



H1 Energy Efficiency

Acceptable Solution H1/AS1

**Energy efficiency for all housing, and
buildings up to 300 m²**

SIXTH EDITION | EFFECTIVE 27 NOVEMBER 2025

Preface

Preface

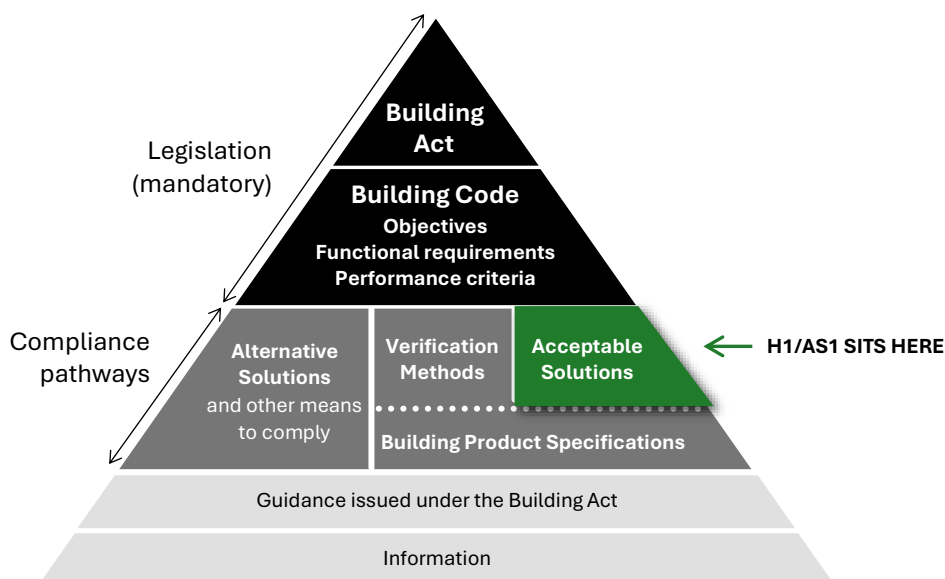
Document status

This document (H1/AS1 Sixth 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/AS1 Fifth 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

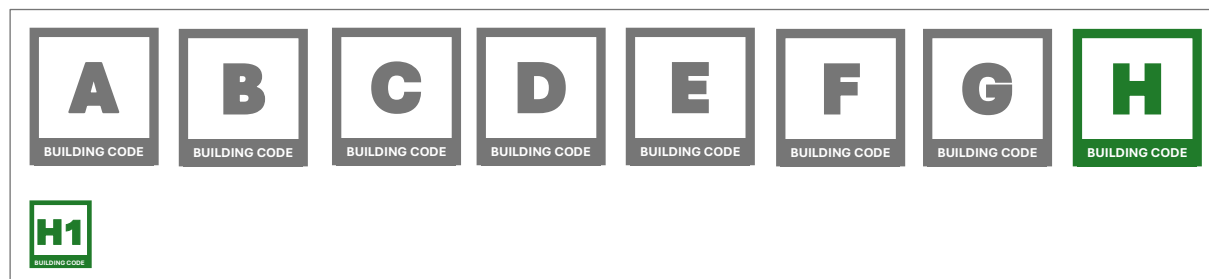
Each acceptable solution outlines the provisions of the Building Code that it relates to. Complying with an acceptable solution or verification method are ways of complying with that part of the Building Code. Other options for establishing compliance are listed in [section 19 of the Building Act](#).

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

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This acceptable solution is the sixth edition of H1/AS1. The main changes from the previous fifth edition amendment 1 are:

- The schedule method has been removed from the acceptable solution.
- In the calculation method, the minimum construction R-value for slab-on-ground floors has been removed. The minimum construction R-values for roofs, walls, and floors other than slab-on-ground floors are now specified directly instead of a percentage of R-values in the reference building equation.
- For multi-unit dwellings and 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](#).
- The performance table for windows and doors in housing in [Appendix D](#) has been revised to better reflect commonly used window specifications.
- [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

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.



Housing



Commercial



Outbuildings



Communal residential



Industrial



Ancillary



Communal non-residential

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General

Part 1. General

1.1 Introduction

1.1.1 Scope of this document

1.1.1.1 This document applies to:

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- a) **housing**; and
- b) other *buildings* with an area of *occupied space* less than or equal to 300 m².

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 *wharenuī*).
2. For mixed-use *buildings* that include **housing**, this document applies to the parts of the *building* containing **housing**. This document also applies to other parts of the *building*, provided their combined area of *occupied space* is less than or equal to 300 m². Acceptable Solution H1/AS2 or Verification Method H1/VM2 may be used for the parts of the *building* other than **housing** if their combined area of *occupied space* is greater than 300 m².

1.1.1.2 For *buildings* that do not meet these characteristics, refer to the Acceptable Solution H1/AS2 or Verification Method H1/VM2 as a means to demonstrate compliance or use an alternative means to demonstrate compliance.

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/VM1 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:

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- a) H.1.3.1 for the *adequate thermal resistance* of the *building envelope*, and for limiting uncontrollable airflow; and
- b) H1.3.2E for the building performance index for **housing**; and
- c) 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
- d) H1.3.4(a) and (b) for the heating, storage, distribution of hot water to and from *sanitary fixtures* and *sanitary appliances*; and

General

H

e) H1.3.4(c) for the efficient use of hot water to and from *sanitary fixtures* and *sanitary appliances* in **housing**.

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- 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.
- 1.1.3.3 Compliance with Building Code clause H1.3.1(a) (*adequate thermal resistance*) satisfies clause H1.3.2E (Building Performance Index or BPI).

COMMENT: The calculation method described in [Part 2. Building thermal envelope](#) is an acceptable solution for Building Code clause H1.3.1(a) (*adequate thermal resistance*). However, compliance with clause H1.3.2E (Building Performance Index or BPI) is not sufficient for demonstrating compliance with clause H1.3.1(a) (*adequate thermal resistance*).

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

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- 1.2.2.1 For **housing**, use the *floor area* of the *building*.
- 1.2.2.2 For *buildings* other than **housing**, calculate the area based on the *occupied space* of the *building* but exclude any parts with a classified use of **industrial, communal non-residential** (assembly service), **outbuildings**, or **ancillary**.
- 1.2.2.3 For mixed-use *buildings* that include **housing**, exclude the *floor area* of the parts of the *building* containing **housing** when calculating the area of *occupied space*.

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/AS1, *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.

Building thermal envelope

Part 2. Building thermal envelope

2.1 Thermal resistance

2.1.1 Overview

2.1.1.1 To provide *adequate thermal resistance*, the *thermal envelope* of *buildings* or parts of *buildings* with classified uses of **housing**, **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/VM1.

COMMENT: For **housing** and **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 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. NZS 4246 sections 5, 6, 7 and 10 provide acceptable methods for installing bulk thermal insulation in light-timber and steel-framed residential *buildings*.

COMMENT: Slab perimeter insulation should be protected against water absorption, ultraviolet (UV) exposure, and impact damage. However, deviating from step 2 in section 10.3 in NZS 4246, encapsulation of slab perimeter insulation is not recommended as it can result in moisture getting trapped.

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*.

2.1.2.3 For **housing** with multi-unit dwellings, the *building* may either be treated as having a single *thermal envelope*, or as having multiple *thermal envelopes*, with different *household units* 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*.

Building thermal envelope

- 2.1.2.4 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 and between adjoining *household units*.

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

1. do not require *construction* that provides *adequate thermal resistance*; and
2. are not included in the areas when determining compliance with Paragraph 2.1.2.5; and
3. are not included in the areas of the heat loss equations for the reference *building* in Paragraph 2.1.2.7 and for the proposed *building* in Paragraph 2.1.2.8.

- 2.1.2.5 The *wall glazing area* of the proposed *building* shall be 40% or less of the *gross wall area*.

- 2.1.2.6 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* ($HL_{\text{reference}}$) for the relevant climate zone and *window area*.

COMMENT: A number of tools available online have implemented the equations of the calculation method and provide a user-friendly way of demonstrating compliance. Free tools include the New Zealand Green Building Council's H1 Calculator available at www.nzgbc.org.nz and BRANZ's H1 Calculation method tool available at www.branz.co.nz/energy-efficiency/h1-calculation-method-tool.

- 2.1.2.7 $HL_{\text{reference}}$ shall be calculated using the equations in Table 2.1.2.7, where:

$HL_{\text{reference}}$ is the temperature-specific heat loss of the reference *building*, and

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

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

$A_{70\% \text{ of gross wall area}}$ equals 70% of the *gross wall area* of the proposed *building* (m^2), and

$A_{30\% \text{ of gross wall area}}$ equals 30% of the *gross wall area* of the proposed *building* (m^2), and

$A_{\text{slab-on-ground floor}}$ is the area of *slab-on-ground floors* that form part of the *thermal envelope floor area* of the proposed *building* (m^2), and

$A_{\text{other floor}}$ is the area of other floors that form part of the *thermal envelope floor area* of the proposed *building* (m^2).

Building thermal envelope

Table 2.1.2.7: Reference building heat loss equations

Paragraph [2.1.2.7](#)

Climate zone ⁽¹⁾	Reference building heat loss equation
1, 2 and 3	$HL_{\text{reference}} = \frac{A_{\text{roof}} + A_{\text{skylight}}}{6.6} + \frac{A_{70\% \text{ of the gross wall area}}}{1.6} + \frac{A_{\text{slab-on-ground floor}}}{1.5} + \frac{A_{\text{other floor}}}{2.5} + \frac{A_{30\% \text{ of gross wall area}}}{0.46}$
4	$HL_{\text{reference}} = \frac{A_{\text{roof}} + A_{\text{skylight}}}{6.6} + \frac{A_{70\% \text{ of the gross wall area}}}{1.6} + \frac{A_{\text{slab-on-ground floor}}}{1.5} + \frac{A_{\text{other floor}}}{2.8} + \frac{A_{30\% \text{ of gross wall area}}}{0.46}$
5	$HL_{\text{reference}} = \frac{A_{\text{roof}} + A_{\text{skylight}}}{6.6} + \frac{A_{70\% \text{ of the gross wall area}}}{1.6} + \frac{A_{\text{slab-on-ground floor}}}{1.6} + \frac{A_{\text{other floor}}}{3.0} + \frac{A_{30\% \text{ of gross wall area}}}{0.50}$
6	$HL_{\text{reference}} = \frac{A_{\text{roof}} + A_{\text{skylight}}}{6.6} + \frac{A_{70\% \text{ of the gross wall area}}}{1.6} + \frac{A_{\text{slab-on-ground floor}}}{1.7} + \frac{A_{\text{other floor}}}{3.0} + \frac{A_{30\% \text{ of gross wall area}}}{0.50}$

Notes:

(1) Climate zone boundaries are shown in [Appendix C](#).

COMMENT: The reference *building* used in these equations has the same *net roof area*, *skylight area*, and areas of floor as the proposed *building*. The *gross wall area* in the reference *building* is assumed to contain a *wall glazing area* of 30%.

2.1.2.8 HL_{proposed} shall be calculated as the sum of all the *building element* temperature-specific heat losses according to [Equation 2.1](#).

$$\text{Equation 2.1: } HL_{\text{proposed}} = \frac{A_{\text{roof}}}{R_{\text{roof}}} + \frac{A_{\text{wall}}}{R_{\text{wall}}} + \frac{A_{\text{floor}}}{R_{\text{floor}}} + \frac{A_{\text{glazing}}}{R_{\text{window}}} + \frac{A_{\text{door, opaque}}}{R_{\text{door, opaque}}} + \frac{A_{\text{skylight}}}{R_{\text{skylight}}}$$

where:

HL_{proposed} is the temperature-specific heat loss of the proposed *building*, and

A_{roof} is the *net roof area* of the proposed *building* (m²), and

R_{roof} is the *construction R-value* of the roof in the proposed *thermal envelope* (m²·K/W), and

A_{wall} is the *net wall area* of the proposed *building* (m²), and

R_{wall} is the *construction R-value* of the walls in the proposed *thermal envelope* (m²·K/W), and

A_{floor} is the *thermal envelope floor area* of the proposed *building* (m²), and

R_{floor} is the *construction R-value* of the floor in the proposed *thermal envelope* (m²·K/W), and

A_{glazing} is the *wall glazing area* of the proposed *building* (m²), and

R_{window} is the *construction R-value* of windows, and glazing in doors, in the proposed *thermal envelope* (m²·K/W), and

$A_{\text{door, opaque}}$ is the *opaque door area* of the proposed *building* (m²), and

$R_{\text{door, opaque}}$ is the *construction R-value* of opaque door areas in the proposed *thermal envelope* (m²·K/W), and

A_{skylight} is the *skylight area* of the proposed *building* (m²), and

R_{skylight} is the *construction R-value* of the skylight(s) in the proposed *thermal envelope* (m²·K/W).

Building thermal envelope

- 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 2.1](#) shall be expanded to suit. For example:

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

- 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 In the proposed *building*, the *construction R-values* for *roofs*, *walls*, and *floors* other than *slab-on-ground floors* that form part of the *building thermal envelope* shall be no less than:
- for *roofs*, R2.6 (m²K)/W; and
 - for *walls*, R1.0 (m²K)/W; and
 - for *floors* other than *slab-on-ground floors*, R1.3 (m²K)/W.

COMMENT: Where a *roof* is proposed to have thinner insulation and therefore reduced *thermal resistance* along the ceiling perimeter, the *roof* term in [Equation 2.1](#) is to be expanded as required in Paragraph 2.1.2.9 to separately account for the parts of the *roof* with different *thermal resistances*. Paragraph 2.1.2.11a) requires that all parts of the proposed *roof* have a *construction R-value* of at least R2.6 (m²K)/W, including along the ceiling perimeter.

- 2.1.2.12 *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 2.1.2.12](#). 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 2.1.2.12: Minimum construction R-values for heated ceilings, heated walls, and heated floors
Paragraph 2.1.2.12

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)
<i>Heated ceiling</i> ⁽⁴⁾	R6.6	R6.6	R6.6	R6.6	R6.6	R6.6
<i>Heated wall</i>	R2.9	R2.9	R2.9	R2.9	R2.9	R2.9
<i>Heated floor</i> ⁽⁵⁾	R2.5	R2.5	R2.5	R2.8	R3.0	R3.0

Notes:

- (1) The *R-values* shown are *construction R-values* measured in m²·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*.

- 2.1.2.13 Where the *construction R-value* of a *building element* is not known, default *construction R-values* of 0.18 m²·K/W for an opaque *building element* and 0.15 m²·K/W for windows and glazing in doors shall be used in the heat loss equation for the proposed *building*.

Building thermal envelope

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 earth walls in *buildings* that meet the requirements of NZS 4299, by using a thermal conductivity for the earth material determined in accordance with NZS 4299 Figure 2.10, and
 - iii) 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](#).

COMMENT: The BRANZ House Insulation Guide 6th edition provides *construction R-values* of common *building* components and is based on calculations consistent with the requirements of Paragraph [2.1.3.1](#). However, the previous BRANZ House Insulation Guide, 5th edition or earlier, should not be used for determining the *construction R-values* of *slab-on-ground floors*, windows and doors due to differences in calculation methods and assumptions compared to [Appendix D.](#) and [Appendix E.](#)

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.

Building thermal envelope

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 **Housing, communal residential, communal non-residential** (assembly care), and **commercial buildings** shall have windows, doors, vents and 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.

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.

Building services

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.

References

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 4246:2016	Energy efficiency – Installing bulk thermal insulation in residential buildings	2.1.1.4
NZS 4299:2024	Earth buildings not requiring specific engineering design	2.1.3.1a)ii)
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.2.1.2(a) , Table D.1.1.1

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.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.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 (6 th Edition), August 2025		2.1.3.1 Comment, E.1.1.1 Comment, E.1.2.1 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.

References

New Zealand Legislation

Energy Efficiency (Energy Using Products) Regulations 2002

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

Where quoted

[3.1.1.1](#) Comment

Portions of this document have used text and figures from NZS 4218: 2009 and NZS 4243.1: 2007. Copyright of NZS 4218: 2009 Thermal Insulation – Housing and Small Buildings; and NZS 4243.1: 2007 Energy Efficiency – Large Buildings Part 1: Building Thermal Envelope is Crown copyright, administered by the New Zealand Standards Executive. Reproduced with permission from Standards New Zealand, on behalf of New Zealand Standards Executive, under copyright licence LN001384.

Definitions

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 <i>building</i> . Included are <i>fixtures</i> , services, <i>drains</i> , permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports.
Building envelope	A <i>building's thermal envelope</i> 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 <i>building</i> within the <i>thermal envelope</i> that may be directly or indirectly heated or cooled. It is separated from <i>unconditioned space</i> by <i>building elements</i> (walls, windows, <i>skylights</i> , doors, <i>roof</i> , and floor) to limit uncontrolled airflow and heat transfer.
Construct	In relation to a <i>building</i> , includes to design, build, erect, prefabricate, and relocate the <i>building</i> ; and construction has a corresponding meaning.
Construction R-value	The <i>total thermal resistance (R-value)</i> of a typical area of a <i>building element</i> .
Curtain walling	Part of the <i>building envelope</i> 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 <i>building</i> , and containing fixed and/or openable infills, which provides all the required functions of an internal or <i>external wall</i> or part thereof, but does not contribute to the load bearing or the stability of the structure of the <i>building</i> .
External wall	Any exterior face of a <i>building</i> within 30° of vertical, consisting of primary and/or secondary elements intended to provide protection against the outdoor environment.
Floor area	In relation to a <i>building</i> , means the <i>floor area</i> (expressed in square metres) of all interior spaces used for activities normally associated with domestic living.
Foil insulation	Material that includes a thin layer of heat-reflecting metallic foil (usually aluminium).
Gross roof area	The <i>net roof area</i> (A_{roof}) plus the <i>skylight area</i> (A_{skylight}).
Gross wall area	The sum of the following: a) the <i>net wall area</i> of the <i>building</i> ; and b) the <i>wall glazing area</i> of the <i>building</i> ; and c) the <i>opaque door area</i> of the <i>building</i> .
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 <i>building element</i> 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 <i>building</i> or group of <i>buildings</i>, or part of a <i>building</i> or group of <i>buildings</i>, that is— i) used, or intended to be used, only or mainly for residential purposes; and ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but 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 <i>building</i> , 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 <i>building</i> .
Intended use	In relation to a <i>building</i>— a) includes any or all of the following: i) any reasonably foreseeable occasional use that is not incompatible with the intended use; ii) normal maintenance; ii) activities undertaken in response to <i>fire</i> or any other reasonably foreseeable emergency; but b) does not include any other maintenance and repairs or rebuilding.
Net roof area (A_{roof})	The area of the <i>roof</i> that is part of the <i>thermal envelope</i> , excluding the <i>skylight area</i> , measured using overall internal dimensions.
Net wall area	The area of walls that are part of the <i>thermal envelope</i> , excluding the <i>opaque door area</i> and the <i>wall glazing area</i> , measured using overall internal dimensions.
Occupied space	Any space within a <i>building</i> in which a person will be present from time to time during the <i>intended use</i> of the <i>building</i> .
Opaque door area ($A_{\text{door, opaque}}$)	The total area of opaque doors and opaque panels of doors in the <i>thermal envelope</i> , including frames and opening tolerances.
R-value	The common abbreviation for describing the values of both <i>thermal resistance</i> and <i>total thermal resistance</i> .
Roof	Any roof/ceiling combination where the exterior surface of the <i>building</i> 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 <i>sanitation</i> , but which is not a <i>sanitary fixture</i> . Included are machines for washing dishes and clothes.
Sanitary fixture	Any <i>fixture</i> which is intended to be used for <i>sanitation</i> .
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 <i>roof</i> , including frames and glazing.

Definitions

Term	Definition
Skylight area (A_{skylight})	The area of <i>skylights</i> that are part of the <i>thermal envelope</i> , including frames and opening tolerances.
Slab-on-ground floor	Floor <i>construction</i> 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 <i>roof</i> , wall, window, <i>skylight</i> , door, and floor <i>construction</i> between <i>conditioned spaces</i> and <i>unconditioned spaces</i> , the ground or the outdoor environment.
Thermal envelope floor area (A_{floor})	The area of the floor that forms part of the <i>thermal envelope</i> measured using overall internal dimensions.
Thermal mass	The heat capacity of the materials of the <i>building</i> affecting the <i>building's heating load</i> and <i>cooling load</i> 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 <i>building element</i> . 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 $\text{m}^2\cdot\text{K}/\text{W}$.
Total thermal resistance	The overall air-to-air <i>thermal resistance</i> across all components of a <i>building element</i> such as a wall, <i>roof</i> , or floor, including the surface resistances.
Unconditioned space	Space within the <i>building envelope</i> that is not <i>conditioned space</i> . 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 <i>conditioned space</i> .
Wall framing fraction	The percentage of the <i>net wall area</i> 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 ($A_{\text{wallglazing}}$)	The total area of windows, and doors that include glazing, in walls of the <i>thermal envelope</i> , including transparent or translucent glazing, frames and opening tolerances, decorative glazing, and louvres. This excludes opaque panels, opaque doors, and <i>skylights</i> .
Wharehenui	A communal meeting house having a large open floor area used for both assembly and sleeping in the traditional Māori manner.

New Zealand climate zones

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

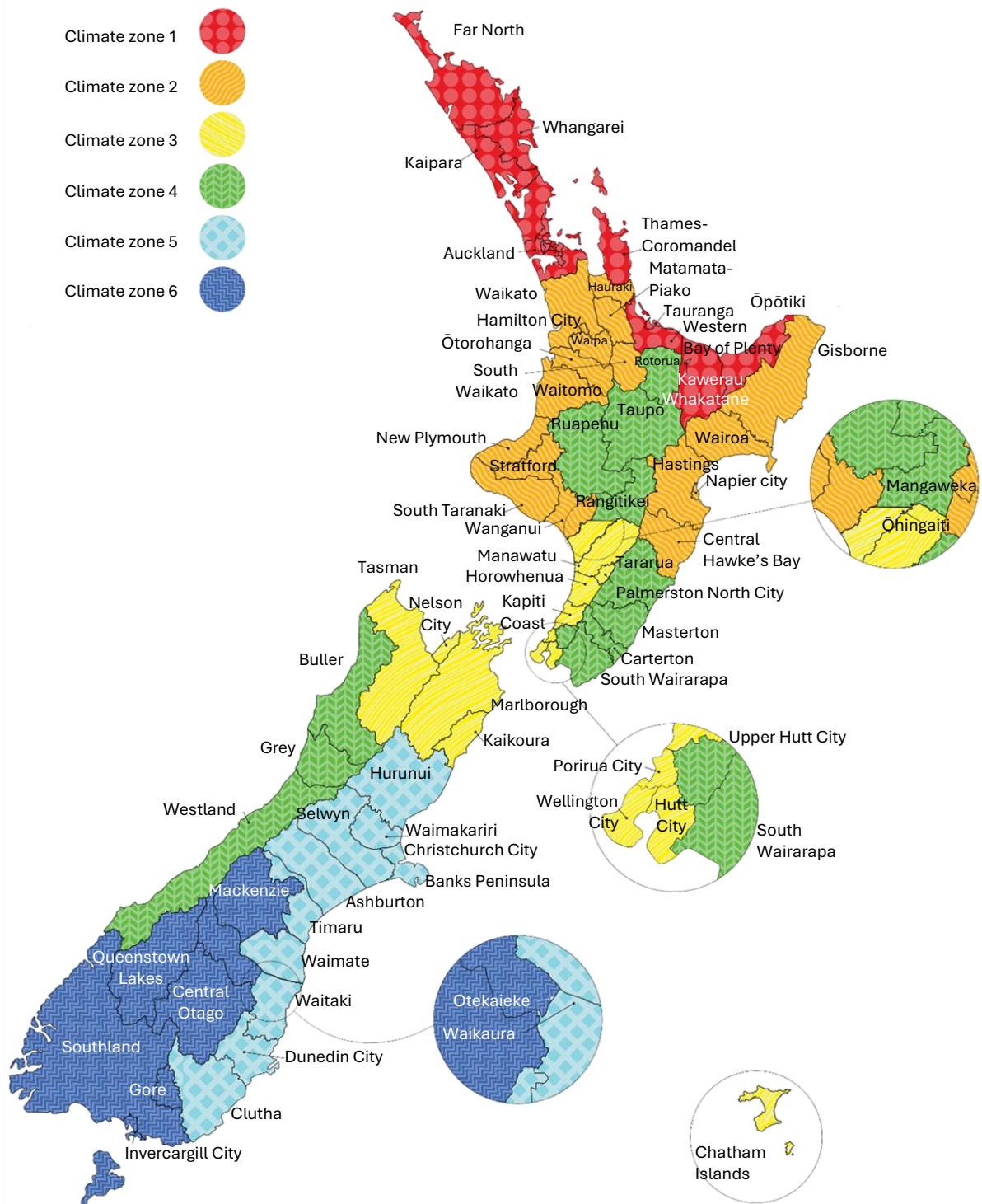
Table C.1.1.2: Climate zones by territorial authorityParagraph [C.1.1.2](#)

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



Windows, doors and skylights

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 glazing in doors (R_{window}) shall include the effects of both the glazing materials and the frame materials. R_{window} shall be determined using one of the following methods:

H

- for **housing** only, from [Table D.1.1.1](#); or
- calculation in accordance with Verification Method H1/VM1 Appendix D.

D.1.1.2 The *construction R-values* of opaque doors and opaque door panels (R_{door}) shall be calculated in accordance with Verification Method H1/VM1 Appendix D, Subsection D.1.2.

COMMENT:

- The *R-values* in [Table D.1.1.1](#) are characteristic *construction R-values* of vertical windows and glazing in doors typical to New Zealand housing. They take into account the different *construction R-values* of individual windows within a typical houseslot. The values provided in this table are not representative of windows and doors in *buildings* other than **housing**.
- [Table D.1.1.1](#) does not apply to opaque doors, or to opaque door panels.
- For doors with glazing, the *R-values* in [Table D.1.1.1](#) include the effects of both the glazing and the frame, but not the effect of any opaque parts other than the frames around the glazing. For doors with both glazing and opaque panels, when using [Table D.1.1.1](#), the opaque panel areas need to be treated separately from the areas with glazing (including frames around the glazing), with the *R-value* of the opaque panel areas determined in accordance with Paragraph [D.1.1.2](#).

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.1](#). The *construction R-value* shall be rounded down to no less than two significant figures.

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

where:

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

U_w is the thermal transmittance of the *skylight* ($\text{W}/(\text{m}^2 \cdot \text{K})$), 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:

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

Windows, doors and skylights

Table D.1.1.1: Construction R-values (R_{window}) of selected generic vertical windows and doors for housing

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

H

Type of glazing	$U_g^{(1)}$	Aluminium frame ($\text{m}^2 \cdot \text{K/W}$)	Thermally broken aluminium frame ($\text{m}^2 \cdot \text{K/W}$)	uPVC frame ($\text{m}^2 \cdot \text{K/W}$)	Timber frame ($\text{m}^2 \cdot \text{K/W}$)
Double pane	2.9	R0.24	R0.30	R0.37	R0.41
	2.6	R0.26	R0.32	R0.40	R0.44
	1.9	R0.30	R0.39	R0.50	R0.56
	1.6	R0.33	R0.42	R0.56	R0.63
	1.3	R0.35	R0.46	R0.63	R0.71
	1.2	R0.36	R0.48	R0.66	R0.74
	1.1	R0.37	R0.50	R0.69	R0.77
	1.0	R0.39	R0.52	R0.73	R0.81
Triple pane	2.1	-	R0.36	R0.47	R0.53
	1.2	-	R0.48	R0.66	R0.74
	1.0	-	R0.52	R0.73	R0.81
	0.7	-	R0.59	R0.86	R0.95
	0.6	-	R0.62	R0.91	R1.01

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

Thermal resistance of slab-on-ground floors

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:
- the performance tables described in Section [E.1.2](#); or
 - calculation in accordance with Verification Method H1/VM1 Appendix E.

COMMENT:

- 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.
- 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:

- 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.
- 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.
- [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.
- Construction R-values* are only provided for vertical edge insulation with a *thermal resistance* of $1.0 \text{ m}^2\cdot\text{K}/\text{W}$. The thermal benefits of increasing the *R-value* of vertical edge insulation beyond $1.0 \text{ m}^2\cdot\text{K}/\text{W}$ are very limited. Refer to BRANZ study report SR352 (2016) for further details.
- 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/VM1 Appendix E, using the default values for the thermal properties of the ground from ISO 13370 Table 7 category 2 (thermal conductivity $\lambda = 2.0 \text{ W}/(\text{m}\cdot\text{K})$, heat capacity per volume $\rho c = 2.0 \times 10^6 \text{ J}/(\text{m}^3\cdot\text{K})$).
- The BRANZ House Insulation Guide 6th edition also provides *construction R-values* for generic concrete *slab-on-ground floors*, including for scenarios not covered in this document.

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

- the overall internal slab dimensions in accordance with [Equation E.1](#); or
- 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

Thermal resistance of slab-on-ground floors

$P_{\text{slab,external}}$ 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).

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](#).

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

where:

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

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

$R_{\text{floor, no edge ins}}$ is the *construction R-value* of the *slab-on-ground floor* ($\text{m}^2 \cdot \text{K/W}$) 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

$R_{\text{floor, with edge ins}}$ is the *construction R-value* of the *slab-on-ground floor* ($\text{m}^2 \cdot \text{K/W}$) 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*.

Thermal resistance of slab-on-ground floors

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 *habitable spaces* and beneath an attached garage, or where there is no vertical slab edge insulation underneath wall openings for windows or doors.

- 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](#).

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

where:

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

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

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

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

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

where:

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

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

$R_{\text{floor, no edge ins, masonry ven}}$ is the *construction R-value* of the *slab-on-ground floor* ($\text{m}^2 \cdot \text{K/W}$) 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

$f_{\text{with edge ins, masonry ven}}$ 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 masonry veneer cladding; and

$R_{\text{floor, with edge ins, masonry ven}}$ is the *construction R-value* of the *slab-on-ground floor* ($\text{m}^2 \cdot \text{K/W}$) 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

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walls with masonry veneer cladding, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*; and

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

$R_{\text{floor, no edge ins, other}}$ is the *construction R-value* of the *slab-on-ground floor* ($\text{m}^2 \cdot \text{K/W}$) 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* ($\text{m}^2 \cdot \text{K/W}$) 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 walls with claddings other than masonry veneer, including along any wall(s) between *conditioned spaces* and *unconditioned spaces*.

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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

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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.

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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.

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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 vertical edge insulation ⁽³⁾	0.6	R0.8	R0.8	R0.9	R0.9	R0.9
	0.8	R0.9	R0.9	R1.0	R1.0	R1.0
	1.0	R1.0	R1.0	R1.1	R1.1	R1.1
	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 m²·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.

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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 m²·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.

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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.

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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 vertical edge insulation ⁽³⁾	0.6	R0.5	R0.5	R0.6	R0.6	R0.6
	0.8	R0.6	R0.6	R0.6	R0.7	R0.7
	1.0	R0.7	R0.7	R0.7	R0.7	R0.8
	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 m²·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 m²·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 m²·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 m²·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 m²·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 m²·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 m²·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 m²·K/W, installed in-between footings underneath the entire floor slab.

Thermal resistance of slab-on-ground floors

Table E.1.2.10: 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 m²·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 m²·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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus 1.2 m wide strip of R1.2 underslab insulation ⁽⁴⁾	0.6	R0.9	R1.0	R1.0	R1.0	R1.1
	0.8	R1.1	R1.1	R1.2	R1.2	R1.3
	1.0	R1.2	R1.3	R1.3	R1.3	R1.3
	1.2	R1.3	R1.3	R1.3	R1.3	R1.3
	1.4	R1.3	R1.3	R1.3	R1.3	R1.3
	1.6	R1.3	R1.3	R1.3	R1.3	R1.3
	1.8	R1.3	R1.3	R1.3	R1.4	R1.4
	2.0	R1.4	R1.4	R1.4	R1.4	R1.5
	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 m²·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 m²·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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus 1.2 m wide strip of R2.4 underslab insulation ⁽⁴⁾	0.6	R0.9	R1.0	R1.1	R1.2	R1.3
	0.8	R1.2	R1.2	R1.3	R1.3	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	R1.4	R1.4	R1.4	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	R1.5	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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus R1.2 full cover underslab insulation ⁽⁴⁾	0.6	R0.8	R0.9	R0.9	R1.0	R1.1
	0.8	R1.0	R1.0	R1.1	R1.2	R1.2
	1.0	R1.1	R1.2	R1.2	R1.3	R1.4
	1.2	R1.2	R1.3	R1.3	R1.4	R1.5
	1.4	R1.3	R1.4	R1.5	R1.5	R1.6
	1.6	R1.4	R1.5	R1.6	R1.7	R1.7
	1.8	R1.5	R1.6	R1.7	R1.8	R1.8
	2.0	R1.6	R1.7	R1.8	R1.9	R1.9
	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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus R1.2 full cover underslab insulation ⁽⁴⁾	0.6	R0.8	R0.9	R0.9	R1.0	R1.1
	0.8	R1.0	R1.0	R1.1	R1.2	R1.2
	1.0	R1.1	R1.2	R1.2	R1.3	R1.4
	1.2	R1.2	R1.3	R1.3	R1.4	R1.5
	1.4	R1.3	R1.4	R1.5	R1.5	R1.6
	1.6	R1.4	R1.5	R1.6	R1.7	R1.7
	1.8	R1.6	R1.6	R1.7	R1.8	R1.8
	2.0	R1.7	R1.7	R1.8	R1.9	R1.9
	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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus R2.4 full cover underslab insulation ⁽⁴⁾	0.6	R0.9	R1.0	R1.1	R1.2	R1.3
	0.8	R1.1	R1.2	R1.3	R1.4	R1.5
	1.0	R1.3	R1.4	R1.5	R1.6	R1.7
	1.2	R1.4	R1.6	R1.7	R1.8	R1.9
	1.4	R1.6	R1.7	R1.8	R1.9	R2.1
	1.6	R1.7	R1.8	R1.9	R2.1	R2.2
	1.8	R1.8	R2.0	R2.1	R2.2	R2.3
	2.0	R2.0	R2.1	R2.2	R2.3	R2.4
	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 m²·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 m²·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 vertical edge insulation ⁽³⁾ plus R2.4 full cover underslab insulation ⁽⁴⁾	0.6	R0.9	R1.0	R1.0	R1.1	R1.2
	0.8	R1.1	R1.2	R1.3	R1.4	R1.4
	1.0	R1.3	R1.4	R1.5	R1.6	R1.6
	1.2	R1.4	R1.5	R1.6	R1.7	R1.8
	1.4	R1.6	R1.7	R1.8	R1.9	R2.0
	1.6	R1.7	R1.8	R1.9	R2.0	R2.1
	1.8	R1.8	R1.9	R2.0	R2.2	R2.3
	2.0	R1.9	R2.0	R2.1	R2.3	R2.4
	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 m²·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 m²·K/W, installed in-between footings underneath the entire floor slab.

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