opening tolerances, decorative glazing, and louvres. This excludes opaque panels, opaque doors, and *skylights*. |
| **Wharenui** | A communal meeting house having a large open floor area used for both assembly and sleeping in the traditional Māori manner. |

# Appendix C. New Zealand climate zones

## C.1 Climate zones

### C.1.1 Climate zone boundaries

C.1.1.1 There are six climate zones. The climate zone boundaries are based on climatic data taking into consideration territorial authority boundaries.

C.1.1.2 A list of the climate zones for each territorial authority is provided in Table C.1.1.2 and illustrated in Figure C.1.1.2. The list in the table takes precedence over the figure.

# New Zealand climate zones

**Table C.1.1.2: Climate zones by territorial authority**

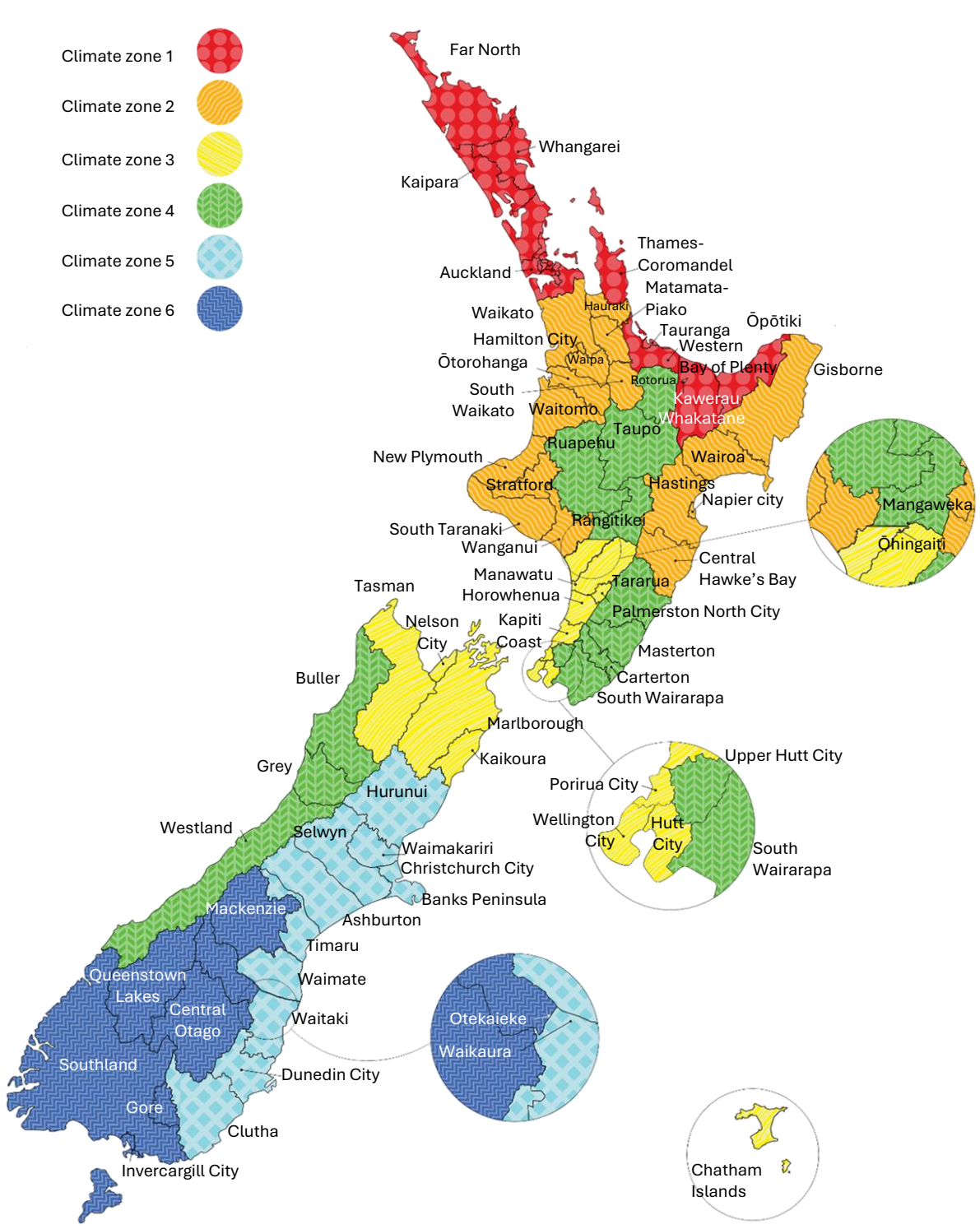
Paragraph C.1.1.2

| North Island/Te Ika-a-Māui Territorial authority | Climate zone | South Island/Te Waipounamu Territorial authority | Climate zone |
|---|---|---|---|
| Far North District | 1 | Tasman District | 3 |
| Whangarei District | 1 | Nelson City | 3 |
| Kaipara District | 1 | Marlborough District | 3 |
| Auckland | 1 | Kaikoura District | 3 |
| Thames-Coromandel district | 1 | Buller District | 4 |
| Hauraki District | 2 | Grey District | 4 |
| Waikato District | 2 | Westland District | 4 |
| Matamata-Piako District | 2 | Hurunui District | 5 |
| Hamilton City | 2 | Waimakariri District | 5 |
| Waipa District | 2 | Christchurch City | 5 |
| Ōtorohanga District | 2 | Selwyn District | 5 |
| South Waikato District | 2 | Ashburton District | 5 |
| Waitomo District | 2 | Timaru District | 5 |
| Taupo District | 4 | Mackenzie District | 6 |
| Western Bay of Plenty District | 1 | Waimate District | 5 |
| Tauranga City | 1 | Chatham Islands | 3 |
| Rotorua District | 4 | Waitaki District (true left of the Otekaieke river) | 6 |
| Whakatane District | 1 | Waitaki District (true right of the Otekaieke river) | 5 |
| Kawerau District | 1 | Central Otago District | 6 |
| Ōpōtiki District | 1 | Queenstown-Lakes District | 6 |
| Gisborne District | 2 | Dunedin City | 5 |
| Wairoa District | 2 | Clutha District | 5 |
| Hastings District | 2 | Southland District | 6 |
| Napier City | 2 | Gore District | 6 |
| Central Hawke's Bay District | 2 | Invercargill City | 6 |
| 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 | | |
| 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 | | |

# New Zealand climate zones

**Figure C.1.1.2: Map of New Zealand climate zones**

Paragraph C.1.1.2



# Appendix D. Windows, doors and skylights

## D.1 Vertical windows and doors

### D.1.1 Methods for determining construction R-values

D.1.1.1 The *construction R-values* for vertical windows and doors shall be determined using one of the following methods:

a) calculation of the *construction R-value* of each individual window and door that is part of the *thermal envelope*, in accordance with Subsection D.1.2; or

b) calculation of the representative *construction R-value* of all windows and doors that are part of the *thermal envelope* of the proposed *building*, which is then deemed to apply to all windows and doors of the proposed *building*, in accordance with Subsection D.1.3.

COMMENT: The window size and frame material have a major impact on the *construction R-value* of a window as a *building element*. Often the *thermal resistance*s of the glazing and the frames are dissimilar. For large windows, the *thermal resistance* of the glazing will have more impact on the overall window *construction R-value* than in a small window, which is dominated by the frame performance. This means that the *construction R-values* of two differently sized windows consisting of identical frame and glazing materials will usually be dissimilar.

### D.1.2 Calculation of the construction R-value of each individual window and door that is part of the thermal envelope

D.1.2.1 For each window that is part of the *thermal envelope* of the proposed *building*, the window *construction R-value* ($R_w$) shall be calculated in accordance with Equation D.1. The *construction R-value* shall be rounded down to no less than two significant figures.

Equation D.1: $R_w = \frac{1}{U_w}$

where:

$R_w$ is the *construction R-value* of the window ($m^2 \cdot K/W$); and
$U_w$ is the thermal transmittance of the window ($W/(m^2 \cdot K)$), determined in accordance with Paragraph D.1.2.2.

D.1.2.2 The thermal transmittance ($U_w$) of each vertical window that is part of the *thermal envelope* of the proposed *building* shall be determined in accordance with ISO 10077-1, with:

a) the thermal transmittance of the glazing ($U_g$) determined using BS EN 673; and

b) the thermal transmittance of the frame ($U_f$) determined using ISO 10077-2. For frames with special extensions overlapping the wall or other *building elements*, such as frames with flanges to the cladding, the following deviations from ISO 10077-2 Section 6.3.1 are permitted:

   i) special extensions may either be disregarded or included in the calculation model, but shall be disregarded when determining the projected width of the frame section ($b_f$) as per ISO 10077-2 Appendix F, and

   ii) window reveal liners that are integral with the window unit may either be disregarded or included in the calculation model.

D.1.2.3 For each door that is part of the *thermal envelope* of the proposed *building*, the door *construction R-value* ($R_D$) shall be calculated in accordance with Equation D.2. The *construction R-value* shall be rounded down to no less than two significant figures.

Equation D.2: $R_D = \frac{1}{U_D}$

where:

$R_D$ is the *construction R-value* of the door ($m^2 \cdot K/W$); and
$U_D$ is the thermal transmittance of the door ($W/(m^2 \cdot K)$), determined in accordance with Paragraph D.1.2.4.

COMMENT: The door *construction R-value* ($R_D$) includes the effects of the frame, any glazing and any opaque panels.

D.1.2.4 The thermal transmittance ($U_D$) of each door that is part of the *thermal envelope* of the proposed *building* shall be determined in accordance with ISO 10077-1, with:

a) the thermal transmittance of the glazing ($U_g$) determined using BS EN 673; and

b) the thermal transmittance of the frame ($U_f$) determined using ISO 10077-2. For frames with special extensions overlapping the wall or other *building elements*, such as frames with flanges to the cladding, the following deviations from ISO 10077-2 Section 6.3.1 are permitted:

   i) special extensions may either be disregarded or included in the calculation model, but shall be disregarded when determining the projected width of the frame section ($b_f$) as per ISO 10077-2 Appendix F, and

   ii) door reveal liners that are integral with the door unit may either be disregarded or included in the calculation model.

### D.1.3 Calculation of the representative construction R-value of all windows and doors that are part of the thermal envelope

D.1.3.1 The representative window and door *construction R-value* ($R_{WD}$) shall be calculated in accordance with Equation D.3. The *construction R-value* shall be rounded down to no less than two significant figures.

Equation D.3: $R_{WD} = \frac{\sum A_W + \sum A_D}{\sum \frac{A_W}{R_W} + \sum \frac{A_D}{R_D}}$

where:

$R_w$ is the *construction R-value* of each vertical window that is part of the *thermal envelope* of the proposed *building* ($m^2 \cdot K/W$) calculated in accordance with Paragraph D.1.2.1; and

$A_w$ is the window area of each vertical window that is part of the *thermal envelope* of the proposed *building* ($m^2$) calculated in accordance with ISO 10077-1 Section 6.3.1; and

$R_D$ is the *construction R-value* of each door that is part of the *thermal envelope* of the proposed *building* ($m^2 \cdot K/W$) calculated in accordance with Paragraph D.1.2.3; and

$A_D$ is the *door area* of each door that is part of the *thermal envelope* of the proposed *building* ($m^2$) calculated in accordance with ISO 10077-1 Section 6.3.1.

## D.2 Skylights

### D.2.1 Construction R-values

D.2.1.1 The *construction R-values* for *skylights* ($R_{skylight}$) shall include the effects of both the glazing materials and the frame materials and shall be calculated in accordance with Equation D.4. The *construction R-value* shall be rounded down to no less than two significant figures.

Equation D.4: $R_{skylight} = \frac{1}{U_w}$

where:

$R_{skylight}$ is the *construction R-value* of the *skylight* ($m^2 \cdot K/W$); and

$U_w$ is the thermal transmittance of the *skylight* ($W/(m^2 \cdot K)$), determined in accordance with Paragraph D.2.1.2.

D.2.1.2 The thermal transmittance ($U_w$) of a *skylight* shall be determined in accordance with ISO 10077-1, with:

a) the thermal transmittance of the glazing ($U_g$) determined using BS EN 673, considering the effects of horizontal or angled (sloping) glazing on the heat transfer; and

b) the thermal transmittance of the frame ($U_f$) determined using ISO 10077-2.

# Appendix E. Thermal resistance of slab-on-ground floors

## E.1 Construction R-values

### E.1.1 Methods for determining construction R-values for slab-on-ground floors

E.1.1.1 The *construction R-values* for concrete *slab-on-ground floors*, including floors of basements that contain *conditioned spaces*, shall be determined using either:

a) the performance tables described in Section E.1.2; or

b) calculation in accordance with Verification Method H1/VM2 Appendix E.

COMMENT:

1. The *thermal resistances* for *slab-on-ground floors* provided in the BRANZ House Insulation Guide 5th edition or earlier should not be used for determining compliance with the requirements of this acceptable solution. This is because they are based on a different calculation method and different assumptions than those specified in this Appendix.
2. Where a concrete floor is only partially in contact with the ground, with other parts being suspended, the part that is in contact with the ground shall be treated as a *slab-on-ground floor*, and the other part be treated as a suspended floor.

### E.1.2 Performance tables for slab-on-ground floors

E.1.2.1 The *construction R-value* for selected generic concrete *slab-on-ground floors* may be determined from the *construction R-value* tables included in this subsection. An overview of these tables is provided in Table E.1.2.1.

# Thermal resistance of slab-on-ground floors

COMMENT:

1. Any parts of a *slab-on-ground floor* that are not part of the *thermal envelope* (such as the floor of porches, attached garages or storage areas) should be thermally separated by installing vertical edge insulation in between conditioned and unconditioned parts of the floor.
2. Since insulation cannot be easily retrofitted to *slab-on-ground floors*, it is recommended to also insulate the floor of any *unconditioned spaces* of the *building*, where these may become *conditioned spaces* at a later stage during the *building* life. An example is an attached garage that could potentially be converted into a *habitable space* in the future.
3. Table E.1.2.1A – Table E.1.2.1X differentiate situations where the *external walls* have a masonry veneer cladding from walls with other types of cladding. With masonry veneer walls, the slab edge has a step-down, resulting in different heat transfer characteristics compared to *slab-on-ground floors* for other *external wall* types.
4. *Construction R-values* are only provided for vertical edge insulation with a *thermal resistance* of 1.0 $m^2$·K/W. The thermal benefits of increasing the *R-value* of vertical edge insulation beyond R1.0 $m^2$·K/W are very limited. Refer to BRANZ study report SR352 (2016) for further details.
5. The *construction R-values* provided in Table E.1.2.1A – Table E.1.2.1X are based on the calculation method provided in Verification Method H1/VM2 Appendix E, using the default values for the thermal properties of the ground from ISO 13370 Table 7 category 2 (thermal conductivity λ= 2.0 W/(m·K), heat capacity per volume ρc= 2.0 x $10^6$ J/($m^3$·K)).

E.1.2.2 The slab area-to-perimeter ratio of the proposed *building* shall be determined using either:

a) the overall internal slab dimensions in accordance with Equation E.1; or

b) the external slab dimensions in accordance with Equation E.2.

$$\text{Equation E.1: slab area-to-perimeter ratio} = \frac{A_{\text{slab, internal}}}{P_{\text{slab, internal}}}$$

$$\text{Equation E.2: slab area-to-perimeter ratio} = \frac{A_{\text{slab, external}}}{P_{\text{slab, external}}} - \frac{w}{2}$$

where:

$A_{\text{slab,internal}}$ is the area of the *slab-on-ground floor* that is part of the *thermal envelope*, measured using overall internal dimensions (including the thickness of any internal partitions) between the interior surfaces of the walls that form the thermal envelope ($m^2$); and

$P_{\text{slab,internal}}$ is the perimeter of the *slab-on-ground floor* that is part of the *thermal envelope*, measured using overall internal dimensions (including the thickness of any internal partitions) along the interior surfaces of the walls that form the *thermal envelope*, including the length of any wall(s) between *conditioned spaces* and *unconditioned spaces* (m).

$A_{\text{slab,external}}$ is the area of the *slab-on-ground floor* that is part of the *thermal envelope*, measured between the exterior vertical edges of the slab beneath *external walls* and the unconditioned edges of any wall(s) between *conditioned spaces* and *unconditioned spaces* ($m^2$); and

$P_{\text{slab,external}}$ is the perimeter of the *slab-on-ground floor* that is part of the *thermal envelope*, measured along the exterior vertical edges of the slab beneath *external walls* and including the length of any wall(s) between *conditioned spaces* and *unconditioned spaces* (m); and

w is the horizontal distance between the outermost exterior concrete slab edge and the interior surface of the *external wall* (m).

# Thermal resistance of slab-on-ground floors

COMMENT:

1. Where the *external walls* do not have masonry veneer cladding, w is the same as the 'Effective thickness of *external walls* on slab' in Table E.1.2.1A – Table E.1.2.1X. However, where the *external walls* have masonry veneer cladding, w is to be determined from the exterior concrete slab edge at the bottom of the step-down, whereas the 'Effective thickness of *external walls* on slab' in Table E.1.2.1A – Table E.1.2.1X is to be determined from the concrete slab edge at floor level.
2. When determining the slab area-to-perimeter ratio, any parts of the *slab-on-ground floor* that are not part of the *thermal envelope* (such as the floor of patios, porches, attached garages or storage areas) are treated as if they were not present.
3. Where an area of the *slab-on-ground floor* is not part of the *thermal envelope* and completely separates other areas that are part of the *thermal envelope*, each of these areas is treated as if they were a separate *slab-on-ground floor*. An example is the *slab-on-ground floor* of a *building* that includes an *unconditioned* **industrial** warehouse and two *conditioned* **commercial** office spaces that are attached on opposite sides of the *building*. In this example only the areas of the *slab-on-ground floor* under the office spaces are part of the *thermal envelope*. Because these areas are not adjoining, they are treated as if they were separate *slab-on-ground floors*, with the slab area under the *unconditioned* **industrial** warehouse treated as if it was not present.

E.1.2.3 Where vertical edge insulation does not cover the entire perimeter of the part of a *slab-on-ground floor* that is part of the *thermal envelope*, the *construction R-value* may be determined using Equation E.3.

$$\text{Equation E.3: } R_{floor} = \frac{1}{\frac{f_{no\ edge\ ins}}{R_{floor,\ no\ edge\ ins}} + \frac{\left(1 - f_{no\ edge\ ins}\right)}{R_{floor,\ with\ edge\ ins}}}$$

where:

$R_{floor}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$); and

$f_{no\ edge\ ins}$ is the fraction of $P_{slab,internal}$ or $P_{slab,external}$ (as defined in Paragraph E.1.2.2) that has no vertical edge insulation; and

$R_{floor,\ no\ edge\ ins}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* has no vertical edge insulation; and

$R_{floor,\ with\ edge\ ins}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire perimeter of the *slab-on-ground floor* that is part of the *thermal envelope* has vertical edge insulation installed along the walls that form the *thermal envelope*, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*.

COMMENT: Examples of where Paragraph E.1.2.3 applies are where there is no vertical edge insulation between conditioned and unconditioned parts of a *slab-on-ground floor* such as between the parts beneath an office space and beneath an attached warehouse, or where there is no vertical slab edge insulation underneath wall openings for windows or doors.

# Thermal resistance of slab-on-ground floors

E.1.2.4 Where a *building* has a mix of different wall types along the perimeter of a *slab-on-ground floor* that is part of the *thermal envelope*, the *construction R-value* may be determined using Equation E.4.

Equation E.4: $$R_{floor} = \frac{1}{\frac{f_{masonry}}{R_{floor,\ masonry\ ven}} + \frac{(1 - f_{masonry\ ven})}{R_{floor,\ other}}}$$

where:

$R_{floor}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$); and

$f_{masonry\ ven}$ is the fraction of $P_{slab,internal}$ or $P_{slab,external}$ (as defined in Paragraph E.1.2.2) that has walls with masonry veneer cladding; and

$R_{floor,\ masonry\ ven}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* that is part of the *thermal envelope* has walls with masonry veneer cladding, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*; and

$R_{floor,\ other}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire perimeter of the *slab-on-ground floor* that is part of the *thermal envelope* has walls with claddings other than masonry veneer, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*.

E.1.2.5 Where a *building* has a mix of different wall types along the perimeter of a *slab-on-ground floor*, and vertical edge insulation that does not cover the entire perimeter of the part of a *slab-on-ground floor* that is part of the *thermal envelope,* the *construction R-value* may be determined using Equation E.5.

Equation E.5:

$$R_{floor} = \frac{1}{\frac{f_{no\ edge\ ins,\ masonry\ ven}}{R_{floor,\ no\ edge\ ins,\ masonry\ ven}} + \frac{f_{with\ edge\ ins,\ masonry\ ven}}{R_{floor,\ with\ edge\ ins,\ masonry\ ven}} + \frac{f_{no\ edge\ ins,\ other}}{R_{floor,\ no\ edge\ ins,\ other}} + \frac{f_{with\ edge\ ins,\ other}}{R_{floor,\ with\ edge\ ins,\ other}}}$$

where:

$R_{floor}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$); and

$f_{no\ edge\ ins,masonry\ ven}$ is the fraction of $P_{slab,internal}$ or $P_{slab,external}$ (as defined in Paragraph E.1.2.2) that has no vertical edge insulation and has walls with masonry veneer cladding; and

$R_{floor,\ no\ edge\ ins,masonry\ ven}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* that is part of the *thermal envelope* has no vertical edge insulation and has walls with masonry veneer cladding, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*; and

$f_{with\ edge\ ins,masonry\ ven}$ is the fraction of $P_{slab,internal}$ or $P_{slab,external}$ (as defined in Paragraph E.1.2.2) that has vertical edge insulation and has walls with masonry veneer cladding; and

$R_{floor,\ with\ edge\ ins,masonry\ ven}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* that is part of the *thermal envelope* has vertical edge insulation and has walls with masonry veneer cladding, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*; and

$f_{no\ edge\ ins,other}$ is the fraction of $P_{slab,internal}$ or $P_{slab,external}$ (as defined in Paragraph E.1.2.2) that has no vertical edge insulation and has walls with claddings other than masonry veneer; and

$R_{floor,\ no\ edge\ ins,other}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2 \cdot K/W$) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* that is part of the *thermal envelope* has no vertical edge insulation and has walls with

claddings other than masonry veneer, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*; and

$f_{\text{with edge ins,other}}$ is the fraction of $P_{\text{slab,internal}}$ or $P_{\text{slab,external}}$ (as defined in Paragraph E.1.2.2) that has vertical edge insulation and has walls with claddings other than masonry veneer; and

$R_{\text{floor, with edge ins,other}}$ is the *construction R-value* of the *slab-on-ground floor* ($m^2$·K/W) determined from the relevant performance table listed in Table E.1.2.1, assuming the entire *slab-on-ground floor* that is part of the *thermal envelope* has vertical edge insulation and has walls with claddings other than masonry veneer, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1: Overview of construction R-value tables for selected slab-on-ground floor scenarios**
Paragraph E.1.2.1

| Floor type | Floor insulation type | External wall type | Table number |
|---|---|---|---|
| Concrete raft foundation | None | Masonry veneer | Table E.1.2.1A |
| | None | Other | Table E.1.2.1B |
| | Vertical edge R1.0 | Masonry veneer | Table E.1.2.1C |
| | Vertical edge R1.0 | Other | Table E.1.2.1D |
| Slab floor | None | Masonry veneer | Table E.1.2.1E |
| | None | Other | Table E.1.2.1F |
| | Vertical edge R1.0 | Masonry veneer | Table E.1.2.1G |
| | Vertical edge R1.0 | Other | Table E.1.2.1H |
| | Underslab 1.2 m strip R1.2 | Masonry veneer | Table E.1.2.1I |
| | Underslab 1.2 m strip R1.2 | Other | Table E.1.2.1J |
| | Underslab 1.2 m strip R2.4 | Masonry veneer | Table E.1.2.1K |
| | Underslab 1.2 m strip R2.4 | Other | Table E.1.2.1L |
| | Underslab full cover R1.2 | Masonry veneer | Table E.1.2.1M |
| | Underslab full cover R1.2 | Other | Table E.1.2.1N |
| | Underslab full cover R2.4 | Masonry veneer | Table E.1.2.1O |
| | Underslab full cover R2.4 | Other | Table E.1.2.1P |
| | Vertical edge R1.0 and Underslab 1.2 m strip R1.2 | Masonry veneer | Table E.1.2.1Q |
| | Vertical edge R1.0 and Underslab 1.2 m strip R1.2 | Other | Table E.1.2.1R |
| | Vertical edge R1.0 and Underslab 1.2 m strip R2.4 | Masonry veneer | Table E.1.2.1S |
| | Vertical edge R1.0 and Underslab 1.2 m strip R2.4 | Other | Table E.1.2.1T |
| | Vertical edge R1.0 and Underslab full cover R1.2 | Masonry veneer | Table E.1.2.1U |
| | Vertical edge R1.0 and Underslab full cover R1.2 | Other | Table E.1.2.1V |
| | Vertical edge R1.0 and Underslab full cover R2.4 | Masonry veneer | Table E.1.2.1W |
| | Vertical edge R1.0 and Underslab full cover R2.4 | Other | Table E.1.2.1X |

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1A: Construction R-values for concrete raft foundation floors without insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type[1] | Slab area-to-perimeter ratio[2] | Effective wall thickness[3] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| No vertical edge insulation | 0.6 | R0.8 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 0.8 | R0.9 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.0 | R0.9 | R1.0 | R1.0 | R1.0 | R1.0 |
| | 1.2 | R1.0 | R1.1 | R1.1 | R1.1 | R1.1 |
| | 1.4 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 1.6 | R1.2 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 1.8 | R1.3 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.0 | R1.3 | R1.4 | R1.4 | R1.4 | R1.5 |
| | 2.2 | R1.4 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 2.4 | R1.5 | R1.6 | R1.6 | R1.6 | R1.7 |
| | 2.6 | R1.6 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 2.8 | R1.7 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 3.0 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.2 | R1.8 | R1.9 | R1.9 | R2.0 | R2.0 |
| | 3.4 | R1.9 | R1.9 | R2.0 | R2.0 | R2.0 |
| | 3.6 | R2.0 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 3.8 | R2.0 | R2.1 | R2.1 | R2.2 | R2.2 |
| | 4.0 | R2.1 | R2.1 | R2.2 | R2.2 | R2.3 |
| | 5.0 | R2.5 | R2.5 | R2.6 | R2.6 | R2.7 |
| | 6.0 | R2.8 | R2.9 | R2.9 | R3.0 | R3.0 |
| | 7.0 | R3.2 | R3.3 | R3.3 | R3.4 | R3.4 |
| | 8.0 | R3.6 | R3.6 | R3.7 | R3.8 | R3.8 |
| | 9.0 | R3.9 | R4.0 | R4.1 | R4.2 | R4.2 |
| | ≥ 10.0 | R4.3 | R4.4 | R4.4 | R4.5 | R4.6 |

**Notes:**

(1) This table also applies to concrete raft foundation floors with pods made of foam insulation material.

(2) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(3) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1B: Construction R-values for concrete raft foundation floors without insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type[1] | Slab area-to-perimeter ratio[2] | Effective wall thickness[3] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[3] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| No vertical edge insulation | 0.6 | R0.6 | R0.6 | R0.6 | R0.7 | R0.7 |
| | 0.8 | R0.7 | R0.7 | R0.7 | R0.8 | R0.8 |
| | 1.0 | R0.8 | R0.8 | R0.8 | R0.8 | R0.9 |
| | 1.2 | R0.9 | R0.9 | R0.9 | R0.9 | R1.0 |
| | 1.4 | R0.9 | R1.0 | R1.0 | R1.0 | R1.0 |
| | 1.6 | R1.0 | R1.0 | R1.1 | R1.1 | R1.1 |
| | 1.8 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 2.0 | R1.2 | R1.2 | R1.3 | R1.3 | R1.4 |
| | 2.2 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.4 | R1.3 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.6 | R1.4 | R1.4 | R1.5 | R1.5 | R1.6 |
| | 2.8 | R1.4 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 3.0 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.2 | R1.6 | R1.6 | R1.7 | R1.8 | R1.8 |
| | 3.4 | R1.6 | R1.7 | R1.7 | R1.8 | R1.9 |
| | 3.6 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.8 | R1.8 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 4.0 | R1.9 | R1.9 | R2.0 | R2.0 | R2.1 |
| | 5.0 | R2.2 | R2.3 | R2.3 | R2.4 | R2.5 |
| | 6.0 | R2.5 | R2.6 | R2.7 | R2.7 | R2.8 |
| | 7.0 | R2.8 | R2.9 | R3.0 | R3.1 | R3.2 |
| | 8.0 | R3.2 | R3.3 | R3.3 | R3.5 | R3.5 |
| | 9.0 | R3.5 | R3.6 | R3.7 | R3.8 | R3.9 |
| | ≥ 10.0 | R3.9 | R4.0 | R4.1 | R4.2 | R4.3 |

**Notes:**

(1) This table also applies to concrete raft foundation floors with pods made of foam insulation material.

(2) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(3) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1C: Construction R-values for concrete raft foundation floors with R1.0 vertical edge insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.8 | R0.8 | R0.9 | R0.9 | R0.9 |
| vertical | 0.8 | R0.9 | R0.9 | R1.0 | R1.0 | R1.0 |
| edge | 1.0 | R1.0 | R1.0 | R1.1 | R1.1 | R1.1 |
| insulation[3] | 1.2 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 1.4 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.6 | R1.3 | R1.3 | R1.3 | R1.3 | R1.4 |
| | 1.8 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.0 | R1.4 | R1.5 | R1.5 | R1.5 | R1.5 |
| | 2.2 | R1.5 | R1.6 | R1.6 | R1.6 | R1.6 |
| | 2.4 | R1.6 | R1.7 | R1.7 | R1.7 | R1.7 |
| | 2.6 | R1.7 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 2.8 | R1.8 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.0 | R1.9 | R1.9 | R1.9 | R2.0 | R2.0 |
| | 3.2 | R2.0 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 3.4 | R2.0 | R2.0 | R2.1 | R2.1 | R2.1 |
| | 3.6 | R2.1 | R2.1 | R2.2 | R2.2 | R2.2 |
| | 3.8 | R2.2 | R2.2 | R2.2 | R2.3 | R2.3 |
| | 4.0 | R2.2 | R2.3 | R2.3 | R2.3 | R2.4 |
| | 5.0 | R2.6 | R2.7 | R2.7 | R2.8 | R2.8 |
| | 6.0 | R3.0 | R3.0 | R3.1 | R3.1 | R3.2 |
| | 7.0 | R3.4 | R3.4 | R3.5 | R3.5 | R3.6 |
| | 8.0 | R3.8 | R3.8 | R3.9 | R3.9 | R4.0 |
| | 9.0 | R4.2 | R4.2 | R4.3 | R4.4 | R4.4 |
| | ≥ 10.0 | R4.5 | R4.6 | R4.7 | R4.8 | R4.8 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an R-value of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab / wall footing, extending from the outermost top edge down to the bottom of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1D: Construction R-values for concrete raft foundation floors with R1.0 vertical edge insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 vertical edge insulation[3] | 0.6 | R0.8 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 0.8 | R0.9 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.0 | R1.0 | R1.0 | R1.0 | R1.0 | R1.0 |
| | 1.2 | R1.1 | R1.1 | R1.1 | R1.1 | R1.1 |
| | 1.4 | R1.2 | R1.2 | R1.2 | R1.2 | R1.2 |
| | 1.6 | R1.3 | R1.3 | R1.3 | R1.3 | R1.3 |
| | 1.8 | R1.4 | R1.4 | R1.4 | R1.4 | R1.4 |
| | 2.0 | R1.5 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 2.2 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 2.4 | R1.6 | R1.6 | R1.7 | R1.7 | R1.7 |
| | 2.6 | R1.7 | R1.8 | R1.8 | R1.8 | R1.8 |
| | 2.8 | R1.8 | R1.8 | R1.8 | R1.8 | R1.9 |
| | 3.0 | R1.9 | R1.9 | R1.9 | R1.9 | R2.0 |
| | 3.2 | R2.0 | R2.0 | R2.0 | R2.0 | R2.1 |
| | 3.4 | R2.0 | R2.0 | R2.1 | R2.1 | R2.1 |
| | 3.6 | R2.1 | R2.1 | R2.1 | R2.2 | R2.2 |
| | 3.8 | R2.2 | R2.2 | R2.2 | R2.3 | R2.3 |
| | 4.0 | R2.3 | R2.3 | R2.3 | R2.3 | R2.4 |
| | 5.0 | R2.6 | R2.7 | R2.7 | R2.7 | R2.8 |
| | 6.0 | R3.0 | R3.1 | R3.1 | R3.1 | R3.2 |
| | 7.0 | R3.4 | R3.4 | R3.5 | R3.5 | R3.6 |
| | 8.0 | R3.8 | R3.8 | R3.9 | R3.9 | R4.0 |
| | 9.0 | R4.2 | R4.2 | R4.3 | R4.3 | R4.4 |
| | ≥ 10.0 | R4.6 | R4.6 | R4.7 | R4.8 | R4.8 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab / wall footing, extending from the outermost top edge down to the bottom of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1E: Construction R-values for slab-floors without insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| No insulation | 0.6 | R0.5 | R0.5 | R0.5 | R0.5 | R0.5 |
| | 0.8 | R0.5 | R0.6 | R0.6 | R0.6 | R0.6 |
| | 1.0 | R0.6 | R0.6 | R0.6 | R0.7 | R0.7 |
| | 1.2 | R0.7 | R0.7 | R0.7 | R0.7 | R0.8 |
| | 1.4 | R0.7 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 1.6 | R0.8 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.8 | R0.9 | R0.9 | R1.0 | R1.0 | R1.0 |
| | 2.0 | R1.0 | R1.0 | R1.0 | R1.1 | R1.1 |
| | 2.2 | R1.0 | R1.1 | R1.1 | R1.1 | R1.2 |
| | 2.4 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 2.6 | R1.2 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 2.8 | R1.2 | R1.3 | R1.3 | R1.3 | R1.4 |
| | 3.0 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 3.2 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 3.4 | R1.4 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 3.6 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 3.8 | R1.6 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 4.0 | R1.6 | R1.7 | R1.7 | R1.7 | R1.8 |
| | 5.0 | R1.9 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 6.0 | R2.3 | R2.3 | R2.4 | R2.4 | R2.5 |
| | 7.0 | R2.6 | R2.6 | R2.7 | R2.8 | R2.8 |
| | 8.0 | R2.9 | R3.0 | R3.0 | R3.1 | R3.2 |
| | 9.0 | R3.2 | R3.3 | R3.4 | R3.5 | R3.5 |
| | ≥ 10.0 | R3.5 | R3.6 | R3.7 | R3.8 | R3.9 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1F: Construction R-values for slab-floors without insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| No insulation | 0.6 | R0.5 | R0.5 | R0.5 | R0.5 | R0.5 |
| | 0.8 | R0.5 | R0.6 | R0.6 | R0.6 | R0.6 |
| | 1.0 | R0.6 | R0.6 | R0.6 | R0.7 | R0.7 |
| | 1.2 | R0.7 | R0.7 | R0.7 | R0.7 | R0.8 |
| | 1.4 | R0.7 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 1.6 | R0.8 | R0.8 | R0.8 | R0.9 | R0.9 |
| | 1.8 | R0.8 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 2.0 | R0.9 | R0.9 | R0.9 | R1.0 | R1.0 |
| | 2.2 | R0.9 | R1.0 | R1.0 | R1.1 | R1.1 |
| | 2.4 | R1.0 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 2.6 | R1.1 | R1.1 | R1.1 | R1.2 | R1.2 |
| | 2.8 | R1.1 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 3.0 | R1.2 | R1.2 | R1.3 | R1.3 | R1.4 |
| | 3.2 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 3.4 | R1.3 | R1.3 | R1.4 | R1.4 | R1.5 |
| | 3.6 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 3.8 | R1.4 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 4.0 | R1.5 | R1.5 | R1.6 | R1.6 | R1.7 |
| | 5.0 | R1.8 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 6.0 | R2.1 | R2.1 | R2.2 | R2.3 | R2.3 |
| | 7.0 | R2.4 | R2.4 | R2.5 | R2.6 | R2.7 |
| | 8.0 | R2.7 | R2.7 | R2.8 | R2.9 | R3.0 |
| | 9.0 | R2.9 | R3.0 | R3.1 | R3.2 | R3.3 |
| | ≥ 10.0 | R3.3 | R3.4 | R3.4 | R3.6 | R3.7 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1G: Construction R-values for slab-floors with R1.0 vertical edge insulation without underslab insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.5 | R0.5 | R0.6 | R0.6 | R0.6 |
| vertical | 0.8 | R0.6 | R0.6 | R0.6 | R0.7 | R0.7 |
| edge | 1.0 | R0.7 | R0.7 | R0.7 | R0.7 | R0.8 |
| insulation[3] | 1.2 | R0.8 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 1.4 | R0.8 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.6 | R0.9 | R0.9 | R1.0 | R1.0 | R1.0 |
| | 1.8 | R1.0 | R1.0 | R1.0 | R1.1 | R1.1 |
| | 2.0 | R1.1 | R1.1 | R1.1 | R1.1 | R1.2 |
| | 2.2 | R1.1 | R1.2 | R1.2 | R1.2 | R1.2 |
| | 2.4 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 2.6 | R1.3 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.8 | R1.3 | R1.4 | R1.4 | R1.4 | R1.5 |
| | 3.0 | R1.4 | R1.4 | R1.5 | R1.5 | R1.5 |
| | 3.2 | R1.5 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 3.4 | R1.6 | R1.6 | R1.6 | R1.6 | R1.7 |
| | 3.6 | R1.6 | R1.6 | R1.7 | R1.7 | R1.7 |
| | 3.8 | R1.7 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 4.0 | R1.8 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 5.0 | R2.1 | R2.1 | R2.2 | R2.2 | R2.2 |
| | 6.0 | R2.4 | R2.5 | R2.5 | R2.6 | R2.6 |
| | 7.0 | R2.8 | R2.8 | R2.9 | R2.9 | R3.0 |
| | 8.0 | R3.1 | R3.2 | R3.2 | R3.3 | R3.3 |
| | 9.0 | R3.5 | R3.5 | R3.6 | R3.7 | R3.7 |
| | ≥ 10.0 | R3.8 | R3.9 | R3.9 | R4.0 | R4.1 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab / wall footing, extending from the outermost top edge down to the bottom of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1H: Construction R-values for slab-floors with R1.0 vertical edge insulation without underslab insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 vertical edge insulation[3] | 0.6 | R0.6 | R0.6 | R0.6 | R0.6 | R0.6 |
| | 0.8 | R0.7 | R0.7 | R0.7 | R0.7 | R0.7 |
| | 1.0 | R0.8 | R0.8 | R0.8 | R0.8 | R0.8 |
| | 1.2 | R0.9 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.4 | R0.9 | R0.9 | R0.9 | R0.9 | R0.9 |
| | 1.6 | R1.0 | R1.0 | R1.0 | R1.0 | R1.0 |
| | 1.8 | R1.0 | R1.1 | R1.1 | R1.1 | R1.1 |
| | 2.0 | R1.1 | R1.1 | R1.1 | R1.2 | R1.2 |
| | 2.2 | R1.2 | R1.2 | R1.2 | R1.2 | R1.3 |
| | 2.4 | R1.3 | R1.3 | R1.3 | R1.3 | R1.3 |
| | 2.6 | R1.3 | R1.4 | R1.4 | R1.4 | R1.4 |
| | 2.8 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 3.0 | R1.5 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 3.2 | R1.5 | R1.6 | R1.6 | R1.6 | R1.6 |
| | 3.4 | R1.6 | R1.6 | R1.7 | R1.7 | R1.7 |
| | 3.6 | R1.7 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 3.8 | R1.8 | R1.8 | R1.8 | R1.8 | R1.9 |
| | 4.0 | R1.8 | R1.8 | R1.9 | R1.9 | R1.9 |
| | 5.0 | R2.2 | R2.2 | R2.2 | R2.3 | R2.3 |
| | 6.0 | R2.5 | R2.5 | R2.6 | R2.6 | R2.7 |
| | 7.0 | R2.9 | R2.9 | R2.9 | R3.0 | R3.0 |
| | 8.0 | R3.2 | R3.3 | R3.3 | R3.4 | R3.4 |
| | 9.0 | R3.6 | R3.6 | R3.7 | R3.7 | R3.8 |
| | ≥ 10.0 | R3.9 | R4.0 | R4.0 | R4.1 | R4.2 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab / wall footing, extending from the outermost top edge down to the bottom of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1I: Construction R-values for slab-floors with a 1.2 m wide strip of R1.2 underslab insulation along the slab perimeter where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| 1.2 m wide strip of R1.2 underslab insulation[3] | 0.6 | R0.8 | R0.9 | R0.9 | R1.0 | R1.0 |
| | 0.8 | R1.0 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 1.0 | R1.1 | R1.1 | R1.1 | R1.2 | R1.2 |
| | 1.2 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 1.4 | R1.1 | R1.1 | R1.2 | R1.2 | R1.2 |
| | 1.6 | R1.1 | R1.2 | R1.2 | R1.2 | R1.2 |
| | 1.8 | R1.2 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 2.0 | R1.2 | R1.3 | R1.3 | R1.3 | R1.4 |
| | 2.2 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 2.4 | R1.3 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.6 | R1.4 | R1.4 | R1.5 | R1.5 | R1.6 |
| | 2.8 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 3.0 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.2 | R1.6 | R1.6 | R1.7 | R1.7 | R1.8 |
| | 3.4 | R1.7 | R1.7 | R1.8 | R1.8 | R1.8 |
| | 3.6 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.8 | R1.8 | R1.9 | R1.9 | R2.0 | R2.0 |
| | 4.0 | R1.9 | R1.9 | R2.0 | R2.0 | R2.1 |
| | 5.0 | R2.2 | R2.3 | R2.3 | R2.4 | R2.4 |
| | 6.0 | R2.5 | R2.6 | R2.7 | R2.7 | R2.8 |
| | 7.0 | R2.9 | R3.0 | R3.0 | R3.1 | R3.2 |
| | 8.0 | R3.2 | R3.3 | R3.4 | R3.5 | R3.5 |
| | 9.0 | R3.6 | R3.7 | R3.8 | R3.9 | R3.9 |
| | ≥ 10.0 | R3.9 | R4.0 | R4.1 | R4.2 | R4.3 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1J: Construction R-values for slab-floors with a 1.2 m wide strip of R1.2 underslab insulation along the slab perimeter where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| 1.2 m wide strip of R1.2 underslab insulation[3] | 0.6 | R0.7 | R0.7 | R0.8 | R0.9 | R1.0 |
| | 0.8 | R0.8 | R0.9 | R1.0 | R1.1 | R1.1 |
| | 1.0 | R0.9 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 1.2 | R1.0 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 1.4 | R1.0 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 1.6 | R1.0 | R1.0 | R1.1 | R1.1 | R1.2 |
| | 1.8 | R1.0 | R1.1 | R1.1 | R1.2 | R1.2 |
| | 2.0 | R1.1 | R1.1 | R1.2 | R1.2 | R1.3 |
| | 2.2 | R1.1 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 2.4 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.6 | R1.3 | R1.3 | R1.4 | R1.4 | R1.5 |
| | 2.8 | R1.3 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 3.0 | R1.4 | R1.4 | R1.5 | R1.6 | R1.6 |
| | 3.2 | R1.4 | R1.5 | R1.6 | R1.6 | R1.7 |
| | 3.4 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.6 | R1.6 | R1.6 | R1.7 | R1.8 | R1.8 |
| | 3.8 | R1.6 | R1.7 | R1.7 | R1.8 | R1.9 |
| | 4.0 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 5.0 | R2.0 | R2.1 | R2.1 | R2.2 | R2.3 |
| | 6.0 | R2.3 | R2.4 | R2.5 | R2.6 | R2.6 |
| | 7.0 | R2.6 | R2.7 | R2.8 | R2.9 | R3.0 |
| | 8.0 | R2.9 | R3.1 | R3.1 | R3.3 | R3.4 |
| | 9.0 | R3.3 | R3.4 | R3.5 | R3.6 | R3.7 |
| | ≥ 10.0 | R3.6 | R3.7 | R3.8 | R4.0 | R4.1 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1K: Construction R-values for slab-floors with a 1.2 m wide strip of R2.4 underslab insulation along the slab perimeter where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| 1.2 m wide strip of R2.4 underslab insulation[3] | 0.6 | R0.9 | R1.0 | R1.1 | R1.2 | R1.3 |
| | 0.8 | R1.1 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 1.0 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.2 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.4 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.6 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.8 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.0 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 2.2 | R1.3 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.4 | R1.4 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 2.6 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 2.8 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.0 | R1.6 | R1.6 | R1.7 | R1.7 | R1.8 |
| | 3.2 | R1.7 | R1.7 | R1.8 | R1.8 | R1.8 |
| | 3.4 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.6 | R1.8 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 3.8 | R1.9 | R1.9 | R2.0 | R2.0 | R2.1 |
| | 4.0 | R1.9 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 5.0 | R2.3 | R2.3 | R2.4 | R2.5 | R2.5 |
| | 6.0 | R2.6 | R2.7 | R2.7 | R2.8 | R2.9 |
| | 7.0 | R3.0 | R3.0 | R3.1 | R3.2 | R3.3 |
| | 8.0 | R3.3 | R3.4 | R3.5 | R3.6 | R3.6 |
| | 9.0 | R3.7 | R3.8 | R3.9 | R4.0 | R4.0 |
| | ≥ 10.0 | R4.0 | R4.1 | R4.2 | R4.4 | R4.4 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1L: Construction R-values for slab-floors with a 1.2 m wide strip of R2.4 underslab insulation along the slab perimeter where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| 1.2 m wide strip of R2.4 underslab insulation[3] | 0.6 | R0.7 | R0.8 | R0.9 | R1.0 | R1.2 |
| | 0.8 | R0.9 | R1.0 | R1.1 | R1.2 | R1.3 |
| | 1.0 | R1.1 | R1.1 | R1.2 | R1.2 | R1.3 |
| | 1.2 | R1.1 | R1.1 | R1.2 | R1.3 | R1.3 |
| | 1.4 | R1.1 | R1.1 | R1.2 | R1.3 | R1.3 |
| | 1.6 | R1.1 | R1.1 | R1.2 | R1.2 | R1.3 |
| | 1.8 | R1.1 | R1.1 | R1.2 | R1.3 | R1.3 |
| | 2.0 | R1.1 | R1.2 | R1.3 | R1.3 | R1.4 |
| | 2.2 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 2.4 | R1.2 | R1.3 | R1.4 | R1.4 | R1.5 |
| | 2.6 | R1.3 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.8 | R1.4 | R1.4 | R1.5 | R1.6 | R1.6 |
| | 3.0 | R1.4 | R1.5 | R1.6 | R1.6 | R1.7 |
| | 3.2 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.4 | R1.5 | R1.6 | R1.7 | R1.8 | R1.8 |
| | 3.6 | R1.6 | R1.7 | R1.7 | R1.8 | R1.9 |
| | 3.8 | R1.7 | R1.7 | R1.8 | R1.9 | R2.0 |
| | 4.0 | R1.7 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 5.0 | R2.0 | R2.1 | R2.2 | R2.3 | R2.4 |
| | 6.0 | R2.4 | R2.5 | R2.5 | R2.7 | R2.7 |
| | 7.0 | R2.7 | R2.8 | R2.9 | R3.0 | R3.1 |
| | 8.0 | R3.0 | R3.1 | R3.2 | R3.4 | R3.5 |
| | 9.0 | R3.3 | R3.5 | R3.6 | R3.7 | R3.8 |
| | ≥ 10.0 | R3.7 | R3.8 | R3.9 | R4.1 | R4.2 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1M: Construction R-values for slab-floors with R1.2 full cover underslab insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.2 full cover underslab insulation[3] | 0.6 | R0.8 | R0.8 | R0.9 | R0.9 | R1.0 |
| | 0.8 | R0.9 | R1.0 | R1.0 | R1.1 | R1.2 |
| | 1.0 | R1.0 | R1.1 | R1.1 | R1.2 | R1.3 |
| | 1.2 | R1.1 | R1.2 | R1.3 | R1.3 | R1.4 |
| | 1.4 | R1.2 | R1.3 | R1.4 | R1.4 | R1.5 |
| | 1.6 | R1.3 | R1.4 | R1.5 | R1.6 | R1.6 |
| | 1.8 | R1.4 | R1.5 | R1.6 | R1.7 | R1.7 |
| | 2.0 | R1.5 | R1.6 | R1.7 | R1.8 | R1.8 |
| | 2.2 | R1.6 | R1.7 | R1.8 | R1.9 | R1.9 |
| | 2.4 | R1.7 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 2.6 | R1.8 | R1.9 | R1.9 | R2.0 | R2.1 |
| | 2.8 | R1.9 | R2.0 | R2.0 | R2.1 | R2.2 |
| | 3.0 | R2.0 | R2.0 | R2.1 | R2.2 | R2.3 |
| | 3.2 | R2.0 | R2.1 | R2.2 | R2.3 | R2.4 |
| | 3.4 | R2.1 | R2.2 | R2.3 | R2.4 | R2.4 |
| | 3.6 | R2.2 | R2.3 | R2.4 | R2.5 | R2.5 |
| | 3.8 | R2.3 | R2.4 | R2.4 | R2.5 | R2.6 |
| | 4.0 | R2.3 | R2.4 | R2.5 | R2.6 | R2.7 |
| | 5.0 | R2.7 | R2.8 | R2.9 | R3.0 | R3.1 |
| | 6.0 | R3.1 | R3.2 | R3.3 | R3.4 | R3.5 |
| | 7.0 | R3.5 | R3.6 | R3.7 | R3.8 | R3.9 |
| | 8.0 | R3.8 | R4.0 | R4.1 | R4.2 | R4.3 |
| | 9.0 | R4.2 | R4.3 | R4.5 | R4.6 | R4.7 |
| | ≥ 10.0 | R4.6 | R4.7 | R4.9 | R5.0 | R5.2 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1N: Construction R-values for slab-floors with R1.2 full cover underslab insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.2 full cover underslab insulation[3] | 0.6 | R0.6 | R0.7 | R0.7 | R0.8 | R0.9 |
| | 0.8 | R0.7 | R0.8 | R0.9 | R1.0 | R1.1 |
| | 1.0 | R0.8 | R0.9 | R1.0 | R1.1 | R1.2 |
| | 1.2 | R0.9 | R1.0 | R1.1 | R1.2 | R1.3 |
| | 1.4 | R1.0 | R1.1 | R1.2 | R1.3 | R1.4 |
| | 1.6 | R1.1 | R1.2 | R1.3 | R1.4 | R1.5 |
| | 1.8 | R1.2 | R1.3 | R1.4 | R1.5 | R1.6 |
| | 2.0 | R1.3 | R1.4 | R1.5 | R1.6 | R1.7 |
| | 2.2 | R1.4 | R1.5 | R1.6 | R1.7 | R1.8 |
| | 2.4 | R1.5 | R1.6 | R1.7 | R1.8 | R1.9 |
| | 2.6 | R1.5 | R1.6 | R1.7 | R1.9 | R1.9 |
| | 2.8 | R1.6 | R1.7 | R1.8 | R2.0 | R2.0 |
| | 3.0 | R1.7 | R1.8 | R1.9 | R2.0 | R2.1 |
| | 3.2 | R1.8 | R1.9 | R2.0 | R2.1 | R2.2 |
| | 3.4 | R1.8 | R1.9 | R2.0 | R2.2 | R2.3 |
| | 3.6 | R1.9 | R2.0 | R2.1 | R2.3 | R2.4 |
| | 3.8 | R2.0 | R2.1 | R2.2 | R2.3 | R2.4 |
| | 4.0 | R2.1 | R2.2 | R2.3 | R2.4 | R2.5 |
| | 5.0 | R2.4 | R2.5 | R2.6 | R2.8 | R2.9 |
| | 6.0 | R2.7 | R2.9 | R3.0 | R3.2 | R3.3 |
| | 7.0 | R3.1 | R3.2 | R3.4 | R3.6 | R3.7 |
| | 8.0 | R3.4 | R3.6 | R3.7 | R3.9 | R4.1 |
| | 9.0 | R3.8 | R4.0 | R4.1 | R4.3 | R4.5 |
| | ≥ 10.0 | R4.1 | R4.3 | R4.5 | R4.7 | R4.9 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1O: Construction R-values for slab-floors with R2.4 full cover underslab insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R2.4 full cover underslab insulation[3] | 0.6 | R0.9 | R0.9 | R1.0 | R1.1 | R1.2 |
| | 0.8 | R1.0 | R1.1 | R1.2 | R1.4 | R1.5 |
| | 1.0 | R1.2 | R1.3 | R1.4 | R1.5 | R1.6 |
| | 1.2 | R1.4 | R1.5 | R1.6 | R1.7 | R1.8 |
| | 1.4 | R1.5 | R1.6 | R1.7 | R1.8 | R2.0 |
| | 1.6 | R1.6 | R1.7 | R1.8 | R2.0 | R2.1 |
| | 1.8 | R1.7 | R1.8 | R2.0 | R2.1 | R2.2 |
| | 2.0 | R1.8 | R2.0 | R2.1 | R2.2 | R2.3 |
| | 2.2 | R2.0 | R2.1 | R2.2 | R2.4 | R2.5 |
| | 2.4 | R2.1 | R2.2 | R2.3 | R2.5 | R2.6 |
| | 2.6 | R2.2 | R2.3 | R2.4 | R2.6 | R2.7 |
| | 2.8 | R2.3 | R2.4 | R2.5 | R2.7 | R2.8 |
| | 3.0 | R2.4 | R2.5 | R2.6 | R2.8 | R2.9 |
| | 3.2 | R2.5 | R2.6 | R2.7 | R2.9 | R3.0 |
| | 3.4 | R2.6 | R2.7 | R2.8 | R3.0 | R3.1 |
| | 3.6 | R2.6 | R2.8 | R2.9 | R3.1 | R3.2 |
| | 3.8 | R2.7 | R2.9 | R3.0 | R3.2 | R3.3 |
| | 4.0 | R2.8 | R3.0 | R3.1 | R3.3 | R3.4 |
| | 5.0 | R3.2 | R3.4 | R3.5 | R3.7 | R3.8 |
| | 6.0 | R3.7 | R3.8 | R4.0 | R4.2 | R4.3 |
| | 7.0 | R4.1 | R4.2 | R4.4 | R4.6 | R4.7 |
| | 8.0 | R4.5 | R4.6 | R4.8 | R5.0 | R5.2 |
| | 9.0 | R4.9 | R5.1 | R5.2 | R5.5 | R5.6 |
| | ≥ 10.0 | R5.3 | R5.5 | R5.7 | R5.9 | R6.1 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1P: Construction R-values for slab-floors with R2.4 full cover underslab insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio(1) | Effective wall thickness(2) ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness(2) ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness(2) ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness(2) ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness(2) ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R2.4 full cover underslab insulation(3) | 0.6 | R0.6 | R0.7 | R0.8 | R0.9 | R1.1 |
| | 0.8 | R0.8 | R0.9 | R1.0 | R1.1 | R1.3 |
| | 1.0 | R0.9 | R1.0 | R1.1 | R1.3 | R1.5 |
| | 1.2 | R1.1 | R1.2 | R1.3 | R1.4 | R1.6 |
| | 1.4 | R1.2 | R1.3 | R1.4 | R1.6 | R1.8 |
| | 1.6 | R1.3 | R1.4 | R1.5 | R1.7 | R1.9 |
| | 1.8 | R1.4 | R1.5 | R1.7 | R1.9 | R2.0 |
| | 2.0 | R1.5 | R1.7 | R1.8 | R2.0 | R2.1 |
| | 2.2 | R1.6 | R1.8 | R1.9 | R2.1 | R2.2 |
| | 2.4 | R1.7 | R1.9 | R2.0 | R2.2 | R2.3 |
| | 2.6 | R1.8 | R2.0 | R2.1 | R2.3 | R2.4 |
| | 2.8 | R1.9 | R2.1 | R2.2 | R2.4 | R2.5 |
| | 3.0 | R2.0 | R2.1 | R2.3 | R2.5 | R2.6 |
| | 3.2 | R2.1 | R2.2 | R2.4 | R2.6 | R2.7 |
| | 3.4 | R2.2 | R2.3 | R2.5 | R2.7 | R2.8 |
| | 3.6 | R2.3 | R2.4 | R2.6 | R2.8 | R2.9 |
| | 3.8 | R2.3 | R2.5 | R2.7 | R2.9 | R3.0 |
| | 4.0 | R2.4 | R2.6 | R2.7 | R3.0 | R3.1 |
| | 5.0 | R2.8 | R3.0 | R3.2 | R3.4 | R3.6 |
| | 6.0 | R3.2 | R3.4 | R3.6 | R3.8 | R4.0 |
| | 7.0 | R3.6 | R3.8 | R4.0 | R4.2 | R4.4 |
| | 8.0 | R3.9 | R4.2 | R4.4 | R4.7 | R4.8 |
| | 9.0 | R4.3 | R4.5 | R4.8 | R5.1 | R5.3 |
| | ≥ 10.0 | R4.7 | R4.9 | R5.2 | R5.5 | R5.7 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1Q: Construction R-values for slab-floors with R1.0 vertical edge insulation and with a 1.2 m wide strip of R1.2 underslab insulation along the slab perimeter where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 vertical edge insulation [3] plus 1.2 m wide strip of R1.2 underslab insulation[4] | 0.6 | R0.9 | R0.9 | R1.0 | R1.1 | R1.1 |
| | 0.8 | R1.1 | R1.1 | R1.2 | R1.2 | R1.3 |
| | 1.0 | R1.2 | R1.2 | R1.2 | R1.3 | R1.3 |
| | 1.2 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.4 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.6 | R1.2 | R1.2 | R1.3 | R1.3 | R1.3 |
| | 1.8 | R1.3 | R1.3 | R1.3 | R1.3 | R1.4 |
| | 2.0 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 2.2 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.4 | R1.4 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 2.6 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 2.8 | R1.6 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 3.0 | R1.6 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 3.2 | R1.7 | R1.8 | R1.8 | R1.8 | R1.9 |
| | 3.4 | R1.8 | R1.8 | R1.9 | R1.9 | R1.9 |
| | 3.6 | R1.9 | R1.9 | R1.9 | R2.0 | R2.0 |
| | 3.8 | R1.9 | R2.0 | R2.0 | R2.0 | R2.1 |
| | 4.0 | R2.0 | R2.0 | R2.1 | R2.1 | R2.2 |
| | 5.0 | R2.3 | R2.4 | R2.4 | R2.5 | R2.5 |
| | 6.0 | R2.7 | R2.8 | R2.8 | R2.9 | R2.9 |
| | 7.0 | R3.1 | R3.1 | R3.2 | R3.3 | R3.3 |
| | 8.0 | R3.4 | R3.5 | R3.6 | R3.6 | R3.7 |
| | 9.0 | R3.8 | R3.9 | R3.9 | R4.0 | R4.1 |
| | ≥ 10.0 | R4.2 | R4.3 | R4.3 | R4.4 | R4.5 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1R: Construction R-values for slab-floors with R1.0 vertical edge insulation and with a 1.2 m wide strip of R1.2 underslab insulation along the slab perimeter where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.9 | R1.0 | R1.0 | R1.0 | R1.1 |
| vertical | 0.8 | R1.1 | R1.1 | R1.2 | R1.2 | R1.3 |
| edge | 1.0 | R1.2 | R1.3 | R1.3 | R1.3 | R1.3 |
| insulation [3] | 1.2 | R1.3 | R1.3 | R1.3 | R1.3 | R1.3 |
| plus | 1.4 | R1.3 | R1.3 | R1.3 | R1.3 | R1.3 |
| 1.2 m wide | 1.6 | R1.3 | R1.3 | R1.3 | R1.3 | R1.3 |
| strip of R1.2 | 1.8 | R1.3 | R1.3 | R1.3 | R1.4 | R1.4 |
| underslab | 2.0 | R1.4 | R1.4 | R1.4 | R1.4 | R1.5 |
| insulation[4] | 2.2 | R1.4 | R1.4 | R1.5 | R1.5 | R1.5 |
| | 2.4 | R1.5 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 2.6 | R1.5 | R1.6 | R1.6 | R1.6 | R1.7 |
| | 2.8 | R1.6 | R1.6 | R1.7 | R1.7 | R1.7 |
| | 3.0 | R1.7 | R1.7 | R1.8 | R1.8 | R1.8 |
| | 3.2 | R1.8 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.4 | R1.8 | R1.9 | R1.9 | R1.9 | R2.0 |
| | 3.6 | R1.9 | R1.9 | R2.0 | R2.0 | R2.0 |
| | 3.8 | R2.0 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 4.0 | R2.0 | R2.1 | R2.1 | R2.2 | R2.2 |
| | 5.0 | R2.4 | R2.4 | R2.5 | R2.5 | R2.6 |
| | 6.0 | R2.8 | R2.8 | R2.9 | R2.9 | R3.0 |
| | 7.0 | R3.1 | R3.2 | R3.2 | R3.3 | R3.4 |
| | 8.0 | R3.5 | R3.6 | R3.6 | R3.7 | R3.8 |
| | 9.0 | R3.9 | R4.0 | R4.0 | R4.1 | R4.2 |
| | ≥ 10.0 | R4.3 | R4.3 | R4.4 | R4.5 | R4.6 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1S: Construction R-values for slab-floors with R1.0 vertical edge insulation and with a 1.2 m wide strip of R2.4 underslab insulation along the slab perimeter where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 vertical edge insulation [3] plus 1.2 m wide strip of R2.4 underslab insulation[4] | 0.6 | R1.0 | R1.1 | R1.2 | R1.3 | R1.4 |
| | 0.8 | R1.2 | R1.3 | R1.3 | R1.4 | R1.4 |
| | 1.0 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 1.2 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 1.4 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 1.6 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| | 1.8 | R1.3 | R1.4 | R1.4 | R1.4 | R1.4 |
| | 2.0 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| | 2.2 | R1.4 | R1.5 | R1.5 | R1.5 | R1.6 |
| | 2.4 | R1.5 | R1.5 | R1.6 | R1.6 | R1.6 |
| | 2.6 | R1.6 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 2.8 | R1.6 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 3.0 | R1.7 | R1.7 | R1.8 | R1.8 | R1.8 |
| | 3.2 | R1.8 | R1.8 | R1.9 | R1.9 | R1.9 |
| | 3.4 | R1.8 | R1.9 | R1.9 | R2.0 | R2.0 |
| | 3.6 | R1.9 | R2.0 | R2.0 | R2.0 | R2.1 |
| | 3.8 | R2.0 | R2.0 | R2.1 | R2.1 | R2.1 |
| | 4.0 | R2.1 | R2.1 | R2.1 | R2.2 | R2.2 |
| | 5.0 | R2.4 | R2.5 | R2.5 | R2.6 | R2.6 |
| | 6.0 | R2.8 | R2.8 | R2.9 | R3.0 | R3.0 |
| | 7.0 | R3.1 | R3.2 | R3.3 | R3.3 | R3.4 |
| | 8.0 | R3.5 | R3.6 | R3.7 | R3.7 | R3.8 |
| | 9.0 | R3.9 | R4.0 | R4.0 | R4.1 | R4.2 |
| | ≥ 10.0 | R4.3 | R4.4 | R4.4 | R4.5 | R4.6 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1T: Construction R-values for slab-floors with R1.0 vertical edge insulation and with a 1.2 m wide strip of R2.4 underslab insulation along the slab perimeter where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.9 | R1.0 | R1.1 | R1.2 | R1.3 |
| vertical | 0.8 | R1.2 | R1.2 | R1.3 | R1.3 | R1.4 |
| edge | 1.0 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| insulation [3] | 1.2 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| plus | 1.4 | R1.3 | R1.3 | R1.4 | R1.4 | R1.4 |
| 1.2 m wide | 1.6 | R1.3 | R1.4 | R1.4 | R1.4 | R1.4 |
| strip of R2.4 | 1.8 | R1.4 | R1.4 | R1.4 | R1.5 | R1.5 |
| underslab | 2.0 | R1.4 | R1.5 | R1.5 | R1.5 | R1.5 |
| insulation[4] | 2.2 | R1.5 | R1.5 | R1.5 | R1.6 | R1.6 |
| | 2.4 | R1.5 | R1.6 | R1.6 | R1.7 | R1.7 |
| | 2.6 | R1.6 | R1.6 | R1.7 | R1.7 | R1.7 |
| | 2.8 | R1.7 | R1.7 | R1.7 | R1.8 | R1.8 |
| | 3.0 | R1.7 | R1.8 | R1.8 | R1.9 | R1.9 |
| | 3.2 | R1.8 | R1.8 | R1.9 | R1.9 | R2.0 |
| | 3.4 | R1.9 | R1.9 | R2.0 | R2.0 | R2.0 |
| | 3.6 | R2.0 | R2.0 | R2.0 | R2.1 | R2.1 |
| | 3.8 | R2.0 | R2.1 | R2.1 | R2.2 | R2.2 |
| | 4.0 | R2.1 | R2.1 | R2.2 | R2.2 | R2.3 |
| | 5.0 | R2.5 | R2.5 | R2.5 | R2.6 | R2.6 |
| | 6.0 | R2.8 | R2.9 | R2.9 | R3.0 | R3.0 |
| | 7.0 | R3.2 | R3.3 | R3.3 | R3.4 | R3.4 |
| | 8.0 | R3.6 | R3.6 | R3.7 | R3.8 | R3.8 |
| | 9.0 | R4.0 | R4.0 | R4.1 | R4.2 | R4.3 |
| | ≥ 10.0 | R4.4 | R4.4 | R4.5 | R4.6 | R4.7 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) A 1.2 m wide strip of horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed along the entire slab perimeter, placed on the interior side of the wall footing.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1U: Construction R-values for slab-floors with R1.0 vertical edge insulation and with R1.2 full cover underslab insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.8 | R0.9 | R0.9 | R1.0 | R1.1 |
| vertical | 0.8 | R1.0 | R1.0 | R1.1 | R1.2 | R1.2 |
| edge | 1.0 | R1.1 | R1.2 | R1.2 | R1.3 | R1.4 |
| insulation[3] | 1.2 | R1.2 | R1.3 | R1.3 | R1.4 | R1.5 |
| plus | 1.4 | R1.3 | R1.4 | R1.5 | R1.5 | R1.6 |
| R1.2 full | 1.6 | R1.4 | R1.5 | R1.6 | R1.7 | R1.7 |
| cover | 1.8 | R1.5 | R1.6 | R1.7 | R1.8 | R1.8 |
| underslab | 2.0 | R1.6 | R1.7 | R1.8 | R1.9 | R1.9 |
| insulation[4] | 2.2 | R1.7 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 2.4 | R1.8 | R1.9 | R2.0 | R2.1 | R2.1 |
| | 2.6 | R1.9 | R2.0 | R2.1 | R2.1 | R2.2 |
| | 2.8 | R2.0 | R2.1 | R2.1 | R2.2 | R2.3 |
| | 3.0 | R2.1 | R2.2 | R2.2 | R2.3 | R2.4 |
| | 3.2 | R2.2 | R2.2 | R2.3 | R2.4 | R2.5 |
| | 3.4 | R2.3 | R2.3 | R2.4 | R2.5 | R2.5 |
| | 3.6 | R2.3 | R2.4 | R2.5 | R2.6 | R2.6 |
| | 3.8 | R2.4 | R2.5 | R2.6 | R2.7 | R2.7 |
| | 4.0 | R2.5 | R2.6 | R2.6 | R2.7 | R2.8 |
| | 5.0 | R2.9 | R3.0 | R3.1 | R3.2 | R3.2 |
| | 6.0 | R3.3 | R3.4 | R3.5 | R3.6 | R3.6 |
| | 7.0 | R3.7 | R3.8 | R3.9 | R4.0 | R4.1 |
| | 8.0 | R4.1 | R4.2 | R4.3 | R4.4 | R4.5 |
| | 9.0 | R4.5 | R4.6 | R4.7 | R4.8 | R4.9 |
| | ≥ 10.0 | R4.9 | R5.0 | R5.1 | R5.3 | R5.4 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) Horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1V: Construction R-values for slab-floors with R1.0 vertical edge insulation and with R1.2 full cover underslab insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.8 | R0.9 | R0.9 | R1.0 | R1.1 |
| vertical | 0.8 | R1.0 | R1.0 | R1.1 | R1.2 | R1.2 |
| edge | 1.0 | R1.1 | R1.2 | R1.2 | R1.3 | R1.4 |
| insulation[3] | 1.2 | R1.2 | R1.3 | R1.3 | R1.4 | R1.5 |
| plus | 1.4 | R1.3 | R1.4 | R1.5 | R1.5 | R1.6 |
| R1.2 full | 1.6 | R1.4 | R1.5 | R1.6 | R1.7 | R1.7 |
| cover | 1.8 | R1.6 | R1.6 | R1.7 | R1.8 | R1.8 |
| underslab | 2.0 | R1.7 | R1.7 | R1.8 | R1.9 | R1.9 |
| insulation[4] | 2.2 | R1.7 | R1.8 | R1.9 | R2.0 | R2.0 |
| | 2.4 | R1.8 | R1.9 | R2.0 | R2.1 | R2.1 |
| | 2.6 | R1.9 | R2.0 | R2.1 | R2.2 | R2.2 |
| | 2.8 | R2.0 | R2.1 | R2.1 | R2.2 | R2.3 |
| | 3.0 | R2.1 | R2.2 | R2.2 | R2.3 | R2.4 |
| | 3.2 | R2.2 | R2.3 | R2.3 | R2.4 | R2.5 |
| | 3.4 | R2.3 | R2.3 | R2.4 | R2.5 | R2.6 |
| | 3.6 | R2.4 | R2.4 | R2.5 | R2.6 | R2.7 |
| | 3.8 | R2.4 | R2.5 | R2.6 | R2.7 | R2.7 |
| | 4.0 | R2.5 | R2.6 | R2.7 | R2.8 | R2.8 |
| | 5.0 | R2.9 | R3.0 | R3.1 | R3.2 | R3.2 |
| | 6.0 | R3.3 | R3.4 | R3.5 | R3.6 | R3.7 |
| | 7.0 | R3.7 | R3.8 | R3.9 | R4.0 | R4.1 |
| | 8.0 | R4.1 | R4.2 | R4.3 | R4.4 | R4.5 |
| | 9.0 | R4.5 | R4.6 | R4.7 | R4.9 | R5.0 |
| | ≥ 10.0 | R4.9 | R5.0 | R5.2 | R5.3 | R5.4 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) Horizontal underslab insulation with an *R-value* of 1.2 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1W: Construction R-values for slab-floors with R1.0 vertical edge insulation and with R2.4 full cover underslab insulation where the external walls have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.9 | R1.0 | R1.1 | R1.2 | R1.3 |
| vertical | 0.8 | R1.1 | R1.2 | R1.3 | R1.4 | R1.5 |
| edge | 1.0 | R1.3 | R1.4 | R1.5 | R1.6 | R1.7 |
| insulation[3] | 1.2 | R1.4 | R1.6 | R1.7 | R1.8 | R1.9 |
| plus | 1.4 | R1.6 | R1.7 | R1.8 | R1.9 | R2.1 |
| R2.4 full | 1.6 | R1.7 | R1.8 | R1.9 | R2.1 | R2.2 |
| cover | 1.8 | R1.8 | R2.0 | R2.1 | R2.2 | R2.3 |
| underslab | 2.0 | R2.0 | R2.1 | R2.2 | R2.3 | R2.4 |
| insulation[4] | 2.2 | R2.1 | R2.2 | R2.3 | R2.5 | R2.6 |
| | 2.4 | R2.2 | R2.3 | R2.4 | R2.6 | R2.7 |
| | 2.6 | R2.3 | R2.4 | R2.5 | R2.7 | R2.8 |
| | 2.8 | R2.4 | R2.5 | R2.7 | R2.8 | R2.9 |
| | 3.0 | R2.5 | R2.6 | R2.8 | R2.9 | R3.0 |
| | 3.2 | R2.6 | R2.7 | R2.9 | R3.0 | R3.1 |
| | 3.4 | R2.7 | R2.8 | R3.0 | R3.1 | R3.2 |
| | 3.6 | R2.8 | R2.9 | R3.1 | R3.2 | R3.3 |
| | 3.8 | R2.9 | R3.0 | R3.1 | R3.3 | R3.4 |
| | 4.0 | R3.0 | R3.1 | R3.2 | R3.4 | R3.5 |
| | 5.0 | R3.4 | R3.6 | R3.7 | R3.9 | R4.0 |
| | 6.0 | R3.9 | R4.0 | R4.1 | R4.3 | R4.4 |
| | 7.0 | R4.3 | R4.5 | R4.6 | R4.8 | R4.9 |
| | 8.0 | R4.7 | R4.9 | R5.0 | R5.2 | R5.3 |
| | 9.0 | R5.2 | R5.3 | R5.5 | R5.7 | R5.8 |
| | ≥ 10.0 | R5.6 | R5.8 | R5.9 | R6.1 | R6.3 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) Horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

# Thermal resistance of slab-on-ground floors

**Table E.1.2.1X: Construction R-values for slab-floors with R1.0 vertical edge insulation and with R2.4 full cover underslab insulation where the external walls do not have masonry veneer cladding**

Paragraph E.1.2.1

| Insulation type | Slab area-to-perimeter ratio[1] | Effective wall thickness[2] ≥ 90 mm to < 140 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 140 mm to < 180 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 180 mm to < 250 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 250 mm to < 300 mm ($m^2$·K/W) | Effective wall thickness[2] ≥ 300 mm ($m^2$·K/W) |
|---|---|---|---|---|---|---|
| R1.0 | 0.6 | R0.9 | R1.0 | R1.0 | R1.1 | R1.2 |
| vertical | 0.8 | R1.1 | R1.2 | R1.3 | R1.4 | R1.4 |
| edge | 1.0 | R1.3 | R1.4 | R1.5 | R1.6 | R1.6 |
| insulation[3] | 1.2 | R1.4 | R1.5 | R1.6 | R1.7 | R1.8 |
| plus | 1.4 | R1.6 | R1.7 | R1.8 | R1.9 | R2.0 |
| R2.4 full | 1.6 | R1.7 | R1.8 | R1.9 | R2.0 | R2.1 |
| cover | 1.8 | R1.8 | R1.9 | R2.0 | R2.2 | R2.3 |
| underslab | 2.0 | R1.9 | R2.0 | R2.1 | R2.3 | R2.4 |
| insulation[4] | 2.2 | R2.1 | R2.2 | R2.3 | R2.4 | R2.5 |
| | 2.4 | R2.2 | R2.3 | R2.4 | R2.6 | R2.7 |
| | 2.6 | R2.3 | R2.4 | R2.5 | R2.7 | R2.8 |
| | 2.8 | R2.4 | R2.5 | R2.6 | R2.8 | R2.9 |
| | 3.0 | R2.5 | R2.6 | R2.7 | R2.9 | R3.0 |
| | 3.2 | R2.6 | R2.7 | R2.8 | R3.0 | R3.1 |
| | 3.4 | R2.7 | R2.8 | R2.9 | R3.1 | R3.2 |
| | 3.6 | R2.8 | R2.9 | R3.0 | R3.2 | R3.3 |
| | 3.8 | R2.9 | R3.0 | R3.1 | R3.3 | R3.4 |
| | 4.0 | R3.0 | R3.1 | R3.2 | R3.4 | R3.5 |
| | 5.0 | R3.4 | R3.6 | R3.7 | R3.9 | R4.0 |
| | 6.0 | R3.9 | R4.0 | R4.1 | R4.3 | R4.4 |
| | 7.0 | R4.3 | R4.4 | R4.6 | R4.8 | R4.9 |
| | 8.0 | R4.7 | R4.9 | R5.0 | R5.2 | R5.4 |
| | 9.0 | R5.2 | R5.3 | R5.5 | R5.7 | R5.8 |
| | ≥ 10.0 | R5.6 | R5.8 | R5.9 | R6.2 | R6.3 |

**Notes:**

(1) The slab area-to-perimeter ratio shall be determined in accordance with Paragraph E.1.2.2. Where the slab area-to-perimeter ratio of the proposed floor is different from the values included in the table, the *construction R-value* shall be determined based on the nearest slab area-to-perimeter ratio in the table that is smaller than the slab area-to-perimeter ratio of the proposed floor.

(2) The effective thickness of *external walls* is the horizontal distance between the exterior concrete slab edge at floor level, and the interior wall surface.

(3) Vertical edge insulation with an *R-value* of 1.0 $m^2$·K/W, installed on all exterior vertical faces of the concrete slab/wall footing, extending from the outermost top edge down to the bottom of the wall footing.

(4) Horizontal underslab insulation with an *R-value* of 2.4 $m^2$·K/W, installed in-between footings underneath the entire floor slab.

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ISBN (online) 978-1-991409-82-9