NCC
Volume One

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Introduction to the National Construction Code (NCC)

About the NCC

The NCC is Australia's primary set of technical construction provisions for buildings. As a performance-based code, it sets the minimum required level for the safety, health, amenity and sustainability of buildings. It primarily applies to the design and construction of new buildings, and plumbing and drainage systems in new and existing buildings. In some cases it may also apply to structures associated with buildings and new building work in existing buildings.

The Australian Building Codes Board (ABCB), on behalf of the Australian Government and each State and Territory government produces and maintains the NCC.

The primary users of the NCC include architects, builders, plumbers, building certifiers / surveyors, hydraulic consultants, engineers and other building and plumbing related professions and trades.

Components of the NCC

There are three volumes in the NCC. They provide the technical provisions for the design and construction of buildings and other structures, and plumbing and drainage systems.

NCC Volume One primarily covers the design and construction of multi-residential, commercial, industrial and public assembly buildings and some associated structures.

NCC Volume Two primarily covers the design and construction of smaller scale buildings including houses, small sheds, carports and some associated structures.

NCC Volume Three covers the design, construction and maintenance of plumbing and drainage systems in new and existing buildings.

Each volume contains:

- GoverningRequirements
- Performance Requirements
- Compliance options to meet the NCC requirements
- State and Territory Additions and Variations.

The NCC uses building classifications to identify requirements for different types of buildings. A building classification relates to the intended use of the building. Information on building classifications is found in Part A6 of the Governing Requirements.

The role of the NCC

The role of the NCC is for design and construction standards to:

- Have a rigorously tested rationale
- Effectively address applicable issues
- Create benefits to society that outweigh costs
- Consider the competitive effects of regulation
- Not be unnecessarily restrictive.

Legislative arrangements and the NCC

Administration of the NCC is the responsibility of the States and Territories under their various building and plumbing Acts and Regulations. State and Territory Acts and Regulations set out the legal framework to support the design and construction of buildings. The NCC is given legal effect through State and Territory building and plumbing legislation.

The dates of adoption and amendments of the NCC are determined by State and Territory building and plumbing administrations.

How to use the NCC

The NCC is split into two main sections:

1. Administrative requirements contained within the Governing Requirements.
2. Technical requirements contained within the remaining sections of the NCC.

The Governing Requirements provides the rules and instructions for using and complying with the NCC. They are vital in understanding how the technical requirements of the NCC should be applied to any particular situation. The Governing

Requirements are also important in understanding how the NCC fits with the building and plumbing regulatory framework within Australia.

NCC supporting materials

The NCC has supporting materials created to make the code easier to understand and apply. These materials are available from the ABCB website at: www.abcb.gov.au.

Introduction to NCC Volume One

About the NCC Volume

NCC Volume One contains technical design and construction requirements for multi-residential, commercial, industrial, and public assembly buildings and their associated structures.

Volume One contains the requirements for—

- all Class 2 to 9 buildings; and
- access requirements for people with a disability in Class 1b and 10a buildings; and
- certain Class 10b structures including access requirements for people with a disability in Class 10b swimming pools.

Components of NCC Volume

NCC Volume One comprises of the following Sections:

- Section A – Governing Requirements, common across the NCC
- Section B – Building structure requirements
- Section C – Fire resistance requirements
- Section D – Access and egress requirements
- Section E – Services and equipment requirements
- Section F – Health and amenity requirements
- Section G – Ancillary provisions
- Section H – Special use buildings requirements
- Section I – ******(Section I provisions were removed in NCC 2014)
- Section J – Energy efficiency requirements
- Schedules – comprising of:
    - State and Territory Variations and Additions;
    - Abbreviation and symbols;
    - Reference documents;
    - NCC definitions;
    - Fire-resistance of building elements; and
    - Fire hazard properties;

Section A contains the mandatory governing requirements for the NCC. Sections B to J contains the mandatory Performance Requirements and the compliance options to satisfy compliance with the NCC.

SECTION **A**

GOVERNING REQUIREMENTS

SECTION A GOVERNING REQUIREMENTS

Section A Governing Requirements of the NCC

Introduction to this Section

The Governing Requirements of the NCC provide the rules and instructions for using and complying with the NCC. It includes—

- **Interpreting** the NCC
- **Complying** with the NCC
- **State or Territory compliance** and application in conjunction with the NCC
- **Applying documents** referenced in the NCC
- **Documenting** the suitability of the design, construction and/or use of materials to comply with the NCC
- **Classifying buildings** by their use.

Part A1 Interpreting the NCC

Introduction to this Part

This Part explains important concepts on how the NCC should be interpreted and applied. There are certain conventions and approaches that need to be taken into account when using the NCC. This includes interpreting specific language and referenced terms. This is critical in understanding the intended technical and legal meaning aspects of the NCC. This Part also explains the difference between the legal components of the NCC and parts that are only explanatory or guidance in nature.

A1.0 Interpretation

(1) The following are non-mandatory and are only informative and for guidance purposes of the NCC:

(a) Content identified as 'Explanatory information'

(b) The 'Introduction to this Part or Section' information, located at the beginning of each Part or Section in the NCC.

Explanatory information

Explanatory information and Introduction to this Part or Section information contained in the NCC are non-mandatory and are provided for guidance purposes only. Informative and guidance material should be read in conjunction with the provisions of the NCC. The statements made in the informative and guidance components of the NCC should not be taken to override the NCC. Unlike the NCC, which is adopted by legislation, the informative and guidance components are not called up into legislation. The informative and guidance components of the NCC do not cover State and Territory variations and additions. Because informative and guidance components of the NCC do not have regulatory force, the ABCB does not accept any responsibility for its contents when applied to specific buildings or any liability which may result from its use.

(2) Words in italics must be interpreted in accordance with—

(a) definitions provided in Schedule 3, unless the contrary intention appears; and

(b) additional definitions in State or Territory appendices, as appropriate.

Explanatory information

Defined words provide the precise meaning of key words and expressions for the purposes of the NCC. Where a word is not defined in the NCC, the common meaning of the word should be used.

(3) The NCC must be interpreted and applied in accordance with the following:

(a) A reference to a building is a reference to an entire building or part of a building (as the case requires).

Explanatory information

When the NCC refers to a building, that reference can be to the whole building or any part of the building. Whether this provision applies depends on the circumstances of that case and the circumstances in which the reference is made.

Generally, a reference to a building is a reference to the whole building, regardless of classification. However, when a provision is applicable to a specific class or classes of building, that reference to a building may be a reference to the whole building or part of the building depending on how the building is classified.

For example, where a building has a single classification, a reference to a building in the NCC is understandably a reference to a whole building. However, where a building has parts of different classification, unless the contrary intention appears (i.e. there is a specific reference to the whole building), a reference to a building in the NCC is a reference to the relevant part of the building. This means that each part of the building must comply with the relevant provisions for its classification.

(b) A reference to a *plumbing or drainage solution*, or *product* in Volume Three is a reference to an entire installation, system or product, or part of an installation, system or *product* (as the case requires).

(c) A reference in a *Performance Requirement* to "appropriate to" means—

(i) that consideration of all the criteria referred to in the *Performance Requirement* will determine the outcome appropriate to the circumstances; and

(ii) that in certain cases it may not be necessary to incorporate any specific measures to meet the relevant *Performance Requirement*.

Explanatory information

A number of the *Performance Requirements* of the NCC use the expression "to the degree necessary" or "appropriate to". These expressions provide flexibility by allowing *appropriate authorities* to determine the degree of compliance necessary in a particular case.

For example, an *appropriate authority* might judge that an item need not be installed, or a particular level of performance be achieved.

(d) An "Application" statement is provided to specify where and when a requirement or provision applies.

(e) A "Limitation" statement is provided to specify where and when the application of a requirement or provision is limited to a certain circumstance.

(f) An "Exemption" statement is provided within a requirement or provision and specifies where or when a requirement or provision does not need to be complied with.

Explanatory information

Application, Limitation, and Exemption statements are used to identify provisions which may or may not apply in certain situations, to varying degrees.

(g) A "Note" is part of a provision or requirement and provides additional mandatory instructions.

(h) Figures in the NCC are used to illustrate specific issues referred to in the associated text. They are not to be construed as containing all design information that is *required* for that particular building element or situation.

Explanatory information

Figures are used to explain the requirements of a particular clause. To ensure the context of the requirement is clearly understood, adjacent construction elements of the building that would normally be required in that particular situation are not always shown.

Accordingly, aspects of figures that are not shown should not be interpreted as meaning these construction details are not required.

(i) The defined symbols and abbreviations listed in Schedule 2**.**

(4) A reference to a building class is understood to be a reference to all the sub-classifications of that class.

(5) A reference to—

(a) Class 1a and 1b are sub-classifications of a Class 1; and

(b) Class 7a and 7b are sub-classifications of a Class 7; and

(c) Class 9a, 9b and 9c are sub-classifications of a Class 9; and

(d) Class 10a, 10b and 10c are sub-classifications of a Class 10.

(6) A reference to a sub-classification is solely to that sub-classification.

Explanatory information

Classes 1a and 1b, 7a and 7b, 9a, 9b and 9c, and 10a, 10b and 10c are separate classifications. In the NCC, when the designation 'a', 'b' or 'c' is not applied, the reference is to all buildings of the general class. For example, 'Class 9b' refers only to Class 9b buildings, but 'Class 9' refers to Class 9a, Class 9b and Class 9c buildings.

Part A2 Compliance with the NCC

Introduction to this Part

This Part explains the possible methods of demonstrating compliance with the NCC. It explains the various compliance pathways within the NCC and the appropriate steps that must be taken for each of these pathways.

A2.0 Compliance

(1) Compliance with the NCC is achieved by complying with—

(a) the Governing Requirements of the NCC; and

(b) the *Performance Requirements*.

(2) A2.0(1) is subject to State and Territory variations and additions as described in A3.0.

Explanatory information

To comply with the NCC, a solution must achieve compliance with the Governing Requirements and *Performance Requirements*. The Governing Requirements contains requirements about how the *Performance Requirements* must be met.

Performance Requirements outline the levels of accomplishment different buildings must attain. The *Performance Requirements* are the only NCC hierarchy levels that must be satisfied.

In some instances, State and Territory variations and additions may also be applicable to certain *Performance Requirements*.

A2.1 Compliance with the Performance Requirements

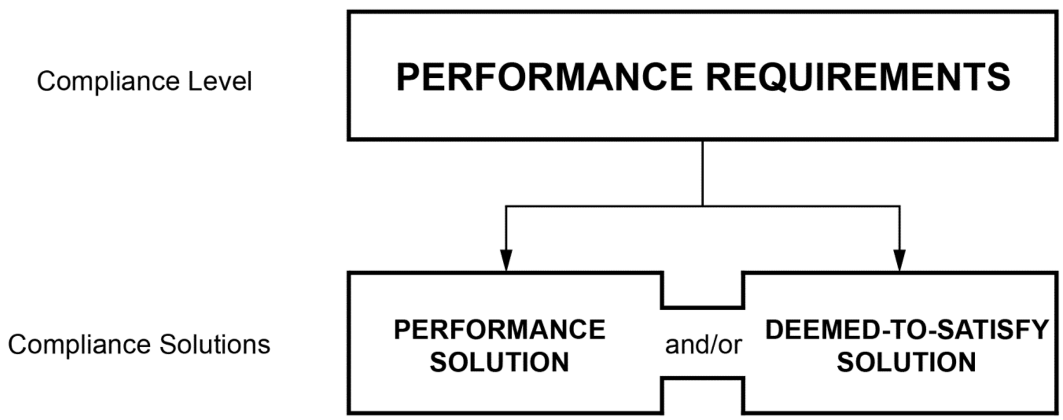
Performance Requirements are satisfied by one of the following as shown in Figure 1:

(1) (a) A *Performance Solution*.

(b) A *Deemed-to-Satisfy Solution*.

(c) A combination of (a) and (b).

Figure 1: NCC Compliance option structure



Explanatory information

A solution may be partly a *Performance Solution* and partly a *Deemed-to-Satisfy Solution*. However, no matter what method is chosen, building proponents need to always meet the *Performance Requirements* of the NCC.

There are three options to comply with the *Performance Requirements*: *Performance Solutions*, *Deemed-to-Satisfy Solutions*, or a combination of both.

A2.2 Performance Solution

(1) A *Performance Solution* is achieved by demonstrating—

(a) compliance with all appropriate *Performance Requirements*; or

(b) a solution is at least *equivalent* to the *Deemed-to-Satisfy Provisions*.

(2) A *Performance Solution* must comply with the *Performance Requirements* through one or a combination of the following:

(a) Evidence of suitability that shows the use of a material, product, *plumbing* and *drainage product*, form of construction or design meets a *Performance Requirement* in accordance with Part A5.

(b) A *Verification Method* including the following:

(i) The *Verification Methods* provided in the NCC.

(ii) Other *Verification Methods*, accepted by the *appropriate authority* that show compliance with the *Performance Requirements*.

Explanatory information

A2.2(b)(ii) provides for the use of *Verification Methods* which are not listed in the NCC. A *Verification Method* may include—

1. a calculation, using analytical methods or mathematical models; or
2. a test, using a technical procedure, either on-site or in a laboratory, to directly measure the extent to which the *Performance Requirements* have been met; or
3. an inspection (and inspection report); or
4. any other acceptable form of certification.

Any *Verification Method* used must be acceptable to the *appropriate authority*.

(c) *Expert Judgement*.

(d) Comparison with the *Deemed-to-Satisfy Provisions*.

Explanatory information

A *Performance Solution* must comply with all applicable *Performance Requirements* of the NCC. A *Performance Solution* provides a tailored solution to meet the intended objective of the *Performance Requirements*. A *Performance Solution* must comply with all relevant *Performance Requirements* and must be verified using one or a combination of the following methods:

- Evidence of suitability
- *Verification Method*
- Expert Judgement
- Comparison with the *Deemed-to-Satisfy Provisions*.

More information on NCC compliance methods is located at www.abcb.gov.au.

For example, building proponents who wish to know what has to be done to satisfy the fire-safety *Performance Requirements* of a particular building can either follow the *Deemed-to-Satisfy Provisions* or develop a *Performance Solution*. For a *Performance Solution* they might, for example, refer to—

- the International Fire Engineering Guidelines (Edition 2005) published by the Australian Building Codes Board; or
- the Fire Brigade Intervention Model (FBIM) developed by the Australasian Fire and Emergency Service Authorities Council (AFAC) to assist with determining fire brigade response times.

A2.3 Deemed to Satisfy Solution

(1) A solution which complies with the *Deemed-to-Satisfy Provisions* is deemed to have met the *Performance Requirements*.

(2) A *Deemed-to-Satisfy Solution* can show compliance with the *Deemed-to-Satisfy Provisions* through one or more of the following:

(a) Evidence of suitability that shows the use of a material, product, *plumbing* and *drainage product*, form of construction or design meets a *Deemed-to-Satisfy Provision* in accordance with Part A5.

(b) *Expert Judgement*.

(c) A *Verification Method* not included in the NCC which is accepted by the *appropriate authority* that shows compliance with the *Performance Requirements*.

Explanatory information

A *Deemed-to-Satisfy Solution* is achieved by following all appropriate *Deemed-to-Satisfy Provisions* in the NCC. The *Deemed-to-Satisfy Provisions* are prescriptive (i.e. like a recipe book, they tell you how, what and in which location things must be done). They include materials, components, design factors, and construction methods that, if used, are deemed to meet the *Performance Requirements*, hence the term "Deemed-to-Satisfy".

A *Deemed-to-Satisfy Solution* must comply with the relevant *Performance Requirements* and must be verified using one or a combination of the following methods:

- Evidence of suitability
- Expert Judgement
- *Verification Methods* not included in the NCC

More information on NCC compliance methods is located at www.abcb.gov.au.

(3) For **Volume Two**:

(a) An acceptable construction manual and an acceptable construction practice contained in the same part are considered to satisfy the same component of a *Performance Requirement*.

(b) In order to comply with the *Deemed-to-Satisfy Provisions* it is only necessary to satisfy -

(i) the appropriate acceptable construction manual; or

(ii) the appropriate acceptable construction practice.

(c) Where an acceptable construction manual and an acceptable construction practice contained in the same part are deemed to satisfy different components of a *Performance Requirement*, compliance with the *Deemed-to-Satisfy Provisions* may require satisfying both the listed acceptable construction manual and the acceptable construction practice for their specific components.

Explanatory information

In Section 3 of Volume Two the *Deemed-to-Satisfy Provisions* are divided into two compliance pathways; "acceptable construction practices" and "acceptable construction manuals".

- "Acceptable construction practices" are some of the most common forms of national construction practice and are written into Section 3.
- "Acceptable construction manuals" are the deemed-to-satisfy referenced documents.

In general, either an "acceptable construction practice" or an "acceptable construction manual" may be used as options when proposing a *Deemed-to-Satisfy Solution*.

(4) For **Volume Three**:

(a) An acceptable plumbing practice satisfies the *Performance Requirement* in a detached Class 1 or Class 10 building only.

(b) In order to comply with the *Deemed-to-Satisfy Provisions* it is only necessary to satisfy -

(i) the appropriate acceptable plumbing manual; or

(ii) the appropriate acceptable plumbing practice.

(c) Where the acceptable plumbing manual and an acceptable plumbing practice contained in the same part are deemed to satisfy different components of a *Performance Requirement*, compliance with the *Deemed-to-Satisfy Provisions* may require satisfying both the listed acceptable plumbing manual and the acceptable plumbing practice for their specific components.

Explanatory information

In Volume Three the *Deemed-to-Satisfy Provisions* are divided into two compliance pathways; "acceptable plumbing practices" and "acceptable plumbing manuals".

- "Acceptable plumbing practices" are some of the most common forms of national plumbing practice and are written into Volume Three.
- "Acceptable plumbing manuals" are the deemed-to-satisfy referenced documents.

In general, either an "acceptable plumbing practice" or an "acceptable plumbing manual" may be used as options when proposing a *Deemed-to-Satisfy Solution*.

Explanatory information:

Section B and Section C acceptable plumbing practices are *Deemed-to-Satisfy Provisions* that are considered to be acceptable forms of plumbing that meet the legislative requirements for Class 1 and 10 buildings only.

There is no obligation to adopt any particular option contained in Section B or Section C, if it is preferred to meet the *Performance Requirement* in some other way.

However, if one of the options described in Section B or Section C is not complied with, then the *appropriate authority* must be satisfied that the *Performance Requirements* have been met.

A2.4 A Combination of Solutions

(1) A *Performance Requirement* or *Performance Requirements* may be satisfied by using a combination of *Performance Solutions* and *Deemed-to-Satisfy Solutions*.

(2) When using a combination of solutions, compliance can be shown through the following:

- (a) A2.2 for assessment against the *Performance Requirements*.
- (b) A2.3 for assessment against the *Deemed-to-Satisfy Provisions*.

(3) In order to comply with A2.4(1), the following method must be used to determine the *Performance Requirement* or *Performance Requirements* relevant to the *Performance Solution*:

- (a) Where a *Performance Requirement* is satisfied entirely by a *Performance Solution*—
  - (i) identify the relevant *Performance Requirement* from the Section or Part to which the *Performance Solution* applies; and
  - (ii) identify *Performance Requirements* from other Sections or Parts that are relevant to any aspects of the *Performance Solution* proposed or that are affected by the application of the *Performance Solution*.
- (b) Where a *Performance Requirement* is satisfied by a *Performance Solution* in combination with a *Deemed-to-Satisfy Solution*—
  - (i) identify the relevant *Deemed-to-Satisfy Provisions* of each Section or Part that is be the subject of the *Performance Solution*; and
  - (ii) identify the *Performance Requirements* from the same Sections or Parts that are relevant to the identified *Deemed-to-Satisfy Provisions*; and
  - (iii) identify *Performance Requirements* from other Sections or Parts that are relevant to any aspects of the *Performance Solution* proposed or that are affected by the application of the *Deemed-to-Satisfy Provisions* that are the subject of the *Performance Solution*.

Explanatory information

When designing a building, both *Performance Solutions* and *Deemed-to-Satisfy Solutions* can be used to achieve compliance with *Performance Requirement*. A combination of solutions may be used to satisfy a single *Performance Requirement*. This may include occasions where a specific *Performance Requirement* covers a number of elements within a building.

No NCC provision can be considered in isolation. Any departure from the *Deemed-to-Satisfy Provisions* for a *Performance Solution* needs to be assessed against the relevant *Performance Requirements* within the relevant NCC Section or Part. Additionally, the proposed *Performance Solution* may also impact on other *Performance Requirements* in other Sections or Parts. Thus, these additional *Performance Requirements* need to be considered in relation to the subject *Performance Solution*. A2.4 sets out the method of determining which *Performance Requirements* are relevant.

It is important that a holistic approach is used when determining the appropriate *Performance Requirements*.

More information on using a combination of solutions approach is located at www.abcb.gov.au.

Part A3 State or Territory compliance and the NCC

Introduction to this Part

This Part explains applying the NCC in accordance with State or Territory legislation. In its own right, the NCC is not a legal document. It has legal effect through references in relevant State and Territory building and plumbing legislation.

Although the NCC is a nationally consistent code, there are some situations where a State or Territory enforce a variation, addition or deletion to it. This Part also explains how these variations, additions and deletions apply.

A3.0 State and Territory compliance

(1) For application within a particular State or Territory, the Volumes of the NCC comprises inclusively of—

  (a) Section A to J of Volume One; and

  (b) Section 1 to 3 of Volume Two; and

  (c) Section A to G of Volume Three.

(2) State or Territory variations, additions and deletions must be complied with in conjunction with the NCC.

(3) The NCC is subject to, and may be overridden by, State or Territory legislation.

(4) State or Territory additions are contained in Schedule1.

(5) State or Territory variations and deletions are contained throughout the NCC.

Part A4 NCC Referenced documents

Introduction to this Part

This Part explains how documents referenced in the NCC are applied and adopted. The NCC itself doesn't contain details of every design and construction requirement for a building or *plumbing* or *drainage* system. As such, the NCC calls upon or "references" other documents with this information. These are called NCC referenced documents. Examples of these are Australian Standards, ABCB protocols, ABCB standards and other publications.

There are two types of referenced documents. A primary referenced document is in the Referenced Documents Schedule of the NCC. A secondary referenced document is one referenced in a primary referenced document.

A4.0 Referenced documents

(1) A reference in the NCC to a document refers to the edition or issue and any amendment listed in Schedule 4.

(2) A document referenced in the NCC is only applicable in the context in which the document is quoted.

(3) Where a new edition, issue or amendment of a primary referenced document is not listed under Schedule 4, the new edition, issue or amendment is not referenced for the purposes of the NCC.

(4) Any document referenced in a primary referenced document is known as a secondary referenced document.

(5) A reference to a secondary or other referenced document is a reference to the document as it existed at the time of publication of the primary referenced document.

Exemption 1:

If the secondary or other referenced document is also a primary referenced document, A4.0(5) does not apply.

A4.1 Differences between referenced documents and the NCC

(1) The NCC overrules in any difference between the NCC and a primary referenced document.

(2) Where a document is referenced in the NCC, any rule, specification or clause within that document cannot vary from the NCC.

A4.2 Adoption of referenced documents

Documents referenced in the NCC exclude the following:

(a) Specification or definition of the rights, responsibilities or obligations between the manufacturer, supplier or purchaser.

(b) Specification of the responsibilities of any trades person or other building operative, architect, engineer, authority, or other person or body.

(c) Requirement for submission for approval for any material, building component, form or method of construction, to any person, authority or body other than those empowered under State or Territory legislation to give that approval.

(d) Specification that a material, product, form of construction or design must be submitted to any person, authority or body for opinion.

(e) Permitting a departure from the NCC, rule, specification or provision at the sole discretion of the manufacturer or purchaser, or by arrangement or agreement between the manufacturer and purchaser.

Part A5 Documentation of design and construction

Introduction to this Part

This Part explains the documents needed to show that the NCC requirements are met and are 'fit for purpose'. It covers the use of materials, products, forms of construction and designs. It details separate requirements for the NCC, BCA and PCA.

Examples of documents to be prepared and retained include certificates, reports, calculations and any other documents or information showing compliance with the NCC requirements.

A5.0 Suitability

A building and *plumbing* or *drainage* installation must be constructed—

(a) using materials, products, *plumbingproducts* and forms of construction fit for their intended purpose; and

(b) in an appropriate manner to meet the *Performance Requirements*.

A5.1 Evidence of suitability - NCC

(1) The form of evidence used must be appropriate to the use of the material, product, *plumbing* product, form of construction or design to which it relates.

(2) Any copy of documentary evidence submitted, must be a complete copy of the original certificate, report or document.

A5.2 Evidence of suitability - BCA

Application 1

A5.2 is only applicable to the BCA.

(1) For the purposes of A5.0, a material, product, form of construction or design is fit for purpose if is—

  (a) supported by evidence of suitability in accordance with A5.2(2) to A5.3(3); and

  (b) constructed or installed in an appropriate manner.

(2) Subject to A5.1(1), A5.4, A5.5 and A5.6, evidence to support that the use of a material, product, form of construction or design meets a *Performance Requirement* or a *Deemed-to-Satisfy Provision* may be in the form of any one, or any combination of the following:

  (a) A current CodeMark Australia or CodeMark *Certificate of Conformity*.

  (b) A current *Certificate of Accreditation*.

  (c) A current certificate, other than a certificate described in A5.2(2)(a) and A5.2(2)(b), issued by a *certification body* stating that the properties and performance of a material, product, form of construction or design fulfil specific requirements of the BCA.

  (d) A report issued by an *Accredited Testing Laboratory* that—

    (i) demonstrates that a material, product or form of construction fulfils specific requirements of the BCA; and

    (i) sets out the tests the material, product or form of construction has been subjected to and the results of those tests and any other relevant information that has been relied upon to demonstrate its suitability for use in the building.

  (e) A certificate or report from a *professional engineer* or other *appropriately qualified person* that—

    (i) certifies that a material, product, form of construction or design fulfils specific requirements of the BCA; and

    (ii) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon to demonstrate its suitability for use in the building.

  (f) Another form of documentary evidence, such as but not limited to a *Product Technical Statement*, that—

    (i) demonstrates that a material, product, form of construction or design fulfils specific requirements of the BCA; and

    (ii) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon to demonstrate its suitability for use in the building.

(3) Evidence to support that a calculation method complies with an ABCB protocol may be in the form of any one, or any combination of the following:

(a) A certificate from a *professional engineer* or other *appropriately qualified person* that—

(i) certifies that the calculation method complies with a relevant ABCB protocol; and

(ii) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice and other publications have been relied upon.

(b) Another form of documentary evidence that correctly describes how the calculation method complies with a relevant ABCB protocol.

A5.3 Evidence of suitability – PCA

Application 1:

A5.3 is only applicable to the PCA.

(1) Any *product* that is intended for use in contact with *drinking water* must comply with the relevant requirements of AS/NZS 4020 in the form of either—

(a) a test report provided by a *certification body* or *accredited testing laboratory*, in accordance with AS/NZS 4020; or

(b) a *WaterMark Licence* issued in accordance with A5.3(2), if it includes compliance with AS/NZS 4020.

(2) A *product* of a type listed on the *WaterMark Schedule of Products* is deemed to be fit for its intended purpose if it has a *WaterMark Licence* issued in accordance with the *WaterMark Scheme Rules*.

(3) A *product* of a type listed on the *WaterMark Schedule of Excluded Products* requires evidence of suitability in the form of—

(a) a current certificate issued by a *certification body* stating that the properties and performance of a *product* can meet the requirements of the PCA; or

(b) a report issued by an *Accredited Testing Laboratory* which—

(i) demonstrates that the *product* complies with the relevant requirements of the PCA; and

(ii) sets out the tests the *product* has been submitted to and the results of those tests and any other relevant information that has been relied upon to demonstrate suitability for use in a *plumbing* or *drainage* installation.

(4) Any *product* that is not covered by A5.3(2) or A5.3(3) must be subjected to a risk assessment in accordance with the *WaterMark Scheme Rules*.

(5) Evidence to support that a design or system meets relevant PCA *Performance Requirements* must be in the form of any one or any combination of the following:

(a) The design or system complies with a *Deemed-to-Satisfy Provision* within the PCA.

(b) The design or system is a *Performance Solution* from a *Professional engineer* or a *recognised expert* which—

(i) certifies that the design or system complies with the relevant requirements of the PCA; and

(ii) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon.

(6) Any other form of documentary evidence that—

(a) demonstrates that a design or system complies with the relevant requirements of the PCA; and

(b) sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon.

Part A6 Building classification

Introduction to this Part

The NCC groups buildings and structures by their function and use, assigning each type of building or structure with a classification. This Part explains how each building classification is defined and used in the NCC.

The building classifications are labelled "Class 1" through to "Class 10". Some classifications also have sub-classifications, referred to by a letter after the number (e.g. Class 1a).

Class 2 to 9 buildings are mostly covered by Volume One of the NCC and Class 1 and 10 buildings are mostly covered by Volume Two of the NCC. Volume Three of the NCC refers to all building classifications.

A building may have parts that have different uses. In most cases, each of these parts are a separate classification. A building (or part of a building) may also have more than one use and may be assigned more than one classification.

A6.0 Determining a building classification

(1) The classification of a building or part of a building is determined by the purpose for which it is designed, constructed or adapted to be used.

(2) Each part of a building must be classified separately and comply with all the appropriate requirements for its classification.

Exemption 1:

For A6.0(1) where a part of a building has different purposes and is less than 10% of the *floor area* of the *storey* it is situated on, the classification of the major use may apply to the whole *storey*.

Limitation 1:

Exemption 1 does not apply where the minor use of a building is a laboratory or Class 2, 3 or 4 part of a building.

(3) A room that contains a mechanical, thermal or electrical facility or the like that serves the building must have the same classification as the part of the building in which it is situated.

(4) Unless another classification is more suitable an *occupiable outdoor area* must have the same classification as the part of the building in which it is situated.

A6.1 Class 1 buildings

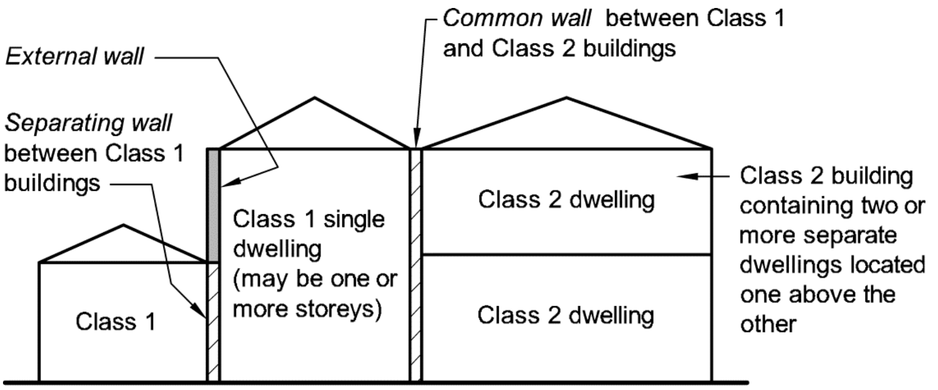
(1) A Class 1 building includes the following sub-classifications:

- (a) Class 1a is one or more buildings, which together form a single dwelling including the following:
  - (i) A detached house.
  - (i) One of a group of two or more attached dwellings, each being a building, separated by a *fire-resisting* wall, including a row house, terrace house, town house or villa unit.
- (b) Class 1b is one or more buildings which together constitute —
  - (i) a boarding house, guest house, hostel or the like that would —
    - (A) ordinarily accommodate not more than 12 people; and
    - (B) has a total area of all floors up to and including 300m^2 (measured over the enclosing walls of the building); or
  - (ii) four or more single dwellings located on one allotment and used for short-term holiday accommodation.

Limitation 1:

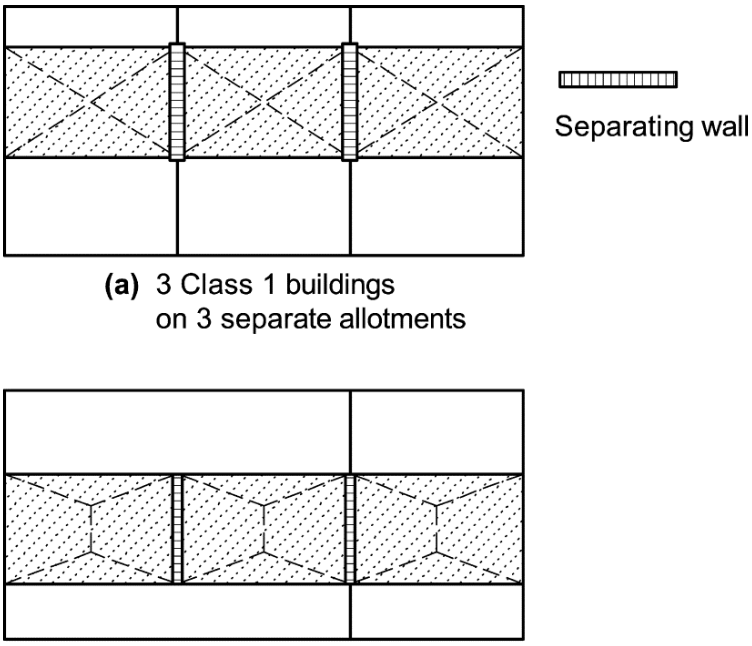
For A6.1, a Class 1 building cannot be located above or below another dwelling or another Class of building, other than a *private garage*. See Figures 2, 3 and 4.

Figure 2: Identification of Class 1 buildings



Elevation

Figure 3: Typical Class 1 configurations

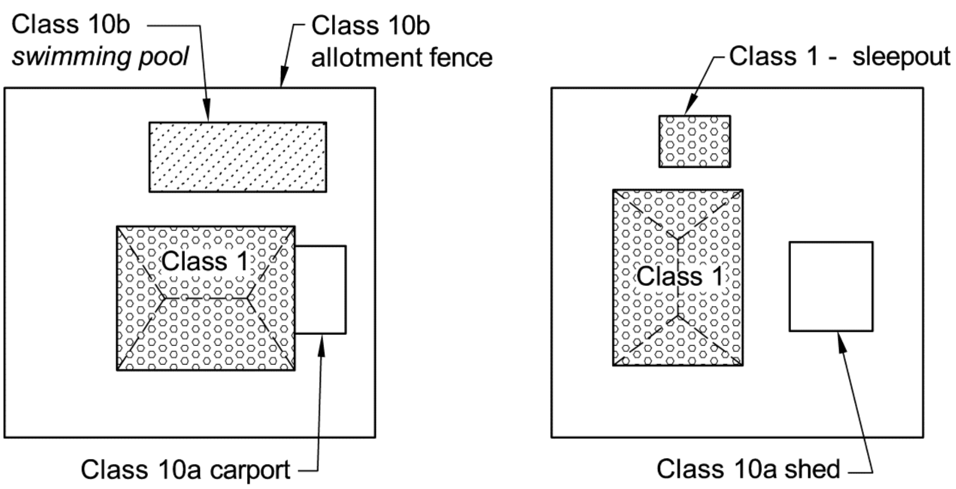


(a) 3 Class 1 buildings on 3 separate allotments

(b) 3 Class 1 buildings on 2 separate allotments

Plan view

Figure 4: Domestic Allotment - Classification of buildings and structures



(a) Class 10 attached and Class 10b

(b) Class 1 part and Class 10 detached

Plan view

A6.2 Class 2 buildings

(1) A Class 2 building is a building containing two or more *sole-occupancy units*.

(2) Each *sole-occupancy unit* must be a separate dwelling.

A6.3 Class 3 buildings

A Class 3 building is a residential building which is a place of long-term or transient accommodation for a number of unrelated persons, including the following:

(a) A boarding house, guest house, hostel, lodging house or backpacker accommodation.

(b) A residential part of a hotel or motel.

(c) A residential part of a *school*.

(d) Accommodation for the aged, children, or people with disability, or a *residential care building*.

(e) A residential part of a *health-care building* which accommodates members of staff.

(f) A residential part of a *detention centre*.

Limitation 1:

For A6.3, a Class 3 building is not a Class 1 or 2 residential building.

A6.4 Class 4 buildings

Class 4 is a dwelling in a Class 5, 6, 7, 8 or 9 building.

Application 1:

A6.4 only applies if it is the only dwelling in the building.

A6.5 Class 5 buildings

A Class 5 building is an office building used for professional or commercial purposes.

Limitation 1

For A6.5, a Class 5 building is not a Class 1 or 2 residential building.

A6.6 Class 6 buildings

(1) A Class 6 building is a shop or other building used for the retail sale of goods or the supply of services direct to the public.

(2) A Class 6 building includes a *service station*.

Exemption 1:

A6.6(1) does not apply to a bar area that is in an *assembly building*.

A6.7 Class 7 buildings

A Class 7 building includes the following sub-classifications:

(a) Class 7a is a building which is a *carpark*.

(b) Class 7b is a building which is used for storage, or display of goods or produce for sale by wholesale.

A6.8 Class 8 buildings

A Class 8 building is defined as the following:

(a) A laboratory.

(b) A building in which the production, assembling, altering, repairing, packing, finishing, or cleaning of goods or produce for sale takes place.

A6.9 Class 9 buildings

A Class 9 building includes the following sub-classifications:

(a) Class 9a is a building of a public nature that is a *health-care building* including any parts of the building set aside as laboratories, and includes a *health-care building* used as a *residential care building*.

(b) Class 9b is s a building of a public nature that is an *assembly building* including a trade workshop or laboratory in a primary or secondary *school*.

Exemption 1:

A6.9(b) excludes any parts of the building that are of another Class.

(c) Class 9c is a building of a public nature that is a *residential care building*.

A6.10 Class 10 buildings

A Class 10 building includes the following sub-classifications:

(a) Class 10a is a non-habitable building including a *private garage*, carport, shed or the like.

(b) Class 10b is a structure that is a fence, mast, antenna, retaining wall or free-standing wall or *swimming pool* or the like.

(c) Class 10c is a *private bushfire shelter*.

A6.11 Multiple classifications

A building (or part of a building) may be designed for multiple purposes and have more than one classification.

Application 1:

For A6.11, a building (or part of a building) must comply with all the appropriate requirements that apply to each of the classifications.

A6.12 United buildings

Buildings are deemed united when two or more buildings adjoining each other form one united building.

Application 1:

For A6.12, a building is a united building if it is connected through openings in the walls dividing them and together comply with all the requirements of the NCC as though they are a single building.

A6.13 Alterations in a united building

If, after alterations or any other building work, two or more of the buildings in A6.12 cease to be connected through openings in the dividing walls, each of those buildings not now connected must comply with all the requirements for a single building.

PART B1 STRUCTURAL PROVISIONS

PERFORMANCE REQUIREMENTS

BP1.1 Structural reliability

(a) A building or structure, during construction and use, with appropriate degrees of reliability, must—
  (i) perform adequately under all reasonably expected design actions; and
  (ii) withstand extreme or frequently repeated design actions; and
  (iii) be designed to sustain local damage, with the structural system as a whole remaining stable and not being damaged to an extent disproportionate to the original local damage; and
  (iv) avoid causing damage to *other properties*,

  by resisting the actions to which it may reasonably expect to be subjected.

(b) The actions to be considered to satisfy (a) include but are not limited to—
  (i) permanent actions (dead loads); and
  (ii) imposed actions (live loads arising from occupancy and use); and
  (iii) wind action; and
  (iv) earthquake action; and
  (v) snow action; and
  (vi) liquid pressure action; and
  (vii) ground water action; and
  (viii) rainwater action (including ponding action); and
  (ix) earth pressure action; and
  (x) differential movement; and
  (xi) time dependent effects (including creep and shrinkage); and
  (xii) thermal effects; and
  (xiii) ground movement caused by—
    (A) swelling, shrinkage or freezing of the subsoil; and
    (B) landslip or subsidence; and
    (C) siteworks associated with the building or structure; and
  (xiv) *construction activity actions*; and
  (xv) termite actions.

BP1.2 Structural resistance

The structural resistance of materials and forms of construction must be determined using five percentile characteristic material properties with appropriate allowance for—

(a) known construction activities; and
(b) type of material; and
(c) characteristics of the site; and
(d) the degree of accuracy inherent in the methods used to assess the structural behaviour; and
(e) action effects arising from the differential settlement of foundations, and from restrained dimensional changes due to temperature, moisture, shrinkage, creep and similar effects.

BP1.3 Glass installations at risk of human impact

Glass installations that are at risk of being subjected to human impact must have glazing that—

(a) if broken on impact, will break in a way that is not likely to cause injury to people; and
(b) resists a reasonably foreseeable human impact without breaking; and
(c) is protected or marked in a way that will reduce the likelihood of human impact.

BP1.4 Buildings in flood areas

Qld BP1.4

SA BP1.4

(a) A building in a *flood hazard area*, must be designed and constructed, to the degree necessary, to resist flotation, collapse or significant permanent movement resulting from the action of hydrostatic, hydrodynamic, erosion and scour, wind and other actions during the *defined flood event*.

(b) The actions and requirements to be considered to satisfy (a) include but are not limited to—

- (i) flood actions; and
- (ii) elevation requirements; and
- (iii) foundation and footing requirements; and
- (iv) requirements for enclosures below the *flood hazard level*; and
- (v) requirements for structural connections; and
- (vi) material requirements; and
- (vii) requirements for utilities; and
- (viii) requirements for occupant egress.

Application:

BP1.4 only applies to—

(a) a Class 2 or 3 building or Class 4 part of a building; and

(b) a Class 9a *health-care building*; and

(c) a Class 9c building.

VERIFICATION METHODS

BV1 Structural reliability

This *Verification Method* is only applicable to components with resistance coefficient of variation of at least 10% and not more than 40%.

(b) ~~the calculated annual structural reliability index (β), for each action, is not less than that listed in Table BV1.1; and~~Compliance with BP1.1 and BP1.2 is verified for the design of a structural component for strength when—

the capacity reduction factor ϕ satisfies—

$\phi <= \text{Average}(\phi_G, \phi_Q, \phi_W, \ldots)$,

where—

ϕG, ϕQ, ϕW,… are capacity reduction factors for all relevant actions and must contain at least permanent (G), imposed (Q) and wind (W) actions.

(ii) the capacity reduction factors ϕ_G, ϕ_Q, ϕ_W,… are calculated for target reliability indices for permanent action β_{TG}, for imposed action β_{TQ}, for wind action β_{TW}, … in accordance with the following—

~~**Table BV1.1 ANNUAL STRUCTURAL RELIABILITY INDICES (β) FOR STRUCTURAL COMPONENTS AND CONNECTIONS**~~

~~Importance Level (see Table B1.2a)~~	~~Permanent and imposed actions~~	~~Wind, earthquake and snow actions~~
~~1~~	~~3.8~~	~~3.2~~
~~2~~		~~3.4~~
~~3~~		~~3.6~~
~~4~~		~~3.8~~
~~**Note:** The structural reliability indices shown in this table are for primary structural components and connections whose failure could result in collapse of the building, structure or *other property*. For other structural components and connections, the target structural reliability indices can be reduced by 0.3.~~		

(b) ~~the annual structural reliability index (β) is calculated in accordance with the following formula:~~

$$\beta = \ln\left[\left(\frac{\bar{R}}{\bar{S}}\right)\sqrt{\frac{C_S}{C_R}}\right] / \sqrt{\ln\left(C_R . C_S\right)}$$

where—

$$\left(\frac{\bar{R}}{\bar{S}}\right) = \frac{\left(\frac{\gamma}{\phi}\right)}{\left(\frac{\bar{S}}{S_N}\right)}\left(\frac{\bar{R}}{R_N}\right)$$

with—

$$C_R = 1 + V_R^2$$
$$C_S = 1 + V_S^2$$

$\frac{\bar{R}}{R_N}$ ~~C_Q~~ = ratio of mean resistance to nominal; and~~correction factor for action; and~~

$\frac{\bar{S}}{S_N}$ ~~C_R~~ = ratio of mean action to nominal; and~~correction factor for resistance; and~~

C_S~~Q_m~~ = correction factor for action; and~~mean action; and~~

C_R ~~Q_n~~ = correction factor for resistance; and~~nominal design action; and~~

V_S~~R_m~~ = coefficient of variation of the appropriate action as given in Table BV1.1; and~~mean resistance; and~~

V_R~~R_n~~ = coefficient of variation of the resistance; and~~nominal design resistance; and~~

γ_i~~V_Q~~ = appropriate load factor for the action i as given in AS/NZS 1170.0; and

ϕ~~V_R~~ = capacity factor for the appropriate action.~~coefficient of variation with respect to resistance; and~~

~~Φ = capacity factor; and~~

Table BV1.1 - Action models

Design Action	Ratio of mean action to nominal	Coefficient of variation of the action
Permanent Action (γG = 1.35)	$(\bar{G}/G_N) = 1.00$	$V_G = 0.10$
Imposed Action (γQ = 1.50)	$(\bar{Q}/Q_N) = 50$	$V_Q0. = 0.43$
Wind Action (γW = 1.00)(Non-cyclonic)	$(\bar{W}/W_N) = 0.35$	$V_W = 0.52$
Wind Action (γW = 1.00) (Cyclonic)	$(\bar{W}/W_N) = 0.17$	$V_W = 0.79$
Snow Action (γS = 1.00)	$(\bar{S}/S_N) = 0.29$	$V_S = 0.57$
Earthquake Action (γE = 1.00)	$(\bar{E}/E_N) = 0.048$	$V_E = 1.97$

~~C_Q = correction factor for action; and~~

~~C_R = correction factor for resistance; and~~

~~Q_m = mean action; and~~

~~Q_n = nominal design action; and~~

~~R_m = mean resistance; and~~

~~R_n = nominal design resistance; and~~

~~V_Q = coefficient of variation with respect to action; and~~

~~V_R = coefficient of variation with respect to resistance; and~~

~~Φ = capacity factor; and~~

~~γ = load factor; and~~

(iii) the target reliability indices β_{TG}, β_{TQ}, β_{TW},… are established as follows:

~~the action models for calculation of the structural reliability index are determined in accordance with Table BV1.2; and~~

(A) For situations where it is appropriate to compare with an equivalent Deemed-to-Satisfy product, a resistance model is established for the equivalent Deemed-to-Satisfy product βTG, βTQ, βTW is calculated for the equivalent Deemed-to-Satisfy product in accordance with Equation (1). The target reliability indices βTG, βTQ, βTW,…thus established, must not be less than those given in Table BV1.2 minus 0.5.

(B) For situations where it is not appropriate to compare with an equivalent Deemed-to-Satisfy product, the target reliability index β must be as given in Table BV1.2.

Table BV1.2 - Target reliability indices

Type of action	Target reliability index β
Permanent action	4.3
Imposed action	4.0
Wind, snow and earthquake action	3.7

Application of Table BV1.2

1. Table BV1.2 is applicable for components with creep characteristics similar to concrete as specified in AS 3600.
2. For components with creep characteristics similar to timber as specified in AS 1720.1, the target reliability index for permanent action must be increased to 5.0.
3. The above target reliability indices are based on materials or systems that exhibit creep or brittle failure characteristics similar to steel, timber and concrete. Table BV1.2 may also be applicable to materials or systems that exhibit creep or brittle failure differently to steel, timber or concrete provided that the creep and/or brittle nature of the material or system are properly accounted for in the design model.

(iv) The resistance model for the component shall be established taking into account variability due to material properties, fabrication and construction process and structural modelling.

~~the resistance model for the structural component or connection is established after taking into account variability~~

~~due to material properties, fabrication and construction processes, and structural modelling.~~

~~**Table BV1.2 — ACTION MODELS**~~

~~Importance Level (see Table B1.2a)~~	~~Permanent action~~		~~Imposed action~~		~~Wind action~~				~~Snow action~~		~~Earthquake action~~	
					~~Non-cyclonic~~		~~Cyclonic~~					
	~~Q_m~~	~~V_Q~~	~~Q_m~~	~~V_Q~~	~~Q_m~~	~~V_Q~~	~~Q_m~~	~~V_Q~~	~~Q_m~~	~~V_Q~~	~~Q_m~~	~~V_Q~~
~~1~~	~~1.00~~	~~0.10~~	~~0.50~~	~~0.43~~	~~0.41~~	~~0.52~~	~~0.21~~	~~0.79~~	~~0.32~~	~~0.57~~	~~0.072~~	~~1.97~~
~~2~~	~~1.00~~	~~0.10~~	~~0.50~~	~~0.43~~	~~0.34~~	~~0.52~~	~~0.18~~	~~0.79~~	~~0.30~~	~~0.57~~	~~0.054~~	~~1.97~~
~~3~~	~~1.00~~	~~0.10~~	~~0.50~~	~~0.43~~	~~0.32~~	~~0.52~~	~~0.16~~	~~0.79~~	~~0.28~~	~~0.57~~	~~0.042~~	~~1.97~~
~~4~~	~~1.00~~	~~0.10~~	~~0.50~~	~~0.43~~	~~0.30~~	~~0.52~~	~~0.14~~	~~0.79~~	~~0.27~~	~~0.57~~	~~0.036~~	~~1.97~~

PART B1 STRUCTURAL PROVISIONS

Deemed-to-Satisfy Provisions

B1.0 Deemed-to-Satisfy Provisions

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

B1.2 Determination of individual actions

The magnitude of individual actions must be determined in accordance with the following:

(a) Permanent actions:
- (i) the design or known dimensions of the building or structure; and
- (ii) the unit weight of the construction; and
- (iii) AS/NZS 1170.1.

(b) Imposed actions:
- (i) the known loads that will be imposed during the occupation or use of the building or structure; and
- (ii) *construction activity actions*; and
- (iii) AS/NZS 1170.1.

(c) Wind, snow and ice and earthquake actions:
- (i) the applicable annual probability of design event for safety, determined by—
  - (A) assigning the building or structure an Importance Level in accordance with Table B1.2a; and
  - (B) determining the corresponding annual probability of exceedance in accordance with Table B1.2b; and
- (ii) AS/NZS 1170.2; and
- (iii) AS/NZS 1170.3 and AS 1170.4 as appropriate; and
- (iv) in cyclonic areas, metal roof cladding, its connections and immediate supporting members must comply with Specification B1.2; and
- (v) for the purposes of (iv), cyclonic areas are those determined as being located in wind regions C and D in accordance with AS/NZS 1170.2.

(d) Actions not covered in (a), (b) and (c) above:
- (i) the nature of the action; and
- (ii) the nature of the building or structure; and
- (iii) the Importance Level of the building or structure determined in accordance with Table B1.2a; and
- (iv) AS/NZS 1170.1.

(e) For the purposes of (d) the actions include but are not limited to—
- (i) liquid pressure action; and
- (ii) ground water action; and
- (iii) rainwater action (including ponding action); and
- (iv) earth pressure action; and
- (v) differential movement; and
- (vi) time dependent effects (including creep and shrinkage); and
- (vii) thermal effects; and
- (viii) ground movement caused by—
  - (A) swelling, shrinkage or freezing of the subsoil; and
  - (B) landslip or subsidence; and
  - (C) *siteworks* associated with the building or structure; and
- (ix) *construction activity actions*.

Deemed-to-Satisfy Provisions

Table B1.2a IMPORTANCE LEVELS OF BUILDINGS AND STRUCTURES

Importance Level	Building Types
1	Buildings or structures presenting a low degree of hazard to life and *other property* in the case of failure.
2	Buildings or structures not included in Importance Levels 1, 3 and 4.
3	Buildings or structures that are designed to contain a large number of people.
4	Buildings or structures that are essential to post-disaster recovery or associated with hazardous facilities.

Table B1.2b Design events for safety

Importance Level	Annual probability of exceedance for non-cyclonic wind	Annual probability of exceedance for cyclonic wind	Annual probability of exceedance for snow	Annual probability of exceedance for earthquakes
1	1:100	1:200	1:100	1:250
2	1:500	1:500	1:150	1:500
3	1:1000	1:1000	1:200	1:1000
4	1:2000	1:2000	1:250	1:1500

~~**Table B1.2b DESIGN EVENTS FOR SAFETY**~~

~~Importance Level~~	~~Annual probability of exceedance~~			
	~~Wind~~		~~Snow~~	~~Earthquake~~
	~~Non-cyclonic~~	~~Cyclonic~~		
~~1~~	~~1:100~~	~~1:200~~	~~1:100~~	~~1:250~~
~~2~~	~~1:500~~	~~1:500~~	~~1:150~~	~~1:500~~
~~3~~	~~1:1000~~	~~1:1000~~	~~1:200~~	~~1:1000~~
~~4~~	~~1:2000~~	~~1:2000~~	~~1:250~~	~~1:1500~~

B1.4 Determination of structural resistance of materials and forms of construction

The structural resistance of materials and forms of construction must be determined in accordance with the following, as appropriate:

(a) Masonry (including masonry-veneer, unreinforced masonry and reinforced masonry): AS 3700.

(b) Concrete:

- (i) Concrete construction (including reinforced and prestressed concrete): AS 3600.
- (ii) Autoclaved aerated concrete: AS 5146.1.
- (iii) Post-installed and cast-in fastenings: SA TS 101.

(c) Steel construction—

- (i) Steel structures: AS 4100.
- (ii) Cold-formed steel structures: AS/NZS 4600.
- (iii) Residential and low-rise steel framing: NASH Standard – Residential and Low-Rise Steel Framing Part 1 or Part 2.

(d) Composite steel and concrete: AS 2327.1.

(e) Aluminium construction: AS/NZS 1664.1 or AS/NZS 1664.2.

(f) Timber construction:

- (i) Design of timber structures: AS 1720.1.
- (ii) * * * * *
- (iii) Timber structures: AS 1684 Part 2, Part 3 or Part 4.
- (iv) Nailplated timber roof trusses: AS 1720.5.

Qld B1.4(f)(v)

(g) Piling: AS 2159.

(h) Glazed assemblies:

(i) The following glazed assemblies in an *external wall* must comply with AS 2047:

(A) Windows excluding those listed in (ii).

(B) Sliding and swinging glazed doors with a frame, including french and bi-fold doors with a frame.

(C) Adjustable louvres.

(D) Shopfronts.

(E) Window walls with one piece framing.

(ii) All glazed assemblies not covered by (i) and the following glazed assemblies must comply with AS 1288:

(A) All glazed assemblies not in an *external wall*.

(B) Revolving doors.

(C) Fixed louvres.

(D) Skylights, roof lights and windows in other than the vertical plane.

(E) Sliding and swinging doors without a frame.

(F) Windows constructed on site and architectural one-off windows, which are not design tested in accordance with AS 2047.

(G) Second-hand windows, re-used windows and recycled windows.

(H) Heritage windows.

(I) Glazing used in balustrades and sloping overhead glazing.

NT B1.4(i)

(i) Termite Risk Management: Where a *primary building element* is subject to attack by subterranean termites: AS 3660.1, and—

(i) for the purposes of this provision, a *primary building element* consisting entirely of, or a combination of, any of the following materials is considered not subject to termite attack:

(A) Steel, aluminium or other metals.

(B) Concrete.

(C) Masonry.

(D) Fibre-reinforced cement.

(E) Timber — naturally termite resistant in accordance with Appendix C of AS 3660.1.

(F) Timber — preservative treated in accordance with Appendix D of AS 3660.1; and

(ii) a durable notice must be permanently fixed to the building in a prominent location, such as a meter box or the like, indicating—

(A) the termite management system used; and

(B) the date of installation of the system; and

(C) where a chemical is used, its life expectancy as listed on the *appropriate authority's* pesticides register label; and

(D) the installer's or manufacturer's recommendations for the scope and frequency of future inspections for termite activity.

(j) Roof construction (except in cyclone areas):

(i) Plastic sheeting: AS/NZS 1562.3, AS/NZS 4256 Parts 1, 2, 3 and 5.

(ii) Roofing tiles: AS 2049, AS 2050.

(iii) Cellulose cement corrugated sheets: AS/NZS 2908.1 with safety mesh installed in accordance with AS/NZS 1562.3 clause 2.4.3.2 except for sub-clause~~sub-clause~~ (g) for plastic sheeting.

(iv) Metal roofing: AS 1562.1.

(v) Asphalt shingles: ASTM D3018-90, Class A.

(k) Particleboard structural flooring: AS 1860.2.

(l) Garage doors and other large access doors in openings not more than 3 m in height in *external walls* of buildings determined as being located in wind region C or D in accordance with AS/NZS 1170.2: AS/NZS 4505.

Deemed-to-Satisfy Provisions

(m) Lift *shafts* which are not *required* to have an FRL, must—

(i) except as required by (ii), be completely enclosed with non-perforated material between the bottom of the pit and the ceiling of the lift *shaft*, other than—

(A) at landing doors, emergency doors and pit access doors; and

(B) *low-rise, low-speed constant pressure lifts*; and

(C) *small-sized, low-rise automatic lifts*; and

(ii) in *atrium* and observation areas, be protected with non-perforated material not less than 2.5 m in height—

(A) above any places on which a person can stand, which are within 800 mm horizontal reach of any vertical moving lift component including ropes and counterweights; and

(B) at the lowest level of the *atrium* area that the lift serves, on all sides except the door opening, for not less than 2.5 m in height, by enclosure with non-perforated material; and

(iii) be of non-brittle material; and

(iv) where glazing is used—

(A) comply with Table B1.4; or

(B) not fail the deflection criteria *required* by Clause 6(c)(iii) of Specification C1.8.

Table B1.4 Material and minimum thickness of glazing

Application	**Lift *shaft* vision panels more than 65 000 mm², door panels, and lift *shafts***	**Lift *shaft* vision panels less than or equal to 65 000 mm²**
Laminated glass	10 mm (0.76 mm interlayer)	6 mm (0.76 mm interlayer)
Toughened/laminated	10 mm (0.76 mm interlayer)	6 mm (0.76 mm interlayer)
Annealed, with security polyester film coating	10 mm	6 mm
Safety wire	Not applicable	Subject to fire test
Polycarbonate	13 mm	6 mm

~~**Table B1.4 MATERIAL AND THICKNESS OF GLAZING**~~

~~**Application**~~	~~**Minimum thickness**~~	
	~~**Lift *shaft* vision panels more than 65 000 mm², door panels, and lift *shafts***~~	~~**Lift *shaft* vision panels less than or equal to 65 000 mm²**~~
~~Laminated glass~~	~~10 mm (0.76 mm interlayer)~~	~~6 mm (0.76 mm interlayer)~~
~~Toughened/ Laminated~~	~~10 mm (0.76 mm interlayer)~~	~~6 mm (0.76 mm interlayer)~~
~~Annealed, with security polyester film coating~~	~~10 mm~~	~~6 mm~~
~~Safety wire~~	~~Not applicable~~	~~Subject to fire test~~
~~Polycarbonate~~	~~13 mm~~	~~6 mm~~

SPECIFICATION B1.2 DESIGN OF BUILDINGS IN CYCLONIC AREAS

Deemed-to-Satisfy Provisions

2. Roof Cladding

Test for strength - Metal roof cladding, its connections and immediate supporting members must be capable of remaining in position notwithstanding any permanent distortion, fracture or damage that might occur in the sheet or fastenings under the pressure sequences A to G defined in Table 1.

~~TABLE 1 LOW-HIGH-LOW PRESSURE SEQUENCE~~

~~Sequence~~	~~Number of cycles~~	~~Load~~
~~A~~	~~4500~~	~~0 to 0.45 Pt~~
~~B~~	~~600~~	~~0 to 0.6 Pt~~
~~C~~	~~80~~	~~0 to 0.8 Pt~~
~~D~~	~~1~~	~~0 to 1.0 Pt~~
~~E~~	~~80~~	~~0 to 0.8 Pt~~
~~F~~	~~600~~	~~0 to 0.6 Pt~~
~~G~~	~~4500~~	~~0 to 0.45 Pt~~

~~Notes:~~

1. ~~Pt is the ultimate limit state wind pressure on internal and external surfaces as determined in accordance with AS/NZS 1170.2, modified by an appropriate factor for variability, as determined in accordance with Table B1 of AS/NZS 1170.0.~~
2. ~~The rate of load cycling must be less than 3Hz.~~
3. ~~The single load cycle (sequence D) must be held for a minimum of 10 seconds.~~

TABLE 1 LOW-HIGH-LOW PRESSURE SEQUENCE

Sequence	Number of cycles	Load
A	4500	0 to 0.45 Pt
B	600	0 to 0.6 Pt
C	80	0 to 0.8 Pt
D	1	0 to 1.0 Pt
E	80	0 to 0.8 Pt
F	600	0 to 0.6 Pt
G	4500	0 to 0.45 Pt

Notes:

1. Pt is the ultimate limit state wind pressure on internal and external surfaces as determined in accordance with AS/NZS 1170.2, modified by an appropriate factor for variability, as determined in accordance with Table B1 of AS/NZS 1170.0.
2. The rate of load cycling must be less than 3Hz.
3. The single load cycle (sequence D) must be held for a minimum of 10 seconds.

NT Specification B1.2 Clause NT3 — NT4.

SECTION C FIRE RESISTANCE

PERFORMANCE REQUIREMENTS

CP1 Structural stability during a fire

A building must have elements which will, to the degree necessary, maintain structural stability during a fire appropriate to—

(a) the function or use of the building; and

(b) the *fire load*; and

(c) the potential *fire intensity*; and

(d) the *fire hazard*; and

(e) the height of the building; and

(f) its proximity to *other property*; and

(g) any active *fire safety systems* installed in the building; and

(h) the size of any *fire compartment*; and

(i) *fire brigade* intervention; and

(j) other elements they support; and

(k) the *evacuation time*.

CP2 Spread of fire

(a) A building must have elements which will, to the degree necessary, avoid the spread of fire—

(i) to *exits*; and

(ii) to *sole-occupancy units* and *public corridors*; and

Application:

CP2(a)(ii) only applies to a Class 2 or 3 building or Class 4 part of a building.

(iii) between buildings; and

(iv) in a building.

(b) Avoidance of the spread of fire referred to in (a) must be appropriate to—

(i) the function or use of the building; and

(ii) the *fire load*; and

(iii) the potential *fire intensity*; and

(iv) the *fire hazard*; and

(v) the number of *storeys* in the building; and

(vi) its proximity to *other property*; and

(vii) any active *fire safety systems* installed in the building; and

(viii) the size of any *fire compartment*; and

(ix) *fire brigade* intervention; and

(x) other elements they support; and

(xi) the *evacuation time*.

CP3 Spread of fire and smoke

A building must be protected from the spread of fire and smoke to allow sufficient time for the orderly evacuation of the building in an emergency.

Application:

CP3 only applies to—

(a) a *patient care area* of a Class 9a *health-care building*; and

(b) a Class 9c building.

CP4 Safe conditions for evacuation

To maintain tenable conditions during occupant evacuation, a material and an assembly must, to the degree necessary, resist the spread of fire and limit the generation of smoke and heat, and any toxic gases likely to be produced, appropriate to—

(a) the *evacuation time*; and

(b) the number, mobility and other characteristics of occupants; and

(c) the function or use of the building; and

(d) any active *fire safety systems* installed in the building.

Application:

CP4 applies to linings, materials and assemblies in a Class 2 to 9 building.

CP5 Behaviour of concrete external walls in a fire

A concrete *external wall* that could collapse as a complete panel (e.g. tilt-up and pre-cast concrete) must be designed so that in the event of fire within the building the likelihood of outward collapse is avoided.

Limitation:

CP5 does not apply to a building having more than two *storeys* above ground level.

CP6 Service equipment

A building must have elements, which will, to the degree necessary, avoid the spread of fire from service equipment having—

(a) a high *fire hazard*; or

(b) a potential for explosion resulting from a high *fire hazard*.

CP7 Emergency equipment

A building must have elements, which will, to the degree necessary, avoid the spread of fire so that emergency equipment provided in a building will continue to operate for a period of time necessary to ensure that the intended function of the equipment is maintained during a fire.

CP8 Openings and penetrations

Any building element provided to resist the spread of fire must be protected, to the degree necessary, so that an adequate level of performance is maintained—

(a) where openings, construction joints and the like occur; and

(b) where penetrations occur for building services.

CP9 Fire brigade access

Access must be provided to and around a building, to the degree necessary, for *fire brigade* vehicles and personnel to facilitate *fire brigade* intervention appropriate to—

(a) the function or use of the building; and

(b) the *fire load*; and

(c) the potential *fire intensity*; and

(d) the *fire hazard*; and

(e) any active *fire safety systems* installed in the building; and

(f) the size of any *fire compartment*.

VERIFICATION METHODS

CV1

Compliance with CP2(a)(iii) to avoid the spread of fire between buildings on adjoining allotments is verified when it is calculated that—

(a) a building will not cause heat flux in excess of those set out in column 2 of Table CV1 at ~~locations within the boundaries of an adjoining property~~the location on an adjoining property set out in column 1 of Table CV1~~ where another building may be constructed~~; and

(b) when located at the distances from the allotment boundary set out in column 1 of Table CV1, a building is capable of withstanding the heat flux set out in column 2 of Table CV1 without ignition.

Table CV1

Location on adjoining allotment	Heat flux (kW/m^2)
On boundary	80 kW/m^2
1 m from boundary	40 kW/m^2
3 m from boundary	20 kW/m^2
6 m from boundary	10 kW/m^2

~~**Table CV1**~~

~~Column 1~~	~~Column 2~~
~~Location~~	~~Heat Flux (kW/m^2)~~
~~On boundary~~	~~80~~
~~1 m from boundary~~	~~40~~
~~3 m from boundary~~	~~20~~
~~6 m from boundary~~	~~10~~

CV2

Compliance with CP2(a)(iii) to avoid the spread of fire between buildings on the same allotment is verified when it is calculated that a building—

(a) is capable of withstanding the heat flux set out in column 2 of Table CV2 without ignition; and

(b) will not cause heat flux in excess of those set out in column 2 of Table CV2,

when the distance between the buildings is as set out in column 1 of Table CV2.

Table CV2

Distance between buildings on the same allotment (m)	Heat flux (kW/m^2)
0 m	80 kW/m^2
2 m	40 kW/m^2
6 m	20 kW/m^2
12 m	10 kW/m^2

~~**Table CV2**~~

~~Column 1~~	~~Column 2~~
~~Distance between buildings~~	~~Heat Flux (kW/m^2)~~
~~0 m~~	~~80~~
~~2 m~~	~~40~~
~~6 m~~	~~20~~
~~12 m~~	~~10~~

CV3

Compliance with CP2 to avoid the spread of fire via the *external wall* of a building is verified when—

(a) compliance with CP2(a)(iii) to avoid the spread of fire between buildings, where applicable, is verified in accordance with CV1 or CV2, as appropriate; and

(b) the *external wall* system—

(i) has been tested for external wall (EW) performance in accordance with AS 5113; and

(ii) has achieved the classification EW; and

(iii) if containing a cavity, incorporates cavity barriers and these cavity barriers have been included in the test performed under (i) at the perimeter of each floor; and

(c) in a building of Type A construction, the building is protected throughout by a sprinkler system complying with Specification E1.5 and has—

(i) sprinkler protection to balconies, patios and terraces, and where overhead sprinkler coverage is not achieved alongside the *external wall*, sidewall sprinkler heads are provided at the *external wall* for the extent of the balcony, patio or terrace where overhead sprinkler coverage is not achieved; and

(ii) for a building with an *effective height* greater than 25 m—

(A) monitored step valves provided at each floor level arranged to allow the isolation of the floor level containing the stop valve while maintaining protection to the remainder of the building; and

(B) the sprinkler system being capable of providing sufficient flow to serve the design area ~~(assumed area of operation)~~ required by AS 2118.1 for the relevant hazard class on each floor level plus the design area ~~(assumed area of operation)~~ required by AS 2118.1 for the floor level above, except where the former level is—

(aa) the floor level below the uppermost roof; or

(bb) any floor level that is wholly below ground; and

(d) in a building of Type B construction, the building is—

(i) a Class 5, 6, 7 or 8 building or Class 4 part of a building; or

(ii) a Class 2, 3 or 9 building that—

(A) is protected throughout by a sprinkler system complying with Specification E1.5; or

(B) has any openings in *external walls* separated by a slab or other horizontal construction complying with C2.6(a)(iv) as if the building were of Type A construction.

CV4

Compliance CP1, CP2, CP3, CP4, CP5, CP6, CP7, CP8 and CP9 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:
The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART C1 FIRE RESISTANCE AND STABILITY

Deemed-to-Satisfy Provisions

C1.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* CP1 to CP9 are satisfied by complying with—

(i) C1.1 to C1.14, C2.1 to C2.14 and C3.1 to C3.17; and

(ii) in a building containing an *atrium*, Part G3; and

(iii) in a building containing an *occupiable outdoor area*, Part G6; and

(iv~~iii~~) for additional requirement for Class 9b buildings, Part H1; and

(v~~iv~~) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

C1.9 Non-combustible building elements

(a) In a building *required* to be of Type A or B construction, the following building elements and their components must be *non-combustible*:

(i) *External walls* and *common walls*, including all components incorporated in them including the facade covering, framing and insulation.

(ii) The flooring and floor framing of lift pits.

(iii) Non-*loadbearing internal walls* where they are *required* to be *fire-resisting*.

(b) A *shaft*, being a lift, ventilating, pipe, garbage, or similar *shaft* that is not for the discharge of hot products of combustion, that is non-*loadbearing*, must be of *non-combustible* construction in—

(i) a building *required* to be of Type A construction; and

(ii) a building *required* to be of Type B construction, subject to C2.10, in—

(A) a Class 2, 3 or 9 building; and

(B) a Class 5, 6, 7 or 8 building if the *shaft* connects more than 2 *storeys*.

(c) A *loadbearing internal wall* and a *loadbearing fire wall*, including those that are part of a *loadbearing shaft*, must comply with Specification C1.1.

(d) The requirements of (a) and (b) do not apply to gaskets, caulking, sealants and damp-proof courses.

(e) The following materials may be used wherever a *non-combustible* material is *required* :

(i) Plasterboard.

(ii) Perforated gypsum lath with a normal paper finish.

(iii) Fibrous-plaster sheet.

(iv) Fibre-reinforced cement sheeting.

(v) Pre-finished metal sheeting having a *combustible* surface finish not exceeding 1 mm thickness and where the *Spread-of-Flame Index* of the product is not greater than 0.

~~(vi) Bonded laminated materials where—~~

~~(A) each lamina, including any core, is *non-combustible*; and~~

~~(B) each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2 mm; and~~

~~(C) the *Spread-of-Flame Index* and the *Smoke-Developed Index* of the bonded laminated material as a whole do not exceed 0 and 3 respectively.~~

C1.10 Fire hazard properties

(a) The *fire hazard properties* of the following internal linings, materials and assemblies within a Class 2 to 9 building must comply with Specification C1.10:

(i) Floor linings and floor coverings.

Deemed-to-Satisfy Provisions

(ii) Wall linings and ceiling linings.

(iii) Air-handling ductwork.

(iv) Lift cars.

NSW C1.10(a)(v)

(v) In Class 9b buildings used as a theatre, public hall or the like—

(A) fixed seating in the audience area or auditorium; and

(B) a proscenium curtain *required* by Specification H1.3.

(vi) Escalators, moving walkways and non-*required* non *fire-isolated stairways* or pedestrian ramps subject to Specification D1.12.

(vii) *Sarking-type materials*.

(viii) Attachments to floors, ceilings, *internal walls*, *common walls*, *fire walls* and to internal linings of *external walls*.

(ix) Other materials including insulation materials other than *sarking-type materials*.

NSW C1.10(b)

(b) Paint or fire-retardant coatings must not be used to achieve compliance with the *required fire hazard properties*.

(c) The requirements of (a) do not apply to a material or assembly if it is—

(i) plaster, cement render, concrete, terrazzo, ceramic tile or the like; or

(ii) a *fire-protective covering*; or

(iii) a timber-framed *window*; or

(iv) a solid timber handrail or skirting; or

(v) a timber-faced ~~solid-core~~ door~~ or timber-faced fire door~~; or

(vi) an electrical switch, socket-outlet, cover plate or the like; or

(vii) a material used for—

(A) a roof insulating material applied in continuous contact with a substrate; or

(B) an adhesive; or

(C) a damp-proof course, flashing, caulking, sealing, ground moisture barrier, or the like; or

(viii) a paint, varnish, lacquer or similar finish, other than nitro-cellulose lacquer; or

(ix) a clear or translucent roof light of glass fibre-reinforced polyester if—

(A) the roof in which it is installed forms part of a single *storey* building *required* to be Type C construction; and

(B) the material is used as part of the roof covering; and

(C) it is not closer than 1.5 m from another roof light of the same type; and

(D) each roof light is not more than 14 m^2 in area; and

(E) the area of the roof lights per 70 m^2 of roof surface is not more than 14 m^2; or

(x) a face plate or neck adaptor of supply and return air outlets of an air handling system; or

(xi) a face plate or diffuser plate of light fitting and emergency *exit* signs and associated electrical wiring and electrical components; or

(xii) a joinery unit, cupboard, shelving, or the like; or

NSW C1.10(c)(xiii)

(xiii) an attached non-building fixture and fitting such as—

(A) a curtain, blind, or similar decor, other than a proscenium curtain *required* by Specification H1.3; and

(B) a whiteboard, *window* treatment or the like; or

(xiv) timber treads, risers, landings and associated supporting framework installed in accordance with D2.25 where the *Spread-of-Flame Index* and the *Smoke-Developed Index* of the timber does not exceed 9 and 8 respectively; or

Vic C1.10(c)(xv)

(xv) any other material that does not significantly increase the hazards of fire.

Deemed-to-Satisfy Provisions

C1.13 Fire-protected timber: Concession

Fire-protected timber ~~in a Class 2, 3 or 5 building~~ may be used wherever an element is *required* to be *non-combustible*, provided—

(a) the building is—

 (i) a separate building; or

 (ii) a part of a building—

  (A) which only occupies part of a *storey*, and is separated from the remaining part by a *fire wall*; or

  (B) which is located above or below a part not containing *fire-protected timber* and the floor between the adjoining parts is provided with an FRL not less than that prescribed for a *fire wall* for the lower *storey*; and

(b) the building has an *effective height* of not more than 25 m; and

(c) the building has a sprinkler system throughout complying with Specification E1.5; and

(d) any insulation installed in the cavity of the timber building element *required* to have an FRL is *non-combustible*; and

(e) cavity barriers are provided in accordance with Specification C1.13.

PART C2 COMPARTMENTATION AND SEPARATION

Deemed-to-Satisfy Provisions

C2.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* CP1 to CP9 are satisfied by complying with—
- (i) C1.1 to C1.14, C2.1 to C2.14 and C3.1 to C3.17; and
- (ii) in a building containing an *atrium*, Part G3; and
- (iii) for additional requirements for Class 9b buildings, Part H1; and
- (iv) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

C2.2 General floor area and volume limitations

(a) The size of any *fire compartment* or *atrium* in a Class 5, 6, 7, 8 or 9 building must not exceed the relevant maximum *floor area* nor the relevant maximum volume set out in Table C2.2 and C2.5 except as permitted in C2.3.

(b) A part of a building which contains only heating, ventilating, or lift equipment, water tanks, or similar service units is not counted in the *floor area* or volume of a *fire compartment* or *atrium* if it is situated at the top of the building.

(c) In a building containing an *atrium*, the part of the *atrium well* bounded by the perimeter of the openings in the floors and extending from the level of the first floor above the *atrium* floor to the roof covering is not counted in the volume of the *atrium* for the purposes of this clause.

~~**Table C2.2 MAXIMUM SIZE OF FIRE COMPARTMENTS OR ATRIA**~~

~~**Classification**~~		~~**Type of construction of building**~~		
		~~**Type A**~~	~~**Type B**~~	~~**Type C**~~
~~5, 9b or 9c *aged care building*~~	~~max *floor area* —~~	~~8 000 m²~~	~~5 500 m²~~	~~3 000 m²~~
	~~max volume —~~	~~48 000 m³~~	~~33 000 m³~~	~~18 000 m³~~
~~6, 7, 8 or 9a (except for *patient care areas*)~~	~~max *floor area* —~~	~~5 000 m²~~	~~3 500 m²~~	~~2 000 m²~~
	~~max volume —~~	~~30 000 m³~~	~~21 000 m³~~	~~12 000 m³~~
~~**Note:** See **C2.5** for maximum size of compartments in *patient care areas* in Class 9a *health care buildings*.~~				

~~**Note:** See **C2.5** for maximum size of compartments in *patient care areas* in Class 9a *health care buildings*.~~

Table C2.2 Maximum size of fire compartments or atria

Classification	Building construction Type A	Building construction Type B	Building construction Type C
5, 9b or 9c *aged care building*	max *floor area*—8 000 m² max volume—48 000 m³	max *floor area*—5 500 m² max volume—33 000 m³	max *floor area*—3 000 m² max volume—18 000 m³
6, 7, 8 or 9a (except for *patient care areas*)	max *floor area*—5 000 m² max volume—30 000 m³	max *floor area*—3 500 m² max volume—21 000 m³	max *floor area*—2 000 m² max volume—12 000 m³

Note: See **C2.5** for maximum size of compartments in *patient care areas* in Class 9a *health care buildings*.

C2.5 Class 9a and 9c buildings

(a) A Class 9a *health care building* must comply with the following:
- (i) *Patient care areas* must be divided into *fire compartments* not exceeding 2000 m^2.
- (ii) A *fire compartment* must be separated from the remainder of the building by *fire walls* and—
  - (A) in Type A construction—floors and roof or ceiling as *required* in Specification C1.1; and
  - (B) in Type B construction—floors with an FRL of not less than 120/120/120 and with the openings in *external walls* bounding *patient care areas* being vertically separated in accordance with the requirements of C2.6 as if the building were of Type A construction.

(iii) *Ward areas*—

(A) where the *floor area* exceeds 1000 m^2, must be divided into *floor areas* not more than 1000 m^2 by walls with an FRL of not less than 60/60/60; and

(B) where the *floor area* exceeds 500 m^2, must be divided into *floor areas* not more than 500 m^2 by smoke-proof walls complying with Specification C2.5; and

(C) where the *floor area* is not more than 500 m^2, must be separated from the remainder of the *patient care area* by smoke-proof walls complying with Specification C2.5; and

(D) where division of *ward areas* by *fire-resisting* walls under (i) or (iii)(A) is not *required*, any smoke-proof wall *required* under (iii)(B) or (C) must have an FRL of not less than 60/60/60.

(iv) *Treatment areas*—

(A) where the *floor area* exceeds 1000 m^2, must be divided into *floor areas* not more than 1000 m^2 by smoke-proof walls complying with Specification C2.5; and

(B) where the *floor area* is not more than 1000 m^2, must be separated from the remainder of the *patient care area* by smoke-proof walls complying with Specification C2.5.

(v) Ancillary use areas located within a *patient care area* and containing equipment or materials that are a high potential *fire hazard*, must be separated from the remainder of the *patient care area* by walls with an FRL of not less than 60/60/60.

(vi) The ancillary use areas referred to in **(v)** include, but are not limited to, the following:

(A) A kitchen and related food preparation areas having a combined *floor area* of more than 30 m^2.

(B) A room containing a hyperbaric facility (pressure chamber).

(C) A room used predominantly for the storage of medical records having a *floor area* of more than 10 m^2.

(D) A laundry, where items of equipment are of the type that are potential fire sources (e.g. gas fire dryers).

(vii) A wall *required* by (v) to separate ancillary use areas from the remainder of the building must extend to the underside of—

(A) the floor above; or

(B) a *non-combustible* roof covering; or

(C) a ceiling having a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes.

(viii) Openings in walls *required* by (iii) and (v) to have an FRL must be protected as follows:

(A) Doorways—*self-closing* or *automatic* closing –/60/30 fire doors.

(B) Windows—*automatic* or permanently fixed closed –/60/– fire windows or –/60/– *automatic* fire shutters.

(C) Other openings—construction having an FRL not less than –/60/–.

NSW C2.5(b)

(b) A Class 9c building must comply with the following:

(i) A building must be divided into areas not more than 500 m^2 by smoke-proof walls complying with Specification C2.5.

(ii) A *fire compartment* must be separated from the remainder of the building by *fire walls* and, notwithstanding C2.7 and Specification C1.1, floors with an FRL of not less than 60/60/60.

(iii) Internal walls (other than those bounding lift and stair shafts) supported by floors provided in accordance with C2.5(b)(ii) need not comply with Specification C1.1 if they have an FRL not less than 60/–/–.

(iv) Ancillary use areas containing equipment or materials that are a high potential *fire hazard*, must be separated from the *sole-occupancy units* by smoke-proof walls complying with Specification C2.5.

(v) The ancillary use areas referred to in (iv) include, but are not limited to, the following:

(A) A kitchen and related food preparation areas having a combined *floor area* of more than 30 m^2.

(B) A laundry, where items of equipment are of the type that are potential fire sources (e.g. gas fired dryers).

(C) Storage rooms greater than 10 m^2 used predominantly for the storage of administrative records.

(vi) Openings in *fire walls* must be protected as follows:

(A) Doorways — *self-closing* or *automatic* closing –/60/30 fire doors.

(B) Windows — *automatic* or permanently fixed closed –/60/– fire windows or –/60/– *automatic* fire shutters.

Deemed-to-Satisfy Provisions

(C) Other openings — construction having an FRL not less than –/60/–.

(c) Where *fire-protected timber* is used in a Class 9a or Class 9c building in accordance with C1.13, Clause 3.1(d) of Specification C1.1 or Clause 4.1(e) of Specification C1.1, notwithstanding the requirements of Specification C2.5, smoke-proof walls and elements *required* to achieve an FRL must—

(i) comply with the requirements of Specification A1.1; and

(ii) if insulation is installed, have *non-combustible* insulation; and

(iii) if cavities exist, contain cavity barriers in accordance with Specification C1.13.

C2.12 Separation of equipment

(a) Equipment other than that described in (b) and (c) must be separated from the remainder of the building with construction complying with (d), if that equipment comprises—

(i) lift motors and lift control panels; or

(ii) emergency generators used to sustain emergency equipment operating in the emergency mode; or

(iii) central smoke control plant; or

(iv) *boilers*; or

(v) a battery or batteries installed in the building that has a total voltage of 12 volts or higher and a storage capacity of 200kWh or higher~~ve a voltage exceeding 24 volts and a capacity exceeding 10 ampere hours~~.

(b) Equipment need not be separated in accordance with (a) if the equipment comprises—

(i) smoke control exhaust fans located in the air stream which are constructed for high temperature operation in accordance with Specification E2.2b; or

(ii) stair pressurising equipment installed in compliance with the relevant provisions of AS/NZS 1668.1; or

(iii) a lift installation without a machine-room; or

(iv) equipment otherwise adequately separated from the remainder of the building.

(c) Separation of on-site fire pumps must comply with the requirements of AS 2419.1.

(d) Separating construction must have—

(i) except as provided by (ii)—

(A) an FRL as *required* by Specification C1.1, but not less than 120/120/120; and

(B) any doorway protected with a *self-closing* fire door having an FRL of not less than –/120/30; or

(ii) when separating a lift *shaft* and lift motor room, an FRL not less than 120/–/–.

SA C2.15

PART C3 PROTECTION OF OPENINGS

Deemed-to-Satisfy Provisions

C3.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* CP1 to CP9 are satisfied by complying with—

(i) C1.1 to C1.14, C2.1 to C2.14 and C3.1 to C3.17; and

(ii) in a building containing an *atrium*, Part G3; and

(iii) for additional requirements for Class 9b buildings, Part H1; and

(iv) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

C3.3 Separation of external walls and associated openings in different fire compartments

The distance between parts of *external walls* and any openings within them in different *fire compartments* separated by a *fire wall* must not be less than that set out in Table C3.3, unless—

(a) those parts of each wall have an FRL not less than 60/60/60; and

(b) any openings protected in accordance with C3.4.

~~**Table C3.3 DISTANCE BETWEEN EXTERNAL WALLS AND ASSOCIATED OPENINGS IN DIFFERENT FIRE COMPARTMENTS**~~

~~Angle between walls~~	~~Min. Distance~~
~~0° (walls opposite)~~	~~6 m~~
~~more than 0° to 45°~~	~~5 m~~
~~more than 45° to 90°~~	~~4 m~~
~~more than 90° to 135°~~	~~3 m~~
~~more than 135° to less than 180°~~	~~2 m~~
~~180° or more~~	~~Nil~~

Table C3.3 Distance between external walls and associated opening in different fire compartments

Angle between walls	Min. distance
0° (walls opposite)	6 m
more than 0° to 45°	5 m
more than 45° to 90°	4 m
more than 90° to 135°	3 m
more than 135° to less than 180°	2 m
180° or more	Nil

C3.5 Doorways in fire walls

(a) The aggregate width of openings for doorways in a *fire wall*, which are not part of a *horizontal exit*, must not exceed ½ of the length of the *fire wall*, and each doorway must be protected by—

(i) 2 fire doors or fire shutters, one on each side of the doorway, each of which has an FRL of not less than ½ that *required* by Specification C1.1 for the *fire wall* except that each door or shutter must have an *insulation* level of at least 30; or

(ii) a fire door on one side and a fire shutter on the other side of the doorway, each of which complies with **(i)**; or

(iii) a single fire door or fire shutter which has an FRL of not less than that *required* by Specification C1.1 for the *fire wall* except that each door or shutter must have an *insulation* level of at least 30.

(b) In addition to (a) the following apply:

(i) A fire door or fire shutter *required* by (a)(i), (a)(ii) or (a)(iii) must be *self-closing*, or *automatic* closing in

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accordance with (ii) and (iii).

(ii) The *automatic* closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located on each side of the *fire wall* not more than 1.5 m horizontal distance from the opening.

(iii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with Specification E1.5, is installed in the building, activation of the system in either *fire compartment* separated by the *fire wall* must also initiate the *automatic* closing operation.

C3.6 Sliding fire doors

(a) If a doorway in a *fire wall* is fitted with a sliding fire door which is open when the building is in use—

(i) it must be held open with an electromagnetic device, which when de-activated in accordance with (b), allows the door to be fully closed in not less than 20 seconds and not more than 30 seconds after release; and

(ii) in the event of power failure to the door — the door must fail safe in the closed position in accordance with (i); and

(iii) an audible warning device must be located near the doorway and a red flashing warning light of adequate intensity on each side of the doorway must be activated in accordance with (b); and

(iv) signs must be installed on each side of the doorway located directly over the opening stating—

WARNING — SLIDING FIRE DOOR

in capital letters not less than 50 mm high in a colour contrasting with the background.

(b) In addition to (a) the following apply:

(i) The electromagnetic device must be de-activated and the warning system activated by heat or smoke detectors, as appropriate, installed in accordance with AS 1905.1 and the relevant provisions of AS 1670.1.

(ii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with Specification E1.5, is installed in the building, activation in either *fire compartment* separated by the *fire wall* must also de-activate the electromagnetic device and activate the warning system.

C3.7 Protection of doorways in horizontal exits

(a) A doorway that is part of a *horizontal exit* must be protected by either—

(i) a single fire door that has an FRL of not less than that *required* by Specification C1.1 for the *fire wall* except that the door must have an *insulation* level of at least 30; or

(ii) in a Class 7 or 8 building — 2 fire doors, one on each side of the doorway, each with an FRL of not less than ½ that *required* by Specification C1.1 for the *fire wall* except that each door must have an *insulation* level of at least 30.

(b) Each door *required* by (a) must be *self-closing*, or *automatic*-closing in accordance with the following:

(i) ~~Each door *required* by **(a)** must be *self-closing*, or *automatic* closing in accordance with **(ii)** and **(iii)**.~~The *automatic*-closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located on each side of the *fire wall* not more than 1.5 m horizontal distance from the opening.

(ii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with Specification E1.5, is installed in the building, activation of the system in either *fire compartment* separated by the *fire wall* must also initiate the *automatic*-closing operation.~~The *automatic* closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located on each side of the *fire wall* not more than 1.5 m horizontal distance from the opening.~~

~~(iii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with **Specification E1.5**, is installed in the building, activation of the system in either *fire compartment* separated by the *fire wall* must also initiate the *automatic* closing operation.~~

C3.8 Openings in fire-isolated exits

(a) The following applies to openings in fire-isolated *exits*:

(i) Doorways that open to *fire-isolated stairways*, *fire-isolated passageways* or *fire-isolated ramps*, and are not

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doorways opening to a road or *open space*, must be protected by –/60/30 fire doors that are *self-closing*, or *automatic*-closing in accordance with (ii) and (iii).

(ii) The *automatic*-closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located not more than 1.5 m horizontal distance from the approach side of the doorway.

(iii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with Specification E1.5, is installed in the building, activation of the system must also initiate the *automatic*-closing operation.

(b) A *window* in an *external wall* of a *fire-isolated stairway*, *fire-isolated passageway* or *fire-isolated ramp* must be protected in accordance with C3.4 if it is within 6 m of, and exposed to, a *window* or other opening in a wall of the same building, other than in the same fire-isolated enclosure.

C3.11 Bounding construction: Class 2 and 3 buildings and Class 4 parts

(a) A doorway in a Class 2 or 3 building must be protected if it provides access from a *sole-occupancy unit* to—

(i) a *public corridor*, public lobby, or the like; or

(ii) a room not within a *sole-occupancy unit*; or

(iii) the landing of an internal non *fire-isolated stairway* that serves as a *required exit*; or

(iv) another *sole-occupancy unit*.

(b) A doorway in a Class 2 or 3 building must be protected if it provides access from a room not within a *sole-occupancy unit* to—

(i) a *public corridor*, public lobby, or the like; or

(ii) the landing of an internal non *fire-isolated stairway* that serves as a *required exit*.

(c) A doorway in a Class 4 part of a building must be protected if it provides access to any other internal part of the building.

NSW C3.11(d)

(d) Protection for a doorway must be at least—

(i) in a building of Type A construction — a *self-closing* –/60/30 fire door; and

(ii) in a building of Type B or C construction — a *self-closing*, tight fitting, solid core door, not less than 35 mm thick,

except—

(iii) in a Class 3 building used as a *residential care building*~~*residential aged care building*~~ protected with a sprinkler system complying with Specification E1.5—

(A) a tight fitting, solid core door not less than 35 mm thick if the building is divided into *floor areas* not exceeding 500 m^2 with smoke proof walls complying with Clause 2 of Specification C2.5; or

(B) a tight fitting, solid core door not less than 35 mm thick fitted with a *self-closing* device, a delayed closing device or an *automatic* closing device.

(e) Other openings in *internal walls* which are *required* to have an FRL with respect to *integrity* and *insulation* must not reduce the *fire-resisting* performance of the wall.

(f) A door *required* by (d) may be *automatic*-closing in accordance with the following:

(i) The *automatic*-closing operation must be initiated by the activation of a smoke detector, or any other detector deemed suitable in accordance with AS 1670.1 if smoke detectors are unsuitable in the atmosphere, installed in accordance with the relevant provisions of AS 1670.1 and located not more than 1.5 m horizontal distance from the approach side of the doorway.

(ii) Where any other *required* suitable fire alarm system, including a sprinkler system complying with Specification E1.5, is installed in the building, activation of the system must also initiate the *automatic*-closing operation.

(g) In a Class 2 or 3 building where a path of travel to an *exit* does not provide a person seeking egress with a choice of travel in different directions to alternative *exits* and is along an open balcony, landing or the like and passes an *external wall* of—

(i) another *sole-occupancy unit*; or

(ii) a room not within a *sole-occupancy unit*,

then that *external wall* must—

(iii) be constructed of concrete or masonry, or be lined internally with a *fire-protective covering*; and

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(iv) have any doorway fitted with a *self-closing*, tight-fitting solid core door not less than 35 mm thick; and

(v) have any *windows* or other openings—

(A) protected internally in accordance with C3.4; or

(B) located at least 1.5 m above the floor of the balcony, landing or the like.

NSW C3.11(h)

C3.15 Openings for service installations

Where an electrical, electronic, plumbing, mechanical ventilation, air-conditioning or other service penetrates a building element (other than an *external wall* or roof) that is *required* to have an FRL with respect to *integrity* or *insulation* or a *resistance to the incipient spread of fire*, that installation must comply with any one of the following:

(a) **Tested systems**

(i) The service, building element and any protection method at the penetration— ~~are identical with a prototype assembly of the service, building element and protection method which has been tested in accordance with AS 4072.1 and AS 1530.4 and has achieved the required FRL or resistance to the incipient spread of fire.~~

(A) are identical with a prototype assembly of the service, building element and protection method which has been tested in accordance with AS 4072.1 and AS 1530.4 and has achieved the *required* FRL or *resistance to the incipient spread of fire*; or

(B) differ from a prototype assembly of the service, building element and protection method in accordance with AS 4072.1.

(ii) It complies with **(i)** except for the *insulation* criteria relating to the service if—

(A) the service is a pipe system comprised entirely of metal (excluding pipe seals or the like); and

(B) any *combustible* building element is not located within 100 mm of the service for a distance of 2 m from the penetration; and

(C) *combustible* material is not able to be located within 100 mm of the service for a distance of 2 m from the penetration; and

(D) it is not located in a *required exit*.

(iii) Tests which determine a *required* FRL must be confirmed in a report from an *Accredited Testing Laboratory* in accordance with Clause 2 of Specification A2.3.

(b) **Ventilation and air-conditioning** — In the case of ventilating or air-conditioning ducts or equipment, the installation is in accordance with AS/NZS 1668.1.

(c) **Compliance with Specification C3.15**

(i) The service is a pipe system comprised entirely of metal (excluding pipe seals or the like) and is installed in accordance with Specification C3.15 and it—

(A) penetrates a wall, floor or ceiling, but not a ceiling *required* to have a *resistance to the incipient spread of fire*; and

(B) connects not more than 2 *fire compartments* in addition to any *fire-resisting* service *shafts*; and

(C) does not contain a flammable or combustible liquid or gas.

(ii) The service is sanitary plumbing installed in accordance with Specification C3.15 and it—

(A) is of metal or UPVC pipe; and

(B) penetrates the floors of a Class 5, 6, 7, 8 or 9b building; and

(C) is in a *sanitary compartment* separated from other parts of the building by walls with the FRL *required* by Specification C1.1 for a stair *shaft* in the building and a *self-closing* –/60/30 fire door.

(iii) The service is a wire or cable, or a cluster of wires or cables installed in accordance with Specification C3.15 and it—

(A) penetrates a wall, floor or ceiling, but not a ceiling *required* to have a *resistance to the incipient spread of fire*; and

(B) connects not more than 2 *fire compartments* in addition to any *fire-resisting* service *shafts*.

(iv) The service is an electrical switch, outlet, or the like, and it is installed in accordance with Specification C3.15.

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(ii) a non-*loadbearing* wall of a Class 2 or 3 building; or

(b) it spans an opening in masonry which is not more than 150 mm thick and—

(i) not more than 3 m wide if the masonry is non-*loadbearing*; or

(ii) not more than 1.8 m wide if the masonry is *loadbearing* and part of a solid wall or one of the leaves of a cavity wall.

2.4 Method of attachment not to reduce the fire-resistance of building elements

The method of attaching or installing a finish, lining, *ancillary element* or service installation to the building element must not reduce the fire-resistance of that element to below that *required* .

2.5 General concessions

(a) **Steel columns** — A steel column, other than one in a *fire wall* or *common wall*, need not have an FRL in a building that contains—

(i) only 1 *storey*; or

(ii) 2 *storeys* in some of its parts and 1 *storey* only in its remaining parts if the sum of the *floor areas* of the upper *storeys* of its 2 *storey* parts does not exceed the lesser of—

(A) 1/8 of the sum of the *floor areas* of the 1 *storey* parts; or

(B) in the case of a building to which one of the maximum *floor areas* specified in **Table C2.2** is applicable — 1/10 of that area; or

(C) in the case of a building to which two or more of the maximum *floor areas* specified in **Table C2.2** is applicable — 1/10 of the lesser of those areas.

(b) **Timber columns** — A timber column may be used in a single *storey* building if—

(i) in a *fire wall* or *common wall* the column has an FRL not less than that listed in the appropriate Tables 3a-j, Table 4a-f or Table 5a-e~~Table 3, 4 or 5~~; and

(ii) in any other case where the column is *required* to have an FRL in accordance with Tables 3a-j, Table 4a-f or Table 5a-e~~Table 3, 4 or 5~~, it has an FRL of not less than 30/–/–.

(c) **Structures on roofs** — A *non-combustible* structure situated on a roof need not comply with the other provisions of this Specification if it only contains—

(i) lift motor equipment; or

(ii) one or more of the following:

(A) Hot water or other water tanks.

(B) Ventilating ductwork, ventilating fans and their motors.

(C) Air-conditioning chillers.

(D) *Window* cleaning equipment.

(E) Other service units that are *non-combustible* and do not contain flammable or combustible liquids or gases.

(d) **Curtain walls and panel walls** — A requirement for an *external wall* to have an FRL does not apply to a *curtain wall* or *panel wall* which is of *non-combustible* construction and fully protected by *automatic* external wall-wetting sprinklers.

(e) * * * * *

(f) **Balconies and verandahs** — A balcony, verandah or the like and any incorporated supporting part, which is attached to or forms part of a building, need not comply with Tables 3a-j, Table 4a-f or Table 5a-e ~~Tables 3, 4 and 5~~ if—

(i) it does not form part of the only path of travel to a *required exit* from the building; and

(ii) in Type A construction—

(A) it is situated not more than 2 *storeys* above the lowest *storey* providing direct egress to a road or *open space*; and

(B) any supporting columns are of *non-combustible* construction.

2.6 Mezzanine floors: Concession

(a) This Clause does not apply to a Class 9b building that is a spectator stand or audience viewing area

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accommodating more than 100 persons as calculated according to D1.13.

(b) A *mezzanine* and its supports need not have an FRL or be *non-combustible* provided—

(i) the total *floor area* of all the *mezzanines* in the same room does not exceed 1/3 of the *floor area* of the room or 200 m^2, whichever is the lesser; and

(ii) the FRL of each wall and column that supports any other part of the building within 6 m of the *mezzanine* is increased by the amount listed in Table 2.6.

~~Table 2.6 INCREASED FRLs — CONSTRUCTION SURROUNDING MEZZANINES~~

~~Level otherwise required for any FRL criterion (mins)~~	~~Increase in level to (not less than):~~
~~30~~	~~60~~
~~60~~	~~90~~
~~90~~	~~120~~
~~120~~	~~180~~
~~180~~	~~240~~
~~**Note:** The increase in level applies to each FRL criterion (*structural adequacy*, *integrity* or *insulation*) relevant to the building element concerned.~~	

Table 2.6 INCREASED FRLs — CONSTRUCTION SURROUNDING MEZZANINES

Level otherwise required for any FRL criterion (mins)	Increase in level to (not less than):
30	60
60	90
90	120
120	180
180	240

Note: The increase in level applies to each FRL criterion (*structural adequacy*, *integrity* or *insulation*) relevant to the building element concerned.

2.7 Enclosure of shafts

Shafts required to have an FRL must be enclosed at the top and bottom by construction having an FRL not less than that *required* for the walls of a non-*loadbearing shaft* in the same building, except that these provisions need not apply to—

(a) the top of a *shaft* extending beyond the roof covering, other than one enclosing a *fire-isolated stairway* or *ramp*; or

(b) the bottom of a *shaft* if it is *non-combustible* and laid directly on the ground.

2.8 Carparks in Class 2 and 3 buildings

(a) If a Class 2 building contains not more than 4 *storeys* of which—

(i) one *storey* is Class 7 used solely for the purpose of parking motor vehicles or for some other purpose that is ancillary to a Class 2; and

(ii) the remaining *storeys* are of Class 2,

the *carpark storey* is regarded as Class 2 only for the purpose of determining the relevant *fire-resisting* requirements of this Specification.

(b) If a Class 3 building or a building of Class 2 and 3 contains not more than 3 *storeys* of which—

(i) one *storey* is Class 7 used solely for the purpose of parking motor vehicles or for some other purpose that is ancillary to the other *storeys*; and

(ii) the remaining *storeys* are of Class 2 or 3,

the *carpark storey* is regarded as Class 2 or 3 only for the purpose of determining the relevant *fire-resisting* requirements of this Specification.

2.9 Residential ~~aged~~ care building: Concession

(a) In a Class 3 building protected with a sprinkler system complying with Specification E1.5 and used as a

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residential care building ~~*residential aged care building*~~, any FRL criterion prescribed in Tables 3a-j, Table 4a-f or Table 5a-e~~Tables 3, 4 or 5~~—

(i) for any floor and any *loadbearing* wall, may be reduced to 60, except any FRL criterion of 90 for an *external wall* must be maintained when tested from the outside; and

(ii) for any non-*loadbearing internal wall*, need not apply if—

(A) it is lined on each side with standard grade plasterboard not less than 13 mm thick or similar *non-combustible* material; and

(B) it extends—

(aa) to the underside of the floor next above; or

(bb) to the underside of a ceiling lined with standard grade plasterboard not less than 13 mm thick or a material with at least an equivalent level of fire protection; or

(cc) to the underside of a *non-combustible* roof covering; and

(C) any insulation installed in the cavity of the wall is *non-combustible*; and

(D) any construction joint, space or the like between the top of the wall and the floor, ceiling or roof is smoke sealed with intumescent putty or other suitable material.

(b) The concession described at (a) does not apply to *fire-protected timber* building elements.

3. Type A Fire-Resisting Construction

3.1 Fire-resistance of building elements

In a building *required* to be of Type A construction—

(a) each building element listed in ~~Table 3~~Table 3j and any beam or column incorporated in it, must have an FRL not less than that listed in the Table for the particular Class of building concerned; and

(b) * * * * *

(c) any *internal wall required* to have an FRL with respect to *integrity* and *insulation* must extend to—

(i) the underside of the floor next above; or

(ii) the underside of a roof complying with Table 3j~~Table 3~~; or

(iii) if under Clause 3.5 the roof is not *required* to comply with Table 3j~~Table 3~~, the underside of the *non-combustible* roof covering and, except for roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not be crossed by timber or other *combustible* building elements; or

(iv) a ceiling that is immediately below the roof and has a *resistance to the incipient spread of fire* to the roof space between the ceiling and the roof of not less than 60 minutes; and

(d) a *loadbearing internal wall* and a *loadbearing fire wall* (including those that are part of a *loadbearing shaft*) must be constructed from—

(i) concrete; or

(ii) masonry; or

(iii) *fire-protected timber*, provided that—

~~(A) the building is a Class 2, 3 or 5 building which is—~~

~~(aa) a separate building; or~~

~~(bb) a part of a building—~~

~~(AA) which only occupies part of a *storey*, and is separated from the remaining part by a *fire wall*; or~~

~~(BB) which is located above or below a part not containing *fire-protected timber* and the floor between the adjoining parts is provided with an FRL not less than that prescribed for a *fire wall* for the lower *storey*; and~~

(~~B~~A) the building has an *effective height* of not more than 25 m; and

(~~C~~B) the building has a sprinkler system throughout complying with Specification E1.5; and

(~~D~~C) any insulation installed in the cavity of the timber building element *required* to have an FRL is *non-combustible*; and

(~~E~~D) cavity barriers are provided in accordance with Specification C1.13; or

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(iv) any combination of (i) to (iii).

(e) * * * * *

(f) the FRLs specified in Table 3a or b ~~Table 3~~ for an external column apply also to those parts of an internal column that face and are within 1.5 m of a *window* and are exposed through that *window* to a *fire-source feature*.

~~**Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS**~~

~~**Building element**~~	~~**Class of building — FRL: (in minutes) *Structural adequacy/Integrity/Insulation***~~			
	~~**2, 3 or 4 part**~~	~~**5, 7a or 9**~~	~~**6**~~	~~**7b or 8**~~
~~**EXTERNAL WALL** (including any column and other building element incorporated therewithin it) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—~~				
~~For *loadbearing* parts—~~				
~~less than 1.5 m~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~
~~1.5 to less than 3 m~~	~~90/ 60/ 60~~	~~120/ 90/ 90~~	~~180/180/120~~	~~240/240/180~~
~~3 m or more~~	~~90/ 60/ 30~~	~~120/ 60/ 30~~	~~180/120/ 90~~	~~240/180/ 90~~
~~For non *loadbearing* parts—~~				
~~less than 1.5 m~~	~~-/ 90/ 90~~	~~-/120/120~~	~~-/180/180~~	~~-/240/240~~
~~1.5 to less than 3 m~~	~~-/ 60/ 60~~	~~-/ 90/ 90~~	~~-/180/120~~	~~-/240/180~~
~~3 m or more~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~
~~**EXTERNAL COLUMN** not incorporated in an *external wall*—~~				
~~For *loadbearing* columns—~~	~~90/ -/ -~~	~~120/ -/ -~~	~~180/ -/ -~~	~~240/ -/ -~~
~~For non *loadbearing* columns—~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~
~~**COMMON WALLS and FIRE WALLS**—~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~
~~**INTERNAL WALLS**—~~				
~~*Fire-resisting* lift and stair *shafts*—~~				
~~*Loadbearing*~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/120/120~~	~~240/120/120~~
~~Non *loadbearing*~~	~~-/ 90/ 90~~	~~-/120/120~~	~~-/120/120~~	~~-/120/120~~
~~Bounding *public corridors*, public lobbies and the like—~~				
~~*Loadbearing*~~	~~90/ 90/ 90~~	~~120/ -/ -~~	~~180/ -/ -~~	~~240/ -/ -~~
~~Non *loadbearing*~~	~~-/ 60/ 60~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~
~~Between or bounding *sole-occupancy units*—~~				
~~*Loadbearing*~~	~~90/ 90/ 90~~	~~120/ -/ -~~	~~180/ -/ -~~	~~240/ -/ -~~
~~Non *loadbearing*~~	~~-/ 60/ 60~~	~~-/ -/ -~~	~~-/ -/ -~~	~~-/ -/ -~~
~~Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion—~~				
~~*Loadbearing*~~	~~90/ 90/ 90~~	~~120/ 90/ 90~~	~~180/120/120~~	~~240/120/120~~
~~Non *loadbearing*~~	~~-/ 90/ 90~~	~~-/ 90/ 90~~	~~-/120/120~~	~~-/120/120~~
~~**OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES**~~				
~~**and COLUMNS**—~~	~~90/ -/ -~~	~~120/ -/ -~~	~~180/ -/ -~~	~~240/ -/ -~~
~~**FLOORS**~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~
~~**ROOFS**~~	~~90/ 60/ 30~~	~~120/ 60/ 30~~	~~180/ 60/ 30~~	~~240/ 90/ 60~~

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Table 3a Type A construction: FRL of external walls, (including any column and other building element incorporated within it) or other external building element

Building element — Distance from any *fire-source feature* to which it is exposed	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
For *loadbearing* parts—less than 1.5 m	90/90/90	120/120/120	180/180/180	240/240/240
For *loadbearing* parts—1.5 to less than 3 m	90/60/60	120/ 90/90	180/180/120	240/240/180
For *loadbearing* parts—3 m or more	90/ 60/30	120/ 60/30	180/120/90	240/180/90
For non-*loadbearing* parts—less than 1.5 m	–/90/90	–/120/120	–/180/180	–/240/240
For non-*loadbearing* parts—1.5 to less than 3 m	–/60/60	–/90/90	–/180/120	–/240/180
For non-*loadbearing* parts—3 m or more	–/–/–	–/–/–	–/–/–	–/–/–

Table 3b Type A construction: FRL of external columns not incorporated in an external wall

Building element	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
For *loadbearing* columns	90/–/–	120/–/–	180/–/–	240/–/–
For non-*loadbearing* columns	–/–/–	–/–/–	–/–/–	–/–/–

Table 3c Type A construction: FRL of common walls and fire walls

Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
90/90/90	120/120/120	180/180/180	240/240/240

Table 3d Type A Construction: FRL of internal walls of fire-resisting lift and stair shafts

Building element	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Loadbearing	90/90/90	120/120/120	180/120/120	240/120/120
Non-*loadbearing*	–/90/90	–/120/120	–/120/120	–/120/120

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Table 3e Type A construction: FRL of internal walls bounding public corridors, public lobbies and the like

Building element	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Loadbearing	90/90/90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/60/60	–/–/–	–/–/–	–/–/–

Table 3f Type A construction: FRL of internal walls between or bounding sole-occupancy units

Building element	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Loadbearing	90/90/90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/60/60	–/–/–	–/–/–	–/–/–

Table 3g Type A construction: FRL of internal walls of ventilating, pipe, garbage, and like shafts not used for the discharge of hot products of combustion

Building element	Class of building — FRL: (in minutes) Structural adequacy/Integrity/Insulation 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Loadbearing	90/90/90	120/90/90	180/120/120	240/120/120
Non-*loadbearing*	–/90/90	–/90/90	–/120/120	–/120/120

Table 3h Type A construction: FRL of other loadbearing internal walls, internal beams, trusses and columns

Building element	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Loadbearing Internal walls, internal beams, trusses and columns other than those covered in Tables 3c-g	90/–/–	120/–/–	180/–/–	240/–/–

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Table 3i Type A construction: FRL of floors

Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
90/90/90	120/120/120	180/180/180	240/240/240

Table 3j Type A construction: FRL of roofs

Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building — FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
90/60/30	120/60/30	180/60/30	240/90/60

3.2 Concessions for floors

A floor need not comply with Table 3i~~Table 3~~ if—

(a) it is laid directly on the ground; or

(b) in a Class 2, 3, 5 or 9 building, the space below is not a *storey*, does not accommodate motor vehicles, is not a storage or work area, and is not used for any other ancillary purpose; or

(c) it is a timber *stage* floor in a Class 9b building laid over a floor having the *required* FRL and the space below the *stage* is not used as a dressing room, store room, or the like; or

(d) it is within a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building; or

(e) it is an open-access floor (for the accommodation of electrical and electronic services and the like) above a floor with the *required* FRL.

3.3 Floor loading of Class 5 and 9b buildings: Concession

If a floor in a Class 5 or 9b building is designed for a live load not exceeding 3 kPa—

(a) the floor next above (including floor beams) may have an FRL of 90/90/90; or

(b) the roof, if that is next above (including roof beams) may have an FRL of 90/60/30.

3.4 Roof superimposed on concrete slab: Concession

A roof superimposed on a concrete slab roof need not comply with Clause 3.1 as to *fire-resisting construction* if—

(a) the superimposed roof and any construction between it and the concrete slab roof are *non-combustible* throughout; and

(b) the concrete slab roof complies with Table 3j~~Table 3~~.

3.5 Roof: Concession

A roof need not comply with Table 3j~~Table 3~~ if its covering is *non-combustible* and the building—

(a) has a sprinkler system complying with Specification E1.5 installed throughout; or

(b) has a *rise in storeys* of 3 or less; or

(c) is of Class 2 or 3; or

(d) has an *effective height* of not more than 25 m and the ceiling immediately below the roof has a *resistance to the incipient spread of fire* to the roof space of not less than 60 minutes.

3.6 Rooflights

If a roof is *required* to have an FRL or its covering is *required* to be *non-combustible*, rooflights or the like installed in that roof must—

(a) have an aggregate area of not more than 20% of the roof surface; and

(b) be not less than 3 m from—

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(i) any boundary of the allotment other than the boundary with a road or public place; and

(ii) any part of the building which projects above the roof unless that part has the FRL *required* of a *fire wall* and any openings in that part of the wall for 6 m vertically above the rooflight or the like are protected in accordance with C3.4; and

(iii) any rooflight or the like in an adjoining *sole-occupancy unit* if the walls bounding the unit are *required* to have an FRL; and

(iv) any rooflight or the like in an adjoining fire-separated section of the building; and

(c) if a ceiling with a *resistance to the incipient spread of fire* is *required*, be installed in a way that will maintain the level of protection provided by the ceiling to the roof space.

3.7 Internal columns and walls: Concession

For a building with an *effective height* of not more than 25 m and having a roof without an FRL in accordance with Clause 3.5, in the *storey* immediately below that roof, internal columns other than those referred to in Clause 3.1(f) and *internal walls* other than *fire walls* and *shaft* walls may have—

(a) in a Class 2 or 3 building: FRL 60/60/60; or

(b) in a Class 5, 6, 7, 8 or 9 building—

(i) with *rise in storeys* exceeding 3: FRL 60/60/60

(ii) with *rise in storeys* not exceeding 3: no FRL.

3.8 Open spectator stands and indoor sports stadiums: Concession

In an *open spectator stand* or indoor sports stadium, the following building elements need not have the FRL specified in Tables 3a-j~~Table 3~~:

(a) The roof if it is *non-combustible*.

(b) Columns and *loadbearing* walls supporting only the roof if they are *non-combustible*.

(c) Any non-*loadbearing* part of an *external wall* less than 3 m—

(i) from any *fire-source feature* to which it is exposed if it has an FRL of not less than –/60/60 and is *non-combustible*; or

(ii) from an *external wall* of another *open spectator stand* if it is *non-combustible*.

3.9 Carparks

(a) Notwithstanding Clause 3.1, a *carpark* may comply with Table 3.9 if it is an *open-deck carpark* or is protected with a sprinkler system complying with Specification E1.5 and is—

(i) a separate building; or

(ii) a part of a building—

(A) which only occupies part of a *storey*, and is separated from the remaining part by a *fire wall*; or

(B) which is located above or below another classification, and the floor separating the classifications complies with C2.9; or

(C) which is located above another Class 7 part of the building not used for carparking, and the floor separating the parts complies with Table 3i~~Table 3~~ for a Class 7 part other than a *carpark*; or

(D) which is located below another Class 7 part of the building not used for carparking, and the floor separating the parts complies with Table 3.9.

(b) For the purposes of this Clause, a *carpark*—

(i) includes—

(A) an administration area associated with the functioning of the *carpark*; and

(B) where the *carpark* is sprinklered, is associated with a Class 2 or 3 building and provides carparking for separate *sole-occupancy units*, each carparking area with an area not greater than 10% of its *floor area* for purposes ancillary to the *sole-occupancy units*; but

(ii) excludes—

(A) except for (b)(i), any area of another classification, or other part of a Class 7 building not used for carparking; and

(B) a building or part of a building specifically intended for the parking of trucks, buses, vans and the

(vi) the building is fitted with an *automatic* smoke alarm system complying with Specification E2.2a.

(b) A Class 2 or 3 building having a *rise in storeys* of not more than 4 may have the top three *storeys* constructed in accordance with (a) provided—

(i) the lowest *storey* is used solely for the purpose of parking motor vehicles or for some other ancillary purpose; and

(ii) the lowest *storey* is constructed of concrete or masonry including the floor between it and the Class 2 or 3 part of the building above; and

(iii) the lowest *storey* and the *storey* above are separated by construction having an FRL of not less than 90/90/90 with no openings or penetrations that would reduce the *fire-resisting* performance of that construction except that a doorway in that construction may be protected by a –/60/30 *self-closing* fire door.

(c) In a Class 2 or 3 building complying with (a) or (b) and fitted with a sprinkler system complying with Specification E1.5, any FRL criterion prescribed in Tables 3a-j~~Table 3~~—

(i) for any floor and any *loadbearing* wall, may be reduced to 60, except any FRL criterion of 90 for an *external wall* must be maintained when tested from the outside; and

(ii) for any non-*loadbearing internal wall*, need not apply if—

(A) it is lined on each side with 13 mm standard grade plasterboard or similar *non-combustible* material; and

(B) it extends—

(aa) to the underside of the floor next above; or

(bb) to the underside of a ceiling with a *resistance to the incipient spread of fire* of 60 minutes; or

(cc) to the underside of a *non-combustible* roof covering; and

(C) any insulation installed in the cavity of the wall is *non-combustible*; and

(D) any construction joint, space or the like between the top of the wall and the floor, ceiling or roof is smoke sealed with intumescent putty or other suitable material; and

(E) any doorway in the wall is protected by a *self-closing*, tight fitting, solid core door not less than 35 mm thick.

4. Type B Fire-Resisting Construction

4.1 Fire-resistance of building elements

In a building *required* to be of Type B construction—

(a) each building element listed in Tables 4a-f~~**Table 4**~~, and any beam or column incorporated in it, must have an FRL not less than that listed in the Table for the particular Class of building concerned; and

(b) * * * * *

(c) if a stair *shaft* supports any floor or a structural part of it—

(i) the floor or part must have an FRL of 60/–/– or more; or

(ii) the junction of the stair *shaft* must be constructed so that the floor or part will be free to sag or fall in a fire without causing structural damage to the *shaft*; and

(d) any *internal wall* which is *required* to have an FRL with respect to *integrity* and *insulation*, except a wall that bounds a *sole-occupancy unit* in the topmost (or only) *storey* and there is only one unit in that *storey*, must extend to—

(i) the underside of the floor next above if that floor has an FRL of at least 30/30/30; or

(ii) the underside of a ceiling having a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(iii) the underside of the roof covering if it is *non-combustible* and, except for roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not be crossed by timber or other *combustible* building elements; or

(iv) 450 mm above the roof covering if it is *combustible*; and

(e) a *loadbearing internal wall* and a *loadbearing fire wall* (including those that are part of a *loadbearing shaft*) must be constructed from—

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(i) concrete; or

(ii) masonry; or

(iii) *fire-protected timber*, provided that—

~~(A) the building is a Class 2, 3 or 5 building which is—~~

~~(aa) a separate building; or~~

~~(bb) a part of a building—~~

~~(AA) which only occupies part of a *storey*, and is separated from the remaining part by a *fire wall*; or~~

~~(BB) which is located above or below a part not containing *fire-protected timber* and the floor between the adjoining parts is provided with an FRL not less than that prescribed for a *fire wall* for the lower *storey*; and~~

(~~B~~A) the building has an *effective height* of not more than 25 m; and

(~~C~~B) the building has a sprinkler system throughout complying with **Specification E1.5**; and

(~~D~~C) any insulation installed in the cavity of the timber building element *required* to have an FRL is *non-combustible*; and

(~~E~~D) cavity barriers are provided in accordance with **Specification C1.13**; or

(iv) any combination of (i) to (iii).

(f) * * * * *

(g) in a Class 5, 6, 7, 8 or 9 building, in the *storey* immediately below the roof, internal columns and *internal walls* other than *fire walls* and *shaft* walls, need not comply with Tables 4a-f~~**Table 4**~~; and

(h) * * * * *

(i) in a Class 2 or 3 building, except where within the one *sole-occupancy unit*, or a Class 9a *health-care building* or a Class 9b building, a floor separating *storeys* or above a space for the accommodation of motor vehicles or used for storage or any other ancillary purpose, must—

(i) be constructed so that it is at least of the standard achieved by a floor/ceiling system incorporating a ceiling which has a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(ii) have an FRL of at least 30/30/30; or

(iii) have a *fire-protective covering* on the underside of the floor, including beams incorporated in it, if the floor is *combustible* or of metal; and

(j) in a Class 9c building a floor above a space for the accommodation of motor vehicles or used for storage or any other ancillary purpose, and any column supporting the floor must—

(i) be constructed so that it is at least of the standard achieved by a floor/ceiling system incorporating a ceiling which has a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(ii) have an FRL of at least 30/30/30; or

(iii) have a *fire-protective covering* on the underside of the floor, including beams incorporated in it, if the floor is *combustible* or of metal.

~~**Table 4 TYPE B CONSTRUCTION: FRL OF BUILDING ELEMENTS**~~

~~**Building element**~~	~~**Class of building—FRL: (in minutes)**~~			
	~~***Structural adequacy/Integrity/Insulation***~~			
	~~**2, 3 or 4 part**~~	~~**5, 7a or 9**~~	~~**6**~~	~~**7b or 8**~~
~~**EXTERNAL WALL** (including any column and other building element incorporated there~~within ~~it) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—~~				
~~For *loadbearing* parts—~~				
~~less than 1.5 m~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~
~~1.5 to less than 3 m~~	~~90/ 60/ 30~~	~~120/ 90/ 60~~	~~180/120/ 90~~	~~240/180/120~~
~~3 to less than 9 m~~	~~90/ 30/ 30~~	~~120/ 30/ 30~~	~~180/ 90/ 60~~	~~240/ 90/ 60~~
~~9 to less than 18 m~~	~~90/ 30/–~~	~~120/ 30/–~~	~~180/ 60/–~~	~~240/ 60/–~~

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~~**Building element**~~	~~**Class of building—FRL: (in minutes)**~~			
	~~***Structural adequacy/Integrity/Insulation***~~			
	~~**2, 3 or 4 part**~~	~~**5, 7a or 9**~~	~~**6**~~	~~**7b or 8**~~
~~18 m or more~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~For non *loadbearing* parts—~~				
~~less than 1.5 m~~	~~–/ 90/ 90~~	~~–/120/120~~	~~–/180/180~~	~~–/240/240~~
~~1.5 to less than 3 m~~	~~–/ 60/ 30~~	~~–/ 90/ 60~~	~~–/120/ 90~~	~~–/180/120~~
~~3 m or more~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~**EXTERNAL COLUMN** not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—~~				
~~For *loadbearing* columns—~~				
~~less than 18 m~~	~~90/–/–~~	~~120/–/–~~	~~180/–/–~~	~~240/–/–~~
~~18 m or more~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~For non *loadbearing* columns—~~				
~~For non *loadbearing* columns—~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~**COMMON WALLS and FIRE WALLS**—~~	~~90/ 90 / 90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~
~~**INTERNAL WALLS**—~~				
~~*Fire-resisting* lift and stair *shafts*—~~				
~~*Loadbearing*~~	~~90/ 90/ 90~~	~~120/120/120~~	~~180/120/120~~	~~240/120/120~~
~~*Fire-resisting* stair *shafts*—~~				
~~Non *loadbearing*~~	~~–/ 90/ 90~~	~~–/120/120~~	~~–/120/120~~	~~–/120/120~~
~~Bounding *public corridors*, public lobbies and the like—~~				
~~*Loadbearing*~~	~~60/ 60/ 60~~	~~120/–/–~~	~~180/–/–~~	~~240/–/–~~
~~Non *loadbearing*~~	~~–/ 60/ 60~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~Between or bounding *sole-occupancy units*—~~				
~~*Loadbearing*~~	~~60/ 60/ 60~~	~~120/–/–~~	~~180/–/–~~	~~240/–/–~~
~~Non *loadbearing*~~	~~–/ 60/ 60~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~
~~**OTHER LOADBEARING INTERNAL WALLS and COLUMNS**—~~	~~60/–/–~~	~~120/–/–~~	~~180/–/–~~	~~240/–/–~~
~~**ROOFS**~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~	~~–/–/–~~

Table 4a Type B construction: FRL of external walls (including any column and other building element incorporated within it) or other external building element

Building element Building element — Distance from any *fire-source feature* to which it is exposed	Class of building—FRL: (in minutes) ***Structural adequacy/Integrity/Insulation*** 2, 3 or 4 part	Class of building—FRL: (in minutes) ***Structural adequacy/Integrity/Insulation*** 5, 7a or 9	Class of building—FRL: (in minutes) ***Structural adequacy/Integrity/Insulation*** 6	Class of building—FRL: (in minutes) ***Structural adequacy/Integrity/Insulation*** 7b or 8
For *loadbearing* parts—less than 1.5 m	90/90/90	120/120/120	180/180/180	240/240/240
For *loadbearing* parts—1.5 to less than 3 m	90/60/30	120/90/60	180/120/90	240/180/120
For *loadbearing* parts—3 to less than 9 m	90/30/30	120/30/30	180/90/60	240/90/60
For *loadbearing* parts—9 to less than 18 m	90/30/–	120/30/–	180/60/–	240/60/–
For *loadbearing*	–/–/–	–/–/–	–/–/–	–/–/–

Building element Building element — Distance from any *fire-source feature* to which it is exposed	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
parts—18 m or more				
For non-*loadbearing* parts—less than 1.5 m	–/90/90	–/120/120	–/180/180	–/240/240
For non-*loadbearing* parts—1.5 to less than 3 m	–/60/30	–/90/60	–/120/90	–/180/120
For non-*loadbearing* parts—3 m or more	–/–/–	–/–/–	–/–/–	–/–/–

Table 4b Type B construction: FRL of external columns not incorporated in an external wall

Building element Building element — Distance from any *fire-source feature* to which it is exposed	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
For *loadbearing* columns—less than 18 m	90/–/–	120/–/–	180/–/–	240/–/–
For *loadbearing* columns—18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
For non-*loadbearing* columns—	–/–/–	–/–/–	–/–/–	–/–/–

Table 4c Type B construction: FRL of common walls and fire walls

Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
90/90/90	120/120/120	180/180/180	240/240/240

Table 4d Type B construction: FRL of internal walls

Building element	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Fire-resisting lift and stair *shafts*—*Loadbearing*	90/90/90	120/120/120	180/120/120	240/120/120
Fire-resisting stair *shafts*—Non-*loadbearing*	–/90/90	–/120/120	–/120/120	–/120/120

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Building element	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 7b or 8
Bounding *public corridors*, public lobbies and the like—*Loadbearing*	60/60/60	120/–/–	180/–/–	240/–/–
Bounding *public corridors*, public lobbies and the like—Non-*loadbearing*	–/ 60/60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—*Loadbearing*	60/60/60	120/–/–	180/–/–	240/–/–
Between or bounding *sole-occupancy units*—Non-*loadbearing*	–/60/60	–/–/–	–/–/–	–/–/–

Table 4e Type B construction: FRL of other loadbearing internal walls and columns

Building element	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 7b or 8
Loadbearing internal walls and columns other than tose covered in Tables 4c and d	60/–/–	120/–/–	180/–/–	240/–/–

Table 4f Type B construction: FRL of roofs

Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation* 7b or 8
–/–/–	–/–/–	–/–/–	–/–/–

4.2 Carparks

(a) Notwithstanding **Clause 4.1**, a *carpark* may comply with **Table 4.2** if it is an *open-deck carpark* or is protected with a sprinkler system complying with **Specification E1.5** and is—

- (i) a separate building; or
- (ii) a part of a building, and if occupying only part of a *storey*, is separated from the remaining part by a *fire wall*.

(b) For the purposes of this Clause, a *carpark*—

- (i) includes—
  - (A) an administration area associated with the functioning of the *carpark*; and

(v) any insulation installed in the cavity of a wall *required* to have an FRL is *non-combustible*; and

(vi) the building is fitted with an *automatic* smoke alarm system complying with Specification E2.2a.

(b) A Class 2 or 3 building having a *rise in storeys* of not more than 2 may have the top *storey* constructed in accordance with (a) provided—

(i) the lowest *storey* is used solely for the purpose of parking motor vehicles or for some other ancillary purpose; and

(ii) the lowest *storey* is constructed of concrete or masonry including the floor between it and the Class 2 or 3 part of the building above; and

(iii) the lowest *storey* and the *storey* above are separated by construction having an FRL of not less than 90/90/90 with no openings or penetrations that would reduce the *fire-resisting* performance of that construction except that a doorway in that construction may be protected by a –/60/30 *self-closing* fire door.

(c) In a Class 2 or 3 building complying with (a) or (b) and fitted with a sprinkler system complying with Specification E1.5, any FRL criterion prescribed in Tables 4a-f~~Table 4~~—

(i) for any *loadbearing* wall, may be reduced to 60, except any FRL criterion of 90 for an *external wall* must be maintained when tested from the outside; and

(ii) for any non-*loadbearing internal wall*, need not apply, if—

(A) it is lined on both sides with 13 mm standard grade plasterboard or similar *non-combustible* material; and

(B) it extends—

(aa) to the underside of the floor next above if that floor has an FRL of at least 30/30/30 or is lined on the underside with a *fire-protective covering*; or

(bb) to the underside of a ceiling with a *resistance to the incipient spread of fire* of 60 minutes; or

(cc) to the underside of a *non-combustible* roof covering; and

(C) any insulation installed in the cavity of the wall is *non-combustible*; and

(D) any construction joints, spaces and the like between the top of the wall and the floor, ceiling or roof is smoke sealed with intumescent putty or other suitable material.

5. Type C Fire-Resisting Construction

5.1 Fire-resistance of building elements

In a building *required* to be of Type C construction—

(a) a building element listed in Tables 5a-e~~Table 5~~ and any beam or column incorporated in it, must have an FRL not less than that listed in the Table for the particular Class of building concerned; and

(b) an *external wall* that is *required* by Tables 5a~~Table 5~~ to have an FRL need only be tested from the outside to satisfy the requirement; and

(c) a *fire wall* or an *internal wall* bounding a *sole-occupancy unit* or separating adjoining units must comply with Specification C1.8 if it is of *lightweight construction* and is *required* to have an FRL; and

(d) in a Class 2 or 3 building, an *internal wall* which is *required* by Tables 5c and d~~Table 5~~ to have an FRL must extend—

(i) to the underside of the floor next above if that floor has an FRL of at least 30/30/30 or a *fire-protective covering* on the underside of the floor; or

(ii) to the underside of a ceiling having a *resistance to the incipient spread of fire* to the space above itself of not less than 60 minutes; or

(iii) to the underside of the roof covering if it is *non-combustible*, and except for roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not be crossed by timber or other *combustible* building elements; or

(iv) 450 mm above the roof covering if it is *combustible*; and

(e) in a Class 2 or 3 building, except where within the one *sole-occupancy unit*, or a Class 9a *health-care building*, or a Class 9b building, a floor separating *storeys*, or above a space for the accommodation of motor vehicles or used for storage or any other ancillary purpose, and any column supporting the floor,

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must—

(i) have an FRL of at least 30/30/30; or

(ii) have a *fire-protective covering* on the underside of the floor including beams incorporated in it and around the column, if the floor or column is *combustible* or of metal; and

(f) in a Class 9c building a floor above a space for the accommodation of motor vehicles or used for storage or any other ancillary purpose, and any column supporting the floor, must—

(i) have an FRL of at least 30/30/30; or

(ii) have a *fire-protective covering* on the underside of the floor including beams incorporated in it and around the column, if the floor or column is *combustible* or of metal.

~~**Table 5 TYPE C CONSTRUCTION: FRL OF BUILDING ELEMENTS**~~

~~**Building element**~~	~~**Class of building—FRL: (in minutes)**~~ ~~***Structural adequacy/Integrity/Insulation***~~			
	~~**2, 3 or 4 part**~~	~~**5, 7a or 9**~~	~~**6**~~	~~**7b or 8**~~
~~**EXTERNAL WALL** (including any column and other building element incorporated there~~within ~~in~~ it~~) or other external building element, where the distance from any *fire-source feature* to which it is exposed is—~~				
~~Less than 1.5 m~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~
~~1.5 to less than 3 m~~	~~–/ –/ –~~	~~60/ 60/ 60~~	~~60/ 60/ 60~~	~~60/ 60/ 60~~
~~3 m or more~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~
~~**EXTERNAL COLUMN** not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—~~				
~~Less than 1.5 m~~	~~90/ –/ –~~	~~90/ –/ –~~	~~90/ –/ –~~	~~90/ –/ –~~
~~1.5 to less than 3 m~~	~~–/ –/ –~~	~~60/ –/ –~~	~~60/ –/ –~~	~~60/ –/ –~~
~~3 m or more~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~
~~**COMMON WALLS and FIRE WALLS**—~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~	~~90/ 90/ 90~~
~~**INTERNAL WALLS**—~~				
~~Bounding *public corridors*, public lobbies and the like—~~	~~60/ 60/ 60~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~
~~Between or bounding *sole-occupancy units*—~~	~~60/ 60/ 60~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~
~~Bounding a stair if *required* to be rated—~~	~~60/ 60/ 60~~	~~60/ 60/ 60~~	~~60/ 60/ 60~~	~~60/ 60/ 60~~
~~**ROOFS**~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~	~~–/ –/ –~~

Table 5a Type C construction: FRL of external walls (including any column and other building element incorporated within it) or other external building element

Building element — Distance from any *fire-source feature* to which it is exposed	**Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*** **2, 3 or 4 part**	**Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*** **5, 7a or 9**	**Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*** **6**	**Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*** **7b or 8**
Less than 1.5 m	90/90/90	90/90/90	90/90/90	90/90/90
1.5 to less than 3 m	–/–/–	60/60/60	60/60/60	60/60/60
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–

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Table 5b Type C construction: FRL of external columns not incorporated in an external wall

Building element — Distance from any *fire-source feature* to which it is exposed	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Less than 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–

Table 5c Type C construction: FRL of common walls and fire walls

Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
90/90/90	90/90/90	90/90/90	90/90/90

Table 5d Type C construction: FRL of internal walls

Building element	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
Bounding *public corridors*, public lobbies and the like	60/60/60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*	60/ 60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated	60/60/60	60/60/60	60/60/60	60/60/60

Table 5e Type C construction: FRL of roofs

Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 2, 3 or 4 part	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 5, 7a or 9	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 6	Class of building—FRL: (in minutes) *Structural adequacy*/*Integrity*/*Insulation* 7b or 8
–/–/–	–/–/–	–/–/–	–/–/–

5.2 Carparks

(a) Notwithstanding **Clause 5.1**, a *carpark* may comply with **Table 5.2** if it is an *open-deck carpark* or is protected with a sprinkler system complying with **Specification E1.5** and is—

(i) a separate building; or

(ii) a part of a building, and if occupying only part of a *storey*, is separated from the remaining part by a *fire wall*.

(b) For the purposes of this Clause, a *carpark*—

(i) includes—

(A) an administration area associated with the functioning of the *carpark*; and

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(B) where the *carpark* is sprinklered, is associated with a Class 2 or 3 building and provides carparking for separate *sole-occupancy units*, each carparking area with an area not greater than 10% of its *floor area* for purposes ancillary to the *sole-occupancy units*; but

(ii) excludes—

(A) except for **(b)(i)**, any area of another classification, or other part of a Class 7 building not used for carparking; and

(B) a building or part of a building specifically intended for the parking of trucks, buses, vans and the like.

Table 5.2 REQUIREMENTS FOR CARPARKS

Building element				FRL (not less than) ***Structural adequacy*/*Integrity*/ *Insulation*** **ESA/M (not greater than)**
Wall				
(a)	*external wall*			
	(i)	less than 1.5 m from a *fire-source feature* to which it is exposed:		
			Loadbearing	60/60/60
			Non-*loadbearing*	–/60/60
	(ii)	1.5 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	*internal wall*			–/–/–
(c)	*fire wall*			
	(i)	from the direction used as a *carpark*		60/60/60
	(ii)	from the direction not used as a *carpark*		90/90/90
Column				
(a)	steel column less than 1.5 m from a *fire-source feature*			60/–/– or 26 m^2/tonne
(b)	any other column less than 1.5 m from a *fire-source feature*			60/–/–
(c)	any other column not covered by (a) or (b)			–/–/–
Beam				
(a)	less than 1.5 m from a *fire-source feature*			
	(i)	steel floor beam in continuous contact with a concrete floor slab		60/–/– or 30 m^2/tonne
	(ii)	any other beam		60/–/–
(b)	1.5 m or more from a *fire-source feature*			–/–/–
Roof, floor slab and vehicle ramp				–/–/–
Note: ESA/M means the ratio of exposed surface area to mass per unit length.				

SPECIFICATION C1.8 STRUCTURAL TESTS FOR LIGHTWEIGHT CONSTRUCTION

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4. Test specimens

4.1 General

Testing must be carried out on either—

(a) construction in-situ; or

(b) a laboratory specimen of the construction.

4.2 Testing in-situ

If testing is carried out in-situ, it must be done on that part of the construction least likely, because of the particular combination of the height of the walls, the support conditions and other aspects of the construction, to resist the loads.

4.3 Testing of specimens

If a laboratory specimen is tested, the specimen must span only in the direction corresponding to the height of the wall and testing must be done in accordance with either (a) or (b) below:

(a) The test specimen—

(i) ~~The~~ height ~~of the test specimen~~ (or length, if the specimen is tested horizontally) must be identical with the height between supports in the actual construction; and

(ii) ~~the specimen~~ must be supported at the top and bottom (or at each end if tested horizontally) by components identical with, and in a manner identical with, the actual construction.

(b) If the distance between supports of the actual construction is more than 3 m, then a smaller specimen may be tested but—

(i) the distance between supports must be not less than 3 m; and

(ii) forces, reactions and support conditions must be modelled so as to reproduce the behaviour of the actual construction if it were tested in-situ.

SPECIFICATION C1.10 FIRE HAZARD PROPERTIES

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2. Application

Linings, materials and assemblies in Class 2 to 9 buildings must comply with the appropriate provisions described in Table 1.

~~Table 1 FIRE HAZARD PROPERTY REQUIREMENTS~~

~~Lining, material or assembly~~	~~Requirement~~
~~Floor linings and floor coverings.~~	~~Clause 3~~
~~Wall linings and ceiling linings.~~	~~Clause 4~~
~~Air-handling ductwork.~~	~~Clause 5~~
~~Lift cars.~~	~~Clause 6~~
~~In fire control rooms subject to Specification C1.8 and fire isolated *exits*~~	~~Clause 7~~
~~In Class 9b buildings used as a theatre, public hall or the like—~~ ~~(a) fixed seating in the audience area or auditorium; and~~ ~~(b) a proscenium curtain *required* by Specification H1.3.~~	
~~Escalators, moving walkways and non *required* non *fire isolated stairways* or pedestrian ramps subject to Specification D1.12.~~	
~~*Sarking type material*.~~	
~~Attachments to internal floors, walls and ceilings.~~	
~~Other materials including Insulation.~~	

Table 1 Fire hazard property requirements

Lining, material or assembly	Requirement
Floor linings and floor coverings	Clause 3
Wall linings and ceiling linings	Clause 4
Air-handling ductwork	Clause 5
Lift cars	Clause 6
In fire control rooms subject to Specification C1.8 and fire isolated *exits*	Clause 7
In Class 9b buildings used as a theatre, public hall or the like— (a) fixed seating in the audience area or auditorium; and (b) a proscenium curtain *required* by Specification H1.3	Clause 7
Escalators, moving walkways and non-*required* non-*fire-isolated stairways* or pedestrian ramps subject to Specification D1.12	Clause 7
Sarking-type material	Clause 7
Attachments to internal floors, walls and ceilings	Clause 7
Other materials including Insulation	Clause 7

3. Floor linings and floor coverings

A floor lining or floor covering must have—

(a) a *critical radiant flux* not less than that listed in Table 2; and

(b) in a building not protected by a sprinkler system complying with Specification E1.5, a maximum *smoke development rate* of 750 percent-minutes; and

(c) a group number complying with Clause 6(b), for any portion of the floor covering that is continued more than 150 mm up a wall.

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~~Table 2 CRITICAL RADIANT FLUX (CHRF in kW/m ^{2}) OF FLOOR LININGSMATERIALS AND FLOOR COVERINGS~~

~~Class of building~~	~~General~~		~~Fire-isolated exits and fire control rooms~~
	~~Building not fitted with a sprinkler system complying with Specification E1.5~~	~~Building fitted with a sprinkler system complying with Specification E1.5~~	
~~Class 2, 3, 5, 6, 7, 8 or 9b, excluding—~~ ~~(i) Class 3 accommodation for the aged; and~~ ~~(ii) Class 9b as specified below.~~	~~2.2~~	~~1.2~~	~~2.2~~
~~Class 3~~ ~~Accommodation for the aged.~~	~~4.5~~	~~2.2~~	~~4.5~~
~~Class 9a~~ ~~*Patient care areas*.~~ ~~Areas other than *patient care areas*.~~	~~4.5~~ ~~2.2~~	~~2.2~~ ~~1.2~~	~~4.5~~ ~~4.5~~
~~Class 9b auditorium or audience seating area used mainly for—~~ ~~(i) indoor swimming or ice skating; and~~ ~~(ii) other sports or multi-purpose functions.~~	~~1.2~~ ~~2.2~~	~~1.2~~ ~~1.2~~	~~2.2~~ ~~2.2~~
~~Class 9c~~ ~~*Resident use areas*.~~ ~~Areas other than *resident use areas*.~~	~~—~~ ~~—~~	~~2.2~~ ~~1.2~~	~~4.5~~ ~~4.5~~

Table 2 Critical radiant flux (CHF in kW/m ^{2}) of floor linings and floor coverings

Class of building	**Building not fitted with a sprinkler system complying with Specification E1.5**	**Building fitted with a sprinkler system complying with Specification E1.5**	**Fire-isolated exits and fire control rooms**
Class 2, 3, 5, 6, 7, 8 or 9b, excluding— (i) Class 3 accommodation for the aged; and (ii) Class 9b as specified below	2.2 kW/m ^{2}	1.2 kW/m ^{2}	2.2 kW/m ^{2}
Class 3 Accommodation for the aged	4.5 kW/m ^{2}	2.2 kW/m ^{2}	4.5 kW/m ^{2}
Class 9a *Patient care areas*	4.5 kW/m ^{2}	2.2 kW/m ^{2}	4.5 kW/m ^{2}
Class 9a Areas other than *patient care areas*	2.2 kW/m ^{2}	1.2 kW/m ^{2}	4.5 kW/m ^{2}
Class 9b auditorium or audience seating area used mainly for indoor swimming or ice skating	1.2 kW/m ^{2}	1.2 kW/m ^{2}	2.2 kW/m ^{2}
Class 9b auditorium or audience seating area used mainly for— other sports or multi-purpose functions.	2.2 kW/m ^{2}	1.2	2.2 kW/m ^{2}
Class 9c	N/A	2.2 kW/m ^{2}	4.5 kW/m ^{2}

Class of building	Building not fitted with a sprinkler system complying with Specification E1.5	Building fitted with a sprinkler system complying with Specification E1.5	Fire-isolated exits and fire control rooms
Resident use areas.			
Class 9c Areas other than *resident use areas.*	N/A	1.2 kW/m ^{2}	4.5 kW/m ^{2}

4. Wall and ceiling linings

(a) A wall or ceiling lining system must comply with the *group number* specified in Table 3 and for buildings not fitted with a sprinkler system complying with **Specification E1.5** have—

(i) a *smoke growth rate index* not more than 100; or

(ii) an *average specific extinction area* less than 250 m^2/kg.

(b) A *group number* of a wall or ceiling lining and the *smoke growth rate index* or *average specific extinction area* must be determined in accordance with AS 5637.1.

~~Table 3 WALL AND CEILING LINING MATERIALS (Material Groups permitted)~~

~~Class of building~~	~~Fire-isolated exits and fire control rooms~~	~~Public corridors~~		~~Specific areas~~		~~Other areas~~
	~~Wall/ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall/ceiling~~
~~Class 2 or 3~~						
~~Excluding accommodation for the aged, people with disabilities, and children~~						
~~Unsprinklered~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~

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~~Class of building~~	~~Fire-isolated exits and fire control rooms~~	~~Public corridors~~		~~Specific areas~~		~~Other areas~~
	~~Wall/ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall/ceiling~~
~~Sprinklered~~	~~1~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~
~~Class 3 or 9a~~						
~~Accommodation for the aged, people with a disability, children and *health-care buildings*~~						
~~Unsprinklered~~	~~1~~	~~1~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~
~~Sprinklered~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~
~~Class 5, 6, 7, 8 or 9b *schools*~~						
~~Unsprinklered~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~	~~1, 2~~	~~1, 2, 3~~
~~Sprinklered~~	~~1~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~
~~Class 9b other than *schools*~~						
~~Unsprinklered~~	~~1~~	~~1~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~
~~Sprinklered~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2,~~	~~1, 2,~~	~~1, 2,~~

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~~Class of building~~	~~Fire-isolated exits and fire control rooms~~	~~Public corridors~~		~~Specific areas~~		~~Other areas~~
	~~Wall/ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall~~	~~Ceiling~~	~~Wall/ceiling~~
				~~3~~	~~3~~	~~3~~
~~Class 9c~~						
~~Sprinklered~~	~~1~~	~~1, 2~~	~~1, 2~~	~~1, 2, 3~~	~~1, 2, 3~~	~~1, 2, 3~~

~~For the purpose of this Table—~~

1. ~~"Sprinklered" means a building fitted with a sprinkler system complying with **Specification E1.5**.~~
2. ~~"Specific areas" means within—~~
   - ~~(a) for Class 2 and 3 buildings, a *sole-occupancy unit*; and~~
   - ~~(b) for Class 5 buildings, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5; and~~
   - ~~(c) for Class 6 buildings, shops or other building with a minimum floor dimension/floor to ceiling height ratio > 5; and~~
   - ~~(d) for Class 9a *health-care buildings*, *patient care areas*; and~~
   - ~~(e) for Class 9b theatres and halls, etc, an auditorium; and~~
   - ~~(f) for Class 9b *schools*, a classroom; and~~
   - ~~(g) for Class 9c buildings, *resident use areas*.~~

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Table 3 Wall and ceiling lining materials (material groups permitted)

Class of building	Fire-isolated exits and fire control rooms	Public corridors	Specific areas	Other areas
Class 2 or 3 Excluding accommodation for the aged, people with disabilities, and children Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3
Class 2 or 3 Excluding accommodation for the aged, people with disabilities, and children Sprinklered	Walls: 1 Ceilings: 1	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3
Class 3 or 9a Accommodation for the aged, people with a disability, children and *health-care buildings* Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3
Class 3 or 9a Accommodation for the aged, people with a disability, children and health-care buildings Sprinklered	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3
Class 5, 6, 7, 8 or 9b *schools* Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3
Class 5, 6, 7, 8 or 9b *schools* Sprinklered	Walls: 1 Ceilings: 1	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3
Class 9b other than *schools* Unsprinklered	Walls: 1 Ceilings: 1	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3
Class 9b other than *schools* Sprinklered	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3
Class 9c Sprinklered	Walls: 1 Ceilings: 1	Walls: 1,2 Ceilings: 1,2	Walls: 1,2,3 Ceilings: 1,2,3	Walls: 1,2,3 Ceilings: 1,2,3

Notes:

1. "Sprinklered" means a building fitted with a sprinkler system complying with Specification E1.5.
2. "Specific areas" means within—
   a. for Class 2 and 3 buildings, a *sole-occupancy unit*; and
   b. for Class 5 buildings, open plan offices with a minimum floor dimension/floor to ceiling height ratio > 5; and

Deemed-to-Satisfy Provisions

c. for Class 6 buildings, shops or other building with a minimum floor dimension/floor to ceiling height ratio > 5; and
d. for Class 9a *health-care buildings*, *patient care areas*; and
e. for Class 9b theatres and halls, etc, an auditorium; and
f. for Class 9b *schools*, a classroom; and
g. for Class 9c buildings, *resident use areas*.

7. Other materials

NSW Spec C1.10 NSW 7

Materials and assemblies in a Class 2 to 9 building not included in Clauses 3, 4, 5 or 6 must not exceed the indices set out in Table 4.

~~**Table 4 OTHER MATERIALS**~~

~~**Material or assembly location**~~	~~**Flammability Index**~~	~~**Spread-of-Flame Index**~~	~~**Smoke-Developed Index**~~
~~Fire control rooms subject to **Specification E1.8** and fire-isolated *exits*, other than a *sarking-type material* used in a ceiling or used as an attachment or part of an attachment to a building element.~~ ~~Note 1~~	~~—~~	~~0~~	~~2~~
~~Class 9b buildings used as a theatre, public hall or the like:~~			
~~(a) Any part of fixed seating in the audience area or auditorium.~~	~~—~~	~~0~~	~~5~~
~~(b) A proscenium curtain *required* by **Specification H1.3**.~~	~~—~~	~~0~~	~~3~~
~~Escalators, moving walkways or non-*required* non-*fire-isolated stairways* or pedestrian ramps subject to **Specification D1.12**.~~	~~—~~	~~0~~	~~5~~
~~*Sarking-type material*:~~			
~~(a) In a fire control room subject to **Specification E1.8** or a fire-isolated *exit* or fire control room used in the form of an exposed wall or ceiling.~~	~~0~~	~~—~~	~~—~~
~~(b) In other locations.~~ ~~Note 2~~	~~5~~	~~—~~	~~—~~
~~Other materials or locations and insulation materials other than *sarking-type materials*.~~ ~~Notes 2 and 3~~	~~—~~	~~9~~	~~8 if the *Spread-of-Flame Index* is more than 5~~

~~**Notes:**~~

~~1. In a fire control room or *fire-isolated stairway*, a material used as an attachment or part of an attachment to a building element must, if *combustible*, be attached directly to a *non-combustible* substrate and not exceed 1 mm finished thickness.~~

~~2. A material, other than one located within a fire-isolated *exit* or fire control room, may be covered on all faces by~~

Deemed-to-Satisfy Provisions

~~Material or assembly location~~		~~Flammability Index~~	~~Spread-of-Flame Index~~	~~Smoke-Developed Index~~
	~~concrete or masonry not less than 50 mm thick, as an alternative to meeting the specified indices.~~			
~~3.~~	~~In the case of a composite member or assembly, the member or assembly must be constructed so that when assembled as proposed in a building —~~			
	~~(a) any material which does not comply with this Table is protected on all sides and edges from exposure to the air; and~~			
	~~(b) the member or assembly, when tested in accordance with Specification A2.4, has a *Spread-of-Flame Index* and a *Smoke-Developed Index* not exceeding those prescribed in this Table; and~~			
	~~(c) the member or assembly retains the protection in position so that it prevents ignition of the material and continues to screen it from access to free air for a period of not less than 10 minutes.~~			

Table 4 Other materials

Material or assembly location	**Flammability Index**	**Spread-of-Flame Index**	**Smoke Developed Index**
Fire control rooms subject to Specification E1.8 and fire-isolated *exits*, other than a *sarking-type material* used in a ceiling or used as an attachment or part of an attachment to a building element. Note 1	N/A	0	2
Class 9b buildings used as a theatre, public hall or the like: Any part of fixed seating in the audience area or auditorium.	N/A	0	5
Class 9b buildings used as a theatre, public hall or the like: A proscenium curtain *required* by Specification H1.3.	N/A	0	3
Escalators, moving walkways or non-*required* non-*fire-isolated stairways* or pedestrian ramps subject to Specification D1.12.	N/A	0	5
Sarking-type material: In a fire control room subject to Specification E1.8 or a fire-isolated *exit* or fire control room used in the form of an exposed wall or ceiling.	0	N/A	N/A
Sarking-type material:	5	N/A	N/A

Deemed-to-Satisfy Provisions

Material or assembly location	**Flammability Index**	**Spread-of-Flame Index**	**Smoke Developed Index**
In other locations. Note 2			
Other materials or locations and insulation materials other than *sarking-type materials*. Notes 2 and 3	N/A	9	8 if the *Spread-of-Flame Index* is more than 5

Notes:

1. In a fire control room or *fire-isolated stairway*, a material used as an attachment or part of an attachment to a building element must, if *combustible*, be attached directly to a *non-combustible* substrate and not exceed 1 mm finished thickness.
2. A material, other than one located within a fire-isolated *exit* or fire control room, may be covered on all faces by concrete or masonry not less than 50 mm thick, as an alternative to meeting the specified indices.
3. In the case of a composite member or assembly, the member or assembly must be constructed so that when assembled as proposed in a building—
    a. any material which does not comply with this Table is protected on all sides and edges from exposure to the air; and
    b. the member or assembly, when tested in accordance with Specification A2.4, has a *Spread-of-Flame Index* and a *Smoke-Developed Index* not exceeding those prescribed in this Table; and
    c. the member or assembly retains the protection in position so that it prevents ignition of the material and continues to screen it from access to free air for a period of not less than 10 minutes.

SPECIFICATION C1.13 CAVITY BARRIERS FOR FIRE-PROTECTED TIMBER

Deemed-to-Satisfy Provisions

2. Requirements

(a) Cavity barriers must be provided in the following locations where *fire-protected timber* is used in any of the listed elements:

(i) At concealed cavities adjacent to junctions between *fire-resisting* floor/ceiling assemblies and *fire-resisting* walls.

(ii) At concealed cavities adjacent to junctions between *fire-resisting* floor/ceiling assemblies and *fire-resisting* or *non-combustible external walls*.

(iii) At concealed cavities adjacent to junctions between *fire-resisting* walls and *fire-resisting* or *non-combustible external walls*.

(iv) Around the perimeter of door and window openings in *fire-resisting* construction.

(b) Cavity barriers must be installed so they are tight fitting and are able to withstand thermal expansion and structural movement without the loss of seal against fire and smoke.

(c) In addition to cavity barriers *required* by Clause 2(a), horizontal and vertical cavity barriers are to be provided to wall cavities within, around or adjacent to *fire-protected timber* elements as follows:

(i) Horizontal cavity barriers — at not more than 5 m centres.

(ii) Vertical cavity barriers — at not more than 10 m centres.

(d) Cavity barriers must—

(i) achieve the performance specified in Table 1 based on the highest FRL of the elements they are mounted within or seal against; or

(ii) consist of—

(A) timber with the minimum thickness specified in Table 1; or

(B) polythene-sleeved mineral wool or mineral wool slabs or strips placed under compression to achieve the minimum thickness specified in Table 1.

(e) Cavity barriers provided around openings may be formed by the window or door frame if—

(i) the frame is constructed of steel or timber with the minimum thickness specified in Table 1 for timber; and

(ii) the frame is tightly fitted to rigid construction and mechanically fixed in position.

(f) The FRL of cavity barriers in *fire-protected timber* construction must be determined in accordance with Specification A2.3 applying the criteria for control joint systems specified in Section 10 of AS 1530.4 with the cavity barrier system fitted within an opening between timber members exposed directly to the furnace heating conditions.

(g) Notwithstanding anything to the contrary in Specification A2.3 or AS 1530.4, the test results from **(f)** may be used when the *fire-protected timber* is constructed from timber having a nominal density at least equal to the tested timber.

Table 1 CAVITY BARRIER FRLs

System *Required* FRL	**–/60/60 or –/90/90**	~~**/90/90**~~	**–/120/120, –/180/180 or –/240/240**
Cavity barrier *required* FRL	~~-~~–/45/45	~~/45/45~~	–/60/60
Timber, *required* minimum thickness	45 mm	~~45 mm~~	~~55~~60 mm
Mineral wool, *required* minimum thickness	~~-~~45 mm	~~-45 mm~~	60 mm
Note: Minimum thicknesses are to be measured in the direction of heat flow.			

SPECIFICATION C1.13A FIRE-PROTECTED TIMBER

2.2 Massive timber

(a) *Fire-protected timber*, where the timber is *massive timber*, need not comply with Clause 2.1 if the *fire-protected timber*—

(i) utilises a *non-combustible fire-protective covering* fixed in accordance with system requirements to achieve an FRL not less than that *required* for the building element; and

(ii) has a *non-combustible fire-protective covering* fixed in accordance with system requirements—

(A) so as the temperature at the interface between the protection system and the timber does not exceed 300°C during a fire resistance test performed in accordance with Clause 3 for the application and periods listed in Table 1; or

(B) not less than that specified by Table 1; and

(iii) has either—

(A) any cavity filled with *non-combustible* insulation—

(aa) between the surface of the timber and the *fire-protective covering*; or

(bb) between timber elements within the *fire-protective covering*; or

(B) no cavities—

(aa) between the surface of the timber and the *fire-protective covering*; or

(bb) between timber members within the *fire-protective covering*.

(b) For the purposes of (a), the *non-combustible fire-protective covering* provided under (a)(ii) may form all or part of the *non-combustible fire-protective covering* provided under (a)(i).

Table 1 INTERFACE TEMPERATURE AND MINIMUM FIRE-PROTECTIVE GRADE PLASTERBOARD THICKNESS

Application	Time ~~—minutes~~ without timber interface exceeding 300°C	Minimum thickness of fire-grade plasterboard ~~(mm)~~
Inside a *fire-isolated stairway* or lift shaft	20 minutes	13 mm
External walls within 1 m of an allotment boundary or 2 m of a building on the same allotment	45 minutes	2 x 13 mm
All other applications	30 minutes	16 mm

3.1 Form of test

(a) Tests must be carried out in accordance with the *Standard Fire Test*, or an equivalent or more severe test, on the timber element with the proposed *non-combustible* coverings fixed in a representative manner, with the time the timber interface temperatures exceeded 300°C confirmed in a report from an *Accredited Testing Laboratory*~~*Registered Testing Authority*~~.

(b) If a fire protection system incorporates joints, the test specimens must incorporate representative joints.

(c) Interface temperatures must be measured over the following features by a minimum of two thermocouples:

(i) At joint positions in the protection systems.

(ii) At least 200 mm from any joint.

(iii) At service penetrations.

(iv) At any other locations where, in the opinion of the *Accredited Testing Laboratory*~~*Registered Testing Authority*~~, the interface temperature may be higher than the above positions.

(d) The temperatures must be measured in accordance with Appendix C1 and Section 2 of AS 1530.4 as appropriate.

3.2 Smaller specimen permitted

An *Accredited Testing Laboratory*~~*Registered Testing Authority*~~ may carry out the test specified in Clause 3.1 at pilot scale provided—

(a) a specimen (which must be not less than 1000 mm x 1000 mm) adequately represents the proposed construction in the building; and

(b) the fire resistance of the specimen has already been determined in a full scale test performed in accordance with AS 1530.4 to demonstrate adequate retention of the fire protection system in conjunction with the timber elements being protected; and

(c) the results of the test do not apply to construction larger than limits defined by the *Accredited Testing Laboratory* ~~*Registered Testing Authority*~~ conducting the pilot examination.

SPECIFICATION C2.5 SMOKE-PROOF WALLS IN HEALTH-CARE AND RESIDENTIAL CARE BUILDINGS~~AGED CARE BUILDINGS~~

Deemed-to-Satisfy Provisions

4. Doorways in smoke-proof walls

A door *required* by **C2.5** or this Specification to be smoke-proof or have an FRL, other than one that serves a *fire compartment* provided with a zone ~~smoke control~~ pressurisation system in accordance with AS/NZS 1668.1, must provide a smoke reservoir by not extending within 400 mm of the underside of—

(a) a roof covering; or

(b) the floor above; or

(c) an imperforate false ceiling that will prevent the free passage of smoke.

SPECIFICATION C3.4 FIRE DOORS, SMOKE DOORS, FIRE WINDOWS AND SHUTTERS

Deemed-to-Satisfy Provisions

3.2 Construction deemed-to-satisfy

A smoke door of one or two leaves satisfies Clause 3.1 if it is constructed as follows:

(a) The leaves are side-hung to swing—

(i) in the direction of egress; or

(ii) in both directions.

(b) The leaves are solid-core leaves at least 35 mm thick, or are capable of resisting smoke at 200°C for 30 minutes.

~~(i) The leaves are capable of resisting smoke at 200°C for 30 minutes.~~

~~(ii) Solid-core leaves at least 35 mm thick satisfy (i).~~

(c) The leaves are fitted with smoke seals.

(d) The leaves—

(i) ~~The leaves~~ are normally in the closed position; or

(ii) close in accordance with the following—~~-~~

(A) The leaves are closed *automatically* with the *automatic* closing operation initiated by smoke detectors, installed in accordance with the relevant provisions of AS 1670.1, located on each side of the doorway not more than 1.5 m horizontal distance from the doorway.~~; and~~

(B) In addition to (A), in the event of power failure to the door, the leaves fail-safe in the closed position.

(e) The leaves return to the fully closed position after each manual opening.

(f) Any glazing incorporated in the door complies with AS 1288.

(g) If a glazed panel is capable of being mistaken for an unobstructed *exit*, the presence of the glass must be identified by an opaque mid-height band, mid-rail, crash-bar or other opaque construction.

~~(i) If a glazed panel is capable of being mistaken for an unobstructed *exit*, the presence of the glass must be identified by opaque construction.~~

~~(ii) An opaque mid-height band, mid-rail or crash bar satisfies (i).~~

SECTION D ACCESS AND EGRESS

PERFORMANCE REQUIREMENTS

ACT DP0.1—0.5

DP1 Access for people with a disability

Access must be provided, to the degree necessary, to enable—

(a) people to—

 (i) approach the building from the road boundary and from any *accessible* carparking spaces associated with the building; and

 (ii) approach the building from any *accessible* associated building; and

 (iii) access work and public spaces, accommodation and facilities for personal hygiene; and

(b) identification of *accessways* at appropriate locations which are easy to find.

Limitation:

DP1 does not apply to a Class 4 part of a building.

DP2 Safe movement to and within a building

So that people can move safely to and within a building, it must have—

(a) walking surfaces with safe gradients; and

(b) any doors installed to avoid the risk of occupants—

 (i) having their egress impeded; or

 (ii) being trapped in the building; and

(c) any stairways and ramps with—

 (i) slip-resistant walking surfaces on—

  (A) ramps; and

  (B) stairway treads or near the edge of the nosing; and

 (ii) suitable handrails where necessary to assist and provide stability to people using the stairway or ramp; and

 (iii) suitable landings to avoid undue fatigue; and

 (iv) landings where a door opens from or onto the stairway or ramp so that the door does not create an obstruction; and

 (v) in the case of a stairway, suitable safe passage in relation to the nature, volume and frequency of likely usage.

DP3 Fall prevention barriers

Where people could fall—

(a) 1 m or more—

 (i) from a floor or roof or through an opening (other than through an openable window) in the *external wall* of a building; or

 (ii) due to a sudden change of level within or associated with a building; or

(b) 2 m or more from a floor through an openable window—

 (i) in a bedroom in a Class 2 or 3 building or a Class 4 part of a building; or

 (ii) in a Class 9b *early childhood centre*; or

(c) 4 m or more from a floor through an openable window not covered by (b),

a barrier must be provided which must be—

(d) continuous and extend for the full extent of the hazard; and

(e) of a height to protect people from accidentally falling from the floor or roof or through the opening or openable window; and

(f) constructed to prevent people from falling through the barrier; and
(g) capable of restricting the passage of children; and
(h) of strength and rigidity to withstand—
  (i) the foreseeable impact of people; and
  (ii) where appropriate, the static pressure of people pressing against it.

Limitations:

DP3 does not apply where such a barrier would be incompatible with the intended use of an area such as a stage, loading dock or the like.

DP3(g) does not apply to—

(a) *fire-isolated stairways*, *fire-isolated ramps*, and other areas used primarily for emergency purposes, excluding external stairways and external ramps; and
(b) Class 7 (other than *carparks*) and Class 8 buildings and parts of buildings containing those classes.

DP4 Exits

Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to—

(a) the travel distance; and
(b) the number, mobility and other characteristics of occupants; and
(c) the function or use of the building; and
(d) the height of the building; and
(e) whether the *exit* is from above or below ground level.

DP5 Fire-isolated exits

To protect evacuating occupants from a fire in the building *exits* must be fire-isolated, to the degree necessary, appropriate to—

(a) the number of *storeys* connected by the *exits*; and
(b) the *fire safety system* installed in the building; and
(c) the function or use of the building; and
(d) the number of *storeys* passed through by the *exits*; and
(e) *fire brigade* intervention.

DP6 Paths of travel to exits

So that occupants can safely evacuate the building, paths of travel to *exits* must have dimensions appropriate to—

(a) the number, mobility and other characteristics of occupants; and
(b) the function or use of the building.

Limitation:

DP6 does not apply to the internal parts of a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building.

DP7 Evacuation lifts

Where a lift is intended to be used in addition to the *required exits* to assist occupants to evacuate a building safely, the type, number, location and fire-isolation must be appropriate to—

(a) the travel distance to the lift; and
(b) the number, mobility and other characteristics of occupants; and
(c) the function or use of the building; and
(d) the number of *storeys* connected by the lift; and
(e) the *fire safety system* installed in the building; and
(f) the waiting time, travel time and capacity of the lift; and
(g) the reliability and availability of the lift; and
(h) the emergency procedures for the building.

DP8 Carparking for people with a disability

Carparking spaces for use by people with a disability must be—

(a) provided, to the degree necessary, to give equitable access for carparking; and

(b) designated and easy to find.

Limitation:

DP8 does not apply to a building where—

(a) a parking service is provided; and

(b) direct access to any carparking spaces by the general public or occupants is not available.

DP9 Communication systems for people with hearing impairment

An inbuilt communication system for entry, information, entertainment, or for the provision of a service, must be suitable for occupants who are deaf or hearing impaired.

Limitation:

DP9 does not apply to—

(a) a Class 4 part of a building; or

(b) an inbuilt communication system used only for emergency warning purposes.

Tas DP10

VERIFICATION METHODS

DV2 Access to and within a building

Compliance with DP1, DP2, DP6, EP3.4 and/or FP2.1 is verified where the proposed building, when compared to a reference building, provides an equivalent level of access in accordance with (c) for an identical occupant profile and *characteristic* using the following process:

(a) Undertake a performance-based design brief to determine the following:

  (i) The appropriate occupant profile and *characteristic* based on the type and use of the building.

  (ii) The appropriate method for determining the level of access.

  (iii) The appropriate modelling method and tool.

  (iv) The measurable acceptable criteria.

(b) Using the appropriate method, the level of access *required* is determined by first modelling a reference building using the relevant *Deemed-to-Satisfy Provisions* of Parts D, E, F and H and the occupant *characteristics* to derive the following:

  (i) The needs of the occupants the reference building addresses.

  (ii) The facilities *required* to be accessed by each occupant profile.

  (iii) The baseline measurable acceptance criteria for use in (d).

(c) The proposed building must be modelled using a modelling method and approach consistent with the reference building, and the same critical features in (a), such as the following:

  (i) In accordance with the proposed access solution.

  (ii) An identical occupant profile and *characteristic*.

  (iii) The same location and orientation.

  (iv) The same location for the all entrances and *exits*.

  (v) Consistent location for facilities important to the solution, including sanitary facilities, lifts, stairwells, etc.

(d) The proposed access solution's level of access is compared by modeling occupant performance using *characteristics*, whereby the proposed building provides for equivalent access to—

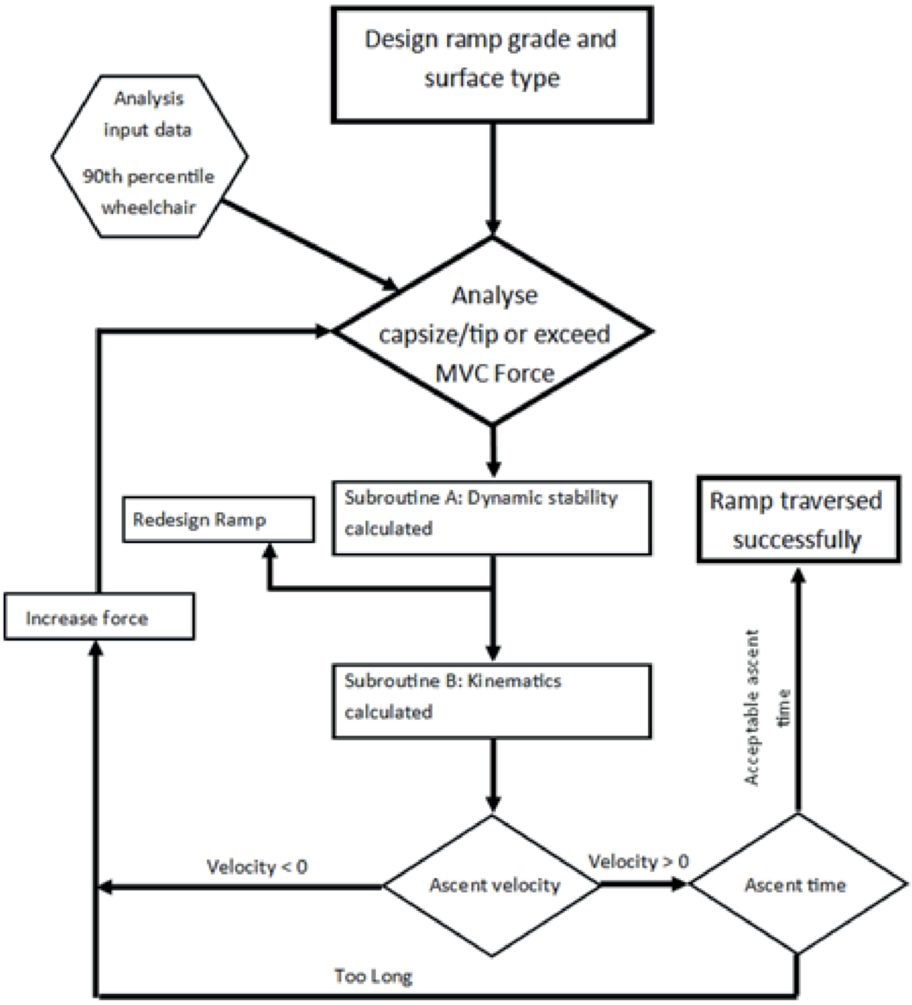
  (i) the number and range of facilities; and

  (ii) the needs of each occupant profile.

DV3 Design for wheelchair

(a) DP2, in regards to wheelchair rolling resistance and ramp design, is verified by undertaking a design using the following process:

Figure DV3



(b) Subroutine A (Dynamic function) — A ramp or surface is compliant for dynamic requirements when it is assessed by one of the following methods:

(i) A detailed assessment is undertaken (as detailed in Figure DV2), such that the following is satisfied:

$$F_p - {}^{C_{f1}}/_{r_1} - {}^{C_{f2}}/_{r_2} - mg\sin\alpha - m\ddot{x} = 0$$

where—

F_p = pushing force; and

C_{f1}, C_{f2} = friction couple on the rear and front wheels; and

r1, r2 = radii of the rear and front wheels; and

g = gravitational acceleration; and

α = ramp gradient; and

m = mass of subject plus wheelchair.

(c) Subroutine B (Kinematic function) — A ramp is deemed acceptable when—

(i) the ramp gradient is not steeper than 1:6; and

(ii) stability is confirmed by the following inequality equation:

$$\ddot{x} > g\cos\alpha\frac{(x - x')}{(y - y')} + g\sin\alpha$$

where—

$\ddot{x}$ = linear acceleration of the subject plus wheelchair; and

g = gravitational acceleration; and

x, x', y, y' = centre of gravity co-ordinates; and

α = ramp gradient.

(d) Fatigue is checked by—

(i) an ascent velocity less than 0.1 m/sec; and

(ii) a traversal interval less than 17 seconds.

(e) The ramp design must also comply with the following:

(i) The ramp camber must be in accordance with AS 1428.1.

(ii) Kerbs and handrails must be installed in accordance with AS 1428.1.

DV4

Compliance with DP4, DP5, DP6 and DP7 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:
The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART D1 PROVISION FOR ESCAPE

Deemed-to-Satisfy Provisions

D1.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* DP1 to DP6, DP8 and DP9 are satisfied by complying with—

(i) D1.1 to D1.17, D2.1 to D2.25 and D3.1 to D3.12; and

(ii) in a building containing an *atrium*, Part G3; and

(iii) in a building in an *alpine area*, Part G4; and

(iv) in a building containing an *occupiable outdoor area*, **Part G6**; and

(v~~iv~~) for additional requirements for Class 9b buildings, Part H1; and

(vi~~v~~) for public transport buildings, Part H2; and

(vii~~vi~~) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

(c) *Performance Requirement* DP7 must be complied with if lifts are to be used to assist occupants to evacuate a building.

There are no *Deemed-to-Satisfy Provisions* for this *Performance Requirement* in respect of using lifts.

D1.3 When fire-isolated stairways and ramps are required

(a) **Class 2 and 3 buildings** — Every stairway or ramp serving as a *required exit* must be fire-isolated unless it connects, passes through or passes by not more than—

(i) 3 consecutive *storeys* in a Class 2 building; or

(ii) 2 consecutive *storeys* in a Class 3 building,

and one extra *storey* of any classification may be included if—

(iii) it is only for the accommodation of motor vehicles or for other ancillary purposes; or

(iv) the building has a sprinkler system complying with Specification E1.5 installed throughout; or

(v) the *required exit* does not provide access to or egress for, and is separated from, the extra *storey* by construction having—

(A) an FRL of –/60/60, if non-*loadbearing;* and

(B) an FRL of 90/90/90, if *loadbearing*; and

(C) no opening that could permit the passage of fire or smoke.

(b) **Class 5, 6, 7, 8 or 9 buildings** — Every stairway or ramp serving as a *required exit* must be fire-isolated unless—

(i) in a Class 9a *health-care building* — it connects, or passes through or passes by not more than 2 consecutive *storeys* in areas other than *patient care areas*; or

(ii) it is part of an *open spectator stand*; or

(iii) in any other case except in a Class 9c building, it connects, passes through or passes by not more than 2 consecutive *storeys* and one extra *storey* of any classification may be included if—

(A) the building has a sprinkler system complying with Specification E1.5 installed throughout; or

(B) the *required exit* does not provide access to or egress for, and is separated from, the extra *storey* by construction having—

(aa) an FRL of –/60/60, if non-*loadbearing*; and

(bb) an FRL of 90/90/90 for Type A construction or 60/60/60 for Type B or C construction, if *loadbearing*; and

(cc) no opening that could permit the passage of fire or smoke.

Deemed-to-Satisfy Provisions

D1.6 Dimensions of exits and paths of travel to exits

In a *required exit* or path of travel to an *exit*—

(a) the unobstructed height throughout must be not less than 2 m, except the unobstructed height of any doorway may be reduced to not less than 1980 mm; and

(b) the unobstructed width of each *exit* or path of travel to an *exit*, except for doorways, must be not less than—

(i) 1 m; or

(ii) 1.8 m in a passageway, corridor or ramp normally used for the transportation of patients in beds within a *treatment area* or *ward area*; and

(iii) in a *public corridor* in a Class 9c *aged care building*~~building~~, notwithstanding (c) and (d)—

(A) 1.5 m; and

(B) 1.8 m for the full width of the doorway, providing access into a *sole-occupancy unit* or communal bathroom; and

(c) if the *storey*, *mezzanine* or *open spectator stand* accommodates more than 100 persons but not more than 200 persons, the aggregate unobstructed width, except for doorways, must be not less than—

(i) 1 m plus 250 mm for each 25 persons (or part) in excess of 100; or

(ii) 1.8 m in a passageway, corridor or ramp normally used for the transportation of patients in beds within a *treatment area* or *ward area*; and

(d) if the *storey*, *mezzanine* or *open spectator stand* accommodates more than 200 persons, the aggregate unobstructed width, except for doorways, must be increased to—

(i) 2 m plus 500 mm for every 60 persons (or part) in excess of 200 persons if egress involves a change in floor level by a stairway or ramp with a gradient steeper than 1 in 12; or

(ii) in any other case, 2 m plus 500 mm for every 75 persons (or part) in excess of 200; and

(e) in an *open spectator stand* which accommodates more than 2000 persons, the aggregate unobstructed width, except for doorways, must be increased to 17 m plus a width (in metres) equal to the number in excess of 2000 divided by 600; and

(f) the unobstructed width of a doorway must be not less than—

(i) in *patient care areas* through which patients would normally be transported in beds, if the doorway provides access to, or from, a corridor of width—

(A) less than 2.2 m — 1200 mm; or

(B) 2.2 m or greater — 1070 mm,

and where the doorway is fitted with two leaves and one leaf is secured in the closed position in accordance with D2.21(b)(v), the other leaf must permit an unobstructed opening not less than 800 mm wide; or

(ii) in *patient care areas* in a *horizontal exit* — 1250 mm; or

(iii) the unobstructed width of each *exit* provided to comply with (b), (c), (d) or (e), minus 250 mm; or

Vic D1.6(f)(iv)

(iv) in a Class 9c building—

(A) 1070 mm where it opens from a *public corridor* to a *sole-occupancy unit*; or

(B) 870 mm in other *resident use areas*; or

(C) 800 mm in non-*resident use areas*,

and where the doorway is fitted with two leaves and one leaf is secured in the closed position in accordance with D2.21(b)(v), the other leaf must permit an unobstructed opening not less than 870 mm wide in *resident use areas* and 800 mm wide in non-*resident use areas*; or

(v) in any other case except where it opens to a *sanitary compartment* or bathroom — 750 mm wide; and

NSW D1.6(f)(vi)

(g) the unobstructed width of a *required exit* must not diminish in the direction of travel to a road or *open space,* except where the width is increased in accordance with (b)(ii) or (f)(i); and

(h) the *required* width of a stairway or ramp must—

(i) be measured clear of all obstructions such as handrails, projecting parts of barriers and the like; and

(ii) extend without interruption, except for ceiling cornices, to a height not less than 2 m vertically above a line along the nosings of the treads or the floor surface of the ramp or landing; and

(i) to determine the aggregate unobstructed width, the number of persons accommodated must be calculated according to D1.13.

NSW D1.6(j)

D1.11 Horizontal exits

(a) *Horizontal exits* must not be counted as *required exits*—
 (i) between *sole-occupancy units*; or
 (ii) in a Class 9b building used as an *early childhood centre*, primary or secondary *school*.

(b) In a Class 9a *health-care building* or Class 9c building, *horizontal exits* may be counted as *required exits* if the path of travel from a *fire compartment* leads by one or more *horizontal exits* directly into another *fire compartment* which has at least one *required exit* which is not a *horizontal exit*.

(c) In cases other than in (b), *horizontal exits* must not comprise more than half of the *required exits* from any part of a *storey* divided by a *fire wall*.

(d) *Horizontal exits* must have a clear area on the side of the *fire wall* to which occupants are evacuating, to accommodate the total number of persons (calculated under D1.13) served by the *horizontal exit* of not less than—
 (i) 2.5 m^2 per patient/resident in a Class 9a *health-care building* or Class 9c *aged care building*~~building~~; and
 (ii) 0.5 m^2 per person in any other case.

(e) Where a *fire compartment* is provided with only two *exits*, and one of those *exits* is a *horizontal exit*, the clear area *required* by (d) is to be of a size that accommodates all the occupants from the *fire compartment* being evacuated.

(f) The clear area *required* by **(d)** must be connected to the *horizontal exit* by an unobstructed path that has at least the dimensions *required* for the *horizontal exit* and may include the area of the unobstructed path.

D1.13 Number of persons accommodated

For the purposes of the *Deemed-to-Satisfy Provisions*, the number of persons accommodated in a *storey*, room or *mezzanine* must be determined with consideration to the purpose for which it is used and the layout of the *floor area* by—

(a) calculating the sum of the numbers obtained by dividing the *floor area* of each part of the *storey* by the number of square metres per person listed in Table D1.13 according to the use of that part, excluding spaces set aside for—
 (i) lifts, stairways, ramps and escalators, corridors, hallways, lobbies and the like; and
 (ii) service ducts and the like, *sanitary compartment*s or other ancillary uses; or

(b) reference to the seating capacity in an *assembly building* or room; or

(c) any other suitable means of assessing its capacity.

~~*NSW Table D1.13*~~

~~**Table D1.13 AREA PER PERSON ACCORDING TO USE**~~

~~**Type of use**~~		~~**m^2 per person**~~
~~Art gallery, exhibition area, museum~~		~~4~~
~~Bar~~	~~— bar standing~~	~~0.5~~
	~~— other~~	~~1~~
~~Board room~~		~~2~~
~~Boarding house~~		~~15~~
~~Cafe, church, dining room~~		~~1~~
~~*Carpark*~~		~~30~~
~~Computer room~~		~~25~~
~~Court room~~	~~— judicial area~~	~~10~~
	~~— public seating~~	~~1~~
~~Dance floor~~		~~0.5~~
~~Dormitory~~		~~5~~

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~~Type of use~~		~~m^2 per person~~
~~*Early childhood centre*~~		~~4~~
~~Factory —~~	~~(a) machine shop, fitting shop or like place for cutting, grading, finishing or fitting of metals or glass, except in the fabrication of structural steelwork or manufacture of vehicles or bulky products~~	~~5~~
	~~(b) areas used for fabrication and processing other than those in (a)~~	~~50~~
	~~(c) a space in which the layout and natural use of fixed plant or equipment determines the number of persons who will occupy the space during working hours~~	~~Area per person determined by the use of the plant or equipment~~
~~Gymnasium~~		~~3~~
~~Hostel, hotel, motel, guest house~~		~~15~~
~~Indoor sports stadium — arena~~		~~10~~
~~Kiosk~~		~~1~~
~~Kitchen, laboratory, laundry~~		~~10~~
~~Library~~	~~— reading space~~	~~2~~
	~~— storage space~~	~~30~~
~~Office, including one for typewriting or document copying~~		~~10~~
~~*Patient care areas*~~		~~10~~
~~Plant room~~	~~— ventilation, electrical or other service units~~	~~30~~
	~~— boilers or power plant~~	~~50~~
~~Reading room~~		~~2~~
~~Restaurant~~		~~1~~
~~*School*~~	~~— general classroom~~	~~2~~
	~~— multi-purpose hall~~	~~1~~
	~~— staff room~~	~~10~~
	~~— trade and practical area — primary~~	~~4~~
	~~— secondary~~	~~As for workshop~~
~~Shop~~	~~— space for sale of goods —~~	
	~~(a) at a level entered direct from the open air or any lower level~~	~~3~~
	~~(b) all other levels~~	~~5~~
~~Showroom~~	~~— display area, covered mall or arcade~~	~~5~~
~~Skating rink, based on rink area~~		~~1.5~~
~~Spectator stand, audience viewing area:~~		

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~~Type of use~~		~~m^2 per person~~
	~~—standing viewing area~~	~~0.3~~
	~~—removable seating~~	~~1~~
	~~—fixed seating (number of seats)~~	
	~~—bench seating (450 mm/person)~~	
~~Storage space~~		~~30~~
~~*Swimming pool*, based on pool area~~		~~1.5~~
~~Switch room, transformer room~~		~~30~~
~~Telephone exchange~~		~~30~~
	~~—private~~	
~~Theatre and public hall~~		~~1~~
~~Theatre dressing room~~		~~4~~
~~Transport terminal~~		~~2~~
~~Workshop~~	~~—for maintenance staff~~	~~30~~
	~~—for manufacturing processes~~	~~As for Factory~~
~~**Note:** Bar standing is the area used by standing patrons and extends not less than 1.5m wide from the outside edge of the bar top for the length of the serving area of the bar.~~		

NSW Table D1.13

Table D1.13 Area per person according to use

Type of use	m^2 per person
Art gallery, exhibition area, museum	4 m^2
Bar—bar standing	0.5 m^2
Bar—other	1 m^2
Board room	2 m^2
Boarding house	15 m^2
Cafe, church, dining room	1 m^2
Carpark	30 m^2
Computer room	25 m^2
Court room—judicial area	10 m^2
Court room—public seating	1 m^2
Dance floor	0.5 m^2
Dormitory	5 m^2
Early childhood centre	4 m^2
Factory— machine shop, fitting shop or like place for cutting, grading, finishing or fitting of metals or glass, except in the fabrication of structural steelwork or manufacture of vehicles or bulky products	5 m^2
Factory— areas used for fabrication and processing other than those in (a)	50 m^2
Factory— a space in which the layout and natural use of fixed plant or equipment determines the number of persons who will	Area per person determined by the use of the plant or equipment

Deemed-to-Satisfy Provisions

Type of use	**m^2 per person**
occupy the space during working hours	
Gymnasium	3 m^2
Hostel, hotel, motel, guest house	15 m^2
Indoor sports stadium—arena	10 m^2
Kiosk	1 m^2
Kitchen, laboratory, laundry	10 m^2
Library—reading space	2 m^2
Library—storage space	30 m^2
Office, including one for typewriting or document copying	10 m^2
Patient care areas	10 m^2
Plant room—ventilation, electrical or other service units	30 m^2
Plant room—boilers or power plant	50 m^2
Reading room	2 m^2
Restaurant	1 m^2
School—general classroom	2 m^2
School—multi-purpose hall	1 m^2
School—staff room	10 m^2
School—trade and practical area—primary	4 m^2
School——trade and practical area—secondary	As for workshop
Shop—space for sale of goods— at a level entered direct from the open air or any lower level	3 m^2
Shop—space for sale of goods— all other levels	5 m^2
Showroom—display area, covered mall or arcade	5 m^2
Skating rink, based on rink area	1.5 m^2
Spectator stand, audience viewing area— standing viewing area	0.3 m^2
Spectator stand, audience viewing area— removable seating	1 m^2
Spectator stand, audience viewing area— fixed seating	per number of seats
Spectator stand, audience viewing area— bench seating	450 mm/person
Storage space	30 m^2
Swimming pool, based on pool area	1.5 m^2
Switch room, transformer room	30 m^2
Telephone exchange—private	30 m^2
Theatre and public hall	1 m^2
Theatre dressing room	4 m^2
Transport terminal	2 m^2
Workshop—for maintenance staff	30 m^2
Workshop—for manufacturing processes	As for Factory

Note: Bar standing is the area used by standing patrons and extends not less than 1.5 m wide from the outside edge of the bar top for the length of the serving area of the bar.

Deemed-to-Satisfy Provisions

D1.15 Method of measurement

The following rules apply:

(a) In the case of a room that is not a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building, the distance includes the straight-line measurement from any point on the floor of the room to the nearest part of a doorway leading from it, together with the distance from that part of the doorway to the single *required exit* or point from which travel in different directions to 2 *required exits* is available.

(b) Subject to (d), the distance from the doorway of a *sole-occupancy unit* in a Class 2 or 3 building or a Class 4 part of a building is measured in a straight line to the nearest part of the *required* single *exit* or point from which travel in different directions to 2 *required exits* is available.

(c) Subject to (d), the distance between *exits* is measured in a straight line between the nearest parts of those *exits*.

(d) Only the shortest distance is taken along a corridor, hallway, external balcony or other path of travel that curves or changes direction.

(e) If more than one corridor, hallway, or other internal path of travel connects *required exits*, for the purposes of D1.5(c) the measurement is along the path of travel through the point at which travel in different directions to those *exits* is available, as determined under D1.4.

(f) If a wall (including a demountable *internal wall*) that does not bound—

    (i) a room; or

    (ii) a corridor, hallway or the like,

    causes a change of direction in proceeding to a *required exit*, the distance is measured along the path of travel past that wall.

(g) If permanent fixed seating is provided, the distance is measured along the path of travel between the rows of seats.

(h) In the case of a non-*fire-isolated stairway* or non-*fire-isolated ramp*, the distance is measured along a line connecting the nosings of the treads, or along the slope of the ramp, together with the distance connecting those lines across any intermediate landings.

ACT D1.101, *ACT D1.102*

PART D2 CONSTRUCTION OF EXITS

Deemed-to-Satisfy Provisions

D2.0 Deemed-to-Satisfy Provisions

(a) Where a Deemed-to-Satisfy Solution is proposed, Performance Requirements DP1 to DP6, DP8 and DP9 are satisfied by complying with—

(i) D1.1 to D1.16, D2.1 to D2.25 and D3.1 to D3.12; and

(ii) in a building containing an atrium, Part G3; and

(iii) in a building in an alpine area, Part G4; and

(iv) in a building containing an *occupiable outdoor area*, Part G6; and

(v~~iv~~) for additional requirements for Class 9b buildings, Part H1; and

(vi~~v~~) for public transport buildings, Part H2; and

(vii~~vi~~) for farm buildings and farm sheds, Part H3.

(b) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with A2.4(3)~~A0.7~~.

(c) Performance Requirement DP7 must be complied with if lifts are to be used to assist occupants to evacuate a building.

D2.13 Goings and risers

(a) A stairway must have—

(i) not more than 18 and not less than 2 risers in each flight; and

(ii) going (G), riser (R) and quantity (2R + G) in accordance with Table D2.13, except as permitted by (b) and (c); and

(iii) constant goings and risers throughout each flight, except as permitted by (b) and (c), and the dimensions of goings (G) and risers (R) in accordance with (a)(ii) are considered constant if the variation between—

(A) adjacent risers, or between adjacent goings, is no greater than 5 mm; and

(B) the largest and smallest riser within a flight, or the largest and smallest going within a flight, does not exceed 10 mm; and

(iv) risers which do not have any openings that would allow a 125 mm sphere to pass through between the treads; and

(v) treads which have—

(A) a surface with a slip-resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586; or

(B) a nosing strip with a slip-resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586; and

(vi) treads of solid construction (not mesh or other perforated material) if the stairway is more than 10 m high or connects more than 3 storeys; and

(vii) in a Class 9b building, not more than 36 risers in consecutive flights without a change in direction of at least 30°; and

(viii) in the case of a required stairway, no winders in lieu of a landing.

NSW D2.13(a)(ix),(x),(xi)

(b) In the case of a non-required stairway—

(i) the stairway must have—

(A) not more than 3 winders in lieu of a quarter landing; and

(B) not more than 6 winders in lieu of a half landing; and

(ii) the going of all straight treads must be constant throughout the same flight and the dimensions of goings (G) is considered constant if the variation between—

(A) adjacent goings, is no greater than 5 mm; and

(B) the largest and smallest going within a flight, does not exceed 10 mm; and

(iii) the going of all winders in lieu of a quarter or half landing may vary from the going of the straight treads within the same flight provided that the going of all such winders is constant.

(c) Where a stairway discharges to a sloping public walkway or public road—

(i) the riser (R) may be reduced to account for the slope of the walkway or road; and

(ii) the quantity (2R+G) may vary at that location.

Deemed-to-Satisfy Provisions

~~Table D2.13 RISER AND GOING DIMENSIONS (mm)~~

	~~Riser (R)~~		~~Going (G)[2]~~		~~Quantity (2R+G)~~	
	~~Max~~	~~Min~~	~~Max~~	~~Min~~	~~Max~~	~~Min~~
~~Public stairways~~	~~190~~	~~115~~	~~355~~	~~250~~	~~700~~	~~550~~
~~Private stairways[1]~~	~~190~~	~~115~~	~~355~~	~~250~~	~~700~~	~~550~~

~~Notes~~

1. ~~Private stairways are~~
   (a) ~~Stairways in a *sole-occupancy unit* in a Class 2 building or Class 4 part of a building; and~~
   (b) ~~In any building, stairways which are not part of a required exit and to which the public do not normally have access.~~
2. ~~The going in tapered treads (except winders in lieu of a quarter or half landing) in a curved or spiral stairway is measured~~
   (a) ~~270 mm in front from the outer side of the unobstructed width of the stairway if the stairway is less than 1 m wide(applicable to a non *required* stairway only); and~~
   (b) ~~270 mm from each side of the unobstructed width of the stairway if the stairway is 1 m wide or more.~~

Table D2.13 Riser and going dimensions (mm)

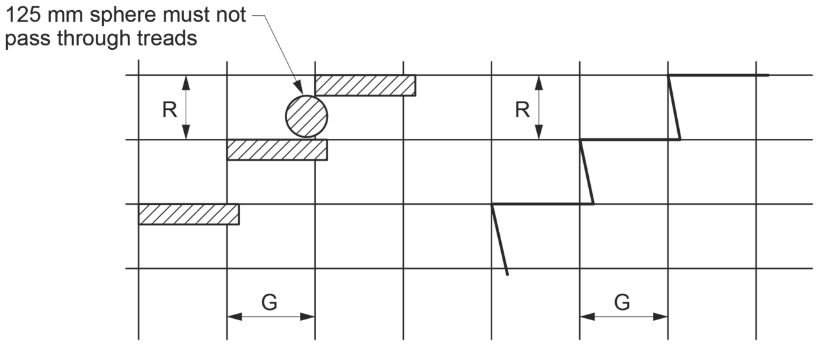
Stairway location	**Riser (R)**	**Going (G)[3]**	**Quantity (2R+G)**
Public	Max: 190 mm Min: 115 mm	Max: 355 mm Min: 250 mm	Max: 700 mm Min: 550 mm
Private[1]	Max: 190 mm Min: 115 mm	Max: 355 mm Min: 240 mm	Max: 700 mm Min: 550 mm

Notes:

1. Private stairways are—
   a. stairways in a *sole-occupancy unit* in a Class 2 building or Class 4 part of a building; and
   b. in any building, stairways which are not part of a *required exit* and to which the public do not normally have access.
2. Going and riser dimensions must be measured in accordance with **Figure D2.13**.
3. The going in tapered treads (except winders in lieu of a quarter or half landing) in a curved or spiral stairway is measured—
   a. 270 mm in front from the outer side of the unobstructed width of the stairway if the stairway is less than 1 m wide (applicable to a non-*required* stairway only); and
   b. 270 mm from each side of the unobstructed width of the stairway if the stairway is 1 m wide or more.

Deemed-to-Satisfy Provisions

Figure D2.13 RISER AND GOING DIMENSIONS



D2.14 Landings

In a stairway—

(a) landings having a maximum gradient of 1:50 may be used in any building to limit the number of risers in each *flight* and each landing must—

(i) be not less than 750 mm long, and where this involves a change in direction, the length is measured 500 mm from the inside edge of the landing; and

(ii) have—

(A) a surface with a slip-resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586; or

(B) a strip at the edge of the landing with a slip-resistance classification not less than that listed in Table D2.14 when tested in accordance with AS 4586, where the edge leads to a *flight* below; and

(b) in a Class 9a building—

(i) the area of any landing must be sufficient to move a stretcher, 2 m long and 600 mm wide, at a gradient not more than the gradient of the stairs, with at least one end of the stretcher on the landing while changing direction between *flights*; or

(ii) the stair must have a change of direction of 180°, and the landing a clear width of not less than 1.6 m and a clear length of not less than 2.7 m.

Table D2.14 Slip-resistance classification

Application	Dry surface conditions	Wet surface conditions
Ramp steeper than 1:14	P4 or R11	P5 or R12
Ramp steeper than 1:20 but not steeper than 1:14	P3 or R10	P4 or R11
Tread or landing surface	P3 or R10	P4 or R11
Nosing or landing edge strip	P3	P4

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~~Table D2.14 SLIP-RESISTANCE CLASSIFICATION~~

~~Application~~	~~Surface conditions~~	
	~~Dry~~	~~Wet~~
~~Ramp steeper than 1:14~~	~~P4 or R11~~	~~P5 or R12~~
~~Ramp steeper than 1:20 but not steeper than 1:14~~	~~P3 or R10~~	~~P4 or R11~~
~~Tread or landing surface~~	~~P3 or R10~~	~~P4 or R11~~
~~Nosing or landing edge strip~~	~~P3~~	~~P4~~

D2.16 Barriers to prevent falls

(a) A continuous barrier must be provided along the side of—
- (i) a roof to which general access is provided; and
- (ii) a stairway or ramp; and
- (iii) a floor, corridor, hallway, balcony, deck, verandah, *mezzanine*, access bridge or the like; and
- (iv) any delineated path of access to a building,

if the trafficable surface is 1 m or more above the surface beneath.

(b) The requirements of **(a)** do not apply to—
- (i) the perimeter of a *stage*, rigging loft, loading dock or the like; or
- (ii) areas referred to in **D2.18**; or
- (iii) a retaining wall unless the retaining wall forms part of, or is directly associated with a delineated path of access to a building from the road, or a delineated path of access between buildings; or
- (iv) a barrier provided to an openable window covered by **D2.24**.

(c) A barrier *required* by **(a)** must be constructed in accordance with Specification D2.16a.~~(d), (e), (f), and (g).~~ ~~Table D2.16a.~~

NSW Table D2.16a 1

~~Table D2.16a BARRIER CONSTRUCTION~~

~~1. Barrier heights~~		
~~Location~~		**~~Minimum height~~**
~~(a)~~	~~Stairways or ramps with a gradient of 1:20 or steeper.~~	~~865 mm~~
~~(b)~~	~~Landings to a stair or ramp where the barrier is provided along the inside edge of the landing and does not exceed 500 mm in length.~~	
~~(c)~~	~~In front of fixed seating on a *mezzanine* or balcony within an auditorium in a Class 9b building, where the horizontal projection extends not less than 1 m outwards from the top of the barrier.~~	~~700 mm~~
~~(d)~~	~~In all other locations.~~	~~1 m~~
~~Notes:~~		
~~1.~~	~~Heights are measured vertically from the surface beneath, except that for stairways the height must be measured above the nosing line of the stair treads.~~	
~~2.~~	~~A transition zone may be incorporated where the barrier height changes from 865 mm on a stair *flight* or ramp to 1 m at a landing or floor~~.	
~~2. Barrier openings~~		
~~Location~~		**~~Maximum Opening~~**
~~(a)~~	~~*Fire-isolated stairways*, *fire-isolated ramps* and other areas used primarily for emergency purposes, excluding —~~ ~~(i) external stairways; and~~ ~~(ii) external ramps.~~	~~A 300 mm sphere must not be able to pass through any opening; or~~ ~~where rails are used —~~
~~(b)~~	~~Class 7 (other than *carparks*) and Class 8 buildings.~~	~~(i) a 150 mm sphere must not be able to pass through the opening between the nosing line of the stair treads~~

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		~~(ii)~~	~~and the rail or between the rail and the floor of the landing, balcony or the like; and the opening between rails must not be more than 460 mm.~~
~~(c)~~	~~In all other locations.~~	~~A 125 mm sphere must not be able to pass through any opening.~~	
~~**Note:** The maximum 125 mm barrier opening for a stairway, such as a non *fire-isolated stairway*, is measured above the nosing line of the stair treads.~~			
~~**3. Barrier climbability**~~			
~~**Location**~~		~~**Requirement**~~	
~~(a)~~ ~~(b)~~	~~*Fire-isolated stairways*, *fire-isolated ramps* and other areas used primarily for emergency purposes, excluding —~~ ~~(i) external stairways; and~~ ~~(ii) external ramps.~~ ~~Class 7 (other than *carparks*) and Class 8 buildings.~~	~~No requirement.~~	
~~(c)~~	~~For floors more than 4 m above the surface beneath in all other locations.~~	~~Any horizontal or near horizontal elements between 150 mm and 760 mm above the floor must not facilitate climbing.~~	

(d) Where a *required* barrier is constructed of wire, it is deemed to meet the requirements of Clause ~~-~~ 4(a) of Specification D2.16a~~**(f)(iii) Table D2.16a 2(c)**~~ if it is constructed in accordance with the following:

(i) For horizontal wire systems—

(A) when measured with a strain indicator, it must be in accordance with the tension values in Specification D2.16b~~**Table D2.16b**~~; or

(B) must not exceed the maximum deflections in Specification D2.16d~~**Table D2.16d**~~.

(ii) For non-continuous vertical wire systems, when measured with a strain indicator, must be in accordance with the tension values in Specification D2.16b~~**Table D2.16b** (see Note 4)~~.

(iii) For continuous vertical or continuous near vertical sloped wire systems—

(A) must have wires of no more than 2.5 mm diameter with a lay of 7×7 or 7×19 construction; and

(B) changes in direction at support rails must pass around a pulley block without causing permanent deformation to the wire; and

(C) must have supporting rails, constructed with a spacing of not more than 900 mm, of a material that does not allow deflection that would decrease the tension of the wire under load; and

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(D) when the wire tension is measured with a strain indicator, it must be in accordance with the tension values in Specification D2.16c~~Table D2.16c~~ and measured in the furthermost span from the tensioning device.

~~**TABLE D2.16b WIRE BARRIER CONSTRUCTION – REQUIRED TENSION FOR STAINLESS STEEL HORIZONTAL WIRES**~~

			Clear distance between posts (mm)								
			600	800	900	1000	1200	1500	1800	2000	2500
Wire dia. (mm)	Lay	Wire spacing (mm)	Minimum *required* tension in Newtons (N)								
2.5	7x7	60	55	190	263	415	478	823	1080	1139	X
		80	382	630	730	824	1025	1288	X	X	X
		100	869	1218	1368	X	X	X	X	X	X
2.5	1x19	60	35	218	310	402	585	810	1125	1325	X
		80	420	630	735	840	1050	1400	1750	X	X
		100	1140	1565	X	X	X	X	X	X	X
3.0	7x7	60	15	178	270	314	506	660	965	1168	1491
		80	250	413	500	741	818	1083	1370	1565	X
		100	865	1278	1390	1639	X	X	X	X	X
3.0	1x19	60	25	183	261	340	520	790	1025	1180	X
		80	325	555	670	785	1015	1330	1725	1980	X
		100	1090	1500	1705	1910	X	X	X	X	X
4.0	7x7	60	5	73	97	122	235	440	664	813	1178
		80	196	422	480	524	760	1100	1358	1530	2130
		100	835	1182	1360	1528	1837	2381	2811	3098	X
4.0	1x19	60	5	5	10	15	20	147	593	890	1280
		80	30	192	300	415	593	1105	1303	1435	1844
		100	853	1308	1487	1610	2048	2608	3094	3418	3849
4.0	7x19	60	155	290	358	425	599	860	1080	1285	1540
		80	394	654	785	915	1143	1485	1860	2105	2615
		100	1038	1412	1598	1785	2165	2735	X	X	X

~~**Notes:**~~

1. ~~Lay = number of strands by the number of individual wires in each strand. For example a lay of 7x19 consists of 7 strands with 19 individual wires in each strand.~~
2. ~~Where a change of direction is made in a run of wire, the tensioning device is to be placed at the end of the longest span.~~
3. ~~If a 3.2 mm wire is used the tension figures for 3.0 mm wire are applied.~~
4. ~~This table may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails.~~
5. ~~X = Not allowed because the required tension would exceed the safe load of the wire.~~
6. ~~Tension measured with a strain indicator.~~

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~~**TABLE D2.16c CONTINUOUS WIRE BARRIER CONSTRUCTION – REQUIRED TENSION FOR VERTICAL OR NEAR VERTICAL STAINLESS STEEL WIRES**~~

~~**Wire dia. (mm)**~~	~~**Lay**~~	~~**Widest spacing between wires (mm)**~~	~~**Maximum clear spacing between rails (mm)**~~
			~~**900**~~
			~~***Required*** **tension in Newtons (N)**~~
~~**2.5**~~	~~**7x19**~~	~~**80**~~	~~145~~
		~~**100**~~	~~310~~
		~~**110**~~	~~610~~
~~**2.5**~~	~~**7x7**~~	~~**80**~~	~~130~~
		~~**100**~~	~~280~~
		~~**110**~~	~~500~~

~~**Notes:**~~

1. ~~Lay = number of strands by the number of individual wires in each strand. For example a lay of 7x19 consists of 7 strands with 19 individual wires in each strand.~~
2. ~~Vertical wires require two pulley blocks to each 180° change of direction in the wire.~~
3. ~~Near vertical wires may only require one pulley block for each change of direction.~~
4. ~~Tension measured with a strain indicator.~~
5. ~~The table only includes 7x7 and 7x19 wires due to other wires not having sufficient flexibility to make the necessary turns.~~

~~TABLE D2.16d WIRE BARRIER CONSTRUCTION – MAXIMUM PERMISSIBLE DEFLECTION FOR STAINLESS STEEL WIRES~~

		~~Clear distance between posts (mm)~~					
		~~600~~	~~900~~	~~1200~~	~~1500~~	~~1800~~	~~2000~~
~~Wire dia. (mm)~~	~~Wire spacing (mm)~~	~~Maximum permissible deflection of each wire in mm when a 2 kg mass is suspended at mid span~~					
~~2.5~~	~~60~~	~~17~~	~~11~~	~~9~~	~~8~~	~~8~~	~~8~~
	~~80~~	~~7~~	~~5~~	~~5~~	~~5~~	~~X~~	~~X~~
~~3.0~~	~~60~~	~~19~~	~~13~~	~~8~~	~~7~~	~~7~~	~~7~~
	~~80~~	~~8~~	~~6~~	~~6~~	~~5~~	~~5~~	~~5~~
~~4.0~~	~~60~~	~~18~~	~~12~~	~~8~~	~~8~~	~~7~~	~~7~~
	~~80~~	~~8~~	~~6~~	~~4~~	~~4~~	~~4~~	~~4~~

~~Notes:~~

1. ~~Where a change of direction is made in a run of wire the 2 kg mass must be placed at the middle of the longest span.~~
2. ~~If a 3.2 mm wire is used the deflection figures for 3.0 mm wire are applied.~~
3. ~~This table may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails. The deflection (offset) is measured by hooking a standard spring scale to the mid-span of each wire and pulling it horizontally until a force of 19.6 N is applied.~~
4. ~~X = Not allowed because the required tension would exceed the safe load of the wire.~~
5. ~~This table has been limited to 60 mm and 80 mm spaces for 2.5 mm, 3 mm and 4 mm diameter wires because the required wire tensions at greater spacings would require the tension to be beyond the wire safe load limit, or the allowed deflection would be impractical to measure.~~

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D2.17 Handrails

(a) Except for handrails referred to in **D2.18**, handrails must be—

(i) located along at least one side of the ramp or *flight*; and

(ii) located along each side if the total width of the stairway or ramp is 2 m or more; and

(iii) in a Class 9b building used as a primary *school*—

(A) have one handrail fixed at a height of not less than 865 mm; and

(B) have a second handrail fixed at a height between 665 mm and 750 mm,

measured above the nosings of stair treads and the floor surface of the ramp, landing or the like; and

(iv) in any other case, fixed at a height of not less than 865 mm measured above the nosings of stair treads and the floor surface of the ramp, landing, or the like; and

(v) continuous between stair *flight* landings and have no obstruction on or above them that will tend to break a hand-hold; and

(vi) in a *required exit* serving an area *required* to be *accessible*, designed and constructed to comply with clause 12 of AS 1428.1, except that clause 12(d) does not apply to a handrail *required* by **(a)(iii)(B)**.

(b) Handrails—

(i) in a Class 9a *health-care building* must be provided along at least one side of every passageway or corridor used by patients, and must be—

(A) fixed not less than 50 mm clear of the wall; and

(B) where practicable, continuous for their full length.

(ii) in a Class 9c *aged care building*~~building~~ must be provided along both sides of every passageway or corridor used by residents, and must be—

(A) fixed not less than 50 mm clear of the wall; and

(B) where practicable, continuous for their full length.

(c) Handrails *required* to assist people with a disability must be provided in accordance with **D3.3**.

(d) Handrails to a stairway or ramp within a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building must—

(i) be located along at least one side of the *flight* or ramp; and

(ii) be located along the full length of the *flight* or ramp, except in the case where a handrail is associated with a barrier, the handrail may terminate where the barrier terminates; and

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(iii) have the top surface of the handrail not less than 865 mm vertically above the nosings of the stair treads or the floor surface of the ramp; and

(iv) have no obstruction on or above them that will tend to break a handhold, except for newel posts, ball type stanchions, or the like.

(e) The requirements of **(d)** do not apply to—

(i) handrails referred to in **D2.18**; or

(ii) a stairway or ramp providing a change in elevation of less than 1 m; or

(iii) a landing; or

(iv) a winder where a newel post is installed to provide a handhold.

D2.21 Operation of latch

Vic D2.21(a)

(a) A door in a *required exit*, forming part of a *required exit* or in the path of travel to a *required exit* must be readily openable without a key from the side that faces a person seeking egress, by—

(i) a single hand downward action on a single device which is located between 900 mm and 1.1 m from the floor and if serving an area *required* to be *accessible* by **Part D3**—

(A) be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and

(B) have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35 mm and not more than 45 mm; or

(ii) a single hand pushing action on a single device which is located between 900 mm and 1.2 m from the floor; and~~.~~

(iii) where the latch operation device referred to in **(ii)** is not located on the door leaf itself—

(A) manual controls to power-operated doors must be located no closer than 500 mm from an internal corner and not more than 2 m from the nearest part of the doorway; and

(B) braille and tactile signage complying with **Clause 3** and **6** of **Specification D3.6** must identify the latch operation device.

(b) The requirements of **(a)** do not apply to a door that—

(i) serves a vault, strong-room, *sanitary compartment*, or the like; or

(ii) serves only, or is within—

(A) a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building; or

(B) a *sole-occupancy unit* in a Class 3 building (other than an entry door to a *sole-occupancy unit* of a boarding house, guest house, hostel, lodging house or backpacker accommodation); or

(C) a *sole-occupancy unit* with a *floor area* not more than 200 m^2 in a Class 5, 6, 7 or 8 building; or

(D) a space which is otherwise inaccessible to persons at all times when the door is locked; or

(iii) serves—

(A) Australian Government Security Zones 4 or 5; or

(B) the secure parts of a bank, *detention centre*, mental health facility, *early childhood centre* or the like; and

it can be immediately unlocked—

(C) by operating a fail-safe control switch, not contained within a protective enclosure, to actuate a device to unlock the door; or

(D) by hand by a person or persons, specifically nominated by the owner, properly instructed as to the duties and responsibilities involved and available at all times when the building is lawfully occupied so that persons in the building or part may immediately escape if there is a fire; or

(iv) is fitted with a fail-safe device which *automatically* unlocks the door upon the activation of any sprinkler system complying with **Specification E1.5** or smoke, or any other detector system deemed suitable in accordance with AS 1670.1 installed throughout the building, and is readily openable when unlocked; or

(v) is in a Class 9a or 9c building and—

(A) is one leaf of a two-leaf door complying with **D1.6(f)(i)** or **D1.6(f)(iv)** provided that it is not held closed by a locking mechanism and is readily openable; and

(B) the door is not *required* to be a fire door or smoke door.

NSW D2.21(c), (d)

SA D2.21(c)

(c) The requirements of **(a)** do not apply in a Class 9b building (other than a *school*, an *early childhood centre* or a building used for religious purposes) to a door in a *required exit*, forming part of a *required exit* or in the path of travel to a *required exit* serving a *storey* or room accommodating more than 100 persons, determined in accordance with **D1.13**, in which case it must be readily openable—

(i) without a key from the side that faces a person seeking egress; and

(ii) by a single hand pushing action on a single device such as a panic bar located between 900 mm and 1.2 m from the floor; and

(iii) where a two-leaf door is fitted, the provisions of **(i)** and **(ii)** need only apply to one door leaf if the appropriate requirements of **D1.6** are satisfied by the opening of that one leaf.

D2.23 Signs on doors

(a) A sign, to alert persons that the operation of certain doors must not be impaired, must be installed where it can readily be seen on, or adjacent to~~, a~~—

(i) a *required*—

(A) ~~required~~ fire door providing direct access to a fire-isolated *exit*, except a door providing direct egress from a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building; and

(B) ~~required~~ smoke door,

on the side of the door that faces a person seeking egress and, if the door is fitted with a device for holding it in the open position, on either the wall adjacent to the doorway or both sides of the door; and

(ii) a—

(A) fire door forming part of a *horizontal exit*; and

(B) smoke door that swings in both directions; and

(C) door leading from a fire isolated *exit* to a road or *open space*,

on each side of the door.

(b) A sign referred to in **(a)** must be in capital letters not less than 20 mm high in a colour contrasting with the background and state—

(i) for an *automatic* door held open by an *automatic* hold-open device—

“**FIRE SAFETY DOOR—DO NOT OBSTRUCT**”; or

(ii) for a *self-closing* door—

“**FIRE SAFETY DOOR**

DO NOT OBSTRUCT

DO NOT KEEP OPEN”; or

(iii) for a door discharging from a fire-isolated *exit*—

“**FIRE SAFETY DOOR—DO NOT OBSTRUCT**”.

NSW D2.101

PART D3 ACCESS FOR PEOPLE WITH A DISABILITY

Deemed-to-Satisfy Provisions

D3.0 Deemed-to-Satisfy Provisions

Tas D3.0

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* DP1 to DP6, DP8 and DP9 are satisfied by complying with—
  - (i) D1.1 to D1.16, D2.1 to D2.25 and D3.1 to D3.12; and
  - (ii) in a building containing an *atrium*, Part G3; and
  - (iii) in a building in an *alpine area*, Part G4; and
  - (iv) for additional requirements for Class 9b buildings, Part H1; and
  - (v) for public transport buildings, Part H2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

(c) *Performance Requirement* DP7 must be complied with if lifts are to be used to assist occupants to evacuate a building.

D3.1 General building access requirements

SA D3.1

Buildings and parts of buildings must be *accessible* as *required* by Table D3.1, unless exempted by D3.4.

Table D3.1 REQUIREMENTS FOR ACCESS FOR PEOPLE WITH A DISABILITY

Class of building	Access requirements
Class 1b	
(a) Dwellings located on one allotment[(1)] and used for short-term holiday accommodation, consisting of—	To and within—
(i) 4 to 10 dwellings	1 dwelling
(ii) 11 to 40 dwellings	2 dwellings
(iii) 41 to 60 dwellings	3 dwellings
(iv) 61 to 80 dwellings	4 dwellings
(v) 81 to 100 dwellings	5 dwellings
(vi) more than 100 dwellings	5 dwellings plus 1 additional dwelling for each additional 30 dwellings or part thereof in excess of 100 dwellings.
(b) A boarding house, bed and breakfast, guest house, hostel or the like, other than those described in (a)	To and within— 1 bedroom and associated sanitary facilities; and not less than 1 of each type of room or space for use in common by the residents or guests, including a cooking facility, sauna, gymnasium, *swimming pool*, laundry, games room, eating area, or the like; and rooms or spaces for use in common by all residents on a floor to which access by way of a ramp complying with AS 1428.1 or a passenger lift is provided.
[(1)] A community or strata-type subdivision or development is considered to be on a single allotment.	
Class 2	
Common areas	From a pedestrian entrance *required* to be *accessible* to at least 1 floor containing *sole-occupancy units* and to the entrance doorway of each *sole-occupancy unit* located on that level. To and within not less than 1 of each type of room or space for use in common by the residents, including a

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Class of building	Access requirements
	cooking facility, sauna, gymnasium, *swimming pool*, common laundry, games room, individual shop, eating area, or the like. Where a ramp complying with AS 1428.1 or a passenger lift is installed— (a) to the entrance doorway of each *sole-occupancy unit*; and (b) to and within rooms or spaces for use in common by the residents, located on the levels served by the lift or ramp.
Class 3	
Common areas	From a pedestrian entrance *required* to be *accessible* to at least 1 floor containing *sole-occupancy units* and to the entrance doorway of each *sole-occupancy unit* located on that level. To and within not less than 1 of each type of room or space for use in common by the residents, including a cooking facility, sauna, gymnasium, *swimming pool*, common laundry, games room, TV room, individual shop, dining room, public viewing area, ticket purchasing service, lunch room, lounge room, or the like. Where a ramp complying with AS 1428.1 or a passenger lift is installed— (a) to the entrance doorway of each *sole-occupancy unit*; and (b) to and within rooms or spaces for use in common by the residents, located on the levels served by the lift or ramp.
Sole-occupancy units	~~Not more than 2 *required accessible sole-occupancy units* may be located adjacent to each other.~~ ~~Where more than 2 *accessible sole-occupancy units* are *required*, they must be representative of the range of rooms available.~~
If the building or group of buildings contain—	To and within—
1 to 10 *sole-occupancy units*	1 *accessible sole-occupancy unit*.
11 to 40 *sole-occupancy units*	2 *accessible sole-occupancy units*.
41 to 60 *sole-occupancy units*	3 *accessible sole-occupancy units*.
61 to 80 *sole-occupancy units*	4 *accessible sole-occupancy units*.
81 to 100 *sole-occupancy units*	5 *accessible sole-occupancy units*.
101 to 200 *sole-occupancy units*	5 *accessible sole-occupancy units* plus 1 additional *accessible sole-occupancy unit* for every 25 units or part thereof in excess of 100.
201 to 500 *sole-occupancy units*	9 *accessible sole-occupancy units* plus 1 additional *accessible sole-occupancy unit* for every 30 units or part thereof in excess of 200.
more than 500 *sole-occupancy units*	19 *accessible sole-occupancy units* plus 1 additional *accessible sole-occupancy unit* for every 50 units or part thereof in excess of 500. Not more than 2 *required accessible sole-occupancy units* may be located adjacent to each other. Where more than 2 *accessible sole-occupancy units* are *required*, they must be representative of the range of rooms available.
Class 5	To and within all areas normally used by the occupants.
Class 6	To and within all areas normally used by the occupants.

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Class of building	**Access requirements**
Class 7a	To and within any level containing *accessible* carparking spaces.
Class 7b	To and within all areas normally used by the occupants.
Class 8	To and within all areas normally used by the occupants.
Class 9a	To and within all areas normally used by the occupants.
Class 9b	
Schools and *early childhood centres*	To and within all areas normally used by the occupants.
An *assembly building* not being a *school* or an *early childhood centre*	To wheelchair seating spaces provided in accordance with D3.9. To and within all other areas normally used by the occupants, except that access need not be provided to tiers or platforms of seating areas that do not contain wheelchair seating spaces.
Class 9c	
Common areas	From a pedestrian entrance *required* to be *accessible* to at least 1 floor containing *sole-occupancy units* and to the entrance doorway of each *sole-occupancy unit* located on that level. To and within not less than 1 of each type of room or space for use in common by the residents, including a cooking facility, sauna, gymnasium, *swimming pool*, common laundry, games room, TV room, individual shop, dining room, public viewing area, ticket purchasing service, lunch room, lounge room, or the like. Where a ramp complying with AS 1428.1 or a passenger lift is installed— (a) to the entrance doorway of each *sole-occupancy unit*; and (b) to and within rooms or spaces for use in common by the residents, located on the levels served by the lift or ramp.
Sole-occupancy units	~~Where more than 2 *accessible sole-occupancy units* are *required*, they must be representative of the range of rooms available.~~
If the building or group of buildings contain—	To and within—
1 to 10 *sole-occupancy units*	1 *accessible sole-occupancy unit*.
11 to 40 *sole-occupancy units*	2 *accessible sole-occupancy units*.
41 to 60 *sole-occupancy units*	3 *accessible sole-occupancy units*.
61 to 80 *sole-occupancy units*	4 *accessible sole-occupancy units*.
81 to 100 *sole-occupancy units*	5 *accessible sole-occupancy units*.
101 to 200 *sole-occupancy units*	5 *accessible sole-occupancy units* plus 1 additional *sole-occupancy unit* for every 25 units or part thereof in excess of 100.
201 to 500 *sole-occupancy units*	9 *accessible sole-occupancy units* plus 1 additional *sole-occupancy unit* for every 30 units or part thereof in excess of 200.
more than 500 *sole-occupancy units*	19 *accessible sole-occupancy units* plus 1 additional *sole-occupancy unit* for every 50 units or part thereof in excess of 500. Where more than 2 *accessible sole-occupancy units* are *required*, they must be representative of the range of rooms available.
Class 10a	
Non-habitable building located in an *accessible* area	To and within—

Class of building	Access requirements
intended for use by the public and containing a sanitary facility, change room facility or shelter	(a) An *accessible* sanitary facility; and (b) a change room facility; and (c) a public shelter or the like.
Class 10b *Swimming pool*	To and into *swimming pools* with a total perimeter greater than 40 m, associated with a Class 1b, 2, 3, 5, 6, 7, 8 or 9 building that is *required* to be *accessible*, but not *swimming pools* for the exclusive use of occupants of a Class 1b building or a *sole-occupancy unit* in a Class 2 or Class 3 building.

SA Table D3.1a

D3.5 Accessible carparking

Accessible carparking spaces—

(a) subject to (b), must be provided in accordance with Table D3.5 in—
  (i) a Class 7a building *required* to be *accessible*; and
  (ii) a carparking area on the same allotment as a building *required* to be *accessible*; and

(b) need not be provided in a Class 7a building or a carparking area where a parking service is provided and direct access to any of the carparking spaces is not available to the public; and

(c) subject to (d), must comply with AS/NZS 2890.6; and

(d) need not be identified with signage~~designated~~ where there is a total of not more than 5 carparking spaces, so as to restrict the use of the carparking space only for people with a disability.

Table D3.5 CARPARKING SPACES FOR PEOPLE WITH A DISABILITY

Class of building to which the *carpark* or carparking area is associated	Number of *accessible* carparking spaces *required*
Class 1b and 3	
(a) Boarding house, guest house, hostel, lodging house, backpackers accommodation, or the residential part of a hotel or motel.	To be calculated by multiplying the total number of carparking spaces by the percentage of— (i) *accessible sole-occupancy units* to the total number of *sole-occupancy units*; or (ii) *accessible* bedrooms to the total number of bedrooms; and the calculated number is to be taken to the next whole figure.
(b) Residential part of a *school*, accommodation for the aged, disabled or children, residential part of a *health-care building* which accommodates members of staff or the residential part of a *detention centre*.	1 space for every 100 carparking spaces or part thereof.
Class 5, 7, 8 or 9c	1 space for every 100 carparking spaces or part thereof.
Class 6 (a) Up to 1000 carparking spaces; and	1 space for every 50 carparking spaces or part thereof.
(b) for each additional 100 carparking spaces or part thereof in excess of 1000 carparking spaces.	1 space.
Class 9a (a) Hospital (non-outpatient area)	1 space for every 100 carparking spaces or part thereof.
(b)Hospital (outpatient area)—	

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Class of building to which the *carpark* or carparking area is associated	**Number of *accessible* carparking spaces *required***
(i) up to 1000 carparking spaces; and	1 space for every 50 carparking spaces or part thereof.
(ii) for each additional 100 carparking spaces or part thereof in excess of 1000 carparking spaces.	1 space.
(c) Nursing home	1 space for every 100 carparking spaces or part thereof.
(d) Clinic or day surgery not forming part of a hospital.	1 space for every 50 carparking spaces or part thereof.
Class 9b	
(a) *School*	1 space for every 100 carparking spaces or part thereof.
(b) Other *assembly building*—	
(i) up to 1000 carparking spaces; and	1 space for every 50 carparking spaces or part thereof.
(ii) for each additional 100 carparking spaces or part thereof in excess of 1000 carparking spaces.	1 space.

D3.6 Signage

In a building *required* to be *accessible*—

(a) braille and tactile signage complying with Specification D3.6 must—

- (i) incorporate the international symbol of access or deafness, as appropriate, in accordance with AS 1428.1 and identify each—
  - (A) sanitary facility, except a sanitary facility within a bedroom ~~*sole-occupancy unit*~~ in a Class 1b building or a *sole-occupancy unit* in a Class 3 or Class 9c building; and
  - (B) space with a hearing augmentation system; and
- (ii) identify each door *required* by E4.5 to be provided with an *exit* sign and state—
  - (A) "**Exit**"; and
  - (B) "**Level**"~~-~~; and either
    - (aa) the floor level number; or
    - (bb) a floor level descriptor; or
    - (cc) a combination of (aa) and (bb); and

(b) signage including the international symbol for deafness in accordance with AS 1428.1 must be provided within a room containing a hearing augmentation system identifying—

- (i) the type of hearing augmentation; and
- (ii) the area covered within the room; and
- (iii) if receivers are being used and where the receivers can be obtained; and

(c) signage must be provided— ~~AS 1428.1 must be provided for accessible unisex sanitary facilities to identify if the facility is suitable for left or right handed use; and~~

- (i) for *accessible* unisex sanitary facilities to identify if the facility is suitable for left or right handed use in accordance with AS 1428.1; or
- (ii) to identify an *accessible* unisex *sanitary compartment required* by F2.4(j) in accordance with Clause 11 of Specification F2.4; and

(d) signage to identify an ambulant *accessible* sanitary facility in accordance with AS 1428.1 must be located on the door of the facility; and

(e) where a pedestrian entrance is not *accessible*, directional signage incorporating the international symbol of access, in accordance with AS 1428.1 must be provided to direct a person to the location of the nearest *accessible* pedestrian entrance; and

(f) where a bank of sanitary facilities is not provided with an *accessible* unisex sanitary facility, directional signage incorporating the international symbol of access in accordance with AS 1428.1 must be placed at the location of the

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sanitary facilities that are not *accessible*, to direct a person to the location of the nearest *accessible* unisex sanitary facility; and

(g) where a bank of sanitary facilities in a building subject to F2.4(j) is not adjacent to an *accessible* unisex *sanitary compartment* that complies with Specification F2.4, directional signage incorporating—

  (i) the international symbol for access in accordance with AS 1428.1; and

  (ii) the 'Hoist / Table' symbol in accordance with Clause 11 of Specification F2.4,

must be provided to direct a person to the nearest such facility.

D3.8 Tactile indicators

(a) For a building *required* to be *accessible*, tactile ground surface indicators must be provided to warn people who are blind or have a vision impairment that they are approaching—

  (i) a stairway, other than a *fire-isolated stairway*; and

  (ii) an escalator; and

  (iii) a passenger conveyor or moving walk; and

  (iv) a ramp other than a *fire-isolated ramp*, step ramp, kerb ramp or *swimming pool* ramp; and

  (v) in the absence of a suitable barrier—

    (A) an overhead obstruction less than 2 m above floor level, other than a doorway; and

    (B) an *accessway* meeting a vehicular way adjacent to any pedestrian entrance to a building, excluding a pedestrian entrance serving an area referred to in D3.4, if there is no kerb or kerb ramp at that point,

  except for areas exempted by D3.4.

(b) Tactile ground surface indicators *required* by (a) must comply with sections 1 and 2 of AS/NZS 1428.4.1.

(c) A hostel for the aged, nursing home for the aged, a *residential aged care building* Class 3 accommodation for the aged, Class 9a *health-care building* or a Class 9c *aged care building*~~building~~ need not comply with (a)(i) and (iv) if handrails incorporating a raised dome button in accordance with ~~the requirements for stairway handrails in~~ AS 1428.4.1 are provided to warn people who are blind or have a vision impairment that they are approaching a stairway or ramp.

D3.9 Wheelchair seating spaces in Class 9b assembly buildings

Where fixed seating is provided in a Class 9b *assembly building*, wheelchair seating spaces complying with AS 1428.1 must be provided in accordance with the following:

(a) The number and grouping of wheelchair seating spaces must be in accordance with Table D3.9.

(b) In a cinema—

  (i) with not more than 300 seats — wheelchair seating spaces must not be located in the front row of seats; and

  (ii) with more than 300 seats — not less than 75% of *required* wheelchair seating spaces must be located in rows other than the front row of seats.~~; and~~

  ~~(iii) the location of wheelchair seating is to be representative of the range of seating provided.~~

Table D3.9 WHEELCHAIR SEATING SPACES IN CLASS 9b ASSEMBLY BUILDINGS

Number of fixed seats in a room or space	Number of wheelchair seating spaces	Grouping and location
Up to 150	3 spaces	1 single space; and 1 group of 2 spaces.
151 to 800	3 spaces; plus 1 additional space for each additional 50 seats or part thereof in excess of 150 seats	Not less than 1 single space; and not less than 1 group of 2 spaces; and not more than 5 spaces in any other group.
801 to 10 000	16 spaces; plus 1 additional space for each additional 100 seats or part thereof in excess of 800 seats	Not less than 2 single spaces; and not less than 2 groups of 2 spaces; and not more than 5 spaces in any other group; and the location of spaces is to be representative

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Number of fixed seats in a room or space	Number of wheelchair seating spaces	Grouping and location
		of the range of seating provided.
More than 10 000	108 spaces; plus 1 additional space for each additional 200 seats or part thereof in excess of 10 000 seats	Not less than 5 single spaces; and not less than 5 groups of 2 spaces; and not more than 10 spaces in any other group; and the location of spaces is to be representative of the range of seating provided.

D3.10 Swimming pools

(a) Not less than 1 means of *accessible* water entry/exit in accordance with Specification D3.10 must be provided for each *swimming pool required* by Table D3.1 to be *accessible*.

(b) An *accessible* entry/exit must be by means of—

- (i) a fixed or movable ramp and an aquatic wheelchair; or
- (ii) a zero depth entry ~~at a maximum gradient of 1:14~~ and an aquatic wheelchair; or
- (iii) a platform *swimming pool* lift and an aquatic wheelchair; or
- (iv) a sling-style *swimming pool* lift.

(c) Where a *swimming pool* has a perimeter of more than 70 m ~~in length~~, at least one *accessible* water entry/exit must be provided by a means specified in (b)(i), (ii) or (iii).

(d) Latching devices on gates and doors forming part of a *swimming pool* safety barrier need not comply with AS 1428.1.

SPECIFICATION D2.16A Barrier construction

Deemed-to-Satisfy Provisions

1. Scope

This Specification sets out the requirements for construction of barriers to prevent falls.

2. Application

This Specification applies only to a barrier that is *required* by D2.16.

3. Barrier height

(a) Barriers must have a minimum height of 1 m, except as follows:

(i) for stairways or ramps with a gradient of 1:20 or steeper, a barrier must have a minimum height of 865 mm.

(ii) for landings to a stair or ramp where the barrier is provided along the inside edge of the landing and does not exceed 500 mm in length, a barrier must have a minimum height of 865 mm.

(iii) In front of fixed seating on a *mezzanine* or balcony within an auditorium in a Class 9b building, where the horizontal projection extends not more than 1000 mm outwards from the top of the barrier, a barrier must have a minimum height of 700 mm.

(b) A transition zone may be incorporated where the barrier height changes from 865 mm on a stair *flight* or ramp to 1000 mm at a landing or floor.

(c) For the purposes of (a), barrier heights are measured vertically from the surface beneath, except that for stairways the height must be measured above the nosing line of the stair treads.

4. Barrier openings

(a) A 125 mm diameter sphere must not be able to pass through any opening, except as provided for in (b).

(b) In any—

(i) *fire-isolated stairway*, *fire-isolated ramp* or other area used primarily for emergency purposes; or

(ii) Class 7 or 8 buildings,

either—

(iii) a 300 mm diameter sphere must not be able to pass through any opening; or

(iv) where rails are used—

(A) a 150 mm diameter sphere must not be able to pass through the opening between the nosing line of the stair treads and the rail or between the rail and the floor of the landing, balcony, or the like; and

(B) the opening between rails must not be more than 460 mm.

(c) The requirements of (b) do not apply to—

(i) an external stairway; or

(ii) an external ramp; or

(iii) a Class 7a *carpark*.

5. Barrier climbability

(a) For floors 4 m or more above the surface beneath, any horizontal or near horizontal elements between 150 mm and 760 mm above the floor must not facilitate climbing.

(b) The requirements of (a) do not apply to—

(i) an external stairway; or

(ii) an external ramp; or

(iii) a Class 7 building other than a *carpark*; or

(iv) a Class 8 building.

SPECIFICATION D2.16B Tension for stainless steel horizontal wires in barriers

Deemed-to-Satisfy Provisions

1. Scope

This Specification sets out the minimum *required* tension for stainless steel horizontal wires used in a barrier.

2. Application

(a) This Specification applies as follows:

(i) For 2.5 mm diameter wire with a lay of 7 x 7, the *required* tension is determined in accordance with Table 1a.

(ii) For 2.5 mm diameter wire with a lay of 1 x 19, the *required* tension is determined in accordance with Table 1b.

(iii) For 3 mm diameter wire with a lay of 7 x 7, the *required* tension is determined in accordance with Table 2a.

(iv) For 3 mm diameter wire with a lay of 1 x 19, the *required* tension is determined in accordance with Table 2b.

(v) For 4 mm diameter wire with a lay of 7 x 7, the *required* tension is determined in accordance with Table 3a.

(vi) For 4 mm diameter wire with a lay of 1 x 19, the *required* tension is determined in accordance with Table 3b.

(vii) For 4 mm diameter wire with a lay of 7 x 19, the *required* tension is determined in accordance with Table 3c.

(b) Lay means the number of strands by the number of individual wires in each strand, for example a lay of 7 x 19 consists of 7 strands with 19 individual wires in each strand.

(c) Where a change in direction is made in a run of wire, the tensioning device must be placed at the end of the longest span.

(d) If 3.2 mm diameter wire is used, the tension figures for 3.0 mm wire are applied.

(e) The tables referred to in (a) may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails.

(f) Wire tension must be measured with a strain indicator.

Table 1a. 2.5 mm diameter wire (7 x 7 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	55 N
60 mm	800 mm	190 N
60 mm	900 mm	263 N
60 mm	1000 mm	415 N
60 mm	1200 mm	478 N
60 mm	1500 mm	823 N
60 mm	1800 mm	1080 N
60 mm	2000 mm	1139 N
80 mm	600 mm	382 N
80 mm	800 mm	630 N
80 mm	900 mm	730 N
80 mm	1000 mm	824 N
80 mm	1200 mm	1025 N
80 mm	1500 mm	1288 N
100 mm	600 mm	869 N
100 mm	800 mm	1218 N

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Wire spacing (mm)	Post spacing (mm)	Required tension (N)
100 mm	900 mm	1368 N

Table 1b. 2.5 mm diameter wire (1 x 19 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	35 N
60 mm	800 mm	218 N
60 mm	900 mm	310 N
60 mm	1000 mm	402 N
60 mm	1200 mm	585 N
60 mm	1500 mm	810 N
60 mm	1800 mm	1125 N
60 mm	2000 mm	1325 N
80 mm	600 mm	420 N
80 mm	800 mm	630 N
80 mm	900 mm	735 N
80 mm	1000 mm	840 N
80 mm	1200 mm	1050 N
80 mm	1500 mm	1400 N
80 mm	1800 mm	1750 N
100 mm	600 mm	1140 N
100 mm	800 mm	1565 N

Table 2a. 3.0 mm diameter wire (7 x 7 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	15 N
60 mm	800 mm	178 N
60 mm	900 mm	270 N
60 mm	1000 mm	314 N
60 mm	1200 mm	506 N
60 mm	1500 mm	660 N
60 mm	1800 mm	965 N
60 mm	2000 mm	1168 N
60 mm	2500 mm	1491 N
80 mm	600 mm	250 N
80 mm	800 mm	413 N
80 mm	900 mm	500 N
80 mm	1000 mm	741 N
80 mm	1200 mm	818 N
80 mm	1500 mm	1083 N
80 mm	1800 mm	1370 N
80 mm	2000 mm	1565 N
100 mm	600 mm	865 N
100 mm	800 mm	1278 N
100 mm	900 mm	1390 N
100 mm	1000 mm	1639 N

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Table 2b. 3.0 mm diameter wire (1 x 19 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	25 N
60 mm	800 mm	183 N
60 mm	900 mm	261 N
60 mm	1000 mm	340 N
60 mm	1200 mm	520 N
60 mm	1500 mm	790 N
60 mm	1800 mm	1025 N
60 mm	2000 mm	1180 N
80 mm	600 mm	325 N
80 mm	800 mm	555 N
80 mm	900 mm	670 N
80 mm	1000 mm	785 N
80 mm	1200 mm	1015 N
80 mm	1500 mm	1330 N
80 mm	1800 mm	1725 N
80 mm	2000 mm	1980 N
100 mm	600 mm	1090 N
100 mm	800 mm	1500 N
100 mm	900 mm	1705 N
100 mm	1000 mm	1910 N

Table 3a. 4.0 mm diameter wire (7 x 7 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	5 N
60 mm	800 mm	73 N
60 mm	900 mm	97 N
60 mm	1000 mm	122 N
60 mm	1200 mm	235 N
60 mm	1500 mm	440 N
60 mm	1800 mm	664 N
60 mm	2000 mm	813 N
60 mm	2500 mm	1178 N
80 mm	600 mm	196 N
80 mm	800 mm	422 N
80 mm	900 mm	480 N
80 mm	1000 mm	524 N
80 mm	1200 mm	760 N
80 mm	1500 mm	1100 N
80 mm	1800 mm	1358 N
80 mm	2000 mm	1530 N
80 mm	2500 mm	2130 N
100 mm	600 mm	835 N
100 mm	800 mm	1182 N
100 mm	900 mm	1360 N
100 mm	1000 mm	1528 N
100 mm	1200 mm	1837 N
100 mm	1500 mm	2381 N

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Wire spacing (mm)	Post spacing (mm)	Required tension (N)
100 mm	1800 mm	2811 N
100 mm	2000 mm	3098 N

Table 3b. 4.0 mm diameter wire (1 x 19 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	5 N
60 mm	600 mm	5 N
60 mm	800 mm	5 N
60 mm	900 mm	10 N
60 mm	1000 mm	15 N
60 mm	1200 mm	20 N
60 mm	1500 mm	147 N
60 mm	1800 mm	593 N
60 mm	2000 mm	890 N
60 mm	2500 mm	1280 N
80 mm	600 mm	30 N
80 mm	800 mm	192 N
80 mm	900 mm	300 N
80 mm	1000 mm	415 N
80 mm	1200 mm	593 N
80 mm	1500 mm	1105 N
80 mm	1800 mm	1303 N
80 mm	2000 mm	1435 N
80 mm	2500 mm	1844 N
100 mm	600 mm	853 N
100 mm	800 mm	1308 N
100 mm	900 mm	1487 N
100 mm	1000 mm	1610 N
100 mm	1200 mm	2048 N
100 mm	1500 mm	2608 N
100 mm	1800 mm	3094 N
100 mm	2000 mm	3418 N
100 mm	2500 mm	3849 N

Table 3c. 4.0 mm diameter wire (7 x 19 lay)

Wire spacing (mm)	Post spacing (mm)	Required tension (N)
60 mm	600 mm	155 N
60 mm	800 mm	290 N
60 mm	900 mm	358 N
60 mm	1000 mm	425 N
60 mm	1200 mm	599 N
60 mm	1500 mm	860 N
60 mm	1800 mm	1080 N
60 mm	2000 mm	1285 N
60 mm	2500 mm	1540 N
80 mm	600 mm	394 N
80 mm	800 mm	654 N
80 mm	900 mm	785 N

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Wire spacing (mm)	Post spacing (mm)	Required tension (N)
80 mm	1000 mm	915 N
80 mm	1200 mm	1143 N
80 mm	1500 mm	1485 N
80 mm	1800 mm	1860 N
80 mm	2000 mm	2105 N
80 mm	2500 mm	2615 N
100 mm	600 mm	1038 N
100 mm	800 mm	1412 N
100 mm	900 mm	1598 N
100 mm	1000 mm	1785 N
100 mm	1200 mm	2165 N
100 mm	1500 mm	2735 N

SPECIFICATION D2.16C Tension for stainless steel vertical wires in barriers

Deemed-to-Satisfy Provisions

1. Scope

This Specification sets out the minimum *required* tension for stainless steel vertical or near vertical wires used in a barrier.

2. Application

(a) This Specification applies as follows:

  (i) For 2.5 mm diameter wire with a lay of 7 x 7, the *required* tension is determined in accordance with Table 1.

  (ii) For 2.5 mm diameter wire with a lay of 7 x 19, the *required* tension is determined in accordance with Table 2.

(b) The maximum clear spacing between rails must be 900 mm.

(c) Lay means the number of strands by the number of individual wires in each strand, for example a lay of 7 x 19 consists of 7 strands with 19 individual wires in each strand.

(d) Vertical wires must have two pulley blocks to each 180 degree change of direction in the wire.

(e) Near vertical wires may only require one pulley block for each change of direction.

(f) Wire tension must be measured with a strain indicator.

(g) This Specification only includes 7 x 7 and 7 x 19 wires due to other wires not having sufficient flexibility to make the necessary turns.

Table 1. 2.5 mm diameter wire (7 x 19 lay)

Maximum spacing between rails (mm)	Widest spacing between wires (mm)	Required tension (N)
900 mm	80 mm	145 N
900 mm	100 mm	310 N
900 mm	110 mm	610 N

Table 2. 2.5 mm diameter wire (7 x 7 lay)

Maximum spacing between rails (mm)	Widest spacing between wires (mm)	Required tension (N)
900 mm	80 mm	130 N
900 mm	100 mm	280 N
900 mm	110 mm	500 N

SPECIFICATION D2.16D Permissible deflection for stainless steel wires in barriers

Deemed-to-Satisfy Provisions

1. Scope

This Specification sets out the maximum permissible deflection for stainless steel wires used in barriers.

2. Application

(a) This Specification applies as follows:

(i) For 2.5 mm diameter wire, the maximum permissible deflection is determined using Table 1.

(ii) For 3.0 mm diameter wire, the maximum permissible deflection is determined using Table 2.

(iii) For 4.0 mm diameter wire, the maximum permissible deflection is determined using Table 3.

(b) The maximum permissible deflection is determined when a 2 kg mass is suspended from the wire at mid span.

(c) Where a change of direction is made in a run of wire, the 2 kg mass must be placed at the middle of the longest span.

(d) If 3.2 mm diameter wire is used, the deflection figures for 3.0 mm wire are applied.

(e) Tables 1, 2 and 3 may also be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between rails.

(f) The deflection (offset) is measured by hooking a standard spring scale to the mid-span of each wire and pulling it horizontally until a force of 19.6 N is applied.

(g) Tables 1, 2 and 3 have been limited to 60 mm and 80 mm spaces for 2.5 mm, 3 mm and 4 mm diameter wires because the required wire tensions at greater spacings would require the tension to be beyond the wire safe load limit, or the allowed deflection would be impractical to measure.

Table 1. 2.5 mm diameter wire

Wire spacing (mm)	Clear distance between posts (mm)	Maximum permissible deflection (mm)
60 mm	600 mm	17 mm
60 mm	900 mm	11 mm
60 mm	1200 mm	9 mm
60 mm	1500 mm	8 mm
60 mm	1800 mm	8 mm
60 mm	2000 mm	8 mm
80 mm	600 mm	7 mm
80 mm	900 mm	5 mm
80 mm	1200 mm	5 mm
80 mm	1500 mm	5 mm

Table 2. 3.0 mm diameter wire

Wire spacing (mm)	Clear distance between posts (mm)	Maximum permissible deflection (mm)
60 mm	600 mm	19 mm
60 mm	900 mm	13 mm
60 mm	1200 mm	8 mm
60 mm	1500 mm	7 mm
60 mm	1800 mm	7 mm
60 mm	2000 mm	7 mm
80 mm	600 mm	8 mm
80 mm	900 mm	6 mm
80 mm	1200 mm	6 mm

Wire spacing (mm)	Clear distance between posts (mm)	Maximum permissible deflection (mm)
80 mm	1500 mm	5 mm
80 mm	1800 mm	5 mm
80 mm	2000 mm	5 mm

Table 3. 4.0 mm diameter wire

Wire spacing (mm)	Clear distance between posts (mm)	Maximum permissible deflection (mm)
60 mm	600 mm	18 mm
60 mm	900 mm	12 mm
60 mm	1200 mm	8 mm
60 mm	1500 mm	8 mm
60 mm	1800 mm	7 mm
60 mm	2000 mm	7 mm
80 mm	600 mm	8 mm
80 mm	900 mm	6 mm
80 mm	1200 mm	4 mm
80 mm	1500 mm	4 mm
80 mm	1800 mm	4 mm
80 mm	2000 mm	4 mm

SPECIFICATION D3.6 BRAILLE AND TACTILE SIGNS

Deemed-to-Satisfy Provisions

1. Scope

This Specification sets out the requirements for the design and installation of braille and tactile signage as *required* by **D2.21** and **D3.6**.

3. Braille and tactile sign specification

(a) Tactile characters must be raised or embossed to a height of not less than 1 mm and not more than 1.5 mm.

(b) Title~~Sentence~~ case (upper case for the first letter of each main word and lower case for all other letters) must be used for all tactile characters, and—

  (i) upper case tactile characters must have a height of not less than 15 mm and not more than 55 mm, except that the upper case tactile characters on a sign identifying a door *required* by **E4.5** to be provided with an *exit* sign must have a height of not less than 20 mm and not more than 55 mm; and

  (ii) lower case tactile characters must have a height of 50% of the related upper case characters.

(c) Tactile characters, symbols, and the like, must have rounded edges.

(d) The entire sign, including any frame, must have all edges rounded.

(e) The background, negative space or fill of signs must be of matt or low sheen finish.

(f) The characters, symbols, logos and other features on signs must be matt or low sheen finish.

(g) The minimum letter spacing of tactile characters on signs must be 2 mm.

(h) The minimum word spacing of tactile characters on signs must be 10 mm.

(i) The thickness of letter strokes must be not less than 2 mm and not more than 7 mm.

(j) Tactile text must be left justified, except that single words may be centre justified.

(k) Tactile text must be Arial typeface.

PART E1 FIRE FIGHTING EQUIPMENT

PERFORMANCE REQUIREMENTS

EP1.1 Fire hose reels

A fire hose reel system must be installed to the degree necessary to allow occupants to safely undertake initial attack on a fire appropriate to—

(a) the size of the *fire compartment*; and

(b) the function or use of the building; and

(c) any other *fire safety systems* installed in the building; and

(d) the *fire hazard*.

EP1.2 Fire extinguishers

Fire extinguishers must be installed to the degree necessary to allow occupants to undertake initial attack on a fire appropriate to—

(a) the function or use of the building; and

(b) any other *fire safety systems* installed in the building; and

(c) the *fire hazard*.

EP1.3 Fire hydrants

A fire hydrant system must be provided to the degree necessary to facilitate the needs of the *fire brigade* appropriate to—

(a) fire-fighting operations; and

(b) the *floor area* of the building; and

(c) the *fire hazard*.

Application:

EP1.3 only applies to a building where a *fire brigade* is available to attend.

EP1.4 Automatic fire suppression systems

NSW EP1.4

An *automatic* fire suppression system must be installed to the degree necessary to control the development and spread of fire appropriate to—

(a) the size of the *fire compartment*; and

(b) the function or use of the building; and

(c) the *fire hazard*; and

(d) the height of the building.

EP1.5 Fire-fighting services in buildings under construction

Suitable means of fire-fighting must be installed to the degree necessary in a building under construction to allow initial fire attack by construction workers and for the *fire brigade* to undertake attack on the fire appropriate to—

(a) the *fire hazard*; and

(b) the height the building has reached during its construction.

EP1.6 Fire control centres

Suitable facilities must be provided to the degree necessary in a building to co-ordinate *fire brigade* intervention during an emergency appropriate to—

(a) the function or use of the building; and

(b) the *floor area* of the building; and

(c) the height of the building.

Tas EP1.7

VERIFICATION METHODS

EV1.1

Compliance with EP1.1, EP1.2, EP1.3, EP1.4 and EP1.6 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:
The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART E1 FIRE FIGHTING EQUIPMENT

Deemed-to-Satisfy Provisions

E1.0 Deemed-to-Satisfy Provisions

Tas E1.0

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* EP1.1 to EP1.6 are satisfied by complying with—
   (i) E1.1 to E1.10; and
   (ii) in a building containing an *atrium*, Part G3; and
   (iii) in a building in an *alpine area*, Part G4; and
   (iv) in a building containing an *occupiable outdoor area*, Part G6; and
   (v) for additional requirements for Class 9b buildings, Part H1; and
   (vi) for *farm buildings* and *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

E1.3 Fire hydrants

(a) A fire hydrant system must be provided to serve a building—
   (i) having a total *floor area* greater than 500 m^2; and
   (ii) where a *fire brigade station* is—
      (A) no more than 50 km from the building as measured along roads; and
      (B) equipped with equipment capable of utilising a fire hydrant.

(b) The fire hydrant system—
   (i) must be installed in accordance with AS 2419.1, except— ~~—a Class 8 electricity network substation need not comply with clause 4.2 of AS 2419.1 if—~~
      (A) a Class 8 *electricity network substation* need not comply with clause 4.2 of AS 2419.1 if—
         (aa) it cannot be connected to town main supply; and
      ~~(A) it cannot be connected to town main supply; and~~
         (bb) one hour water storage is provided for firefighting; and
      (B) ~~one hour water storage is provided for firefighting; and~~where a sprinkler system is installed throughout a building in accordance with AS 2118.1, AS 2118.4 or AS 2118.6, the fire hydrant booster protection requirements of 7.3(c)(ii) and 7.3(d)(iii) of AS 2419.1 do not apply; and
      (C) a fire hydrant booster assembly may be located within 3.5 - 10 m of the building and need not comply with clause 7.3(d)(iii) of AS 2419.1 where a fire-rated freestanding wall is provided that—
         (aa) achieves an FRL of not less than 90/90/90; and
         (bb) extends to a distance of not less than 1 m each side of the outermost fire hydrant booster risers within the assembly, provided a minimum of 3 m total width is achieved; and
         (cc) extends to a height of not less than 2 m above finished ground level; and
   (ii) where internal fire hydrants are provided, they must serve only the *storey* on which they are located except that a *sole-occupancy unit*—
      (A) in a Class 2 or 3 building or Class 4 part of a building may be served by a single fire hydrant located at the level of egress from that *sole-occupancy unit*; or
      (B) of not more than 2 *storeys* in a Class 5, 6, 7, 8 or 9 building may be served by a single fire hydrant located at the level of egress from that *sole-occupancy unit* provided the fire hydrant can provide coverage to the whole of the *sole-occupancy unit*.

Deemed-to-Satisfy Provisions

E1.4 Fire hose reels

(a) E1.4 does not apply to—
- (i) a Class 2, ~~or~~ 3 or 5 building or Class 4 part of a building; or
- (ii) a Class 8 *electricity network substation*; or
- (iii) a Class 9c building; or
- (iv) classrooms and associated corridors in a primary or secondary *school*.

(b) A fire hose reel system must be provided—
- (i) to serve the whole building where one or more internal fire hydrants are installed; or
- (ii) where internal fire hydrants are not installed, to serve any *fire compartment* with a *floor area* greater than 500 m^2.

(c) The fire hose reel system must—
- (i) have fire hose reels installed in accordance with AS 2441; and
- (ii) provide fire hose reels to serve only the *storey* at which they are located, except a *sole-occupancy unit* of not more than 2 *storeys* in a Class 5, 6, 7, 8 or 9 building may be served by a single fire hose reel located at the level of egress from that *sole-occupancy unit* provided the fire hose reel can provide coverage to the whole of the *sole-occupancy unit*.

(d) Fire hose reels must be located internally, externally or in combination, to achieve the system coverage specified in AS 2441.

(e) In achieving system coverage, one or a combination of the following criteria for individual internally located fire hose reels must be met in determining the layout of any fire hose reel system:
- (i) Fire hose reels must be located adjacent to an internal fire hydrant (other than one within a fire-isolated *exit*), except that a fire hose reel need not be located adjacent to every fire hydrant, provided system coverage can be achieved.
- (ii) Fire hose reels must be located within 4 m of an *exit*, except that a fire hose reel need not be located adjacent to every *exit*, provided system coverage can be achieved.
- (iii) Where system coverage is not achieved by compliance with (i) and (ii), additional fire hose reels may be located in paths of travel to an *exit* to achieve the *required* coverage.

(f) Fire hose reels must be located so that the fire hose will not need to pass through doorways fitted with fire or smoke doors, except—
- (i) doorways in walls referred to in C2.5(a)(v) in a Class 9a building and C2.5(b)(iv) in a Class 9c building, separating ancillary use areas of high potential *fire hazard*; and
- (ii) doorways in walls referred to in C2.12 or C2.13 separating equipment or electrical supply systems; and
- (iii) doorway openings to *shafts* referred to in C3.13.

(g) Where the normal water supply cannot achieve the flow and pressures required by AS 2441, or is unreliable—
- (i) a pump; or
- (ii) water storage facility; or
- (iii) both a pump and water storage facility,

must be installed to provide the minimum flow and pressures required by clause 6.1 of AS 2441.

E1.5 Sprinklers

A sprinkler system must

(a) be installed in a building or part of a building when *required* by Table E1.5; and

(b) comply with Specification E1.5.

NSW Table E1.5

NT Table E1.5

Vic Table E1.5

Deemed-to-Satisfy Provisions

Table E1.5 ~~REQUIREMENTS FOR SPRINKLERS~~Requirements for sprinklers

Occupancy	When sprinklers are required
All classes— (a) including an *open-deck carpark* within a multi-classified building; but (b) excluding— (i) an *open-deck carpark* being a separate building; and (ii) a Class 8 *electricity network substation,* with a *floor area* not more than 200 m^2, located within a multi-classified building.	Throughout the whole building if any part of the building has an *effective height* of more than 25 m.
Class 2 or 3 building (excluding a building used as a *residential care building*) and a Class 4 part of a building	If any part of the building has a *rise in storeys* of 4 or more and an *effective height* not more than 25 m — See Specification E1.5
Class 3 building used as a *residential ~~aged~~care building*	Throughout the building and in any *fire compartment* containing a Class 3 part used for residential care.
Class 6	In *fire compartments* where either of the following apply: (a) A *floor area* of more than 3 500 m^2. (b) A volume more than 21 000 m^3.
Class 7a, other than *open-deck carparks*	In *fire compartments* where more than 40 vehicles are accommodated.
Class 9a *health care building* used as a *residential ~~aged~~care building*	Throughout the building and in any *fire compartment* containing a Class 9a part used for residential care.
Class 9c building	Throughout the building and any *fire compartment* containing a Class 9c part.
Class 9b	see Part H1
Atrium construction	see Part G3
Large isolated buildings	see Clause C2.3
Occupancies of excessive hazard (see Note 4)	In *fire compartments* where either of the following apply: (a) A *floor area* of more than 2 000 m^2. (b) A volume of more than 12 000 m^3.

Notes:

1. See Specification C1.1 for use of sprinklers in Class 2 buildings and *carparks* generally.
2. See Part E2 for use of sprinklers to satisfy Smoke Hazard Management provisions.
3. See C1.13 and Specification C1.1 for use of sprinklers in Class 2, 3 and 5 buildings containing *fire-protected timber*.
4. For the purposes of this Table, occupancies of excessive *fire hazard* comprise buildings which contain—
   a. hazardous processes or storage including the following:
      i. Aircraft hangars.
      ii. Cane furnishing manufacture, processing and storage.
      iii. Fire-lighter and fireworks manufacture and warehousing.
      iv. Foam plastic and foam plastic goods manufacture, processing and warehousing e.g. furniture factory.
      v. Hydrocarbon based sheet product, manufacture, processing and warehousing e.g. vinyl floor coverings.
      vi. Woodwool and other flammable loose fibrous material manufacture.
   b. combustible goods with an aggregate volume exceeding 1000 m^3 and stored to a height greater than 4 m including the following:
      i. Aerosol packs with flammable contents.
      ii. Carpets and clothing.

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iii. Electrical appliances.
iv. Combustible compressed fibreboards (low and high density) and plywoods.
v. Combustible cartons, irrespective of content
vi. Esparto and other fibrous combustible material.
vii. Furniture including timber, cane and composite, where foamed rubber or plastics are incorporated.
viii. Paper storage (all forms of new or waste) e.g. bales, sheet, horizontal or vertical rolls, waxed coated or processed.
ix. Textiles raw and finished, e.g., rolled cloth, clothing and manchester
x. Timber storage including sheets, planks, boards, joists and cut sizes.
xi. Vinyl, plastic, foamed plastic, rubber and other combustible sheets, offcuts and random pieces and rolled material storage, e.g. carpet, tar paper, linoleum, wood veneer and foam mattresses.
xii. All materials having wrappings or preformed containers of foamed plastics.

E1.6 Portable fire extinguishers

(a) Portable fire extinguishers must be—
  (i) provided as listed in Table E1.6; and
  (ii) for a Class 2, ~~or~~ 3 or 5 building or Class 4 part of a building, provided—
    (A) to serve the whole Class 2, ~~or~~ 3 or 5 building or Class 4 part of a building where one or more internal fire hydrants are installed; or
    (B) where internal fire hydrants are not installed, to serve any *fire compartment* with a *floor area* greater than 500 m^2, and for the purposes of this clause, a *sole-occupancy unit* in a Class 2, ~~or~~ 3 or 5 building or Class 4 part of a building is considered to be a *fire compartment*; and
  (iii) subject to (b), selected, located and distributed in accordance with Sections 1, 2, 3 and 4 of AS 2444.
(b) Portable fire extinguishers provided in a Class 2 or 3 building or Class 4 part of a building must be—
  (i) an ABE type fire extinguisher; and
  (ii) a minimum size of 2.5 kg; and
  (iii) distributed outside a *sole-occupancy unit*—
    (A) to serve only the *storey* at which they are located; and
    (B) so that the travel distance from the entrance doorway of any *sole-occupancy unit* to the nearest fire extinguisher is not more than 10 m.

Table E1.6 Requirements for extinguishers

Occupancy class	Risk class (as defined in AS 2444)
General provisions—Class 2 to 9 buildings (except within *sole-occupancy units* of a Class 9c building)	(a) To cover Class AE or E fire risks associated with emergency services switchboards. (Note 1) (b) To cover Class F fire risks involving cooking oils and fats in kitchens. (c) To cover Class B fire risks in locations where flammable liquids in excess of 50 litres are stored or used (not including that held in fuel tanks of vehicles). (d) To cover Class A fire risks in normally occupied *fire compartments* less than 500 m^2 not provided with fire hose reels (excluding *open deck carparks*). (e) To cover Class A fire risks in classrooms and associated corridors in primary and secondary schools not provided with fire hose reels. (f) To cover Class A fire risks associated with a Class 2 or 3 building or Class 4 part of a building.

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Occupancy class	Risk class (as defined in AS 2444)
Specific provisions (in addition to general provisions)— (a) Class 9a *health care building*, including a Class 9a building used as a *residential care building* (b) Class 3 parts of detention and correctional occupancies (c) Class 3 accommodation for children, aged persons and people with disabilities, including a Class 3 building used as a *residential care building* (d) Class 9c building	To cover Class A and E fire risks. (Note 2)

Notes:

1. For the purposes of this Table, an emergency services switchboard is one which sustains emergency equipment operating in the emergency mode.
2. A Class E fire extinguisher need only be located at each nurses', supervisors' station or the like.
3. Additional extinguishers may be required to cover fire risks in relation to special hazards provided for in E1.10.
4. The fire risks in a Class 2 or 3 building or Class 4 part of a building must include risks within any *sole-occupancy units*, however portable fire extinguishers are not required to be located within a *sole-occupancy unit* unless the *sole-occupancy unit* has a *floor area* greater than 500 m^2.

SPECIFICATION E1.5 FIRE SPRINKLER SYSTEMS

Deemed-to-Satisfy Provisions

2. Adoption of ~~AS 2118~~automatic fire sprinkler standards

Vic Spec E1.52

Subject to this Specification, an *automatic* fire sprinkler system must comply with—

(a) AS 2118.1; or

(b) for a Class 2 or 3 building or Class 4 part of a building not more than 25 m in *effective height*, Clause 14~~: AS 2118.4 as applicable~~; or

(c) for a combined sprinkler and fire hydrant system: AS 2118.6; or

(d) for a Class 9a *health care building* used as a *residential care building*~~*residential aged care building*~~: AS 2118.4 as applicable; or

(e) for a Class 9c building: AS 2118.4 as applicable.

3. Separation of sprinklered and non-sprinklered areas

Where a part of a building is not protected with sprinklers, the sprinklered and non-sprinklered parts must be fire-separated with a wall or floor which must—

(a) comply with any specific requirement of the *Deemed-to-Satisfy Provisions* of the BCA; or

(b) where there is no specific requirement, comply with the relevant part of AS 2118, FPAA101D or FPAA101H.

4. Protection of openings

Any openings, including those for service penetrations, in construction separating sprinklered and non-sprinklered parts of a building, including the construction separating the areas nominated for omitted protection ~~(permitted exceptions)~~ in AS 2118.1, must be protected in accordance with the *Deemed-to-Satisfy Provisions* of Part C3.

7. Water supply

(a) A *required* sprinkler system must be provided with at least one water supply ~~(Grade 3 water supply)~~.

(b) A *required* sprinkler system in a building greater than 25 m in *effective height*~~,~~ must be provided with dual water supply ~~(Grade 1 water supply)~~ except that a secondary water supply storage capacity of 25,000 litres may be used if—

   (i) the storage tank is located at the topmost *storey* of the building; and

   (ii) the building occupancy is classified as no more hazardous than Ordinary Hazard 2 (OH2) under AS 2118.1; and

   (iii) an operational *fire brigade* service is available to attend a building fire; and

8. Building occupant warning system

A *required* sprinkler system, except for an FPAA101D or FPAA101H sprinkler system, must be connected to and activate a building occupant warning system complying with ~~Clause 6 of Specification E2.2a~~Clause 7 of Specification E2.2a.

10. Anti-tamper devices

Where a sprinkler system is installed, ~~in a theatre, public hall or the like,~~ any valves provided to control sprinklers— ~~over any stage area must be fitted with anti-tamper devices connected to a monitoring panel at the location normally used by the *stage* manager.~~

(a) in a theatre, public hall or the like over any *stage* area must be located in an area normally used by the *stage* manager; and

(b) in a lift room, secondary floor, sheave room or machine room, must be located adjacent to the space; and

(c) must be fitted with anti-tamper devices connected to a monitoring panel.

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12. ~~Aged~~ Residential care buildings

In addition to the provisions of AS 2118.4, a sprinkler system in—

(a) a Class 3 building used as a *residential care building*~~*residential aged care building*~~; or

(b) a Class 9a *health-care building* used as a *residential care building*~~*residential aged care building*~~; or

(c) a Class 9c building,

must—

(d) be provided with a monitored main stop valve in accordance with AS 2118.1; and

(e) be permanently connected with a direct data link or other approved monitoring system to a fire station or fire station dispatch centre.

13. Sprinkler systems in lift installations

Where sprinklers are installed in a space housing lift electrical and control equipment, including machine rooms, secondary floors and sheave rooms, sprinklers in these spaces~~they~~ must— ~~be of the dry system type in accordance with AS 2118.1.~~

(a) have heads protected from accidental damage by way of a guard that will not impair the performance of the head; and

(b) be capable of being isolated and drained, either separately or collectively, without isolating any other sprinklers within the building; and

(c) be monitored and secured in accordance with Clause 10(c).

14. Class 2 and 3 Buildings not more than 25 m in effective height

(a) An *automatic* fire sprinkler system required in a Class 2 or 3 building with an effective height of not more than 25 m and a *rise in storeys* greater than 3 must comply with either—

(i) AS 2118.1; or

(ii) AS 2118.4, as applicable; or

(iii) FPAA101D, except for *residential care buildings; or*

(iv) FPAA101H; except for *residential care buildings*.

(b) A Class 2 or 3 building not more than 25 m in effective height with a *rise in storeys* greater than 3 that has an *automatic* fire sprinkler system complying with (a) may be constructed in accordance with (c), (d) or (e) as applicable, provided—

(i) the *automatic* fire sprinkler system is permanently connected with a direct data link or other approved monitoring system to a fire station or fire station dispatch centre in accordance with Specification E2.2d if—

(A) it has more than 100 sprinkler heads; or

(B) in the case of a *residential care building*, the building will accommodate more than 32 residents; and

(ii) the *automatic* fire sprinkler system is fitted with sprinklers complying with Clause 2.6 of AS 2118.4 in bedrooms; and

(iii) an *automatic* smoke detection and alarm system is installed in accordance with Specification E2.2a, except that it need not be connected to a fire station and in the case of a *residential care building* must be installed in accordance with—

(A) Specification E2.2a Clause 4; or

(B)

(aa) Specification E2.2a Clause 3 provided Clause 3(b)(ii) is applied as if the building was not protected with a sprinkler system; and

(bb) Specification E2.2d; and

(iv) in a *residential care building*, the *automatic* smoke detection and alarm system and the *automatic* fire sprinkler system are connected to an alarm panel constructed in accordance with Specification E2.2d; and

(v) fire orders are provided in a Class 3 building in accordance with G4.9 as for a building in an *alpine area*.

(c) Subject to compliance with (a)(i) and (a)(ii) the following concessions are permitted:

(i) C3.11 — the FRL of *self-closing* fire doors must be at least -/30/30.

(ii) Specification C1.1 — the FRL for internal non-*loadbearing* walls must be at least -/45/45 and the FRL for service

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penetrations through internal non-*loadbearing* walls and *shafts* must be at least -/45/15, except that non-*loadbearing* walls constructed of *fire-protected timber* must have an FRL of at least -/60/60 and the FRL for service penetrations through internal non-*loadbearing walls* and *shafts* must be at least -/60/15.

(iii) D1.3 — *fire-isolated stairways* enclosed with non-*loadbearing* construction must have an FRL of at least -/45/45 and *self-closing* fire doors must have an FRL of at least -/30/30.

(iv) D1.4(a)(i)(A)— except in a *residential care building*, the maximum distance of travel may be increased from 6 m to 12 m.

(v) D1.5(c)(i) — except in a *residential care building*, the maximum distance between alternative *exits* may be increased from 45 m to 60 m.

(vi) E1.3 — internal fire hydrants need not be provided in buildings that have a *rise in storeys* of not more than 5 if—

(A) an external fire hydrant is installed in accordance with E1.3 except that in a *residential care building*, the nozzle at the end of the length of hose need only reach the entry door of any *sole-occupancy unit* to be considered as covering the floor area within the *sole-occupancy unit*; or

(B) a dry fire main fitted with standard fire hydrant heads is installed in the building and—

(aa) each fire hydrant head is located in accordance with E1.3 and fitted with a blank end cap or plug; and

(bb) the pipework is installed in accordance with E1.3 (as if it were a fire main suitable for that building) except that it does not need to be connected to a water supply; and

(cc) a booster inlet connection is provided in accordance with E1.3; and

(dd) an external fire hydrant is located within 60 m of the booster connection.

(vii) E4.9 — a sound system and intercom system for emergency purposes need not be provided in a *residential care building* if an intercom system with an override public address facility is installed in accordance with Specification E2.2d.

(d) Subject to compliance with (a)(iii) the following concessions are permitted:

(i) C2.14 — the length of a public corridor may be increased from 40 m to 60 m and may be divided at intervals of not more than 60 m in lieu of 40 m with smoke proof walls complying with Clause 2 of Specification C2.5.

(ii) C3.2 — openings in an *external wall* that is required to have an FRL need not be protected.

(iii) C3.8(b), C3.11(g), D1.8(c)(i) — openings need not be protected except that any doorway that must be passed when seeking egress must be provided with a -/30/30 self-closing fire door.

(iv) Specification C1.1 — the FRL for internal non-*loadbearing* walls must be at least 60/60/60 and the FRL for service penetrations through internal non-*loadbearing* walls and *shafts* must be at least -/60/15, except that non-*loadbearing* walls constructed of *fire-protected timber* must have an FRL of at least -/60/60 and the FRL for service penetrations through internal non-*loadbearing* walls and *shafts* must be at least -/60/15.

(v) D1.4(a)(i)(A) — the maximum distance of travel may be increased from 6 m to 12 m.

(vi) D1.4(a)(i)(B) — the maximum distance of travel from a single *exit* serving the *storey* at the level of egress to a road or *open space* may be increased from 20 m to 30 m.

(vii) D1.5(c)(i) — except in a *residential care building*, the maximum distance between alternative *exits* may be increased from 45 m to 60 m.

(viii) E1.3 — internal fire hydrants need not be provided if—

(A) an external fire hydrant is installed in accordance with E1.3 and provides compliant coverage; or

(B) a dry fire main fitted with standard fire hydrant heads is installed in the building, provided that —

(aa) each fire hydrant head is located in accordance with E1.3 and fitted with a blank end cap or plug; and

(bb) the pipework is installed in accordance with E1.3 (as if it were a fire main suitable for that building) except that it does not need to be connected to a water supply and need only be 50 mm in diameter; and

(cc) a 38 mm booster inlet connection is provided in accordance with E1.3; and

(dd) a street fire hydrant is located within 60 m of the booster inlet connection.

(e) Subject to compliance with (a)(iv) the following concessions are permitted:

(i) C2.14 — the length of a public corridor may be increased from 40 m to 60 m and may be divided at intervals of not more than 60 m in lieu of 40 m with smoke proof walls complying with Clause 2 of Specification C2.5.

(ii) C3.2 — openings in an *external wall* that is required to have an FRL need not be protected.

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(iii) C3.8(b), C3.11(g), D1.8(c)(i) — openings need not be protected except that any doorway that must be passed when seeking egress must be provided with a -/30/30 self-closing fire door.

(iv) Specification C1.1 — the FRL for internal non-*loadbearing* walls must be at least 60/60/60 and the FRL for service penetrations through internal non-*loadbearing* walls and *shafts* must be at least -/60/15, except that non-*loadbearing* walls constructed of *fire-protected timber* must have an FRL of at least -/60/60 and the FRL for service penetrations through internal non-*loadbearing* walls and *shafts* must be at least -/60/15.

(v) D1.4(a)(i)(A) — the maximum distance of travel may be increased from 6 m to 20 m.

(vi) D1.4(a)(i)(B) — the maximum distance of travel from a single *exit* serving the *storey* at the level of egress to a road or *open space* may be increased from 20 m to 30 m.

(vii) D1.4(a)(ii) — the maximum distance from a point on the floor of a room which is not in a *sole-occupancy unit* may be increased from 20 m to 30 m from an *exit* or from a point at which travel in different direction to two *exits* is available.

(viii) D1.5(c)(i) — except in a *residential care building*, the maximum distance between alternative *exits* may be increased from 45 m to 60 m.

PART E2 SMOKE HAZARD MANAGEMENT

PERFORMANCE REQUIREMENTS

EP2.1 Automatic warning for sleeping occupants

In a building providing sleeping accommodation, occupants must be provided with *automatic* warning on the detection of smoke so they may evacuate in the event of a fire to a *safe place*.

Application:

EP2.1 only applies to a Class 2, 3, 9a or 9c building or Class 4 part of a building.

EP2.2 Safe evacuation routes

(a) In the event of a fire in a building the conditions in any *evacuation route* must be maintained for the period of time occupants take to evacuate the part of the building so that—
  - (i) the temperature will not endanger human life; and
  - (ii) the level of visibility will enable the *evacuation route* to be determined; and
  - (iii) the level of toxicity will not endanger human life.

(b) The period of time occupants take to evacuate referred to in **(a)** must be appropriate to—
  - (i) the number, mobility and other characteristics of the occupants; and
  - (ii) the function or use of the building; and
  - (iii) the travel distance and other characteristics of the building; and
  - (iv) the *fire load*; and
  - (v) the potential *fire intensity*; and
  - (vi) the *fire hazard*; and
  - (vii) any active *fire safety systems* installed in the building; and
  - (viii) *fire brigade* intervention.

Limitation:

EP2.2 does not apply to an *open-deck carpark* or *open spectator stand*.

VERIFICATION METHODS

EV2.1

Compliance with EP2.1 and EP2.2 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:

The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART E2 SMOKE HAZARD MANAGEMENT

Deemed-to-Satisfy Provisions

E2.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* EP2.1 to EP2.2 are satisfied by complying with—

(i) E2.1 to E2.3; and

(ii) in a building containing an *atrium*, Part G3; and

(iii) in a building in an *alpine area*, Part G4; and

(iv) for additional requirements for Class 9b buildings, Part H1.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

E2.2 General requirements

(a) A building must comply with (b), (c), (d) and—

(i) Table E2.2a as applicable to Class 2 to 9 buildings such that each separate part complies with the relevant provisions for the classification; and

(ii) Table E2.2b as applicable to Class 6 and 9b buildings such that each separate part complies with the relevant provisions for the classification.

(b) An air-handling system which does not form part of a smoke hazard management system in accordance with Table E2.2a or Table E2.2b and which recycles air from one *fire compartment* to another *fire compartment* or operates in a manner that may unduly contribute to the spread of smoke from one *fire compartment* to another *fire compartment* must—

(i) be designed and installed to operate as a smoke control system in accordance with AS/NZS 1668.1; or

(ii)

(A) incorporate smoke dampers where the air-handling ducts penetrate any elements separating the *fire compartments* served; and

(B) be arranged such that the air-handling system is shut down and the smoke dampers are activated to close *automatically* by smoke detectors complying with clause 7.5 of AS 1670.1; and

for the purposes of this provision, each *sole-occupancy unit* in a Class 2 or 3 building is treated as a separate *fire compartment*.

(c) Miscellaneous air-handling systems covered by Sections 5 and 6 of AS/NZS 1668.1 serving more than one *fire compartment* (other than a *carpark* ventilation system) and not forming part of a smoke hazard management system must comply with that Section of the Standard.

(d) A smoke detection system must be installed in accordance with **Clause 6 of Specification E2.2a** ~~**Clause 5 of Specification E2.2a.**~~ to operate AS/NZS 1668.1 systems that are provided for zone ~~smoke control~~pressurisation and *automatic* air pressurisation for fire-isolated *exits*.

E2.3 Provision for special hazards

Additional smoke hazard management measures may be necessary due to the—

(a) special characteristics of the building; or

(b) special function or use of the building; or

(c) special type or quantity of materials stored, displayed or used in a building; or

(d) special mix of classifications within a building or *fire compartment*,

which are not addressed in Tables E2.2a and E2.2b.

NSW Table E2.2a

Table E2.2a GENERAL PROVISIONS

FIRE-ISOLATED EXITS

Deemed-to-Satisfy Provisions

A *required*—

(a) *fire-isolated stairway*, including any associated *fire-isolated passageway* or *fire-isolated ramp* serving—
   (i) any *storey* above an *effective height* of 25 m; or
   (ii) more than 2 below ground *storeys*, not counted in the *rise in storeys* in accordance with C1.2; or
   (iii) an *atrium* to which Part G3 applies; or
   (iv) a Class 9a building with a *rise in storeys* of more than 2; or
   (v) a Class 9c building with a *rise in storeys* of more than 2; ~~and~~or
   (vi) a Class 3 building used as a *residential care building* with a *rise in storeys* of more than 2; and

(b) *fire-isolated passageway* or *fire-isolated ramp* with a length of travel more than 60 m to a road or *open space*,

must be provided with—

(c) an *automatic* air pressurisation system for fire-isolated *exits* in accordance with AS/NZS 1668.1; or

(d) open access ramps or balconies in accordance with D2.5.

Notes:

1. An *automatic* air pressurisation system for fire-isolated *exits* applies to the entire *exit*.
2. Refer D1.7(d) for pressurisation of a fire-isolated *exit* having more than 2 access doorways from within the same *storey*.

BUILDINGS MORE THAN 25 M IN EFFECTIVE HEIGHT

CLASS 2 AND 3 BUILDINGS AND CLASS 4 PART OF A BUILDING

A Class 2 and 3 building or part of a building and Class 4 part of a building must be provided with an *automatic* smoke detection and alarm system complying with Specification E2.2a.

Note: Refer C2.14 for division of *public corridors* greater than 40 m in length.

CLASS 5, 6, 7b, 8 or 9b BUILDINGS

A Class 5, 6, 7b, 8 or 9b building or part of a building must be provided with a zone ~~smoke control~~ pressurisation system between vertically separated *fire compartments* in accordance with AS/NZS 1668.1.

Notes:

1. Refer Table E2.2b for Specific Provisions applicable to a Class 6 (in a *fire compartment* having a *floor area* of more than 2000 m^2) and 9b building or part of a building.
2. This requirement does not apply to a building that has a *fire compartment* containing a Class 5, 6, 7b, 8 or 9b part (or a combination of these classes in the same *fire compartment*) where there is only one *fire compartment* containing these classifications in an otherwise Class 2, 3, 9a or 9c building.

CLASS 9a BUILDINGS

A Class 9a building must be provided with—

(a) an *automatic* smoke detection and alarm system complying with Specification E2.2a; and

(b) a zone ~~smoke control~~pressurisation system between vertically separated *fire compartments* in accordance with AS/NZS 1668.1.

Note: A building more than 25 m in *effective height* requires a sprinkler system under E1.5.

BUILDINGS NOT MORE THAN 25 M IN EFFECTIVE HEIGHT

CLASS 2 AND 3 BUILDINGS AND CLASS 4 PART OF A BUILDING

A Class 2 and 3 building or part of a building and Class 4 part of a building—

(a) must be provided with an *automatic* smoke detection and alarm system complying with Specification E2.2a; and

(b) where a *required fire-isolated stairway* serving the Class 2 or 3 parts also serves one or more *storeys* of Class 5, 6, 7 (other than an *open deck carpark*), 8 or 9b parts—
   (i) the *fire-isolated stairway*, including any associated *fire-isolated passageway* or *fire-isolated ramp*, must be provided with an *automatic* air pressurisation system for fire-isolated *exits* in accordance with AS/NZS 1668.1; or
   (ii) the Class 5, 6, 7 (other than an *open deck carpark*), 8 and 9b parts must be provided with—
      (A) an *automatic* smoke detection and alarm system complying with Specification E2.2a; or
      (B) a sprinkler system complying with Specification E1.5; and

(c) where a *required fire-isolated stairway* serving the Class 4 part also serves one or more *storeys* of Class 5, 6, 7

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(other than an *open deck carpark*), 8 or 9b parts—

(i) a system complying with (b)(i) or (b)(ii) must be installed; or

(ii) a smoke alarm or detector system complying with Specification E2.2a must be provided except that alarms or detectors need only be installed adjacent to each doorway into each *fire-isolated stairway* (set back horizontally from the doorway by a distance of not more than 1.5 m) to initiate a building occupant warning system for the Class 4 part.

Notes:

1. Refer C2.14 for division of *public corridors* greater than 40 m in length.
2. Refer Table E2.2b for Specific Provisions applicable to a Class 6 (in a *fire compartment* having a *floor area* of more than 2000 m^2) and 9b building or part of a building.

CLASS 5, 6, 7b, 8 and 9b BUILDINGS

In a—

(a) Class 5 or 9b *school* building or part of a building having a *rise in storeys* of more than 3; or

(b) Class 6, 7b, 8 or 9b building (other than a *school*) or part of a building having a *rise in storeys* of more than 2; or

(c) building having a *rise in storeys* of more than 2 and containing—

(i) a Class 5 or 9b *school* part; and

(ii) a Class 6, 7b, 8 or 9b (other than a *school*) part,

the building must be provided with—

(d) in each *required fire-isolated stairway*, including any associated *fire-isolated passageway* or *fire-isolated ramp,* an *automatic* air pressurisation system for fire-isolated *exits* in accordance with AS/NZS 1668.1; or

(e) a zone ~~smoke control~~ pressurisation system between vertically separated *fire compartments* in accordance with AS/NZS 1668.1, if the building has more than one *fire compartment*; or

(f) an *automatic* smoke detection and alarm system complying with Specification E2.2a; or

(g) a sprinkler system complying with Specification E1.5.

LARGE ISOLATED BUILDINGS SUBJECT TO C2.3

(a) In a Class 7 or 8 building, which does not exceed 18 000 m^2 in *floor area* nor exceed 108 000 m^3 in volume, the building must be provided with—

(i) a sprinkler system complying with Specification E1.5, and provided with perimeter vehicular access complying with C2.4(b); or

(ii) an *automatic* fire detection and alarm system complying with AS 1670.1 and monitored in accordance with **Clause 8 of Specification E2.2a**~~**Clause 7 of Specification E2.2a**~~; or

(iii) an *automatic* smoke exhaust system in accordance with Specification E2.2b; or

(iv) *automatic smoke-and-heat vents* in accordance with Specification E2.2c; or

(v) natural smoke venting, with ventilation openings distributed as evenly as practicable and comprising permanent openings at roof level with a free area not less than 1.5% of *floor area* and low level openings which may be permanent or readily openable with a free area not less than 1.5% of *floor area*.

(b) In a Class 5, 6, 7, 8 or 9 building, which exceeds 18 000 m^2 in *floor area* or 108 000 m^3 in volume, the building must be provided with—

(i) if the ceiling height of the *fire compartment* is not more than 12 m—

(A) an *automatic* smoke exhaust system in accordance with Specification E2.2b; or

(B) *automatic smoke-and-heat vents* in accordance with Specification E2.2c; or

(ii) if the ceiling height of the *fire compartment* is more than 12 m, an *automatic* smoke exhaust system in accordance with Specification E2.2b.

Notes:

1. Refer Table E2.2b for Specific Provisions applicable to a Class 6 (in a *fire compartment* having a *floor area* of more than 2000 m^2) and 9b building or part of a building.
2. Refer provisions under Class 2 and 3 buildings and Class 4 part of a building in this Table where a Class 5, 6, 7b, 8 and 9b building contains a Class 2, 3 or 4 part.
3. Reference to "the building" being provided with specified measures, means to the nominated classes within the building. For parts of the building of other classes, see other parts of this Table.

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CLASS 9a and 9c BUILDINGS

A Class 9a *health-care building* or a Class 9c building, or a building containing a part thereof, must be provided throughout with—

(a) an *automatic* smoke detection and alarm system complying with Specification E2.2a; and

(b) *automatic* shutdown of any air-handling system which does not form part of a zone ~~smoke control~~ pressurisation system (other than individual room units with a capacity not more than 1000 L/s, systems serving critical treatment areas and miscellaneous exhaust air systems installed in accordance with Sections 5 and 6 of AS/NZS 1668.1) on the activation of—

(i) smoke detectors installed in accordance with (a); and

(ii) any other installed fire detection and alarm system including a sprinkler system complying with Specification E1.5; and

(c) in a building having a *rise in storeys* of more than 2 and not more than 25 m *effective height* (not being a Class 9c building)—

(i) a zone ~~smoke control~~pressurisation system between vertically separated *fire compartments* in accordance with AS/NZS 1668.1; or

(ii) a sprinkler system complying with Specification E1.5 throughout with residential sprinkler heads in *patient care areas*.

Note: Refer to **Clause 2 of Specification C2.5** for the provisions for smoke dampers.

CLASS 7a BUILDINGS

A Class 7a building, including a basement, provided with a mechanical ventilation system in accordance with AS 1668.2 must comply with clause 5.5 of AS/NZS 1668.1 except that—

(a) fans with metal blades suitable for operation at normal temperature may be used; and

(b) the electrical power and control cabling need not be fire rated.

BASEMENTS (other than Class 7a buildings)

A basement, not counted in the *rise in storeys* in accordance with C1.2, must—

(a) comply with measures in accordance with this Table applicable to the building generally; and

(b) where the basement has a total *floor area* of more than 2000 m^2, be provided with—

(i) if not more than 2 below ground *storeys*—

(A) a zone ~~smoke control~~pressurisation system between vertically separated *fire compartments* in accordance with AS/NZS 1668.1, if the basement has more than one *fire compartment*; or

(B) an *automatic* smoke detection and alarm system complying with Specification E2.2a; or

(C) a sprinkler system complying with Specification E1.5; or

(c) if more than 2 below ground *storeys*, a sprinkler system complying with Specification E1.5.

Notes:

(a) Refer Table E2.2b for Specific Provisions applicable to a Class 6 (in a *fire compartment* having a *floor area* of more than 2000 m^2) and 9b building or part of a building.

(b) Basements with more than 3 below ground *storeys* or containing Class 6 or 9b occupancies with a large number of occupants may require special consideration in accordance with E2.3.

ATRIUMS

Refer Part G3.

NSW Table E2.2b

Table E2.2b SPECIFIC PROVISIONS

CLASS 6 BUILDINGS — IN FIRE COMPARTMENTS MORE THAN 2000 m^2

CLASS 6 BUILDINGS (not containing an enclosed common walkway or mall serving more than one Class 6 *sole-occupancy unit*)

(a) Where the *floor area* of a Class 6 part of a *fire compartment* is more than 2000 m^2, the *fire compartment*, must be provided with—

(i) an *automatic* smoke exhaust system complying with Specification E2.2b; or

(ii) *automatic smoke-and-heat vents* complying with Specification E2.2c, if the building is single *storey*; or

(iii) if the *floor area* of the *fire compartment* is not more than 3500 m² and the building—

(A) is single *storey*, an *automatic* smoke detection and alarm system complying with Specification E2.2a; or

(B) has a *rise in storeys* of not more than 2, a sprinkler system complying with Specification E1.5.

(b) The provisions of (a) do not apply to—

(i) a Class 6 *sole-occupancy unit* that—

(A) has a *floor area* of not more than 2000 m²; and

(B) is single *storey* with a main public entrance opening to a road or *open space*; and

(C) is separated from other parts of the *fire compartment* by construction, including openings, penetrations and junctions with other building elements, that prevents the free passage of smoke; and

(ii) parts of any other classification that are smoke separated from a Class 6 part by construction complying with (i)(C).

CLASS 6 BUILDINGS (containing an enclosed common walkway or mall serving more than one Class 6 *sole-occupancy unit*)

(a) Where the *floor area* of a Class 6 part of a *fire compartment* is more than 2000 m², the *fire compartment*, including the enclosed common walkway or mall, must be provided with—

(i) an *automatic* smoke exhaust system complying with Specification E2.2b; or

(ii) *auutomatic smoke-and-heat vents* complying with Specification E2.2c, if the building is single *storey*; or

(iii) if the *floor area* of the *fire compartment* is not more than 3500 m² and the building has a *rise in storeys* of not more than 2, a sprinkler system complying with Specification E1.5.

(b) The provisions of (a) do not apply to—

(i) a Class 6 *sole-occupancy unit* that—

(A) opens onto the enclosed common walkway or mall if the Class 6 *sole-occupancy unit* has a *floor area* of not more than 1000 m²; or

(B) does not open onto the enclosed common walkway or mall if the Class 6 *sole-occupancy unit*—

(aa) has a *floor area* of not more than 2000 m²; and

(ab) is single *storey* with a main entrance opening to a road or *open space*; and

(ac) is separated from other parts of the *fire compartment* by construction, including openings, penetrations and junctions with other building elements, that prevents the free passage of smoke; and

(ii) parts of any other classification that are smoke separated from a Class 6 part by construction complying with (i)(B)(cc).

Note: A *fire compartment* having a *floor area* of more than 3500 m² in a Class 6 building requires a sprinkler system under E1.5.

CLASS 9b — ASSEMBLY BUILDINGS

NIGHTCLUBS and DISCOTHEQUES AND THE LIKE

A building or part of a building used as a nightclub, discotheque or the like must be provided with—

(a) *automatic* shutdown of any air-handling system (other than miscellaneous exhaust air systems installed in accordance with Sections 5 and 6 of AS/NZS 1668.1) which does not form part of the smoke hazard management system, on the activation of—

(i) smoke detectors installed complying with **Clause 6 of Specification E2.2a**~~Clause 5 of Specification E2.2a~~; and

(ii) any other installed fire detection and alarm system, including a sprinkler system complying with Specification E1.5; and

(b)

(i) an *automatic* smoke exhaust system complying with Specification E2.2b; or

(ii) *automatic smoke-and-heat vents* complying with Specification E2.2c, if the building is single *storey*; or

(iii) a sprinkler system complying with Specification E1.5 with fast response sprinkler heads.

EXHIBITION HALLS

A building or part of a building used as an exhibition hall must be provided with—

(a) *automatic* shutdown of any air-handling system (other than miscellaneous exhaust air systems installed in

SPECIFICATION E2.2A SMOKE DETECTION AND ALARM SYSTEMS

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2. Type of system

A *required automatic* smoke detection and alarm system must ~~comply~~ be provided in accordance with the following:

(a) **Class 2 ~~and 3~~ buildings and Class 4 parts of a building—**

(i) a smoke alarm system complying with Clause 3; or

(ii) a smoke detection system complying with Clause 4; or

(iii) a combination of a smoke alarm system and a smoke detection system complying with Clause 5.

~~(i) Subject to **(ii)**, a Class 2 and 3 building and Class 4 part of a building must be provided with—~~

~~(A) a smoke alarm system complying with **Clause 3**; or~~

~~(B) a smoke detection system complying with **Clause 4**; or~~

~~(C) a combination of a smoke alarm system complying with **Clause 3** within *sole-occupancy units* and a smoke detection system complying with **Clause 4** in areas not within the *sole-occupancy units*.~~

~~(ii) A Class 3 building must be provided with a smoke detection system complying with **Clause 4** if it—~~

~~(A) has a Class 3 part located more than 2 *storeys* above ground level; or~~

~~(B) accommodates more than 20 residents and is used as a residential part of a *school* or accommodation for the aged, children or people with a disability.~~

(b) **Class 3 buildings—**

(i) **with a Class 3 part located more than 2 *storeys* above ground level — a** smoke detection system complying with Clause 4; or

(ii) **which accommodate more than 20 residents and are the residential part of a *school*, accommodation for the aged, children or people with a disability —** a smoke detection system complying with Clause 4; or

(iii) **all other Class 3 buildings—**

(A) a smoke alarm system complying with Clause 3; or

(B) a smoke detection system complying with Clause 4; or

(C) a combination of a smoke alarm system and a smoke detection system complying with Clause 5.

(c~~b~~) **Class 5, 6, 7, 8, 9b and ~~9b~~9c buildings** a smoke detection system complying with Clause 4.

(d~~c~~) **Class 9a health-care building—**

(i) **where more than 6 bed patients are accommodated —** a smoke detection system complying with Clause 4; or

(ii) **where 6 or less bed patients are accommodated—**

(A) a smoke alarm system complying with Clause 3; or

(B) a smoke detection system complying with Clause 4.

~~(i) **Where 6 or less bed patients are accommodated—**~~

~~(A) a smoke alarm system complying with **Clause 3**; or~~

~~(B) a smoke detection system complying with **Clause 4**.~~

~~(ii) **Where more than 6 bed patients are accommodated**, a smoke detection system complying with **Clause 4**.~~

~~(d) **Class 9c building:** A smoke detection system complying with **Clause 4**.~~

3. Smoke alarm system

(a) **All buildings—**

(i) A smoke alarm system must—

(A) consist of smoke alarms complying with AS 3786; and

(B) be powered from the consumer mains source.

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(ii) In kitchens and other areas where the use of the area is likely to result in smoke alarms causing spurious signals—

(A) any other alarm deemed suitable in accordance with AS 1670.1 may be installed provided that smoke alarms are installed elsewhere in the *sole-occupancy unit* in accordance with Clause 3(b)(i) and Clause 3(b)(ii); or

(B) an alarm acknowledgement facility may be installed,

except where the kitchen or other area is in a building protected with a sprinkler system complying with Specification E1.5, the alarms need not be installed in the kitchen or other areas likely to result in spurious signals.

~~(a) A smoke alarm system must—~~

~~(i) consist of smoke alarms complying with AS 3786; and~~

~~(ii) be powered from the consumers mains source.~~

~~(b) In kitchens and other areas where the use of the area is likely to result in smoke alarms causing spurious signals—~~

~~(i) any other alarm deemed suitable in accordance with AS 1670.1 may be installed provided that smoke alarms are installed elsewhere in the *sole-occupancy unit* in accordance with **Clause 3(c)(i)** and **3(c)(ii)** or~~

~~(ii) an alarm acknowledgement facility may be installed,~~

~~except where the kitchen or other area is sprinklered, the alarms need not be installed in the kitchen or other areas likely to result in spurious signals.~~

(b~~c~~) **Class 2 or 3 buildings or Class 4 parts of a building —** In a Class 2 or 3 building or Class 4 part of a building provided with a smoke alarm system, the following applies:~~ alarms must—~~

(i) Alarms must be installed within each *sole-occupancy unit*, and located on or near the ceiling in any *storey*—

(A) containing bedrooms—

(aa) between each part of the *sole-occupancy unit* containing bedrooms and the remainder of the *sole-occupancy unit*; and

(bb) where bedrooms are served by a hallway, in that hallway; and

(B) not containing any bedrooms, in egress paths.~~; and~~

(ii) W~~w~~here there is more than one alarm installed within a *sole-occupancy unit*, alarms must be interconnected within that *sole-occupancy unit*~~; and~~.

(iii) Subject to (iv), alarms must be—

(A) installed in *public corridors* and other internal public spaces, located in accordance with the requirements for smoke detectors in AS 1670.1; and

(B) connected to activate a building occupant warning system in accordance with Clause 7.

(iv) In a Class 2 or 3 building of Class 4 part of a building protected with a sprinkler system complying with Specification E1.5, alarms are not *required* in *public corridors* and other internal public spaces.

~~(iii) be installed in a building not protected with a sprinkler system, in *public corridors* and other internal public spaces, located in accordance with the requirements for smoke detectors in AS 1670.1 and connected to activate a building occupant warning system in accordance with **Clause 6**.~~

(c~~d~~) ~~In a~~ **Class 9a buildings —**~~,~~ ~~s~~Smoke alarms must be ~~installed in every room, *public corridor* and other internal public spaces and~~—

(i) installed in every room, *public corridor* and other internal public space; and

(ii) be located in accordance with the requirements for smoke detectors in AS 1670.1; and ~~interconnected to provide a common alarm; and~~

(iii) interconnected to provide a common alarm; and

(~~i~~iv) have manual call points installed in *evacuation routes* so that no point on a floor is more than 30 m from a manual call point.

4. Smoke detection system

(a) **All classifications—**

(i) A smoke detection system must—

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(A) subject to (b) and (c), comply with AS 1670.1; and

(B) activate a building occupant warning system in accordance with Clause 7.

(ii) In kitchens and other areas where the use of the area is likely to result in smoke detectors causing spurious signals—

(A) any other detector deemed suitable in accordance with AS 1670.1 may be installed provided that smoke detectors are installed elsewhere in the *sole-occupancy unit* in accordance with Clause 3(b)(i) and Clause 3(b)(ii); or

(B) an alarm acknowledgement facility may be installed,

except where the kitchen or other area is in a building protected with a sprinkler system complying with Specification E1.5, the detectors need not be installed in the kitchen or other areas likely to result in spurious signals.

~~(a) A smoke detection system must—~~

~~(i) subject to **(c)** and **(d)**, comply with AS 1670.1 except for the provisions of—~~

~~(A) Clause 3.28(f); and~~

~~(B) * * * * *~~

~~(ii) activate a building occupant warning system in accordance with **Clause 6**.~~

~~(b) In kitchens and other areas where the use of the area is likely to result in smoke detectors causing spurious signals—~~

~~(i) any other detector deemed suitable in accordance with AS 1670.1 may be installed provided that smoke detectors are installed elsewhere in the *sole-occupancy unit* in accordance with **Clause 3(c)(i)** and **3(c)(ii)**; or~~

~~(ii) an alarm acknowledgement facility may be installed,~~

~~except where the kitchen or other area is sprinklered, the detectors need not be installed in the kitchen or other areas likely to result in spurious signals.~~

(b~~c~~) ~~In a~~ **Class 2 or 3 buildings or Class 4 parts of a building —** In a Class 2 or 3 building or Class 4 part of a building provided with a smoke detection system, the following applies:~~smoke detectors must be installed—~~

(i) Smoke detectors must be installed—

(A) within each *sole-occupancy unit*, in accordance with the requirements for alarms in Clause 3(b)(i) and Clause 3(b)(ii); and

(B) subject to (ii), in *public corridors* and other internal public spaces.

(ii) In a Class 2 or 3 building or Class 4 part of a building protected with a sprinkler system complying with Specification E1.5, smoke detectors are not *required* in *public corridors* and other internal public spaces.

~~(i) within each *sole-occupancy unit*, in accordance with the requirements for alarms in **Clause 3(c)(i)** and **3(c)(ii)**; and~~

~~(ii) in a building not protected with a sprinkler system, in *public corridors* and other internal public spaces.~~

(c~~d~~) **Class 9a *health-care buildings* —** The following applies ~~I~~in a Class 9a *health-care building*:~~—~~

(i)

(A) ~~p~~Photoelectric type smoke detectors must be installed in *patient care areas* and in paths of travel to *exits* from *patient care areas*; and

(B) in areas other than *patient care areas* and paths of travel to *exits* from *patient care areas*, where the use of the area is likely to result in smoke detectors causing spurious signals, any other detector deemed suitable in accordance with AS 1670.1 may be installed in lieu of smoke detectors,

except where an area is ~~sprinklered~~protected with a sprinkler system complying with Specification E1.5, smoke detectors need not be installed where the use of the area is likely to result in spurious signals; and

(ii) ~~m~~Manual call points must be installed in *evacuation routes* so that no point on a floor is more than 30 m from a manual call point.

Vic Spec E2.2a 4(d~~e~~)

(d~~e~~) **Class 9c buildings —** In a Class 9c building—

(i) remote automatic indication of each zone must be given in each smoke compartment by means of—

(A) mimic panels with an illuminated display; or

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(B) annunciator panels with alpha numeric display; and

(ii) if the building accommodates more than 20 residents, manual call points must be installed in paths of travel so that no point on a floor is more than 30 m from a manual call point.

5. Combined smoke alarm and smoke detection system

(a) A Class 2 or 3 building or Class 4 part of a building provided with a combination of a smoke alarm system and smoke detection system in accordance with Clause 2 must—

(i) be provided with a smoke alarm system complying with Clause 3 within *sole-occupancy units*; and

(ii) subject to (b), be provided with a smoke detection system complying with Clause 4 in areas not within *sole-occupancy units*.

(b) In a Class 2 or 3 building of Class 4 part of a building protected with a sprinkler system complying with Specification E1.5, smoke detectors are not *required* in *public corridors* and other internal public spaces.

6~~5~~. Smoke detection for smoke control systems

(a) Smoke detectors *required* to activate air pressurisation systems for fire-isolated *exits* and zone ~~smoke control~~ pressurisation systems must—

(i) be installed in accordance with AS 1670.1; and

(ii) have additional smoke detectors installed adjacent to each bank of lift landing doors set back horizontally from the door openings by a distance of not more than 3 m.

(b) Smoke detectors *required* to activate—

(i) *automatic* shutdown of air-handling systems in accordance with Table E2.2b; or

(ii) a smoke exhaust system in accordance with Specification E2.2b,

must—

(iii) be spaced—

(A) not more than 20 m apart and not more than 10 m from any wall, bulkhead or smoke curtain; and

(B) in enclosed malls and walkways in a Class 6 building not more than 15 m apart and not more than 7.5 m from any wall, bulkhead or curtain; and

(iv) have a sensitivity—

(A) in accordance with AS 1670.1 in areas other than a multi-*storey* walkway and mall in a Class 6 building; and

(B) not exceeding 0.5% smoke obscuration per metre with compensation for external airborne contamination as necessary, in a multi-*storey* walkway and mall in a Class 6 building.

(c) Smoke detectors provided to activate a smoke control system must—

(i)

(A) form part of a building fire or smoke detection system complying with AS 1670.1; or

(B) be a separate dedicated system incorporating control and indicating equipment complying with AS 1670.1; and

(ii) activate a building occupant warning system complying with ~~Clause 6~~Clause 7, except that smoke detectors provided solely to initiate *automatic* shutdown of air-handling systems in accordance with (b)(i) need not activate a building occupant warning system.

7~~6~~. Building occupant warning system

Subject to **E4.9**, a building occupant warning system provided as part of a smoke hazard management system must comply with clause 3.22 of AS 1670.1 to sound through all occupied areas except—

(a) in a Class 2 and 3 building or Class 4 part of a building provided with a smoke alarm system in accordance with Clause 3(~~c~~b)(iii)—

(i) the sound pressure level need not be measured within a *sole-occupancy unit* if a level of not less than 85 dB(A) is provided at the door providing access to the *sole-occupancy unit*; and

(ii) the inbuilt sounders of the smoke alarms may be used to wholly or partially meet the requirements; and

(b) in a Class 2 and 3 building or Class 4 part of a building provided with a smoke detection system in accordance with ~~Clause 4(b)~~ Clause 4(c), the sound pressure level from a building occupant warning system need not be

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measured within a *sole-occupancy unit* if a level of not less than 100 dB(A) is provided at the door providing access to the *sole-occupancy unit*; and

(c) in a Class 3 building used as a *residential care building*~~*residential aged care building*~~, the system—

(i) must be arranged to provide a warning for occupants; and

(ii) in areas used by residents, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of residents; and

(d) in a Class 9a *health-care building*, in a *patient care area*, the system—

(i) must be arranged to provide a warning for occupants; and

(ii) in a *ward area*, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of the patients; and

(e) in a Class 9c building, the system—

(i) must be arranged to provide a warning for occupants; and

(ii) must notify staff caring for the residents of the building; and

(iii) in areas used by residents, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of residents.

8~~7~~. System monitoring

The following installations must be connected to a fire alarm monitoring system connected to a fire station or fire station dispatch centre in accordance with AS 1670.3:

(a) A smoke detection system in a Class 3 building provided in accordance with Clause 2(b)(i) and Clause 2(a)(ii).

Vic Spec E2.2a 8~~7~~(b)

(b) A smoke detection system in a Class 9a *health-care building*, if the building accommodates more than 20 patients.

Vic Spec E2.2a ~~7~~8(c)

(c) A smoke detection system in a Class 9c building.

(d) Smoke detection in accordance with Clause 6 ~~Clause 5~~ provided to activate—

(i) a smoke exhaust system in accordance with Specification E2.2b; or

(ii) *smoke-and-heat vents* in accordance with Specification E2.2c.

NSW Spec E2.2a 8~~7~~(e)

(e) An *automatic* fire detection and alarm system *required* by Table E2.2a for large isolated buildings subject to C2.3.

SPECIFICATION E2.2B SMOKE EXHAUST SYSTEMS

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2. Smoke exhaust capacity

(a) Smoke exhaust fans must have a sufficient capacity to contain the smoke layer—

(i) within a smoke reservoir formed in accordance with Clause 4 and not less than 2 m above the highest floor level; and

(ii) above the top of any openings interconnecting different smoke reservoirs.

(b) Exhaust rates must be determined in accordance with Figure 2, with the height measurement taken from the lowest floor level to the underside of the smoke layer~~.~~ and the *fire load* determined in accordance with Table 1.

3. Smoke exhaust fans

Each smoke exhaust fan, complete with its drive, flexible connections, control gear and wiring must—

(a) be constructed and installed so that it is capable of continuous operation (exhausting the *required* volumetric flow rate at the installed system resistance) at a temperature of 200° C for a period of not less than 1 hour; and

(b) in a building not fitted with a sprinkler system, be capable of continuous operation at a temperature of 300° C for a period of not less than 30 minutes; and

(c) be rated to handle the *required* volumetric flow rate at ambient temperature to be capable of exhausting cool smoke during the early stages of a fire and to allow routine testing; and

(d) have any high temperature overload devices installed, *automatically* overridden during the smoke exhaust operation.

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~~**Figure 2**~~			
~~**SMOKE EXHAUST RATE**~~			
~~**Classification**~~		~~***Fire Load* (MW)**~~	
		~~**- Unsprinklered**~~	~~**- Sprinklered**~~
~~Class 2, 3 or 5~~		~~5~~	~~1.5~~
~~Class 6~~		~~10~~	~~5~~
~~Class 7 or 8~~		~~15~~	~~5~~
~~Class 9 —~~			
	~~Generally~~	~~5~~	~~1.5~~
	~~Class 9b buildings covered by **Part H1** (see Note), or exhibition halls.~~	~~10~~	~~5~~
~~**Note:**~~ ~~If the smoke reservoir above the *stage* is smoke separated from the audience area, the *fire load* specified applies to the *stage* area only and the *fire load* for the audience area is as per Class 9 generally.~~			

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Figure 2

SMOKE EXHAUST RATE

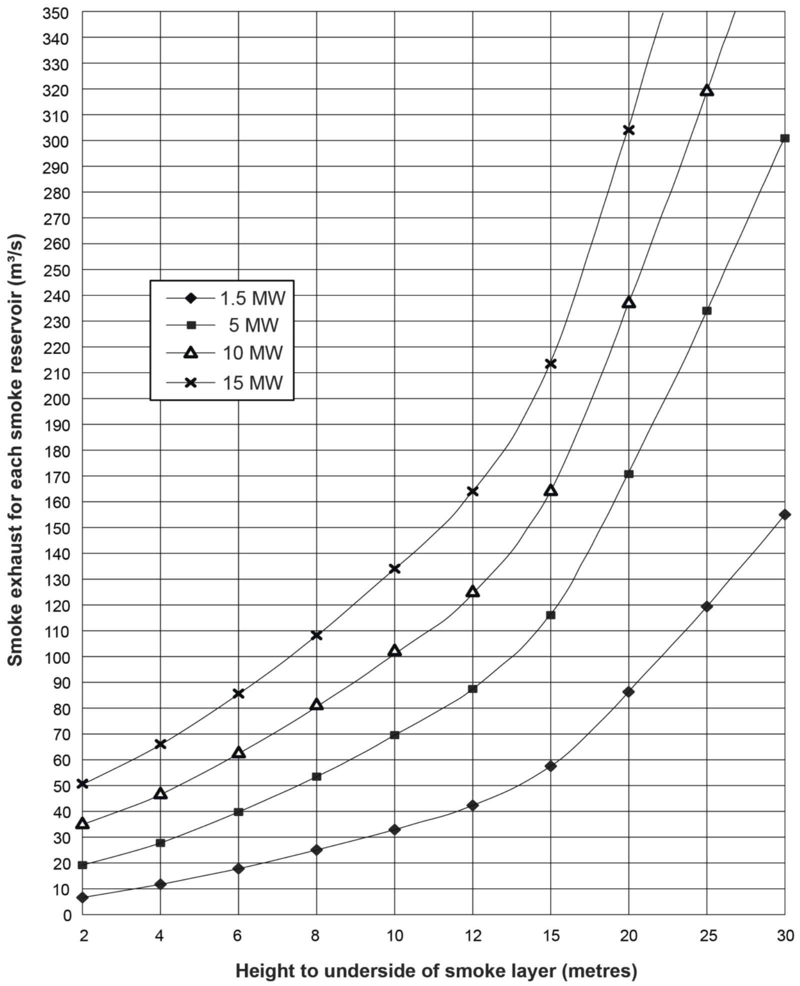

Table 1 Fire load (MW)

Classification	Fire load (MW) for unsprinklered buildings	Fire load (MW) for sprinklered buildings
Class 2, 3 or 5	5	1.5
Class 6	10	5
Class 7 or 8	15	5
Class 9 — Generally	5	1.5
Class 9b buildings covered by Part H1 (see Note), or exhibition halls.	10	5

Note: If the smoke reservoir above the *stage* is smoke separated from the audience area, the *fire load* specified applies to the *stage* area only and the *fire load* for the audience area is as per Class 9 generally.

SPECIFICATION E2.2C SMOKE-AND-HEAT VENTS

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2. Controls

Where a *smoke-and-heat vent* system is installed to comply with **Table E2.2b**, the following must apply:

(a) In addition to thermally released link operation, *smoke-and-heat vents* must also be initiated by smoke detection complying with **Clauses 6**~~**Clauses 5**~~ and **8 of Specification E2.2a**~~**7 of Specification E2.2a**~~ and arranged in zones to match the smoke reservoirs.

SPECIFICATION E2.2D RESIDENTIAL FIRE SAFETY SYSTEMS

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1. Scope

This Specification describes the requirements for residential fire safety systems referenced in Clause 14 of Specification E1.5.

Clause 3 of this Specification applies to Class 3 *residential care buildings*. It covers installation requirements for local fire indicator panels (or alarm panels) that provide information to staff when a fire alarm is activated.

Clause 4 of this Specification describes requirements for connecting residential sprinkler systems in Class 2 and 3 buildings or a *residential care building*, to a fire station or other approved monitoring service.

2. Definitions

For the purpose of this Specification the following definitions apply:

(a) **ActivFire listed** — means a product approved and listed in the ActivFire Scheme Register of Fire Protection Equipment maintained by the Commonwealth Scientific and Industrial Research Organisation, Division of Materials Science and Engineering (CSIRO-MSE).

(b) **Alarm zone** — means an area of a building protected by one or more smoke alarms connected to one alarm circuit.

(c) **Fixed wired** — means a system of electrical wiring (either a.c. or d.c.), in which cables are fixed or supported in position in accordance with the appropriate requirement of AS/NZS 3000.

(d) **Smoke alarm** — means a device containing a smoke detector and an integral alarm sounding device complying with AS 3786.

(e) **Sprinkler alarm switch** — means a device capable of sending an electrical signal to activate an alarm when a residential sprinkler head is activated (e.g. a flow switch).

(f) **Voltage** — means a difference of potential, measured in Volts (V), as follows:

- (i) **Extra-low voltage** — voltage not exceeding 50 V a.c. or 120 V ripple-free d.c.
- (ii) **Low voltage** — voltage exceeding extra-low voltage, but not exceeding 1000 V a.c. or 1500 V a.c.

3. Residential local fire alarm systems

(a) **General requirements:**

- (i) This Clause applies to Class 3 *residential care buildings*.
  - (A) The installation must consist of a system of smoke alarms powered either—
    - (aa) directly from the low voltage supply mains; or
    - (bb) from an extra-low voltage power source originating at a local fire indicator panel with a battery back-up facility.
  - (B) A smoke detector complying with AS 1603.2 may be substituted for a smoke alarm, provided an external warning device is associated with each detector.
  - (C) The sound pressure level provided by a warning device must be equivalent to that required in Clause 3.22 of AS 1670.1, except that the sound pressure level need not be measured inside a *sole-occupancy unit*, provided that a level of not less than 85 dB(A) is attained at the access door to the unit.
- (ii) The alarm system must be wired in accordance with the relevant requirements of AS/NZS 3000 for low voltage or extra-low voltage wiring.
- (iii) The system must be designed so—
  - (A) an audible alarm is given in the area in which the smoke alarm activates; and
  - (B) visible and audible indication of an alarm is provided at the local fire indicator panel; and
  - (C) an audible alarm is given in any area (including sleeping quarters and staff outbuildings) set aside for staff use.
- (iv) The maximum number of smoke alarms on any one alarm zone must—
  - (A) be determined by the maximum current output rating of the system source; and
  - (B) not exceed 10.

Deemed-to-Satisfy Provisions

(v) Each alarm zone must be located around a single central access passageway, corridor or similar thoroughfare, to enable staff to readily identify the source of the alarm.

(vi) Where the smoke alarm is functionally dependent on an external power source, an audible fault signal must sound at the local fire indicator panel if that power source fails. The local fire indicator panel must be permanently connected to a reliable 240 V separate low voltage final sub-circuit. Source power must be protected by a separate circuit breaker, or fuse, supplied from the live side of the main switch.

(vii) The smoke alarm system is not required to be connected to a fire station (refer to Clause 14 of Specification E1.5)

(b) **Local fire indicator panel:**

(i) The local fire indicator panel must be located in a central area, such as a reception area or manager's office, so that it is readily accessible by staff at all times.

(ii) The local fire indicator panel must be fixed wired in accordance with the relevant requirement of AS/NZS 3000. It must incorporate the following:

(A) A suitable mains power supply with battery back-up (capable of operating the system for 12 hours) for the local fire indicator panel and extra-low voltage smoke alarms supplied directly from the local fire indicator panel.

(B) Suitable terminals for input signal conductors from the smoke alarm and residential sprinkler system. If the signal source is from a low voltage smoke alarm, suitable external isolation must be provided.

(C) Visible indication of the alarm zone in which the actuating device is located.

(D) *Automatic* audible and visible indication of the following faults:

(aa) A break in the wiring of any circuit between smoke alarms or sprinkler alarm switch and the local fire indicator panel.

(bb) Low battery condition.

(E) Automatic visible indication of mains power failure.

(F) Initiation of any ancillary control facilities such as smoke door release or air conditioning shut-down.

(G) Local operation of individual smoke alarms, in the event of alarm zone isolation at the local fire indicator panel.

(iii) If the local fire indicator panel is also used for other non-fire related purposes such as security, then these functions must be on separate and distinct circuits. When disabled or isolated, these functions must not interfere with the operation of fire alarm circuitry.

(iv) The local fire indicator panel must be ActivFire listed.

(v) The local fire indicator panel must have the capacity to incorporate AS 1603.1 approved heat detectors on either the same or separate alarm zones as the smoke alarms.

(c) **Smoke alarms:**

(i) Extra-low voltage smoke alarms must be—

(A) ActivFire listed; and

(B) compatible with the local fire indicator panel.

(ii) Low voltage smoke alarms must be—

(A) ActivFire listed; and

(B) comply with AS/NZS 3000; and

(C) be configured to send an output alarm signal to the local fire indicator panel.

(iii) Unless there is internal isolation of the signal output conductors, they must at all times be treated as low voltage conductors.

(d) **Signal isolation interface units:**

(i) Signal isolation interface units must isolate any low voltage connected to the smoke alarms from the local fire indicator panel.

(ii) Signal isolation interface units must be certified by an Accredited Testing Laboratory as compatible with the specific types of smoke alarms used in the system.

(iii) Signal isolation interface units must be accepted by the electricity supply authority, to ensure the isolation provided is in accordance with the requirements of AS/NZS 3100.

Deemed-to-Satisfy Provisions

(iv) Units must be marked in a clearly visible location, with the following information:

SMOKE ALARM SIGNAL ISOLATION UNIT WARNING — 240V
Isolate power supply before removing cover

(e) **Wiring:**

(i) Smoke alarms and associated equipment must be fixed wired in accordance with the relevant requirements of AS/NZS 3000 for low voltage and extra-low voltage wiring systems, as applicable.

(ii) All extra-low voltage wiring must be red sheathed 0.6/1 kV stranded, with conductors having a cross sectional area of not less than 0.75 mm^2.

(iii) Clear and concise “as-installed” single line drawings to a suitable scale, showing rooms, external and internal walls, fixed partitions, doorways etc., are to be provided for each installation at the local fire indicator panel.

(iv) Drawings must also include the actual location of fire alarms, smoke alarms, sprinkler flow switches (where installed), alarm connection points and local fire indicator panel, to enable easy identification of alarm system elements and their relationship to the building layout. Symbols to be used are:

Flow Switch

FS

Heat Detector

Smoke Detector

End-of-Line Device

ELD

Fire Indicator Panel

FIP

Smoke Alarm

(f) Inspection and testing of the complete system after installation must verify compliance with relevant requirements of this Specification.

4. Connection of residential sprinkler systems to a fire station or other approved monitoring service

(a) **System design** — the sprinkler installation must comply with Specification E1.5.

(b) **Connecting to monitoring service**

(i) Connection of a residential sprinkler system to a fire station or other approved monitoring service must be via a sprinkler alarm switch, connected to alarm signaling equipment complying with AS 4428.6. The connection from the alarm signaling equipment must be in accordance with AS 1670.1 Clause 3.18.3.

(ii) The alarm signaling equipment must be installed—

(A) in a secure accessible position; and

(B) in a weatherproof housing, if located externally; and

(C) not more than 500 mm from the system flow switch.

(iii) Flow switches must be ActivFire listed.

(c) **Indication at the fire indicator panel**

Any signal from the alarm signaling equipment must be mimicked by an audible and visible signal at the fire indicator panel.

PART E3 LIFT INSTALLATIONS

PERFORMANCE REQUIREMENTS

EP3.1 Stretcher facilities

Stretcher facilities must be provided, to the degree necessary—

(a) in at least one emergency lift *required* by EP3.2; or

(b) where an emergency lift is not *required* and a passenger lift is provided, in at least one lift, to serve each floor in the building served by the passenger lift.

EP3.2 Emergency lifts

One or more passenger lifts fitted as emergency lifts to serve each floor served by the lifts in a building must be installed to facilitate the activities of the *fire brigade* and other emergency services personnel.

Application:

EP3.2 only applies to—

(a) a building with an *effective height* of more than 25 m; and

(b) a Class 9a building in which *patient care areas* are located at a level that does not have direct access to a road or *open space*.

EP3.3 Emergency alerts

Signs or other means must be provided to alert occupants about the use of a lift during an emergency.

EP3.4 Access for people with a disability

When a passenger lift is provided in a building *required* to be *accessible*, it must be suitable for use by people with a disability.

VERIFICATION METHOD

EV3.1

(a) Compliance with *Performance Requirement* EP3.3 is verified when building occupants are provided with *automatic* warning that lifts must not be used during a fire emergency.

(b) The *automatic* warning must be—

- (i) initiated by a smoke management system complying with Part E2; and
- (ii) provided via a sound system complying where applicable with AS 1670.4; and
- (iii) designed to—
  - (A) cancel the normal operation of lift call buttons when activated; and
  - (B) be capable of being manually overridden by emergency personnel.

EV3.2

Compliance with EP3.2 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:
The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART E3 LIFT INSTALLATIONS

Deemed-to-Satisfy Provisions

E3.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* EP3.1 to EP3.4 are satisfied by complying with—

(i) E3.1 to E3.10; and

(ii) in a building containing an *occupiable outoor area*, **Part G6**; and

(iii) for public transport buildings, Part H2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

E3.4 Emergency lifts

(a) At least one emergency lift complying with (d) must be installed in—

(i) a building which has an *effective height* of more than 25 m; and

(ii) a Class 9a building in which *patient care areas* are located at a level that does not have direct egress to a road or *open space*.

(b) An emergency lift may be combined with a passenger lift and must serve those *storeys* served by the passenger lift so that all *storeys* of the building served by passenger lifts are served by at least one emergency lift.

(c) Where two or more passenger lifts are installed and serve the same *storeys*, excluding a lift that is within an *atrium* and not contained wholly within a *shaft*—

(i) at least two emergency lifts must be provided to serve those *storeys*; and

(ii) if located within different *shafts*, at least one emergency lift must be provided in each *shaft*.

(d) An emergency lift must—

(i) be contained within a *fire-resisting shaft* in accordance with C2.10; and

(ii) in a Class 9a building serving a *patient care area*—

(A) have minimum dimensions, measured clear of all obstructions, including handrails, etc complying with Table E3.4; and

(B) be connected to a standby power supply system where installed; and

(iii) if the building has an *effective height* of more than 75 m, have a rating of at least—

(A) 600 kg if not provided with a stretcher facility; or

(B) 900 kg if provided with a stretcher facility.

Table E3.4 MINIMUM EMERGENCY LIFT DIMENSIONS IN CLASS 9a BUILDINGS

Lift component	Minimum dimension (mm)
Minimum depth of car	2280 mm
Minimum width of car	1600 mm
Minimum floor to ceiling height	2300 mm
Minimum door height	2100 mm
Minimum door width	1300 mm

E3.6 Passenger lifts

~~In an accessible building, every passenger lift must—~~

(a) ~~be one of the types identified in **Table E3.6a**, subject to the limitations on use specified in the Table; and~~In an ***accessible*** building — every passenger lift must—

(i) subject to the specified limitations on use in (b) to (e), be one of the following types:

(A) an *electric passenger lift*; or

(B) an *electrohydraulic passenger lift*; or

Deemed-to-Satisfy Provisions

(C) a *stairway platform lift*; or

(D) an *inclined lift*; or

(E) a *low-rise platform lift*; or

(F) a *low-rise, low-speed constant pressure lift*; or

(G) a *small-sized, low-speed automatic lift*; and

(ii) have *accessible* features in accordance with (f) to (n); and

(iii) not rely on constant pressure device for its operation if the lift car is fully enclosed.

(b) ~~have *accessible* features in accordance with **Table E3.6b**; and~~***Stairway platform lift*** — a *stairway platform lift* must not—

(i) be used to serve a space in a building accommodating more than 100 persons calculated according to D1.13; or

(ii) be used in a high traffic public use area such as a theatre, cinema, auditorium, transport interchange, shopping centre or the like; or

(iii) be used where it is possible to install another type of passenger lift; or

(iv) connect more than 2 *storeys*; or

(v) where more than 1 stairway lift is installed, serve more than 2 consecutive *storeys*; or

(vi) when in the folded position, encroach on the minimum width of a stairway *required* by D1.6.

(c) ~~not rely on a constant pressure device for its operation if the lift car is fully enclosed.~~***Low-rise platform lift*** — a *low-rise platform lift* must not travel more than 1 m.

(d) ***Low-rise, low-speed constant pressure lift*** — a *low-rise, low-speed constant pressure lift* must not—

(i) for an enclosed type, travel more than 4 m; or

(ii) for an unenclosed type, travel more than 2 m; or

(iii) be used in high traffic public use areas in buildings such as a theatre, cinema, auditorium, transport interchange, shopping complex or the like.

(e) ***Small-sized, low-speed automatic lift*** — a *small-sized, low-speed automatic lift* must not travel more than 12 m.

(f) ***Lift handrails*** — all passenger lifts, except a *stairway platform lift* and a *low-rise platform lift*, must have handrails complying with the provisions for a mandatory handrail in AS 1735.12.

(g) **Minimum lift floor dimension**—

(i) All lifts which travel more than 12 m must have a lift floor dimension of not less than 1400 mm wide x 1600 mm deep.

(ii) All lifts which travel not more than 12 m must have a lift floor dimension of not less than 1100 mm wide x 1400 mm deep.

(iii) A *stairway platform lift* must have a lift floor dimension of not less than 810 mm wide x 1200 mm deep.

(h) **Minimum clear door opening** —all lifts, except a *stairway platform lift*, must have a minimum clear door opening complying with AS 1735.12.

(i) **Passenger protection system** — all lifts with a power operated door must have a passenger protection system installed complying with AS 1735.12.

(j) **Lift landing doors** — all lifts, except a *stairway platform lift*, must have lift landing doors at the upper landing.

(k) **Lift car and landing control buttons** — all lifts, except a *stairway platform lift* and a *low-rise platform lift*, must have lift car and landing control buttons installed complying with AS 1735.12.

(l) **Lift lighting** — all enclosed lifts must have lighting in complying with AS 1735.12.

(m) **Automatic audible and visual information** — all lifts serving more than 2 levels must have—

(i) automatic audible information within the lift car to identify the level each time the car stops; and

(ii) audible and visual indication at each level landing to indicate the arrival of the lift car; and

(iii) audible information and audible indication required by (m)(i) and (m)(ii) is to be provided in a range of between 20-80 dB(A) at a maximum frequency of 1 500 Hz.

(n) **Emergency hands-free communication** — all lifts, except a *stairway platform lift*, must have emergency hands-free communication installed, including a button that alerts a call centre of a problem and a light to signal that the call has been received.

Deemed-to-Satisfy Provisions

~~Table E3.6a LIMITATIONS ON USE OF TYPES OF PASSENGER LIFTS~~

~~**Lift type**~~	~~**Limitations on use**~~
~~*Electric passenger lift*~~	~~No limitation.~~
~~*Electrohydraulic passenger lift*~~	~~No limitation.~~
~~*Stairway platform lift*~~	~~Must not —~~ ~~(a) be used to serve a space in a building accommodating more than 100 persons calculated according to **D1.13**; or~~ ~~(b) be used in a high traffic public use area such as a theatre, cinema, auditorium, transport interchange, shopping centre or the like; or~~ ~~(c) be used where it is possible to install another type of passenger lift; or~~ ~~(d) connect more than 2 *storeys*; or~~ ~~(e) where more than 1 stairway lift is installed, serve more than 2 consecutive *storeys*; or~~ ~~(f) when in the folded position, encroach on the minimum width of a stairway *required* by **D1.6**.~~
~~*Inclined lift*~~	~~No limitation.~~
~~*Low-rise platform lift*~~	~~Must not travel more than 1000 mm.~~
~~*Low-rise, low-speed constant pressure lift*~~	~~Must not —~~ ~~(a) for an enclosed type, travel more than 4 m; or~~ ~~(b) for an unenclosed type, travel more than 2 m; or~~ ~~(c) be used in a~~ high traffic public use areas in buildings such as a theatre, cinema, auditorium, transport interchange, shopping complex or the like.centre
~~*Small-sized, low-speed automatic lift*~~	~~Must not travel more than 12 m.~~

~~Table E3.6b APPLICATION OF FEATURES TO PASSENGER LIFTS~~

~~**Feature**~~	~~**Application**~~
~~Handrail complying with the provisions for a mandatory handrail in AS 1735.12~~	~~All lifts except —~~ ~~(a) a *stairway platform lift*; and~~ ~~(b) a *low-rise platform lift*.~~
~~Lift floor dimension of not less than 1400 mm wide x 1600 mm deep~~	~~All lifts which travel more than 12 m.~~
~~Lift floor dimensions of not less than 1100 mm wide x 1400 mm deep~~	~~All lifts which travel not more than 12 m except a *stairway platform lift*.~~
~~Lift floor dimensions of not less than 810 mm wide x 1200 mm deep~~	~~A *stairway platform lift*.~~
~~Minimum clear door opening complying with AS 1735.12~~	~~All lifts except a *stairway platform lift*.~~
~~Passenger protection system complying with AS 1735.12~~	~~All lifts with a power operated door.~~
~~Lift landing doors at the upper landing~~	~~All lifts except a *stairway platform lift*.~~
~~Lift car and landing control buttons complying with AS 1735.12~~	~~All lifts except —~~ ~~(a) a *stairway platform lift*; and~~ ~~(b) a *low-rise platform lift*.~~
~~Lighting in accordance with AS 1735.12~~	~~All enclosed lift cars.~~
~~(a) Automatic audible information within the lift car to identify the level each time the car stops; and~~ ~~(b) audible and visual indication at each lift landing to indicate the arrival of the lift car; and~~ ~~(c) audible information and audible indication *required* by (a) and (b) is to be provided in a range of between 20 - 80 dB(A) at a maximum frequency of 1 500 Hz~~	~~All lifts serving more than 2 levels.~~
~~Emergency hands-free communication, including a~~	~~All lifts except a *stairway platform lift*.~~

~~Feature~~	~~Application~~
~~button that alerts a call centre of a problem and a light to signal that the call has been received~~	

E3.7 Fire service controls

Where lifts serve any *storey* above an *effective height* of 12 m, the following must be provided:

(a) A fire service recall control switch complying with E3.9 for—

  (i) a group of lifts; or

  (ii) a single lift not in a group that serves the *storey*.

(b) A lift car fire service drive control switch complying with E3.10 for every lift.

E3.8 ~~Aged care buildings~~Residential care buildings

Where residents in a Class 9c *residential care building*~~*aged care building*~~ are on levels which do not have direct access to a road or *open space*, the building must be provided with either—

(a) at least one lift to accommodate a stretcher in accordance with E3.2(b); or

(b) a ramp in accordance with AS 1428.1, and

the lift or ramp must discharge at a level providing direct access to a road or *open space*.

PART E4 VISIBILITY IN AN EMERGENCY, EXIT SIGNS AND WARNING SYSTEMS

PERFORMANCE REQUIREMENTS

EP4.1 Visibility in an emergency

To facilitate safe evacuation in an emergency, a building must be provided with a system that—

(a) ensures a level of visibility sufficient to enable *exits*, paths of travel to *exits* and any obstacles along a path of travel to an *exit* to be identified; and

(b) activates instantaneously upon the failure of an artificial lighting system,

to the degree necessary, appropriate to—

(c) the function or use of the building; and

(d) the *floor area* of the building; and

(e) the distance of travel to an *exit*.

Limitation:

EP4.1 does not apply to the internal parts of a *sole-occupancy unit* in a Class 2, 3 or 9c building or Class 4 part of a building.

EP4.2 Exits

To facilitate evacuation, suitable signs or other means of identification must, to the degree necessary—

(a) be provided to identify the location of *exits*; and

(b) guide occupants to *exits*; and

(c) be clearly visible to occupants; and

(d) operate in the event of a power failure of the main lighting system for sufficient time for occupants to safely evacuate.

Limitation:

EP4.2 does not apply to the internal parts of a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building.

EP4.3 Sound systems and intercom systems for emergency purposes

To warn occupants of an emergency and assist evacuation of a building, a sound system and intercom system for emergency purposes must be provided, to the degree necessary, appropriate to—

(a) the *floor area* of the building; and

(b) the function or use of the building; and

(c) the height of the building.

EV4.2

Compliance with EP4.1, EP4.2 and EP4.3 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:
The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART E4 VISIBILITY IN AN EMERGENCY, EXIT SIGNS AND WARNING SYSTEMS

Deemed-to-Satisfy Provisions

E4.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* EP4.1 to EP4.3 are satisfied by complying with—

(i) E4.1 to E4.9; and

(ii) in a building containing an *atrium*, Part G3; and

(iii) in a building in an *alpine area*, Part G4; and

(iv) in a building containing an *occupiable outoor area*, Part G6; and

(v~~iv~~) for additional requirements for Class 9b buildings, Part H1; and

(vi~~v~~) for *farm buildings* and *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

E4.9 Emergency warning and intercom systems~~Sound systems and intercom systems for emergency purposes~~

An emergency warning and intercom system~~sound system and intercom system for emergency purposes~~ complying where applicable with AS 1670.4 must be installed—

(a) in a building with an *effective height* of more than 25 m; and

(b) in a Class 3 building having a *rise in storeys* of more than 2 and used as~~—~~ the residential part of a primary or secondary *school*.

~~(i) the residential part of a school; or~~

~~(ii) accommodation for the aged, children or people with a disability; and~~

(c) in a Class 3 building used as a *residential care building*~~*residential aged care building*~~, except that the system—

(i) must be arranged to provide a warning for occupants; and

(ii) in areas used by the residents, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of residents; and

(d) in a Class 9a building having a *floor area* of more than 1000 m^2 or a *rise in storeys* of more than 2, and the system—

(i) must be arranged to provide a warning for occupants; and

(ii) in a *ward area*, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of patients; and

(e) in a Class 9b building—

(i) used as a *school* and having a *rise in storeys* of more than 3; or

(ii) used as a theatre, public hall, or the like, having a *floor area* more than 1000 m^2 or a *rise in storeys* of more than 2.

PART F1 DAMP AND WEATHERPROOFING

PERFORMANCE REQUIREMENTS

FP1.1 Managing rainwater impact on adjoining properties

Surface water, resulting from a storm having an *average recurrence interval* of 20 years and which is collected or concentrated by a building or *sitework*, must be disposed of in a way that avoids the likelihood of damage or nuisance to any *other property*.

FP1.2 Preventing rainwater from entering buildings

Surface water, resulting from a storm having an *average recurrence interval* of 100 years must not enter the building.

Limitation:

FP1.2 does not apply to—

(a) a Class 7 or 8 building where in the particular case there is no necessity for compliance; or

(b) a garage, tool shed, *sanitary compartment*, or the like, forming part of a building used for other purposes; or

(c) an *open spectator stand* or *open-deck carpark*.

FP1.3 Rainwater drainage systems

A drainage system for the disposal of *surface water* resulting from a storm having an *average recurrence interval* of—

(a) 20 years must—

(i) convey *surface water* to an appropriate *outfall*; and

(ii) avoid *surface water* damaging the building; and

(b) 100 years must avoid the entry of *surface water* into a building.

FP1.4 Weatherproofing

A roof and *external wall* (including openings around *windows* and doors) must prevent the penetration of water that could cause—

(a) unhealthy or dangerous conditions, or loss of amenity for occupants; and

(b) undue dampness or deterioration of building elements.

Limitation:

FP1.4 does not apply to—

(a) a Class 7 or 8 building where in the particular case there is no necessity for compliance; or

(b) a garage, tool shed, *sanitary compartment*, or the like, forming part of a building used for other purposes; or

(c) an *open spectator stand* or *open-deck carpark*.

FP1.5 Rising damp

SA FP1.5

Moisture from the ground must be prevented from causing—

(a) undue dampness or deterioration of building elements; and

(b) unhealthy or dangerous conditions, or loss of amenity for occupants.

Limitation:

FP1.5 does not apply to—

(a) a Class 7 or 8 building where in the particular case there is no necessity for compliance; or

(b) a garage, tool shed, *sanitary compartment*, or the like, forming part of a building used for other purposes; or

(c) an *open spectator stand* or *open-deck carpark.*

FP1.6 Wet area overflows

SA FP1.6

Overflow from a bathroom, laundry facility or the like must be prevented from penetrating to—

(a) another *sole-occupancy unit* used for sleeping accommodation; and

(b) a public space,

in a *storey* below in the same building.

FP1.7 Wet areas

To protect the structure of the building and to maintain the amenity of the occupants, water must be prevented from penetrating—

(a) behind fittings and linings; and

(b) into concealed spaces,

of *sanitary compartments*, bathrooms, laundries and the like.

SA FP1.8

VERIFICATION METHODS

FV1.1 Weatherproofing

(a) Compliance with **FP1.4** for weatherproofing of an *external wall*— that

   (i) has a risk score of 20 or less, when the sum of all risk factor scores are determined in accordance with Table FV1.1; and

   (ii) is not subjected to an ultimate limit state wind pressure of more than 2.5 kPa; and

   (iii) includes only windows that comply with AS 2047,

   is verified when a prototype passes the procedure described below:

   (iv) The test specimen is in accordance with the requirements of (b).

   (v) The test procedure is in accordance with the requirements of (c).

   (vi) The test specimen does not fail the criteria in (d).

   (vii) The test is recorded in accordance with the requirements of (e).

~~Table FV1.1 RISK FACTORS AND SCORES~~

~~Risk factor~~	~~Category~~	~~Risk severity~~	~~Score~~
~~Wind region~~	~~Region A (AS/NZS 1170.2)~~	~~Low to medium~~	~~0~~
	~~Region B (AS/NZS 1170.2)~~		
	~~Region C (AS/NZS 1170.2)~~	~~High~~	~~1~~
	~~Region D (AS/NZS 1170.2)~~	~~Very high~~	~~2~~
~~Number of *storeys*~~	~~One *storey*~~	~~Low~~	~~0~~
	~~Two *storeys* in part~~	~~Medium~~	~~1~~
	~~Two *storeys*~~	~~High~~	~~2~~
			~~4~~

~~**Risk factor**~~	~~**Category**~~	~~**Risk severity**~~	~~**Score**~~
	~~More than two *storeys*~~	~~Very high~~	
~~Roof/wall junctions~~	~~Roof-to-wall junctions fully protected~~	~~Low~~	~~0~~
	~~Roof-to-wall junctions partially exposed~~	~~Medium~~	~~1~~
	~~Roof-to-wall junctions fully exposed~~	~~High~~	~~3~~
	~~Roof elements finishing within the boundaries formed by the *external walls*~~	~~Very high~~	~~5~~
~~Eaves width~~	~~More than 600 mm for single *storey*~~	~~Low~~	~~0~~
	~~451-600 mm for single *storey*; or more than 600 mm for two *storey*~~	~~Medium~~	~~1~~
	~~101-450 mm for single *storey*; or 451-600 mm for two *storey*; or more than 600 mm for above two *storey*~~	~~High~~	~~2~~
	~~0-100 mm for single *storey*; or 0-450 mm for two *storey*; or less than~~	~~Very high~~	~~5~~

~~Risk factor~~	~~Category~~	~~Risk severity~~	~~Score~~
	~~600 mm for above two *storey*~~		
~~Envelope complexity~~	~~Simple shape with single cladding type~~	~~Low~~	~~0~~
	~~Complex shape with not more than two cladding types~~	~~Medium~~	~~1~~
	~~Complex shape with more than two cladding types~~	~~High~~	~~3~~
	~~As for high risk but with fully exposed roof to wall junctions~~	~~Very high~~	~~6~~
~~Decks, porches and balconies~~	~~None; or timber slat deck or porch at ground level~~	~~Low~~	~~0~~
	~~Fully covered in plan view by roof; or timber slat deck attached at first or second floor level~~	~~Medium~~	~~2~~
	~~Balcony exposed in plan view at first floor level; or balcony cantilevered at first floor level~~	~~High~~	~~4~~
	~~Balcony exposed in plan view at~~	~~Very high~~	~~6~~

~~Risk factor~~	~~Category~~	~~Risk severity~~	~~Score~~
	~~second floor level or above; or balcony cantilevered at second floor level or above~~		

~~Notes:~~

1. ~~Eaves width is measured horizontally from the external face of any wall cladding to the outer edge of any overhang, including fascia and external gutters.~~
2. ~~Barriers to prevent falling and parapets are considered as 0 mm eaves.~~

Table FV1.1 – Risk factors and scores

Risk factor	Category	Risk severity	Score
Wind region	Region A (AS/NZS 1170.2)	Low to medium	0
Wind region	Region B (AS/NZS 1170.2)	Low to medium	0
Wind region	Region C (AS/NZS 1170.2)	High	1
Wind region	Region D (AS/NZS 1170.2)	Very high	2
Number of *storeys*	One *storey*	Low	0
Number of *storeys*	Two *storeys* in part	Medium	1
Number of *storeys*	Two *storeys*	High	2
Number of *storeys*	More than two *storeys*	Very high	4
Roof/wall junctions	Roof-to-wall junctions fully protected	Low	0
Roof/wall junctions	Roof-to-wall junctions partially exposed	Medium	1
Roof/wall junctions	Roof-to-wall junctions fully exposed	High	3
Roof/wall junctions	Roof elements finishing within the boundaries formed by the *external walls*	Very high	5
Eaves width	More than 600 mm for single *storey*	Low	0
Eaves width	451-600 mm for single *storey*; or more than 600 mm for two *storey*	Medium	1
Eaves width	101-450 mm for single *storey*; or 451-600 mm for two *storey*; or more than 600 mm for above two *storey*	High	2
Eaves width	0-100 mm for single *storey*; or 0-450 mm for two *storey*; or less than 600 mm for above two *storeys*	Very high	5

Risk factor	Category	Risk severity	Score
Envelope complexity	Simple shape with single cladding type	Low	0
Envelope complexity	Complex shape with not more than two cladding types	Medium	1
Envelope complexity	Complex shape with more than two cladding types	High	3
Envelope complexity	As for high risk but with fully exposed roof-to-wall junctions	Very high	6
Decks, porches and balconies	None; or timber slat deck or porch at ground level	Low	0
Decks, porches and balconies	Fully covered in plan view by roof; or timber slat deck attached at first or second floor level	Medium	2
Decks, porches and balconies	Balcony exposed in plan view at first floor level; or balcony cantilevered at first floor level	High	4
Decks, porches and balconies	Balcony exposed in plan view at second floor level or above; or balcony cantilevered at second floor level or above	Very high	6

Notes:

1 Eaves width is measured horizontally from the external face of any wall cladding to the outer edge of any overhang, including fascia and external gutters.

2 Barriers to prevent falling and parapets are considered as 0 mm eaves.

(b) **Test specimen**

The test specimen must incorporate—

(i) representative samples of openings and joints, including—

(A) vertical and horizontal control joints; and

(B) wall junctions; and

(C) *windows* or doors; and

(D) electrical boxes; and

(E) balcony drainage and parapet flashings; and

(F) footer and header termination systems; and

(ii) for a *cavity wall*—

(A) a transparent material for a proportion of the internal wall lining (to provide an unobstructed view of the *external wall* cladding) with sufficient structural capability and similar air tightness to resist the applied wind pressures; and

(B) a 15 mm diameter hole in the internal wall lining below a *window*.

(c) **Test procedure**

(i) The test procedure for a *direct fix cladding wall* or *unique wall* must be as follows:

(A) Apply 100% positive and negative serviceability wind pressures to the external face of the test specimen for a period of not less than 1 minute each.

(B) Apply static pressure of either 300 Pa or 30% serviceability wind pressure, whichever is higher, in accordance with the water penetration test procedure at clause 8.5.2 of AS/NZS 4284.

(C) Apply cyclic pressure in accordance with—

(aa) the three stages of **Table FV1.2**; and

(bb) the water penetration test procedure at clause 8.6.2 of AS/NZS 4284.

Table FV1.2

Stage number	Serviceability wind pressure
1	15% to 30%
2	20% to 40%
3	30% to 60%

(ii) The test procedure for a *cavity wall* must be as follows:

(A) Apply 100% positive and negative serviceability wind pressures to the external face of the test specimen for a period of not less than 1 minute each.

(B) Apply static pressure of either 300 Pa or 30% serviceability wind pressure, whichever is higher, in accordance with the water penetration test procedure at clause 8.5.2 of AS/NZS 4284.

(C) Apply cyclic pressure in accordance with—

(aa) stage 3 of **Table FV1.2**; and

(bb) the water penetration test procedure at clause 8.6.2 of AS/NZS 4284.

(D) To simulate the failure of the primary weather-defence or sealing, the following procedure must be applied to the test specimen:

(aa) Insert 6 mm diameter holes through the external face of the *cavity wall* in all places specified below:

(AA) Wall/window or wall/door junctions at ¾ height.

(BB) Immediately above the head flashing.

(CC) Through external sealing of the horizontal and vertical joints.

(DD) Above any other penetration detail not covered by **(AA)** to **(CC)**.

(bb) Repeat the static and cyclic pressure tests of **(B)** and **(C)**.

(cc) Within 30 minutes of the completion of **(bb)**, remove the internal lining of the *cavity wall* and check for compliance with **(d)**.

(dd) With the internal lining removed, apply a final static pressure test at 50 Pa for a period of 15 minutes.

(d) **Compliance**

(i) A direct fix cladding wall and *unique wall* are verified for compliance with **FP1.4** if there is no presence of water on the inside surface of the facade.

(ii) A *cavity wall* is verified for compliance with **FP1.4** if there is no presence of water on the removed surface of the cavity, except that during the simulation of the failure of the primary weather-defence or sealing, water may—

(A) transfer to the removed surface of the cavity due to the introduced defects (6 mm holes); and

(B) contact, but not pool on, battens and other cavity surfaces.

(e) **Test report**

The test report must include the following information:

(i) Name and address of the person supervising the test.

(ii) Test report number.

(iii) Date of the test.

(iv) Cladding manufacturer's name and address.

(v) Construction details of the test specimen, including a description, and drawings and details of the components, showing modifications, if any.

(vi) Test sequence with the pressures used in all tests.

(vii) For each of the static and cyclic pressure tests, full details of all leakages, including position, extent and timing.

FV1.2 Overflow Protection

FP1.6 is verified when, for all *vessels* in the room, the flow rate of the in-built overflow is greater than the flow rate of the source filling the *vessel*.

Application:

FV1.2 only applies to bathrooms, laundries and the like in a Class 2 or 3 building or a Class 4 part of a building.

PART F1 DAMP AND WEATHERPROOFING

Deemed-to-Satisfy Provisions

F1.0 Deemed-to-Satisfy Provisions

(a) *Performance Requirement* FP1.4, for the prevention of the penetration of water through *external walls*, must be complied with.

There are no *Deemed-to-Satisfy Provisions* for this *Performance Requirement* in respect of *external walls*.

SA F1.0(b)

(b) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* FP1.1 to FP1.3 and FP1.5 to FP1.7 are satisfied by complying with F1.1 to F1.13.

(c) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

F1.7 Waterproofing of wet areas in buildings

SA F1.7(a)

(a) In a Class 2 and 3 building and a Class 4 part of a building, building elements in *wet areas* must—
   - (i) be *water resistant* or *waterproof* in accordance with Tables F1.7a-d~~**Table F1.7**~~; and
   - (ii) comply with AS 3740.

(b) In a Class 5, 6, 7, 8 or 9 building, building elements in the bathroom or shower room, a slop hopper or sink compartment, a laundry or *sanitary compartment* must—
   - (i) be *water resistant* or *waterproof* in accordance with Tables F1.7a-d~~**Table F1.7**~~; and
   - (ii) comply with AS 3740,

   as if they were in a Class 2 or 3 building or a Class 4 part of a building.

(c) Where a slab or stall type urinal is installed—
   - (i) the floor surface of the room containing the urinal must—
     - (A) be an impervious material; and
     - (B) where no step is installed—
       - (aa) be graded to the urinal channel for a distance of 1.5 m from the urinal channel; and
       - (bb) the remainder of the floor be graded to a floor waste; and
     - (C) where a step is installed—
       - (aa) the step must have an impervious surface and be graded to the urinal channel; and
       - (bb) the floor behind the step must be graded to a floor waste; and
   - (ii) the junction between the floor surface and the urinal channel must be impervious.

(d) Where a wall hung urinal is installed—
   - (i) the wall must be surfaced with impervious material extending from the floor to not less than 50 mm above the top of the urinal and not less than 225 mm on each side of the urinal.
   - (ii) the floor must be surfaced with impervious material and graded to a floor waste.

(e) In a room with timber or steel-framed~~steel framed~~ walls and containing a urinal—
   - (i) the wall must be surfaced with an impervious material extending from the floor to not less than 100 mm above the floor surface; and
   - (ii) the junction of the floor surface and the wall surface must be impervious.

SA Table F1.7

Table F1.7a Waterproofing and water resistance requirements for building elements in wet areas—shower areas (enclosed and unenclosed)

Vessels or area where the fixture is installed	Floors and horizontal surfaces	Walls	Wall junctions and joints	Wall / floor junctions	Penetrations
With hob With step-down Without hob or step-down	*Waterproof* floor in *shower area* (including any hob or step-down).	(a) *Waterproof* all walls in *shower area* to a height the greater of— (i) not less than 150 mm above floor substrate; or (ii) not less than 25 mm above maximum retained water level; and (b) *Water resistant* walls in *shower area* to not less than 1.8 m above finished floor level of the shower.	*Waterproof* wall junctions within *shower area*.	*Waterproof* wall / floor junctions within *shower area*.	*Waterproof* penetrations in *shower area*.
With preformed shower base	N/A	*Water resistant* walls in *shower area* to not less than 1.8 m above finished floor level of the shower.	*Waterproof* wall junctions within *shower area*.	*Waterproof* wall / floor junctions within *shower area*.	*Waterproof* penetrations in *shower area*.

Table F1.7b Waterproofing and water resistance requirements for building elements in wet areas—areas outside shower area

Vessels or area where the fixture is installed	Floors and horizontal surfaces	Walls	Wall junctions and joints	Wall / floor junctions	Penetrations
For concrete and compressed fibre-cement sheet flooring	*Water resistant* floor of the room.	N/A	N/A	~~*Waterproof*~~*Water resistant* wall / floor junctions.	N/A
For timber floors including particleboard,	*Waterproof* floor of the room.	N/A	N/A	*Waterproof* wall / floor junctions.	N/A

Deemed-to-Satisfy Provisions

Vessels or area where the fixture is installed	**Floors and horizontal surfaces**	**Walls**	**Wall junctions and joints**	**Wall / floor junctions**	**Penetrations**
plywood and other timber based flooring materials					

Table F1.7c Waterproofing and water resistance requirements for building elements in wet areas—areas adjacent to baths and spas

Vessels or area where the fixture is installed	**Floors and horizontal surfaces**	**Walls**	**Wall junctions and joints**	**Wall / floor junctions**	**Penetrations**
For concrete and compressed fibre-cement sheet flooring	*Water resistant* floor of the room.	(a) *Water resistant* to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall. (b) *Water resistant* all exposed surfaces below *vessel* lip.	*Water resistant* junctions within 150 mm above a *vessel* for the extent of the *vessel*.	*Water resistant* wall / floor junctions for the extent of the *vessel*.	*Waterproof* tap and spout penetrations where they occur in horizontal surfaces.
For timber floors including particleboard, plywood and other timber based flooring materials	*Waterproof* floor of the room.	(a) *Water resistant* to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall. (b) *Water resistant* all exposed surfaces below *vessel* lip.	*Water resistant* junctions within 150 mm above a *vessel* for the extent of the *vessel*.	*Water resistant* wall / floor junctions for the extent of the *vessel*.	*Waterproof* tap and spout penetrations where they occur in horizontal surfaces.
Inserted baths and spas	(a) *Waterproof* shelf areaincorporating waterstop	(a) *Waterproof* to not less than 150 mm above lip of bath or	(a) *Waterproof* junctions within 150 mm above bath or spa;	N/A	*Waterproof* tap and spout penetrations where they occur in horizontal

Deemed-to-Satisfy Provisions

Vessels or area where the fixture is installed	Floors and horizontal surfaces	Walls	Wall junctions and joints	Wall / floor junctions	Penetrations
	under the bath lip. (b) No requirement under bath.	spa; and (b) No requirement under bath.	and (b) No requirement under bath.		surfaces.

Note: Where a shower is above a bath or spa, use requirements for shower.

Table F1.7d Waterproofing and water resistance requirements for building elements in wet areas—other areas

Vessels or area where the fixture is installed	Floors and horizontal surfaces	Walls	Wall junctions and joints	Wall / floor junctions	Penetrations
Walls adjoining other *vessel* (e.g. sink, basin or laundry tub)	N/A	*Water resistant* to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall.	*Waterproof* wall junctions where a *vessel* is fixed to a wall.	N/A	*Waterproof* tap and spout penetrations where they occur in surfaces *required* to be *waterproof* or *water resistant*.
Laundries and WCs	*Water resistant* floor of the room.	N/A	N/A	~~*Waterproof*~~*Water resistant* wall / floor junctions.	N/A
Bathrooms and laundries *required* to be provided with a floor waste by F1.11.	*Waterproof* floor of the room.	N/A	N/A	*Waterproof* wall / floor junctions.	*Waterproof* penetrations where they occur through the floor.

Note: N/A means not applicable.

~~**Table F1.7 WATERPROOFING AND WATER-RESISTANCE REQUIREMENTS FOR BUILDING ELEMENTS IN WET AREAS**~~

~~Vessels or area where the fixture is installed~~	~~Floors and horizontal surfaces~~	~~Walls~~	~~Wall junctions and joints~~	~~Wall / floor junctions~~	~~Penetrations~~
~~**Shower area (enclosed and unenclosed)**~~					
~~With hob~~ ~~With step down~~	~~*Waterproof* floor in *shower area* (including any hob or step-down).~~	~~(a) *Waterproof* all walls in *shower area* to a height the greater of—~~ ~~(i) not less than 150 mm above floor substrate; or~~ ~~(ii) not less than 25 mm above maximum retained water level; and~~ ~~(b) *Water resistant* walls in *shower area* to not less than 1800 mm above finished floor level of the shower.~~	~~*Waterproof* wall junctions within *shower area*.~~	~~*Waterproof* wall / floor junctions within *shower area*.~~	~~*Waterproof* penetrations in *shower area*.~~
~~Without hob or step down~~					
~~With preformed shower base~~	~~N/A~~	~~*Water resistant* walls in *shower area* to not less than 1800 mm above finished floor level of the shower.~~	~~*Waterproof* wall junctions within *shower area*.~~	~~*Waterproof* wall / floor junctions within *shower area*.~~	~~*Waterproof* penetrations in *shower area*.~~
~~**Area outside shower area**~~					
~~For concrete and compressed fibre-cement sheet flooring~~	~~*Water resistant* floor of the room.~~	~~N/A~~	~~N/A~~	~~*Water resistant* wall / floor junctions.~~	~~N/A~~
~~For timber floors including particleboard, plywood and other timber based flooring materials~~	~~*Waterproof* floor of the room.~~			~~*Waterproof* wall / floor junctions.~~	
~~**Areas adjacent to baths and spas**~~					
~~For concrete and~~	~~*Water resistant* floor of the~~	~~(a) *Water resistant* to a~~	~~*Water resistant* junctions~~	~~*Water resistant* wall / floor~~	~~*Waterproof* tap and spout~~

~~Vessels or area where the fixture is installed~~	~~Floors and horizontal surfaces~~	~~Walls~~	~~Wall junctions and joints~~	~~Wall / floor junctions~~	~~Penetrations~~
~~compressed fibre cement sheet flooring~~	~~room.~~	~~height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall.~~	~~within 150 mm above a *vessel* for the extent of the *vessel*.~~	~~junctions for the extent of the *vessel*.~~	~~penetrations where they occur in horizontal surfaces.~~
~~For timber floors including particleboard, plywood and other timber based flooring materials~~	~~*Waterproof* floor of the room.~~	~~(b) *Water resistant* all exposed surfaces below *vessel* lip.~~			
~~Inserted baths and spas~~	~~(a) *Waterproof* shelf area, incorporating waterstop under the bath lip.~~ ~~(b) No requirement under bath.~~	~~(a) *Waterproof* to not less than 150 mm above lip of bath or spa; and~~ ~~(b) No requirement under bath.~~	~~(a) *Waterproof* junctions within 150 mm above bath or spa; and~~ ~~(b) No requirement under bath.~~	~~N/A~~	~~*Waterproof* tap and spout penetrations where they occur in horizontal surfaces.~~
~~**Note:** Where a shower is above a bath or spa, use requirements for shower.~~					
~~**Other areas**~~					
~~Walls adjoining other *vessel* (e.g. sink, basin or laundry tub)~~	~~N/A~~	~~*Water resistant* to a height of not less than 150 mm above the *vessel*, for the extent of the *vessel*, where the *vessel* is within 75 mm of a wall.~~	~~*Waterproof* wall junctions where a *vessel* is fixed to a wall.~~	~~N/A~~	~~*Waterproof* tap and spout penetrations where they occur in surfaces *required* to be *waterproof* or *water resistant*.~~
~~Laundries and WCs~~	~~*Water resistant* floor of the room.~~	~~N/A~~	~~N/A~~	~~*Waterproof* wall / floor junctions.~~	
~~Bathrooms and laundries *required* to provide a floor waste by **F1.11**.~~	~~*Waterproof* floor of the room.~~	~~N/A~~	~~N/A~~	~~*Waterproof* wall / floor junctions.~~	~~*Waterproof* penetrations where they occur through the floor.~~
~~**Note:** N/A means not applicable.~~					

Deemed-to-Satisfy Provisions

F1.12 Subfloor ventilation

(a) Subfloor spaces must—

(i) be provided with openings in *external walls* and internal subfloor walls in accordance with Table F1.12 for the climatic zones given in Figure F1.12; and

(ii) have clearance between the ground surface and the underside of the lowest horizontal member in the subfloor in accordance with Table F1.12.

~~**Table F1.12 SUBFLOOR OPENINGS AND GROUND CLEARANCE**~~

~~Climatic zone (see Figure F1.12)~~	~~Minimum aggregate subfloor ventilation openings (mm²/m of wall)~~		~~Minimum ground clearance height (mm)~~	
	~~No membrane~~	~~Ground sealed with impervious membrane~~	~~Termite inspection or management system not *required*~~	~~Termite inspection *required* Note 1~~
~~A~~	~~2000~~	~~1000~~	~~150~~	~~400~~
~~B~~	~~4000~~	~~2000~~	~~150~~	~~400~~
~~C~~	~~6000~~	~~3000~~	~~150~~	~~400~~

~~**Notes:**~~

~~1. 400 mm clearance *required* only where termite management systems are installed that need to be inspected (see **B1.4**).~~

~~2. On sloping sites, the 400 mm clearance *required* by (1) may be reduced to 150 mm within 2 m of *external walls*.~~

~~3. In situations where openings in *external walls* and internal subfloor walls, are not able to be provided, additional measures must be provided to ensure that the overall level of ventilation of the subfloor space is maintained. This may include measures similar to those in **F1.12(e)** i.e. providing durability class timbers, or having the ground sealed in the subfloor space with an impervious membrane.~~

Table F1.12 Subfloor openings and ground clearance

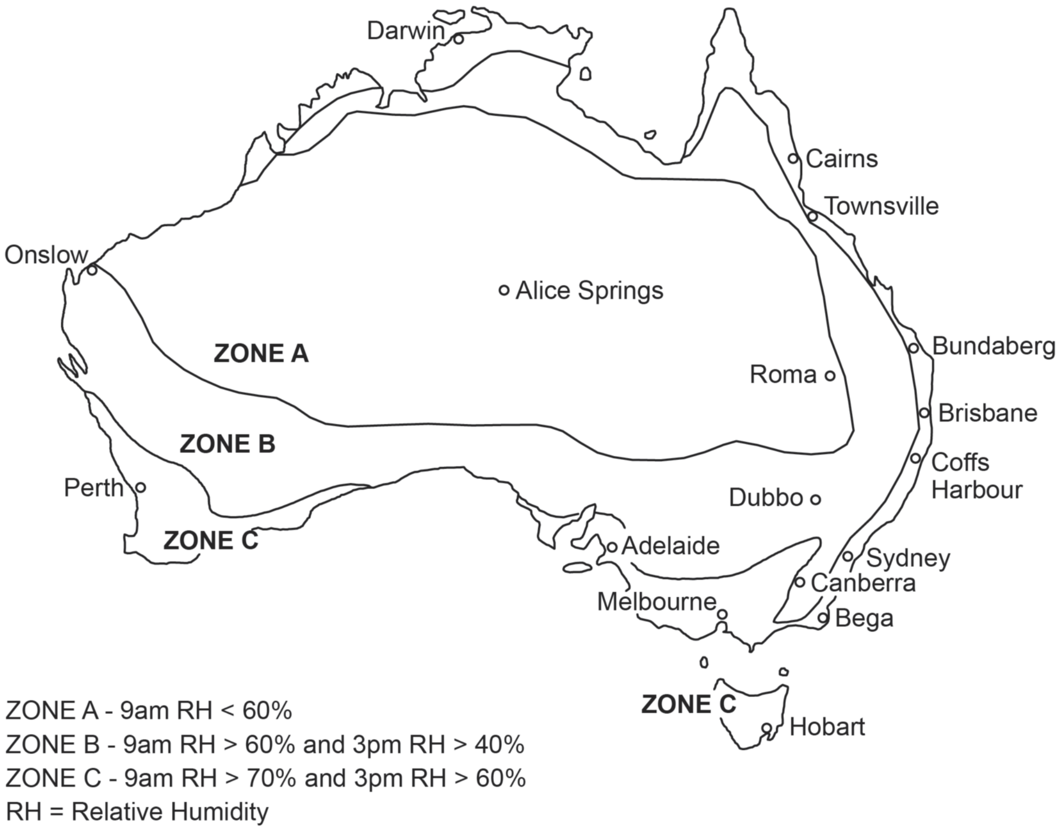
Climatic zone (see Figure F1.12)	**No membrane**	**Ground sealed with impervious membrane**	**Termite inspection or management system not *required***	**Termite inspection *required* Note 1**
A	Minimum aggregate subfloor ventilation openings: 2000 mm^2/m of wall	Minimum aggregate subfloor ventilation openings: 1000 mm^2/m of wall	Minimum ground clearance height: 150 mm	Minimum ground clearance height: 400 mm
B	Minimum aggregate subfloor ventilation openings: 4000 mm^2/m of wall	Minimum aggregate subfloor ventilation openings: 2000 mm^2/m of wall	Minimum ground clearance height: 150 mm	Minimum ground clearance height: 400 mm
C	Minimum aggregate subfloor ventilation openings: 6000 mm^2/m of wall	Minimum aggregate subfloor ventilation openings: 3000 mm^2/m of wall	Minimum ground clearance height: 150 mm	Minimum ground clearance height: 400 mm

Notes:

1. 400 mm clearance *required* only where termite management systems are installed that need to be inspected (see B1.4).
2. On sloping sites, the 400 mm clearance *required* by (1) may be reduced to 150 mm within 2 m of *external walls*.
3. In situations where openings in *external walls* and internal subfloor walls, are not able to be provided, additional measures must be provided to ensure that the overall level of ventilation of the subfloor space is maintained. This may include measures similar to those in F1.12(e) i.e. providing durability class timbers, or having the ground sealed in the subfloor space with an impervious membrane.

Figure F1.12

CLIMATIC ZONES BASED ON RELATIVE HUMIDITY



Note: The season with the highest relative humidity is used. Generally this will be July for southern Australia and January for northern Australia.

(b) In addition to (a), a subfloor space must—

(i) be cleared of all building debris and vegetation; and

(ii) have the ground beneath the suspended floor graded to prevent *surface water* ponding under the building; and

(iii) contain no dead air spaces; and

(iv) have openings evenly spaced as far as practicable; and

(v) have openings placed not more than 600 mm in from corners.

(c) In double leaf masonry walls, openings specified in **(a)** must be provided in both leaves of the masonry, with openings being aligned to allow an unobstructed flow of air.

(d) Openings in internal subfloor walls specified in **(a)** must have an unobstructed area equivalent to that *required* for the adjacent external openings.

(e) Where the ground or subfloor space is excessively damp or subject to frequent flooding, in addition to the requirements of **(a)** to **(d)**—

(i) the subfloor ventilation *required* in **(a)** must be increased by 50%; or

(ii) the ground within the subfloor space must be sealed with an impervious membrane; or

(iii) subfloor framing must be—

(A) where above ground, durability Class 1 or 2 timbers or H3 preservative treated timbers in accordance with AS 1684.2, AS 1684.3 or AS 1684.4; or

(B) where in ground, in-ground durability Class 1 timbers or H5 preservative treated timbers in accordance with AS 1684.2, AS 1684.3 or AS 1684.4; or~~steel in accordance with NASH Standard 'Residential and Low-Rise Steel Framing' Part 2.~~

(C) steel in accordance with NASH Standard 'Residential and Low-Rise Steel Framing' Part 2.

PART F2 SANITARY AND OTHER FACILITIES

PERFORMANCE REQUIREMENTS

FP2.1 Personal hygiene facilities

Suitable sanitary facilities for personal hygiene must be provided in a convenient location within or associated with a building, to the degree necessary, appropriate to—

(a) the function or use of the building; and

(b) the number and gender of the occupants; and

(c) the disability or other particular needs of the occupants.

FP2.2 Laundry facilities

Laundering facilities or space for laundering facilities and the means for the sanitary disposal of waste water must be provided in a convenient location within or associated with a building appropriate to the function or use of the building.

Vic FP2.2 Application

Application:

FP2.2 only applies to—

(a) a Class 2 building or Class 4 part of a building; and

(b) a Class 9a *health-care building;* and

(c) a Class 9b *early childhood centre*; and

(d) a Class 9c building.

FP2.3 Kitchens

A facility must be provided which includes—

(a) a means for food rinsing, utensil washing and the sanitary disposal of associated waste water; and

(b) a means for cooking food; and

(c) a space for food preparation.

Application:

FP2.3 only applies to—

(a) a Class 2 building or Class 4 part of a building; and

(b) a Class 9a *health-care building;* and

(c) a Class 9b *early childhood centre*; and

(d) a Class 9c building.

FP2.4 Slop hoppers in health and aged care buildings

Suitable means must be provided in a building containing wards or bedrooms to facilitate the emptying of sewage or dirty water from containers.

Application:

FP2.4 only applies to a Class 9a or 9c building.

FP2.5 Toilet room construction to allow removal of unconscious people

A *sanitary compartment* must be constructed with sufficient space or other means to permit an unconscious occupant to be removed from the compartment.

FP2.6 Microbial control for water systems

NSW FP2.6

Hot water, warm water and cooling water systems installed in a building must control the accumulation of harmful levels of micro-organisms.

Limitation:

FP2.6 does not apply to a system serving only a single *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building.

VERIFICATION METHODS

FV2.1 Sanitary Facilities

(a) FP2.1, for the number of sanitary facilities, is verified when queuing modelling predicts that occupant waiting time for sanitary facilities is at least equivalent to the waiting time predicted using the respective *Deemed-to-Satisfy Provisions*.

(b) For calculations performed under (a), the occupant waiting time is determined as the 90th percentile wait time at maximum population.

(c) Queuing modelling in (a) must reflect the following:

  (i) Function or use of the building.

  (ii) Number and gender of occupants.

  (iii) The disability or other particular needs of the occupants.

  (iv) Occupant usage patterns.

PART F2 SANITARY AND OTHER FACILITIES

Deemed-to-Satisfy Provisions

F2.0 Deemed-to-Satisfy Provisions

Vic F2.0

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* FP2.1 to FP2.6 are satisfied by complying with—

(i) F2.1 to F2.8; and

(ii) for public transport buildings, Part H2; and

(iii) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

F2.1 Facilities in Residential Buildings

(a) For facilities in Class 2 buildings, the following applies:

(i) Within each *sole-occupancy unit*, provide—

(A) a kitchen sink and facilities for the preparation and cooking of food; and

(B) a bath or shower; and

(C) a closet pan; and

(D) a washbasin.

(ii) For laundry facilities, provide either—

(A) in each *sole-occupancy unit*—

(aa) clothes washing facilities, comprising at least one washtub and a space for a washing machine; or

(bb) clothes drying facilities comprising clothes line or a hoist with not less than 7.5 m of line, or space for one heat operated drying cabinet or appliance in the same room as the clothes washing facilities; or

(B) a separate laundry for each 4 *sole-occupancy units*, or part thereof, that must comprise—

(aa) clothes washing facilities, comprising at least one washtub and a space for a washing machine; and

(bb) clothes drying facilities comprising clothes line or a hoist with not less than 7.5 m of line per *sole-occupancy unit*, or space for one heat operated drying cabinet or appliance.

(iii) For the purposes of (a)(i) and (a)(ii), a kitchen sink or washbasin must not be counted as a laundry washtub.

~~(d) If the building contains more than 10 *sole-occupancy units*, or a group of Class 2 buildings on the one allotment contains, in total, more than 10 *sole-occupancy units* — provide a closet pan and washbasin in a compartment or room at or near ground level and accessible to employees without entering a *sole-occupancy unit*.~~

~~(e) For the purposes of (d), a reference to "employees" includes owners, managers, workers and contractors.~~

(b) For facilities in Class 3 buildings other than *residential care buildings*, the following applies:

(i) For residents in each building or group of buildings, provide—

(A) a bath or shower; and

(B) a closet pan; and

(C) a washbasin,

for each 10 residents for whom private facilities are not provided.

(ii) Despite (b)(i), if one urinal is provided for each 25 males up to 50 and one additional urinal for each additional 50 males or part thereof, one closet pan for each 12 males may be provided.

(iii) Facilities for employees must be provided in accordance with F2.3.

(iv) Facilities *required* by (b)(i), (ii) or (iii) need not be situated in the same building.

(c) For facilities in Class 3 *residential care buildings*, the following applies:

(i) For residents in each building or group of buildings, provide—

(A) a shower, closet pan and wash basin for each 8 residents or part thereof for whom private facilities are not provided; and

(B) a suitable bath for each 30 residents or part thereof.

(ii) For the purposes of (c)(i), urinals must not be taken into consideration in calculating the number of facilities.

(d) For each *sole-occupancy unit* in a Class 4 part of a building, provide—

(i) a kitchen sink and facilities for the preparation and cooking of food; and

(ii) a bath or shower; and

(iii) a closet pan; and

(iv) a washbasin; and

(v) clothes washing facilities, comprising a washtub and space in the same room for a washing machine; and

(vi) a clothes line or hoist, or space for a heat-operated drying cabinet or similar appliance for the exclusive use of the occupants; and

(vii) for the purposes of (d), a kitchen sink or washbasin must not be counted as a laundry washtub.

(e) For facilities in Class 9c buildings, the following applies:

(i) For residents in each building or group of buildings, provide—

(A) a closet pan and wash basin for each 6 residents or part thereof for whom private facilities are not provided; and

(B) a shower for each 7 residents or part thereof for whom private facilities are not provided; and

(C) a suitable bath, fixed or mobile.

(ii) In addition to the facilities *required* by (e)(i), provide—

(A) one kitchen or other adequate facility for the preparation and cooking or reheating of food including a kitchen sink and washbasin; and

(B) laundry facilities for the cleansing and drying of linen and clothing or adequate facilities for holding and dispatch or treatment of soiled linen and clothing and the like and the receipt and storage of clean linen; and

(C) one clinical hand washing basin for each 16 residents or part thereof.

(iii) For the purposes of (e)(i), urinals must not be taken into consideration in calculating the number of facilities.~~Sanitary and other facilities~~

~~F2.1 Facilities in residential buildings~~

~~Sanitary and other facilities for Class 2, 3 and 9c buildings and for Class 4 parts of buildings must be provided in accordance with **Table F2.1**.~~

~~Table F2.1 PROVISION OF SANITARY AND OTHER FACILITIES IN RESIDENTIAL BUILDINGS~~

~~Class 2~~
~~Within each *sole-occupancy unit*, provide—~~ ~~(a) a kitchen sink and facilities for the preparation and cooking of food; and~~ ~~(b) a bath or shower; and~~ ~~(c) closet pan; and~~ ~~(d) a washbasin.~~ ~~Laundry facilities, provide either—~~ ~~(a) in each *sole-occupancy unit*—~~ ~~(i) clothes washing facilities, comprising at least one washtub and space for a washing machine; and~~ ~~(ii) clothes drying facilities comprising—~~ ~~(A) clothes line or hoist with not less than 7.5 m of line; or~~ ~~(B) space for one heat-operated drying cabinet or appliance in the same room as the clothes washing facilities; or~~ ~~**Note:** A kitchen sink or washbasin must not be counted as a laundry washtub.~~ ~~(b) a separate laundry for each 4 *sole-occupancy units*, or part thereof—~~ ~~(i) clothes washing facilities comprising at least one washtub and one washing machine; and~~ ~~(ii) clothes drying facilities comprising—~~ ~~(A) clothes line or hoist with not less than 7.5 m of line per *sole-occupancy unit*; or~~ ~~(B) one heat-operated drying cabinet or appliance for each 4 *sole-occupancy units*.~~

~~Facilities for employees —~~ ~~If the building contains more than 10 *sole-occupancy units*, or a group of Class 2 buildings on the one allotment contains, in total, more than 10 *sole-occupancy units* — provide a closet pan and washbasin in a compartment or room at or near ground level and accessible to employees without entering a *sole-occupancy unit*.~~ ~~**Note:** A reference to "employees" includes owners, managers, workers and contractors.~~
~~**Class 3** (other than Class 3 *residential care building**residential aged care buildings*)~~
~~Facilities for residents —~~ ~~For each building or group of buildings, provide —~~ ~~(a) a bath or shower; and~~ ~~(b) a closet pan; and~~ ~~(c) a washbasin,~~ ~~for each 10 residents for whom private facilities are not provided, except that —~~ ~~(c) if one urinal is provided for each 25 males up to 50 and one additional urinal for each additional 50 males or part thereof,~~ ~~one closet pan for each 12 males may be provided.~~ ~~Facilities for employees — see **F2.3**.~~ ~~**Note:** These facilities need not be situated within the building.~~
~~**Class 3** (*residential care building**residential aged care buildings*)~~
~~Facilities for residents —~~ ~~For each building or group of buildings, provide —~~ ~~(a) a shower, closet pan and wash basin for each 8 residents or part thereof for whom private facilities are not provided; and~~ ~~(b) a suitable bath for each 30 residents or part thereof.~~ ~~**Note:** Urinals must not be taken into consideration in calculating the number of facilities.~~
~~**Class 4**~~
~~For each *sole-occupancy unit*, provide —~~ ~~(a) a kitchen sink and facilities for the preparation and cooking of food; and~~ ~~(b) a bath or shower; and~~ ~~(c) a closet pan; and~~ ~~(d) a washbasin; and~~ ~~(e) clothes washing facilities, comprising a washtub and space in the same room for a washing machine; and~~ ~~(f) a clothes line or hoist, or space for a heat-operated drying cabinet or similar appliance for the exclusive use of the occupants.~~ ~~**Note:** A kitchen sink or washbasin must not be counted as a laundry washtub.~~
~~**Class 9c**~~
~~Facilities for residents —~~ ~~For each building or group of buildings, provide —~~ ~~(a) a closet pan and wash basin for each 6 residents or part thereof for whom private facilities are not provided; and~~ ~~(b) a shower for each 7 residents or part thereof for whom private facilities are not provided; and~~ ~~(c) a suitable bath, fixed or mobile.~~ ~~Other facilities, provide —~~ ~~(a) one kitchen or other adequate facility for the preparation and cooking or reheating of food including a kitchen sink and washbasin; and~~ ~~(b) laundry facilities for the cleansing and drying of linen and clothing or adequate facilities for holding and dispatch or treatment of soiled linen and clothing and the like and the receipt and storage of clean linen; and~~ ~~(c) one clinical hand washing basin for each 16 residents or part thereof.~~ ~~**Note:** Urinals must not be taken into consideration in calculating the number of facilities.~~

F2.2 Calculation of number of occupants and facilities

(a) The number of persons accommodated must be calculated according to **D1.13** if it cannot be more accurately determined by other means.

(b) Unless the premises are used predominantly by one sex, sanitary facilities must be provided on the basis of equal numbers of males and females.

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(c) In calculating the number of sanitary facilities to be provided under **F2.1** and **F2.3**, a unisex facility *required* for people with a disability may be counted once for each sex.

(d) For the purposes of this Part, a unisex facility comprises one closet pan, one washbasin and means for the disposal of sanitary ~~towels~~products.

F2.3 Facilities in Class 3 to 9 buildings

(a) Except where permitted by **(b)**, **(c)**, **(f)**, **F2.4(a)** and **F2.4(b)**, separate sanitary facilities for males and females must be provided for Class 3, 5, 6, 7, 8 or 9 buildings in accordance with Specification F2.3.

(b) If not more than 10 people are employed, a unisex facility may be provided instead of separate facilities for each sex.

(c) If the majority of employees are of one sex, not more than 2 employees of the other sex may share toilet facilities if the facilities are separated by means of walls, partitions and doors to afford privacy.

(d) Employees and the public may share the same facilities in a Class 6 and 9b building (other than a *school* or *early childhood centre*) provided the number of facilities provided is not less than the total number of facilities *required* for employees plus those *required* for the public.

(e) Adequate means of disposal of sanitary ~~towels~~products must be provided in sanitary facilities for use by females.

(f) Separate sanitary facilities for males and females need not be provided for patients in a *ward area* of a Class 9a building.

(g) A Class 9a *health-care building* must be provided with—

  (i) one kitchen or other adequate facility for the preparation and cooking or reheating of food including a kitchen sink and washbasin; and

  (ii) laundry facilities for the cleansing and drying of linen and clothing or adequate facilities for holding and dispatch or treatment of soiled linen and clothing, sanitary ~~towels~~products and the like and the receipt and storage of clean linen; and

  (iii) one shower for each 8 patients or part thereof; and

  (iv) one island-type plunge bath in each *storey* containing a *ward area*.

~~Vic F2.3(g)~~Vic F2.3(h) and *(ha)*

(h) A Class 9b *early childhood centre* must be provided with—

  (i) a kitchen or food preparation area with a kitchen sink, separate hand washing facilities, space for a refrigerator and space for cooking facilities, with—

    (A) the facilities protected by a door or gate with child proof latches to prevent unsupervised access to the facilities by children younger than 5 years old; and

    (B) the ability to facilitate supervision of children from the facilities if the *early childhood centre* accommodates children younger than 2 years old; and

  (ii) one bath, shower or shower-bath; and

  (iii) if the centre accommodates children younger than 3 years old—

    (A) a laundry facility comprising a washtub and space in the same room for a washing machine; and

    (B) a bench type baby bath, which is within 1 m of the nappy change bench; and

    (C) a nappy changing bench which—

      (aa) is within 1 m of separate adult hand washing facilities and bench type baby bath; and

      (bb) must be not less than 0.9 m^2 in area and at a height of not less than 850 mm, but not more than 900 mm above the finished floor level; and

      (cc) must have a space not less than 800 mm high, 500 mm wide and 800 mm deep for the storage of steps; and

      (dd) is positioned to permit a staff member changing a nappy to have visibility of the play area at all times.

(i) Class 9b theatres and sporting venues must be provided with one shower for each 10 participants or part thereof.

(j) Not less than one washbasin must be provided where closet pans or urinals are provided.

Tas Table F2.3

~~**Table F2.3 SANITARY FACILITIES IN CLASS 3, 5, 6, 7, 8 OR 9 BUILDINGS**~~

~~**User Group**~~	~~**Closet Pans**~~		~~**Urinals**~~		~~**Washbasins**~~	
	~~**Design Occupancy**~~	~~**Number**~~	~~**Design Occupancy**~~	~~**Number**~~	~~**Design Occupancy**~~	~~**Number**~~
~~**Class 3, 5, 6 and 9 other than *schools***~~						
~~Male employees~~	~~1–20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~	~~1–10~~ ~~11–25~~ ~~26–50~~ ~~>50~~	~~0~~ ~~1~~ ~~2~~ ~~Add 1 per 50~~	~~1–30~~ ~~> 30~~	~~1~~ ~~Add 1 per 30~~
~~Female employees~~	~~1–15~~ ~~> 15~~	~~1~~ ~~Add 1 per 15~~			~~1–30~~ ~~> 30~~	~~1~~ ~~Add 1 per 30~~
~~**Class 7 and 8**~~						
~~Male employees~~	~~1–20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~	~~1–10~~ ~~11–25~~ ~~26–50~~ ~~>50~~	~~0~~ ~~1~~ ~~2~~ ~~Add 1 per 50~~	~~1–20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~
~~Female employees~~	~~1–15~~ ~~> 15~~	~~1~~ ~~Add 1 per 15~~			~~1–20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~
~~**Note:** Sanitary facilities need not be provided for a Class 8 *electricity network substation*~~						
~~**Class 6 — department stores, shopping centres**~~						
~~Male patrons~~	~~1–1200~~ ~~> 1200~~	~~1~~ ~~Add 1 per 1200~~	~~1–600~~ ~~>600~~	~~1~~ ~~Add 1 per 1200~~	~~1–600~~ ~~>600~~	~~1~~ ~~Add 1 per 1200~~
~~Female patrons~~	~~1–300~~ ~~301–600~~ ~~>600~~	~~1~~ ~~2~~ ~~Add 1 per 1200~~			~~1–600~~ ~~601–1200~~ ~~>1200~~	~~1~~ ~~2~~ ~~Add 1 per 1200~~
~~**Note:** Sanitary facilities need not be provided for patrons if the total number of persons accommodated in the building is not more than 600.~~						
~~**Class 6 — restaurants, cafes, bars**~~						
~~Male patrons~~	~~1–100~~ ~~101–300~~ ~~>300~~	~~1~~ ~~2~~ ~~Add 1 per 200~~	~~1–50~~ ~~51–100~~ ~~101–150~~ ~~151–200~~ ~~201–250~~ ~~>250~~	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~Add 1 per 100~~	~~1–50~~ ~~51–200~~ ~~>200~~	~~1~~ ~~2~~ ~~Add 1 per 200~~
~~Female patrons~~	~~1–25~~ ~~26–50~~ ~~51–100~~ ~~101–150~~	~~1~~ ~~2~~ ~~3~~ ~~4~~			~~1–50~~ ~~51–150~~ ~~>150~~	~~1~~ ~~2~~ ~~Add 1 per 200~~

~~User Group~~	~~Closet Pans~~		~~Urinals~~		~~Washbasins~~	
	~~Design Occupancy~~	~~Number~~	~~Design Occupancy~~	~~Number~~	~~Design Occupancy~~	~~Number~~
	~~151 – 200~~ ~~201 – 250~~ ~~>250~~	~~5~~ ~~6~~ ~~Add 1 per 100~~				
~~**Note:** Sanitary facilities need not be provided for patrons if the total number of persons accommodated in the building is not more than 20.~~						
~~Class 9a — ***health-care buildings***~~						
~~Male patients~~	~~1 – 16~~ ~~>16~~	~~2~~ ~~Add 1 per 8~~			~~1 – 8~~ ~~> 8~~	~~1~~ ~~Add 1 per 8~~
~~Female patients~~	~~1 – 16~~ ~~>16~~	~~2~~ ~~Add 1 per 8~~			~~1 – 8~~ ~~> 8~~	~~1~~ ~~Add 1 per 8~~
~~Class 9b — ***schools***~~						
~~Male employees~~	~~1 – 20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~	~~1 – 10~~ ~~11 – 20~~ ~~21 – 45~~ ~~>45~~	~~0~~ ~~1~~ ~~2~~ ~~Add 1 per 30~~	~~1 – 30~~ ~~> 30~~	~~1~~ ~~Add 1 per 30~~
~~Female employees~~	~~1 – 5~~ ~~>5~~	~~1~~ ~~Add 1 per 15~~			~~1 – 30~~ ~~> 30~~	~~1~~ ~~Add 1 per 30~~
~~Male students~~	~~1 – 25~~ ~~26 – 75~~ ~~76 – 150~~ ~~151 – 200~~ ~~> 200~~	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~Add 1 per 100~~	~~1 – 50~~ ~~51 – 100~~ ~~>100~~	~~1~~ ~~2~~ ~~Add 1 per 100~~	~~1 – 10~~ ~~11 – 50~~ ~~51 – 100~~ ~~> 100~~	~~1~~ ~~2~~ ~~3~~ ~~Add 1 per 75~~
~~Female students~~	~~1 – 10~~ ~~11 – 25~~ ~~26 – 100~~ ~~> 100~~	~~1~~ ~~2~~ ~~Add 1 per 25~~ ~~Add 1 per 50~~			~~1 – 10~~ ~~11 – 50~~ ~~51 – 100~~ ~~> 100~~	~~1~~ ~~2~~ ~~3~~ ~~Add 1 per 75~~
~~Class 9b — ***early childhood centres***~~						
~~Children~~	~~1 – 30~~ ~~> 30~~	~~2~~ ~~Add 1 per 15~~			~~1 – 30~~ ~~> 30~~	~~2~~ ~~Add 1 per 15~~
~~**Note:** Facilities for use by children must be —~~ ~~(a) junior pans; and~~ ~~(b) washbasins with a rim height not exceeding 600mm; and~~ ~~(c) accessible from both indoor and outdoor play areas.~~						
~~Class 9b — theatres and cinemas with multiple auditoria, art galleries or the like~~						
		~~1~~		~~1~~		~~1~~

~~User Group~~	~~Closet Pans~~		~~Urinals~~		~~Washbasins~~	
	~~Design Occupancy~~	~~Number~~	~~Design Occupancy~~	~~Number~~	~~Design Occupancy~~	~~Number~~
~~Male participants~~	~~1—20~~ ~~> 20~~	 ~~Add 1 per 20~~	~~1—10~~ ~~> 10~~	 ~~Add 1 per 10~~	~~1—10~~ ~~> 10~~	 ~~Add 1 per 10~~
~~Female participants~~	~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~			~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~
~~Male spectators or patrons~~	~~1—250~~ ~~251—500~~ ~~>500~~	~~1~~ ~~2~~ ~~Add 1 per 500~~	~~1—100~~ ~~>100~~	~~1~~ ~~Add 1 per 100~~	~~1—150~~ ~~>150~~	~~1~~ ~~Add 1 per 150~~
~~Female spectators or patrons~~	~~1—10~~ ~~11—50~~ ~~>51~~	~~1~~ ~~2~~ ~~Add 1 per 60~~			~~1—80~~ ~~81—250~~ ~~251—430~~ ~~> 430~~	~~1~~ ~~2~~ ~~3~~ ~~Add 1 per 200~~
~~Class 9b — single auditorium theatres and cinemas~~						
~~Male patrons~~	~~1—50~~ ~~51—250~~ ~~251—500~~ ~~>500~~	~~0~~ ~~1~~ ~~2~~ ~~Add 1 per 500~~	~~1—50~~ ~~51—100~~ ~~>100~~	~~0~~ ~~1~~ ~~Add 1 per 100~~	~~1—50~~ ~~51—150~~ ~~>150~~	~~0~~ ~~1~~ ~~Add 1 per 150~~
~~Female patrons~~	~~1—50~~ ~~51—110~~ ~~111—170~~ ~~171—230~~ ~~231—250~~ ~~>250~~	~~0~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~Add 1 per 80~~			~~1—50~~ ~~51—150~~ ~~>150~~	~~0~~ ~~1~~ ~~Add 1 per 150~~
~~Class 9b — sports venues or the like~~						
~~Male participants~~	~~1—20~~ ~~> 20~~	~~1~~ ~~Add 1 per 20~~	~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~	~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~
~~Female participants~~	~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~			~~1—10~~ ~~> 10~~	~~1~~ ~~Add 1 per 10~~
~~Male spectators or patrons~~	~~1—250~~ ~~251—500~~ ~~> 500~~	~~1~~ ~~2~~ ~~Add 1 per 500~~	~~1—100~~ ~~> 100~~	~~1~~ ~~Add 1 per 100~~	~~1—150~~ ~~> 150~~	~~1~~ ~~Add 1 per 150~~
~~Female spectators or patrons~~	~~1—15~~ ~~16—60~~ ~~61—120~~	~~1~~ ~~2~~ ~~3~~			~~1—60~~ ~~61—200~~ ~~201—350~~	~~1~~ ~~2~~ ~~3~~

~~**User Group**~~	~~**Closet Pans**~~		~~**Urinals**~~		~~**Washbasins**~~	
	~~**Design Occupancy**~~	~~**Number**~~	~~**Design Occupancy**~~	~~**Number**~~	~~**Design Occupancy**~~	~~**Number**~~
	~~> 120~~	~~Add 1 per 70~~			~~> 350~~	~~Add 1 per 150~~
~~**Class 9b — churches, chapels or the like**~~						
~~Male patrons~~	~~1 — 300~~ ~~>300~~	~~1~~ ~~Add 1 per 500~~	~~1 — 200~~ ~~> 200~~	~~1~~ ~~Add 1 per 200~~	~~1 — 250~~ ~~> 250~~	~~1~~ ~~Add 1 per 250~~
~~Female patrons~~	~~1 — 150~~ ~~> 150~~	~~1~~ ~~Add 1 per 150~~			~~1 — 250~~ ~~> 250~~	~~1~~ ~~Add 1 per 250`~~
~~**Class 9b — public halls, function rooms or the like**~~						
~~Male patrons~~	~~1 — 100~~ ~~>100~~	~~1~~ ~~Add 1 per 200~~	~~1 — 50~~ ~~51 — 100~~ ~~101 — 150~~ ~~151 — 200~~ ~~201 — 250~~ ~~>250~~	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~Add 1 per 100~~	~~1 — 50~~ ~~51 — 200~~ ~~>200~~	~~1~~ ~~2~~ ~~Add 1 per 200~~
~~Female patrons~~	~~1 — 25~~ ~~26 — 50~~ ~~51 — 100~~ ~~101 — 150~~ ~~151 — 200~~ ~~201 — 250~~ ~~>250~~	~~1~~ ~~2~~ ~~3~~ ~~4~~ ~~5~~ ~~6~~ ~~Add 1 per 100~~			~~1 — 50~~ ~~51 — 150~~ ~~>150~~	~~1~~ ~~2~~ ~~Add 1 per 200~~
~~**Note:** Sanitary facilities need not be provided for patrons if the total number of persons accommodated in the building is not more than 20.~~						
~~**Notes:**~~ ~~1. Number — means the number of facilities *required*.~~ ~~2. > — means greater than~~ ~~3. Employees — a reference to employees includes owners and managers using the building.~~ ~~4. A reference to "add 1 per 100 or 150, 250, 500" etc. includes any part of that number.~~						

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F2.4 Accessible sanitary facilities

In a building *required* to be *accessible*—

SA F2.4(a)

(a) *accessible* unisex *sanitary compartments* must be provided in *accessible* parts of the building in accordance with Table F2.4(a); and

SA F2.4(b)

(b) *accessible* unisex showers must be provided in accordance with Table F2.4(b); and

(c) at each bank of toilets where there is one or more toilets in addition to an *accessible* unisex *sanitary compartment* at that bank of toilets, a *sanitary compartment* suitable for a person with an ambulant disability in accordance with AS 1428.1 must be provided for use by males and females; and

(d) an *accessible* unisex *sanitary compartment*~~-~~, other than one *required* by (j), must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary ~~towels~~products; and

(e) the circulation spaces, fixtures and fittings of all *accessible* sanitary facilities provided in accordance with Table F2.4(a) and Table F2.4(b) must comply with the requirements of AS 1428.1; and

(f) an *accessible* unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only; and

(g) where two or more of each type of *accessible* unisex sanitary facility are provided, the number of left and right handed mirror image facilities must be provided as evenly as possible; and

(h) where male sanitary facilities are provided at a separate location to female sanitary facilities, *accessible* unisex sanitary facilities are only *required* at one of those locations; and

(i) an *accessible* unisex *sanitary compartment* or an *accessible* unisex shower need not be provided on a *storey* or level that is not *required* by D3.3(f) to be provided with a passenger lift or ramp complying with AS 1428.1.

(j) in addition to those *required* by (a), one unisex *accessible sanitary compartment* complying with Specification F2.4 must be provided in an *accessible* part of any—

  (i) Class 6 shopping centre that has a design occupancy greater than 1400 people, determined in accordance with Table D1.13 for each part of the building that is used as a shop; and

  (ii) Class 9b *public building*, other than one that is *required* to comply with H2.8, and in which at least one *accessible* unisex *sanitary compartment* is *required* by (a).

Table F2.4(a) ACCESSIBLE UNISEX SANITARY COMPARTMENTS

Class of building	Minimum accessible unisex sanitary compartments to be provided
Class 1b	(a) Not less than 1; and (b) where private *accessible* unisex *sanitary compartments* are provided for every *accessible* bedroom, common *accessible* unisex *sanitary compartments* need not be provided.
Class 2	Where *sanitary compartments* are provided in common areas, not less than 1.
Class 3 and Class 9c	(a) In every *accessible sole-occupancy unit* provided with *sanitary compartments* within the *accessible sole-occupancy unit*, not less than 1; and (b) at each bank of *sanitary compartments* containing male and female *sanitary compartments* provided in common areas, not less than 1.
Class 5, 6, 7, 8 or 9 — except for within a *ward area* of a Class 9a *health-care building*	Where F2.3 requires closet pans— (a) 1 on every *storey* containing *sanitary compartments*; and (b) where a *storey* has more than 1 bank of *sanitary compartments* containing male and female *sanitary compartments*, at not less than 50% of those banks.
Class 10a except—	At each bank of *sanitary compartments* containing male

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Class of building	Minimum accessible unisex sanitary compartments to be provided
(a) a Class 10a appurtenant to another Class of building; and (b) a *sanitary compartments* dedicated to a single caravan/camping site	and female *sanitary compartments*, not less than 1.

SA Table F2.4(a)(i)

Table F2.4(b) ACCESSIBLE UNISEX SHOWERS

Class of building	Minimum accessible unisex showers to be provided
Class 1b	(a) Not less than 1; and (b) where private *accessible* unisex showers are provided for every *accessible* bedroom, common *accessible* unisex showers need not be provided.
Class 2	Where showers are provided in common areas, not less than 1.
Class 3 and Class 9c	(a) In every *accessible sole-occupancy unit* provided with showers within the *accessible sole-occupancy unit*, not less than 1; and (b) 1 for every 10 showers or part thereof provided in common areas.
Class 5, 6, 7, 8 or 9 — except for within a *ward area* of a Class 9a *health-care building*	Where **F2.3** requires 1 or more showers, not less than 1 for every 10 showers or part thereof.
Class 10a except— (a) a Class 10a appurtenant to another Class of building; and (b) a *sanitary compartment* dedicated to a single caravan/camping site	Where showers are provided, 1 for every 10 showers or part thereof.

SA Table F2.4(b)(i)

F2.8 Waste management

(a) In a Class 9a *health-care building*, at least one slop-hopper or other device, other than a water closet pan or urinal, must be provided—
   (i) on any *storey* containing *ward areas* or bedrooms to facilitate emptying of containers of sewage or dirty water; and
   (ii) with a flushing apparatus, tap and grating.

(b) In a Class 9c building, the following facilities must be provided for every 60 beds or part thereof on each storey containing *resident use areas*—
   (i) one slop-hopper or other device other than a water closet pan or urinal for the safe handling and disposal of liquid and solid wastes with a flushing apparatus, tap and grating; and
   (ii) an appliance for the disinfection of pans or an adequate means to dispose of receptacles.

Tas F2.101, *F2.102*

Vic F2.101

Explanatory information: Cross-volume considerations

NCC Volume Three contains a number of plumbing and drainage provisions which are relevant to facilities. These include, but may not be limited to, the following:

Access for maintenance of plumbing and drainage	Parts B1, B2, B3, C1 and~~,~~ C2~~, E1, F1 and F2~~
Heated water temperature control for facilities used for personal hygiene	Part B2

SPECIFICATION F2.3 Sanitary facilities in Class 3, 5, 6, 7, 8 or 9 buildings

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1. Scope

This Specification sets out the number and type of sanitary facilities *required* in Class 3, 5, 6, 7, 8 and 9 buildings.

2. Application

(a) The number of *required* sanitary facilities must be determined in accordance with the following:

(i) Class 3, 5, 6 and 9 buildings, other than *schools* — use Tables 1a-c.

(ii) Class 7 and 8 buildings — use Tables 2a-c.

(iii) Class 6 buildings, for —

(A) department stores and shopping centres — use Tables 3a-c; and

(B) restaurants, cafes and bars — use Tables 4a-c.

(iv) Class 9a *health-care buildings* — use Tables 5a and b.

(v) Class 9b buildings, for —

(A) *schools* — use Tables 6a-c; and

(B) *early childhood centres* — use Tables 7a and b; and

(C) theatres and cinemas with multiple auditoria, art galleries or the like — use Tables 8a-c; and

(D) single auditorium theatres and cinemas — use Tables 9a-c; and

(E) sports venues or the like — use Tables 10a-c; and

(F) churches, chapels or the like — use Tables 11a-c; and

(G) public halls, function rooms or the like — use Tables 12a-c.

(b) In the tables referred to in (a)—

(i) > means greater than; and

(ii) any reference to "employees" includes owners and managers using the building; and

(iii) any reference to "add 1 per 100 or 150, 200, 500" etc. includes any part of that number.

(c) In a Class 9b *early childhood centre*, facilities for use by children must be—

(i) junior pans; and

(ii) washbasins with a rim height not exceeding 600 mm; and

(iii) accessible from both the indoor and outdoor play areas.

3. Exemptions

(a) Sanitary facilities need not be provided for a Class 8 *electricity network substation*.

(a) In a Class 6 department store or shopping centre, sanitary facilities need not be provided for patrons if the total number of persons accommodated in the building is not more than 600.

(c) In a —

(i) Class 6 restaurant, cafe or bar; or

(ii) Class 9b public hall, function room or the like,

sanitary facilities need not be provided for patrons if the total number of persons accommodated in the building is not more than 20.

Table 1a Closet pans — Class 3, 5, 6 and 9 buildings other than schools

User group (design occupancy)	Number of facilities
Male employees (1 – 20)	1
Male employees (> 20)	Add 1 per 20
Female employees (1 – 15)	1
Female employees (> 15)	Add 1 per 15

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Table 1b Urinals — Class 3, 5, 6 and 9 buildings other than schools

User group (design occupancy)	Number of facilities
Male employees (1 – 10)	0
Male employees (11 – 25)	1
Male employees (26 – 50)	2
Male employees (> 50)	Add 1 per 50

Table 1c Washbasins — Class 3, 5, 6 and 9 buildings other than schools

User group (design occupancy)	Number of facilities
Male employees (1 – 30)	1
Male employees (> 30)	Add 1 per 30
Female employees (1 – 30)	1
Female employees (> 30)	Add 1 per 30

Table 2a Closet pans — Class 7 and 8 buildings

User group (design occupancy)	Number of facilities
Male employees (1 – 20)	1
Male employees (> 20)	Add 1 per 20
Female employees (1 – 15)	1
Female employees (> 15)	Add 1 per 15

Table 2b Urinals — Class 7 and 8 buildings

User group (design occupancy)	Number of facilities
Male employees (1 – 10)	0
Male employees (11 – 25)	1
Male employees (26 – 50)	2
Male employees (> 50)	Add 1 per 50

Table 2c Washbasins — Class 7 and 8 buildings

User group (design occupancy)	Number of facilities
Male employees (1 – 20)	1
Male employees (> 20)	Add 1 per 20
Female employees (1 – 20)	1
Female employees (> 20)	Add 1 per 20

Table 3a Closet pans — Class 6 department stores and shopping centres

User group (design occupancy)	Number of facilities
Male patrons (1 – 1200)	1
Male patrons (> 1200)	Add 1 per 1200
Female patrons (1 – 300)	1
Female patrons (301 – 600)	2
Female patrons (> 600)	Add 1 per 1200

Table 3b Urinals — Class 6 department stores and shopping centres

User group (design occupancy)	Number of facilities
Male patrons (1 – 600)	1
Male patrons (> 20)	Add 1 per 200

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Table 3c Washbasins — Class 6 department stores and shopping centres

User group (design occupancy)	Number of facilities
Male patrons (1 – 600)	1
Male patrons (> 600)	Add 1 per 1200
Female patrons (1 – 600)	1
Female patrons (601 – 1200)	2
Female patrons (> 1200)	Add 1 per 1200

Table 4a Closet pans — Class 6 restaurants, cafes, bars

User group (design occupancy)	Number of facilities
Male patrons (1 – 100)	1
Male patrons (101 – 300)	2
Male patrons (> 300)	Add 1 per 200
Female patrons (1 – 25)	1
Female patrons (26 – 50)	2
Female patrons (51 – 100)	3
Female patrons (101 – 150)	4
Female patrons (151 – 200)	5
Female patrons (201 – 250)	6
Female patrons (>250)	Add 1 per 100

Table 4b Urinals — Class 6 restaurants, cafes, bars

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	1
Male patrons (51 – 100)	2
Male patrons (101 – 150)	3
Male patrons (151 – 200)	4
Male patrons (201 – 250)	5
Male patrons (> 250)	Add 1 per 100

Table 4c Washbasins — Class 6 department stores and shopping centres

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	1
Male patrons (51 – 200)	2
Male patrons (>200)	Add 1 per 200
Female patrons (1 – 50)	1
Female patrons (51 – 150	2
Female patrons (> 150)	Add 1 per 200

Table 5a Closet pans — Class 9a health-care buildings

User group (design occupancy)	Number of facilities
Male patients (1 – 16)	2
Male patients (> 16)	Add 1 per 8
Female patients (1 – 16)	2
Female patients (> 16)	Add 1 per 8

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Table 5b Washbasins — Class 9a health-care buildings

User group (design occupancy)	Number of facilities
Male patients (1 – 8)	1
Male patients (> 8)	Add 1 per 8
Female patients (1 – 8)	1
Female patients (> 8)	Add 1 per 8

Table 6a Closet pans — Class 9b schools

User group (design occupancy)	Number of facilities
Male employees (1 – 20)	1
Male employees (> 20)	Add 1 per 20
Female employees (1 – 5)	1
Female employees (> 5)	Add 1 per 15
Male students (1 – 25)	1
Male students (26 – 75)	2
Male students (76 – 150)	3
Male students (151 – 200)	4
Male students (> 200)	Add 1 per 100
Female students (1 – 10)	1
Female students (11 – 25)	2
Female students (26 – 100)	Add 1 per 25
Female students (> 100)	Add 1 per 50

Table 6b Urinals — Class 9b schools

User group (design occupancy)	Number of facilities
Male employees (1 – 10)	0
Male employees (11 – 20)	1
Male employees (21 – 45)	2
Male employees (> 45)	Add 1 per 30
Male students (1 – 50)	1
Male students (51 – 100)	2
Male patrons (> 100)	Add 1 per 100

Table 6c Washbasins — Class 9b schools

User group (design occupancy)	Number of facilities
Male employees (1 – 30)	1
Male employees (> 30)	Add 1 per 30
Female employees (1 – 30)	1
Female employees (> 30)	Add 1 per 30
Male students (1 – 10)	1
Male students (11 – 50)	2
Male students (51 – 100)	3
Male students (> 100)	Add 1 per 75
Female students (1 – 10)	1
Female students (11 – 50)	2
Female students (51 – 100)	3
Female students (> 100)	Add 1 per 75

Deemed-to-Satisfy Provisions

Table 7a Closet pans — Class 9b early childhood centres

User group (design occupancy)	Number of facilities
Children (1 – 30)	2
Children (> 30)	Add 1 per 15

Table 7b Washbasins — Class 9a health-care buildings

User group (design occupancy)	Number of facilities
Children (1 – 30)	2
Children (> 30)	Add 1 per 15

Table 8a Closet pans — Class 9b theatres, cinemas with multiple auditoria, art galleries and the like

User group (design occupancy)	Number of facilities
Male participants (1 – 20)	1
Male participants (> 20)	Add 1 per 20
Female participants (1 – 10)	1
Female participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 250)	1
Male spectators or patrons (251 – 500)	2
Male spectators or patrons (> 500)	Add 1 per 500
Female spectators or patrons (1 – 10)	1
Female spectators or patrons (11 – 50)	2
Female spectators or patrons (> 51)	Add 1 per 60

Table 8b Urinals — Class 9b theatres, cinemas with multiple auditoria, art galleries and the like

User group (design occupancy)	Number of facilities
Male participants (1 – 10)	1
Male participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 100)	1
Male spectators or patrons (> 100)	Add 1 per 100

Table 8c Washbasins — Class 9b theatres, cinemas with multiple auditoria, art galleries and the like

User group (design occupancy)	Number of facilities
Male participants (1 – 10)	1
Male participants (> 10)	Add 1 per 10
Female participants (1 – 10)	1
Female participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 150)	1
Male spectators or patrons (> 150)	Add 1 per 150
Female spectators or patrons (1 – 80)	1
Female spectators or patrons (81 – 250)	2
Female spectators or patrons (251 – 430)	3
Female spectators or patrons (> 430)	Add 1 per 200

Table 9a Closet pans — Class 9b single auditorium theatres and cinemas

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	0
Male patrons (51 – 250)	1
Male patrons (251 – 500)	2

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User group (design occupancy)	Number of facilities
Male patrons (> 500)	Add 1 per 500
Female patrons (1 – 50)	0
Female patrons (51 – 110)	3
Female patrons (111 – 170)	4
Female patrons (171 – 230)	5
Female patrons (231 – 250)	6
Female patrons (> 250)	Add 1 per 80

Table 9b Urinals — Class 9b single auditorium theatres and cinemas

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	0
Male patrons (51 – 100)	1
Male patrons (> 100)	Add 1 per 100

Table 9c Washbasins — Class 9a health-care buildings

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	0
Male patrons (51 – 100)	1
Male patrons (> 100)	Add 1 per 100
Female patrons (1 – 50)	0
Female patrons (51 – 100)	1
Female patrons (> 100)	Add 1 per 100

Table 10a Closet pans — Class 9b sports venues and the like

User group (design occupancy)	Number of facilities
Male participants (1 – 20)	1
Male participants (> 20)	Add 1 per 20
Female participants (1 – 10)	1
Female participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 250)	1
Male spectators or patrons (251 – 500)	2
Male spectators or patrons (> 500)	Add 1 per 500
Female spectators or patrons (1 – 15)	1
Female spectators or patrons (15 – 60)	2
Female spectators or patrons (61 – 120)	3
Female spectators or patrons (>120)	Add 1 per 70

Table 10b Urinals — Class 9b sports venues and the like

User group (design occupancy)	Number of facilities
Male participants (1 – 10)	1
Male participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 100)	1
Male spectators or patrons (> 100)	Add 1 per 100

Table 10c Washbasins — Class 9b sports venues or the like

User group (design occupancy)	Number of facilities
Male participants (1 – 10)	1

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User group (design occupancy)	Number of facilities
Male participants (> 10)	Add 1 per 10
Female participants (1 – 10)	1
Female participants (> 10)	Add 1 per 10
Male spectators or patrons (1 – 150)	1
Male spectators or patrons (> 150)	Add 1 per 150
Female spectators or patrons (1 – 60)	1
Female spectators or patrons (61 – 200)	2
Female spectators or patrons (201 – 350)	3
Female spectators or patrons (> 350)	Add 1 per 150

Table 11a Closet pans — Class 9b churches, chapels or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 300)	1
Male patrons (> 300)	Add 1 per 300
Female patrons (1 – 150)	1
Female patrons (> 150)	Add 1 per 150

Table 11b Urinals — Class 9b churches, chapels or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 200)	1
Male patrons (> 200)	Add 1 per 200

Table 11c Washbasins — Class 9b churches, chapels or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 250)	1
Male patrons (> 250)	Add 1 per 250
Female patrons (1 – 250)	1
Female patrons (> 250)	Add 1 per 250

Table 12a Closet pans — Class 9b public halls, function rooms or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 100)	1
Male patrons (> 100)	Add 1 per 200
Female patrons (1 – 25)	1
Female patrons (26 – 50)	2
Female patrons (51 – 100)	3
Female patrons (101 – 150)	4
Female patrons (151 – 200)	5
Female patrons (201 – 250)	6
Female patrons (> 250)	Add 1 per 100

Table 12b Urinals — Class 9b public halls, function rooms or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	1
Male patrons (51 – 100)	2
Male patrons (101 – 150)	3
Male patrons (151 – 200)	4

User group (design occupancy)	Number of facilities
Male patrons (201 – 250)	5
Male patrons (> 250)	Add 1 per 100

Table 12c Washbasins — Class 9b public halls, function rooms or the like

User group (design occupancy)	Number of facilities
Male patrons (1 – 50)	1
Male patrons (51 – 200)	2
Male patrons (> 200)	Add 1 per 200
Female patrons (1 – 50)	1
Female patrons (51 – 150)	2
Female patrons (> 150)	Add 1 per 200

SPECIFICATION F2.4 UNISEX ACCESSIBLE SANITARY COMPARTMENTS - ADDITIONAL FEATURES

Deemed-to-Satisfy Provisions

1. Scope

This Specification contains the requirements for unisex *accessible sanitary compartments* that are *required* to include additional features to assist people who may be unable to use standard unisex *accessible* sanitary facilities independently.

2. Application

This Specification only applies to a unisex *accessible sanitary compartments* that is *required* by F2.4(j) or H2.8(b).

3. Circulation space

(a) The following minimum *circulation spaces* are *required* within the unisex *accessible sanitary compartment*:

   (i) Turning space: a full circle of 1125 mm radius.

   (ii) Each side of pan: 900 mm measured from each outside edge of the pan.

   (iii) In front of pan: 2350 mm measured from wall behind the pan (therefore includes the pan itself).

   (iv) For a washbasin: the width of the basin (450 mm) increasing to a width of 1350 mm measured at a distance of 750 mm out from the wall against which the washbasin is mounted then continuing at that width for a further 800 mm from the wall to a total of 1550 mm out from the wall.

   (v) For changing rails: the width of the rails increasing to a width of 1350 mm at a distance of 750 mm out from the wall to which the rails are fixed then continuing at that width for a further 800 mm to a total of 1550 mm out from the wall.

   (vi) For a shower (if provided): 2 m x 1.6 m.

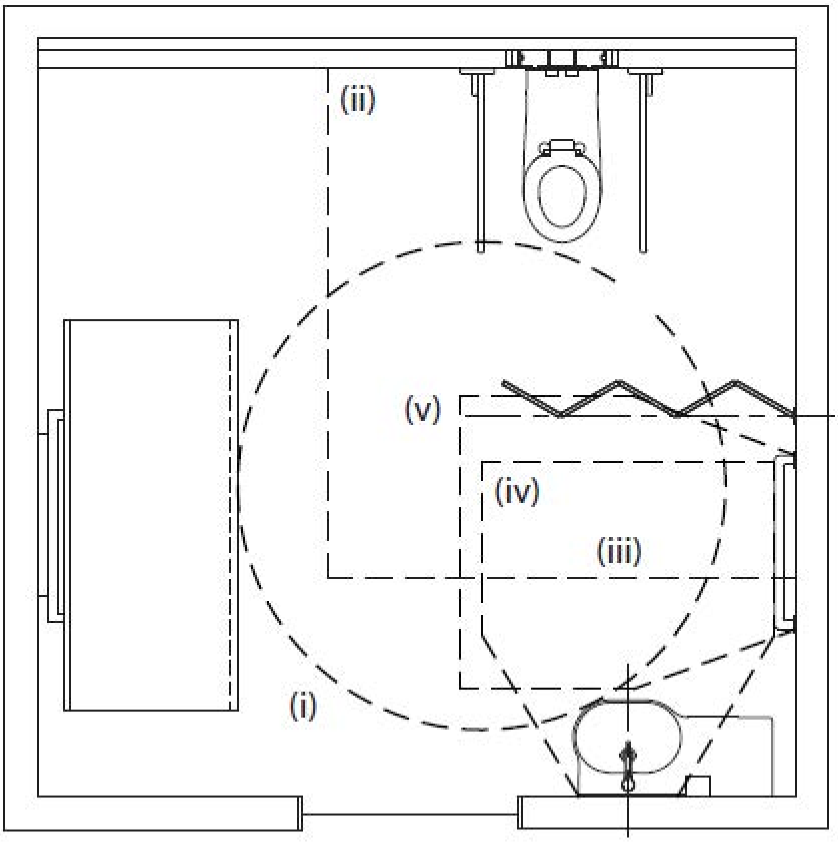
(b) All *required circulation spaces* must extend for a minimum height of 2 m above finished floor level.

(c) *Required circulation spaces* may overlap.

(d) Certain fixtures and fittings may encroach into a *required circulation space*, as specified in this Specification.

(e) The *circulation spaces required* by Clause 3(a) are depicted in Figure 1.

Figure 1 Circulation spaces



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Notes:

1. The Roman numerals in the diagram correspond with the number for each *circulation space required* under Clause 3(a), which are also denoted by Roman numerals.
2. A shower (optional) has not been included in the above layout.
3. The diagram depicts a fixed change table. A fold away change table may impede a *required circulation space*, but only when in the open position (in use) — see Clause 5(c).

4. Hoist

(a) A hoist must be installed to enable a person to be lifted from a wheelchair onto the change table, and back again.

(b) The hoist must have a maximum safe working load of not less than 180 kg, and be capable of sustaining a static load of not less than 1.5 times the rated load.

(c) The hoist must be ceiling mounted, and must be permanently installed.

5. Change table

(a) A change table must be provided that is—

- (i) permanently installed, with one of the long edges up against a wall and with a safety rail on the opposite side; and
- (ii) height adjustable between 450 mm and 900 mm above finished floor level; and
- (iii) not less than 700 mm wide; and
- (iv) not less than 1.8 m long.

(b) A change table must have a maximum safe working load of at least 180 kg, including when raising or lowering the table.

(c) A change table may encroach into a *required circulation space* only if it is able to be folded out of the *circulation space* when not in use.

6. Toilet

(a) A toilet pan, backrest, seat and flushing controls must be provided and must comply with AS 1428.1, except as varied by (b).

(b) The toilet pan must be a peninsula-type, with at least 900 mm clear space provided from each side of the pan, between the edge of the pan and any adjacent wall or obstruction, in accordance with Clause 3(a)(ii).

7. Drop-down grab-rails

(a) Drop-down grab-rails must be provided as follows:

- (i) Drop-down grab-rails must be provided on each side of the pan, set between 750 mm and 770 mm apart, equidistant (i.e. 375 mm to 385 mm) from the centreline of the pan.
- (ii) The height of the grab-rail must be between 800 mm and 810 mm from finished floor level to the top of the rail.
- (iii) The length of the grab-rail must be not less than 850 mm.
- (iv) The rail diameter of the grab-rail must be 30 mm to 40 mm.
- (v) the grab rail must be securely fixed and, when lowered, able to withstand a force of not less than 1100 Newtons (N) in any direction.
- (vi) the graib rail must be able to be lifted up or swung away to allow unimpeded access to each side of the pan.

(b) At least one of the drop-down grab-rails must include a toilet roll holder.

(c) Drop-down grab-rails that can be lifted up or swung aside may encroach into a *required circulation space* only when they are in the in-use position.

8. Hand-wash basin

A hand-wash basin must be provided in accordance with AS 1428.1.

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9. Fixtures and fittings

(a) At least one of each of the following must be provided:

  (i) Wall-mounted mirror.

  (ii) Towel dispenser or hand dryer.

  (iii) Soap dispenser.

  (iv) Clothes hook.

  (v) Bin for the hygienic disposal of incontinence pads/wipes.

  (vi) Hook for the storage of a sling.

  (vii) Retractable privacy screen between the toilet pan and the remainder of the room.

  (viii) Changing rails.

  (ix) Toilet roll holder — in accordance with Clause 7(b).

(b) The fixtures and fittings required by (a)(i) to (v) must be installed in accordance with AS 1428.1.

(c) The clothes hook must be installed beside the change table, at a height of 1.5 m above finished floor level, and at least 500 mm away from any internal corner.

(d) The retractable privacy screen must be wall-mounted and non-removable.

(e) The changing rails must be two parallel rails, each with a diameter of 30 to 40 mm, installed with—

  (i) installed with the top of the lower rail between 800 mm and 810 mm above the finished floor level; and

  (ii) installed with the top of the upper rail between 1000 mm and 1010 mm, above finished floor level; and

  (iii) able to withstand a force of not less than 1100 N in any direction.

(f) The fixtures and fittings *required* by (a) may encroach into a *required circulation space*.

10. Door and door controls

The door must—

(a) provide a minimum opening width of 850 mm; and

(b) have a hold-open function; and

(c) otherwise comply with AS 1428.1.

11. Signage

(a) Signage must incorporate—

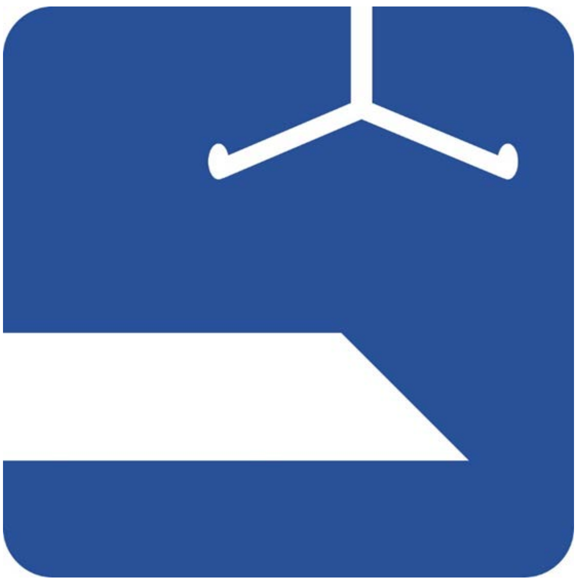
  (i) the symbol shown in Figure 2; and

  (ii) the words “Hoist / Table” or the abbreviation “H/T”.

(b) The symbol required by (a)(i) must have a blue (B21, ultramarine) background with the hoist and table elements shown in white.

(c) Signage must be braille and tactile signage complying with Specification D3.6.

Figure 2 Hoist / Table symbol



PART F3 ROOM HEIGHTS

PERFORMANCE REQUIREMENTS

FP3.1 Room or space heights

Vic FP3.1

A *habitable room* or space must have sufficient height that does not unduly interfere with its intended function.

VERIFICATION METHODS

FV3.1

(a) Compliance with FP3.1 is verified where the height of a *habitable room* or space provides an appropriate *activity support level* that does not unduly interfere with its intended function.

(b) For the purposes of (a), the *activity support level* must consider the dimensions of—

  (i) doors, *required exits*, ramps, barriers, stairs and *windows*; and

  (ii) fixed fittings and *services*; and

  (iii) fixed and moveable equipment or furniture; and

  (iv) occupant circulation spaces.

PART F3 ROOM HEIGHTS

Deemed-to-Satisfy Provisions

F3.0 Deemed-to-Satisfy Provisions

Vic F3.0

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* FP3.1 is satisfied by complying with—
  (i) F3.1; and
  (ii) for *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

F3.1 Height of rooms and other spaces

The height of rooms and other spaces must be not less than—

(a) in a Class 2 or 3 building or Class 4 part of a building—
  (i) a kitchen, laundry, or the like — 2.1 m; and
  (ii) a corridor, passageway or the like — 2.1 m; and
  (iii) a *habitable room* excluding a kitchen — 2.4 m; and
  (iv) in a room or space with a sloping ceiling or projections below the ceiling line within—
    (A) a *habitable room*—
      (aa) in an attic — a height of not less than 2.2 m for not less than two-thirds of the *floor area* of the room or space; and
      (bb) in other rooms — a height of not less than 2.4 m for not less than two-thirds of the *floor area* of the room or space; and
    (B) a non-*habitable room* — a height of not less than 2.1 m for not less than two-thirds of the *floor area* of the room or space; and

  when calculating the *floor area* of a room or space, any part that has a ceiling height of less than 1.5 m is not included; and

(b) in a Class 5, 6, 7 or 8 building—
  (i) except as allowed in (ii) and (f) — 2.4 m; and
  (ii) a corridor, passageway, or the like — 2.1 m; and

(c) in a Class 9a *health-care building*—
  (i) a *patient care area* — 2.4 m; and
  (ii) an operating theatre or delivery room — 3 m; and
  (iii) a treatment room, clinic, waiting room, passageway, corridor, or the like — 2.4 m; and

(d) in a Class 9b building—
  (i) a *school* classroom or other *assembly building* or part that accommodates not more than 100 persons — 2.4 m; and
  (ii) a theatre, public hall or other *assembly building* or part that accommodates more than 100 persons — 2.7 m; and
  (iii) a corridor—
    (A) that serves an *assembly building* or part that accommodates not more than 100 persons — 2.4 m; or
    (B) that serves an *assembly building* or part that accommodates more than 100 persons — 2.7 m; and
  (iv) the number of persons accommodated must be calculated according to D1.13; and

(e) in a Class 9c building—
  (i) a kitchen, laundry, or the like — 2.1 m; and
  (ii) a corridor, passageway or the like — 2.4 m; and
  (iii) a *habitable room* excluding a kitchen — 2.4 m; and

Deemed-to-Satisfy Provisions

(f) in any building—
   (i) a bathroom, shower room, *sanitary compartment*, other than a *sanitary compartment required* to comply with F2.4(j), airlock, tea preparation room, pantry, store room, garage, car parking area, or the like — 2.1 m; and
   (ii) a commercial kitchen — 2.4 m; and
   (iii) above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like.
   (iv) a *sanitary compartment required* to comply with F2.4(j) — 2.4 m

Vic F3.101 — F3.103

PART F4 LIGHT AND VENTILATION

PERFORMANCE REQUIREMENTS

FP4.1 Natural lighting

Sufficient openings must be provided and distributed in a building so that natural light, when available, provides an average daylight factor of~~level of *illuminance*~~ not less than 2% appropriate to the function or use of that part of the building.

FP4.2 Artificial lighting

Artificial lighting must be installed to provide an ~~level of~~ *illuminance* of at least 20 lux appropriate to the function or use of the building to enable safe movement by occupants.

FP4.3 Outdoor air supply

A space in a building used by occupants must be provided with means of ventilation with *outdoor air* which will maintain adequate air quality.

FP4.4 Mechanical ventilation to control odours and contaminants

A mechanical air-handling system installed in a building must control—

(a) the circulation of objectionable odours; and

(b) the accumulation of harmful contamination by micro-organisms, pathogens and toxins.

FP4.5 Disposal of contaminated air

Contaminated air must be disposed of in a manner which does not unduly create a nuisance or hazard to people in the building or *other property*.

VERIFICATION METHODS

FV4.1 Verification of suitable indoor air quality

For a Class 2, 3, 5, 6, 9b or 9c building or Class 4 part of a building, compliance with FP4.3 and FP4.4(a) is verified when it is determined that the building under typical conditions in use is provided with sufficient ventilation with *outdoor air* such that contaminant levels do not exceed the limits specified in Table FV4.1~~Table FV4.1~~.

~~**Table FV4.1 MAXIMUM CONTAMINANT LIMITS FOR ACCEPTABLE INDOOR AIR QUALITY**~~

~~**Pollutant**~~		~~**Averaging time**~~	~~**Maximum air quality value**~~
~~Carbon dioxide, CO_2~~		~~8 hours~~	~~850 ppm Note 1~~
~~Carbon monoxide, CO~~		~~15 minutes~~ ~~30 minutes~~ ~~1 hour~~ ~~8 hours~~	~~90 ppm~~ ~~50 ppm~~ ~~25 ppm~~ ~~10 ppm~~
~~Formaldehyde, CH_2O~~		~~30 minutes~~	~~0.1 mg/m^3~~
~~Nitrogen dioxide, NO_2~~		~~1 year~~ ~~1 hour~~	~~40 µg/m^3 (0.0197 ppm) Note 2~~ ~~200 µg/m^3 (0.0987 ppm)~~
~~Ozone, O_3~~		~~8 hour, daily maximum~~	~~100 µg/m^3(0.0473 ppm)~~
~~Particulate matter, PM~~	~~$PM_{2.5}$~~	~~1 year~~ ~~24 hour (99th percentile)~~	~~10 µg/m^3~~ ~~25 µg/m^3~~
	~~PM_{10}~~	~~1 year~~ ~~24 hour (99th percentile)~~	~~20 µg/m^3~~ ~~50 µg/m^3~~
~~Total volatile organic compounds~~		~~1 hour~~	~~500 µg/m^3~~
~~**Notes:**~~			

~~Pollutant~~	~~Averaging time~~	~~Maximum air quality value~~
~~1.~~	~~Based on body odour metric (i.e. 450 ppm above ambient CO_2 level of 400 ppm and demand control ventilation provisions in AS 1668.2).~~	
~~2.~~	~~Based on pressure of 101.325 kPa and temperature of 25°C (i.e. the conversion is mg/m^3 = ppm (molecular weight/24.4)).~~	

Table FV4.1 Maximum contaminant limits for acceptable indoor air quality

Pollutant	Averaging time	Maximum air quality value (ppm, mg/m^3 or $\mu g/m^3$)
Carbon dioxide, CO_2	8 hours	850 ppm [Note 1]
Carbon monoxide, CO	15 minutes	90 ppm
Carbon monoxide, CO	30 minutes	50 ppm
Carbon monoxide, CO	1 hour	25 ppm
Carbon monoxide, CO	8 hours	10 ppm
Formaldehyde, CH_2O	30 minutes	0.1 mg/m^3
Nitrogen dioxide, NO_2	1 year	40 $\mu g/m^3$ (0.0197 ppm) [Note 2]
Nitrogen dioxide, NO_2	1 hour	200 $\mu g/m^3$ (0.0987 ppm) [Note 2]
Ozone, O_3	8 hour, daily maximum	100 $\mu g/m^3$(0.0473 ppm)
Particulate matter, $PM_{2.5}$	1 year	10 $\mu g/m^3$
Particulate matter, $PM_{2.5}$	24 hour (99th percentile)	25 $\mu g/m^3$
Particulate matter, PM_{10}	1 year	20 $\mu g/m^3$
Particulate matter, PM_{10}	24 hour (99th percentile)	50 $\mu g/m^3$
Total volatile organic compounds	1 hour	500 $\mu g/m^3$

Notes:

1. Based on body odour metric (i.e. 450 ppm above ambient CO_2 level of 400 ppm and demand control ventilation provisions in AS 1668.2).
2. Based on pressure of 101.325 kPa and temperature of 25°C (i.e. the conversion is mg/m^3 = ppm (molecular weight/24.4)).

FV4.2 Verification of suitable indoor air quality for carparks

For a Class 7a building, compliance with **FP4.3** and **FP4.4(a)** is verified when it is determined that the building is provided with sufficient ventilation with *outdoor air* such that carbon monoxide exposure levels do not exceed the limits specified in Table FV4.2~~**Table FV4.2**~~.

~~**Table FV4.2 MAXIMUM CARBON MONOXIDE EXPOSURE FOR CARPARKS**~~

~~**Concentration, ppm**~~	~~**Total exposure duration per day**~~
~~100~~	~~Not to be exceeded~~
~~90~~	~~15 minutes~~
~~60~~	~~1 hour~~
~~30~~	~~8 hours~~
~~**Note:** Various government work, health and safety regulations specify workplace exposure limits for airborne contaminants in the workplace.~~	

Table FV4.2 Maximum carbon monoxide exposure for carparks

Concentration, ppm	**Total exposure duration per day**
100 ppm	Not to be exceeded
90 ppm	15 minutes
60 ppm	1 hour
30 ppm	8 hours

Note: Various government work, health and safety regulations specify workplace exposure limits for airborne contaminants in the workplace.

FV4.3 Verification of suitable provision of natural light

Compliance with FP4.1 is verified for the provision of natural light for—

(a) *habitable rooms* of Class 2 buildings and Class 4 parts of buildings; and

(b) bedrooms and dormitories of Class 3 buildings; and

(c) rooms used for sleeping purposes in Class 9a and 9c buildings; and

(d) general purpose classrooms in primary and secondary *school* and playrooms or the like for the use of children in an *early childhood centre* in Class 9b buildings,

when the average daylight factor for each *window* is determined in accordance with the following formula:

$$\text{Average Daylight Factor} = \frac{W}{A}\frac{T\theta}{(1-R^2)}$$

W = the net area of the light transmitting area of the *window* (m^2); and

A = the total area of the internal wall, floor and ceiling surfaces (m^2); and

T = the diffuse light transmittance of the *window*; and

θ = visible sky angle in degrees, measured in a vertical plane normal to and from the centre of the *window*; and

R = the area-weighted average reflectance of area A.

PART F4 LIGHT AND VENTILATION

Deemed-to-Satisfy Provisions

F4.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* FP4.1 to FP4.5 are satisfied by complying with—

(i) F4.1 to F4.12; and

(ii) in a building containing an *occupiable outdoor area*, Part G6; and

(iii~~ii~~) for *farm buildings* and *farm sheds*, Part H3.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

F4.2 Methods and extent of natural light

(a) *Required* natural light must be provided by—

(i) *windows*, excluding *roof lights*, that—

(A) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 10% of the *floor area* of the room; and

(B) are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or

(ii) *roof lights*, that—

(A) have an aggregate light transmitting area measured exclusive of framing members, glazing bars or other obstructions of not less than 3% of the *floor area* of the room; and

(B) are open to the sky; or

(iii) a proportional combination of *windows* and *roof lights required* by (i) and (ii).

Vic F4.2(b)

(b) Except in a Class 9c *aged care building*~~building~~, in a Class 2, 3 or 9 building or Class 4 part of a building a *required window* that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must not be less than a horizontal distance from that boundary or wall that is the greater of—

(i) generally — 1 m; and

(ii) in a *patient care area* or other room used for sleeping purposes in a Class 9a building — 3 m; and

(iii) 50% of the square root of the exterior height of the wall in which the *window* is located, measured in metres from its sill.

Vic F4.2(c)

(c) In a Class 9c *aged care building*~~building~~, a *required window* must be transparent and located—

(i) in an *external wall* with the *window* sill not more than 1 m above the floor level; and

(ii) where the *window* faces an adjoining allotment, another building or another wall of the same building, it must not be less than a horizontal distance of 3 m from the adjoining allotment, other building or wall.

Vic F4.2(d)

(d) In a Class 9b *early childhood centre*, the sills of 50% of *windows* in children's rooms must be located not more than 500 mm above the floor level.

PART F5 SOUND TRANSMISSION AND INSULATION

NT Part F5

PERFORMANCE REQUIREMENTS

FP5.1 Floors

Floors separating—

(a) *sole-occupancy units*; or

(b) a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby, or the like, or a part of a different classification,

must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.

Application:

FP5.1 only applies to a Class 2 or 3 building.

FP5.2 Walls

Walls separating *sole-occupancy units* or a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby, or the like, or parts of a different classification, must provide insulation against the transmission of—

(a) airborne sound; and

(b) impact generated sound, if the wall is separating a bathroom, *sanitary compartment*, laundry or kitchen in one *sole-occupancy unit* from a *habitable room* (other than a kitchen) in an adjoining unit,

sufficient to prevent illness or loss of amenity to the occupants.

Application:

FP5.2 only applies to a Class 2 or 3 building.

FP5.3 Floor and wall penetrations and door assemblies

The *required* sound insulation of a floor or a wall must not be compromised by—

(a) the incorporation or penetration of a pipe or other service element; or

(b) a door assembly.

Application:

FP5.3 only applies to a Class 2 or 3 building.

FP5.4 Floors in aged care buildings

Floors separating *sole-occupancy units* must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.

Application:

FP5.4 only applies to a Class 9c building.

FP5.5 Walls in aged care buildings

Walls separating *sole-occupancy units*, or a *sole-occupancy unit* from a kitchen, bathroom, *sanitary compartment* (not being an associated ensuite), laundry, plant room or utilities room, must provide insulation against the transmission of—

(a) airborne sound; and

(b) impact generated sound, if the wall separates a *sole-occupancy unit* from a kitchen or laundry,

sufficient to prevent illness or loss of amenity to the occupants.

Application:

FP5.5 only applies to a Class 9c building.

FP5.6 Floor and wall penetrations in aged care buildings

The *required* sound insulation of a floor or a wall must not be compromised by the incorporation or penetration of a pipe or other service element.

Application:
FP5.6 only applies to a Class 9c building.

VERIFICATION METHODS

FV5.1

Compliance with FP5.1 and FP5.3 to avoid the transmission of airborne and impact generated sound through floors is verified when it is measured in-situ that the separating floor has—

(a) airborne: a weighted standardised level difference with spectrum adaptation term ($D_{nT,w}$ + C_{tr}) not less than 45 when determined under AS/NZS ISO 717.1~~AS/NZS 1276.1 or ISO 717.1~~; and

(b) impact: a weighted standardised impact sound pressure level ~~with spectrum adaptation term~~ ($L_{nT,w}$) not more than 62 when determined under AS ISO 717.2.

FV5.2

Compliance with FP5.2(a) and FP5.3 to avoid the transmission of airborne sound through walls is verified when it is measured in-situ that—

(a) a wall separating *sole-occupancy units* has a weighted standardised level difference with spectrum adaptation term ($D_{nT,w}$ + C_{tr}) not less than 45 when determined under AS/NZS ISO 717.1~~AS/NZS 1276.1 or ISO 717.1~~; or

(b) a wall separating a *sole-occupancy unit* from a plant room, lift *shaft*, stairway, *public corridor*, public lobby, or the like, or parts of a different classification, has a weighted standardised level difference ($D_{nT,w}$) not less than 45 when determined under AS/NZS ISO 717.1~~AS/NZS 1276.1 or ISO 717.1~~; or

(c) any door assembly located in a wall that separates a *sole-occupancy unit* from a stairway, public corridor, public lobby, or the like, has a weighted standardised level difference ($D_{nT,w}$) not less than 25 when determined under AS/NZS ISO 717.1~~AS/NZS 1276.1 or ISO 717.1~~.

FV5.3

Compliance with FP5.4 and FP5.6 to avoid the transmission of airborne and impact generated sound through floors is verified when it is measured in-situ that the separating floor has—

(a) airborne: a weighted standardised level difference ($D_{nT,w}$) not less than 40 when determined under AS/NZS ISO 717.1; and

(b) impact: a weighted standardised impact sound pressure level ($L_{nT,w}$) not more than 62 when determined under AS ISO 717.2.

FV5.4

Compliance with FP5.5(a) and FP5.6 to avoid the transmission of airborne sound through walls is verified when it is measured in-situ that—

(a) a wall separating *sole-occupancy units* has a weighted standardised level difference ($D_{nT,w}$) not less than 40 when determined under AS/NZS ISO 717.1; or

(b) a wall separating a *sole-occupancy unit* from a kitchen, bathroom, sanitary compartment (not being an associated ensuite), laundry, plant room or utilities room has a weighted standardised level difference ($D_{nT,w}$) not less than 40 when determined under AS/NZS ISO 717.1.

PART F5 SOUND TRANSMISSION AND INSULATION

Deemed-to-Satisfy Provisions

NT Part F5

F5.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* FP5.1 to FP5.6 are satisfied by complying with F5.1 to F5.7.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

F5.2 Determination of airborne sound insulation ratings

A form of construction *required* to have an airborne sound insulation rating must—

(a) have the *required* value for weighted sound reduction index (R_w) or weighted sound reduction index with spectrum adaptation term (R_w + C_{tr}) determined in accordance with AS/NZS ISO 717.1~~AS/NZS 1276.1 or ISO 717.1~~ using results from laboratory measurements; or

(b) comply with Specification F5.2.

SPECIFICATION F5.2 SOUND INSULATION FOR BUILDING ELEMENTS

Deemed-to-Satisfy Provisions

1. Scope

(a) This Specification lists the weighted sound reduction index R_w for some common forms of construction.

(b) Wall systems listed in Table 2a to Table 2d~~Table 2~~ having a minimum 20 mm cavity between 2 separate leaves, with—

(i) for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and

(ii) for other than masonry, there is no mechanical linkage between leaves except at the periphery,

are deemed to be discontinuous construction.

2. Construction Deemed-to-Satisfy

The forms of construction listed in Table 2a to Table 2d~~Table 2~~ for wall construction and Table 3a to Table 3c~~Table 3~~ for floor construction, are considered to have the R_w, $R_w + C_{tr}$ and $L_{n,w}$ stated in that Table. The forms of construction must be installed as follows:

(a) **Masonry** — Units must be laid with all joints filled solid, including those between the masonry and any adjoining construction.

(b) **Concrete slabs** — Joints between concrete slabs or panels and any adjoining construction must be filled solid.

(c) **Sheeting materials**—

(i) if one layer is *required* on both sides of a wall, it must be fastened to the studs with joints staggered on opposite sides; and

(ii) if two layers are *required*, the second layer must be fastened over the first layer so that the joints do not coincide with those of the first layer; and

(iii) joints between sheets or between sheets and any adjoining construction must be taped and filled solid.

(d) **Timber or steel-framed construction** — perimeter framing members must be securely fixed to the adjoining structure and—

(i) bedded in resilient compound; or

(ii) the joints must be caulked so that there are no voids between the framing members and the adjoining structure.

(e) **Services**—

(i) Services must not be chased into concrete or masonry elements.

(ii) A door or panel *required* to have a certain $R_w + C_{tr}$ that provides access to a duct, pipe or other service must—

(A) not open into any *habitable room* (other than a kitchen); and

(B) be firmly fixed so as to overlap the frame or rebate of the frame by not less than 10 mm, be fitted with a sealing gasket along all edges and be constructed of—

(aa) wood, particleboard or blockboard not less than 33 mm thick; or

(bb) compressed fibre-reinforced cement sheeting not less than 9 mm thick; or

(cc) other suitable material with a mass per unit area not less than 24.4 kg/m^2.

(iii) A water supply pipe must—

(A) only be installed in the cavity of discontinuous construction; and

(B) in the case of a pipe that serves only one *sole-occupancy unit*, not be fixed to the wall leaf on the side adjoining any other *sole-occupancy unit* and have a clearance not less than 10 mm to the other wall leaf.

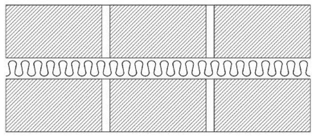
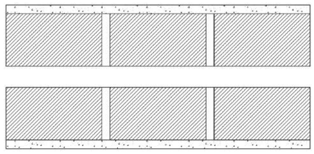
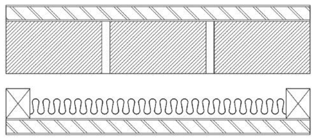
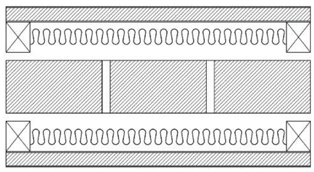
(iv) Electrical outlets must be offset from each other—

(A) in masonry walling, not less than 100 mm; and

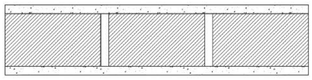
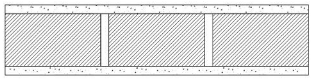
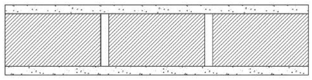
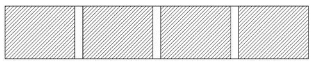
(B) in timber or steel-framed~~ walling, not~~ less than 300 mm.

Deemed-to-Satisfy Provisions

Table 2a Acceptable forms of construction for masonry walls

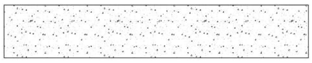
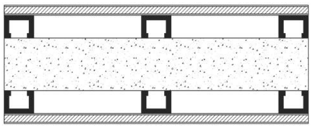
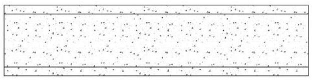
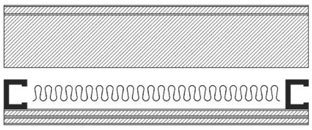
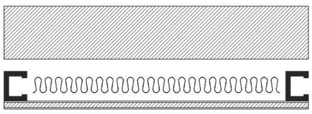
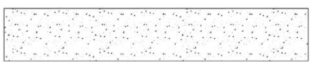
Description	**$R_w + C_{tr}$ (not less than)**	**R_w (not less than)**	**Construction**
Two leaves of 110 mm clay brick masonry with— (a) cavity not less than 50 mm between leaves; and (b) 50 mm thick glass wool insulation with a density of 11 kg/m^3 or 50 mm thick polyester insulation with a density of 20 kg/m^3 in the cavity.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
Two leaves of 110 mm clay brick masonry with— (a) cavity not less than 50 mm between leaves; and (b) 13 mm cement render on each outside face.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
Single leaf of 110 mm clay brick masonry with— (a) a row of 70 mm × 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced 20 mm from the masonry wall; and (b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 positioned between studs; and (c) one layer of 13 mm plasterboard fixed to outside face of studs and outside face of masonry.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
Single leaf of 90 mm clay brick masonry with— (a) a row of 70 mm × 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced 20 mm from each face of the masonry wall; and (b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 positioned between studs in each row; and (c) one layer of 13 mm plasterboard fixed to	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	

Deemed-to-Satisfy Provisions

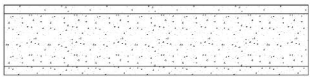
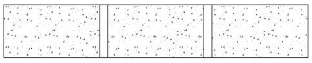
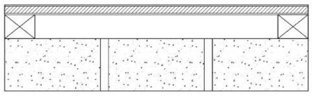
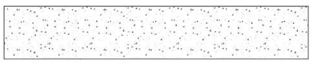
Description	$R_w + C_{tr}$ (not less than)	R_w (not less than)	Construction
studs on each outside face.			
Single leaf of 150 mm brick masonry with 13 mm cement render on each face.	N/A	50 R_w (not less than)	
Single leaf of 220 mm brick masonry with 13 mm cement render on each face.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
110 mm thick brick masonry with 13 mm cement render on each face.	N/A	45 R_w (not less than)	
110 mm thick concrete brickwork.	N/A	45 R_w (not less than)	

Deemed-to-Satisfy Provisions

Table 2b Acceptable forms of construction for concrete walls

Description	$R_w + C_{tr}$ (not less than)	R_w (not less than)	Construction
150 mm thick concrete panel.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
150 mm thick concrete panel with one layer of 10 mm plasterboard fixed to 28 mm metal furring channels on each face.	N/A	50 R_w (not less than)	
200 mm thick concrete panel with one layer of 13 mm plasterboard or 13 mm cement render on each face.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
100 mm thick concrete panel with— (a) a row of 64 mm steel studs at 600 mm centres, spaced 25 mm from the concrete panel; and (b) 80 mm thick polyester insulation or 50 mm thick glass wool insulation with a density of 11 kg/m³, positioned between studs; and (c) two layers of 13 mm plasterboard fixed to outside face of studs and one layer of 13 mm plasterboard fixed to outside face of concrete panel.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
125 mm thick concrete panel with— (a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the concrete panel; and (b) 70 mm polyester insulation with a density of 9 kg/m³, positioned between studs; and (c) one layer of 13 mm plasterboard fixed to the outside face of the studs.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
125 mm thick concrete panel.	N/A	50 R_w (not less than)	
100 mm concrete panel with	N/A	50 R_w (not less than)	

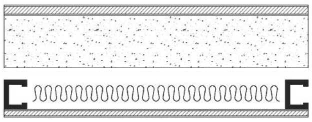
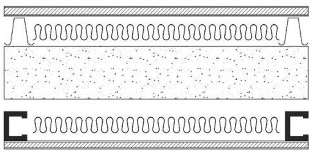
Deemed-to-Satisfy Provisions

Description	$R_w + C_{tr}$ (not less than)	R_w (not less than)	Construction
13 mm cement render or one layer of 13 mm plasterboard on each face.			
190 mm thick concrete blockwork.	N/A	45 R_w (not less than)	
140 mm thick concrete blockwork, the face shell thickness of the blocks being not less than 44 mm and with— (a) 50 mm x 50 mm timber battens spaced at not more than 610 mm centres screw-fixed on one face of the blocks into resilient plugs with rubber inserts between battens and the wall; and (b) the face of the battens clad with 13 mm plasterboard.	N/A	45 R_w (not less than)	
Concrete panel - 100 mm thick	N/A	45 R_w (not less than)	

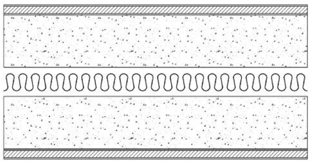
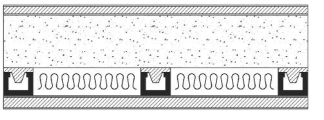
Note: For the purposes of this table the term "concrete panel" is a reference to a solid in-situ concrete panel or solid precast concrete panel.

Deemed-to-Satisfy Provisions

Table 2c Acceptable forms of construction for autoclaved aerated concrete walls

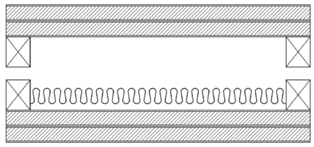
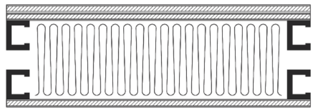
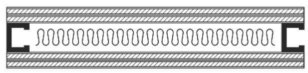
Description	$R_w + C_{tr}$ (not less than)	R_w (not less than)	Construction
75 mm thick autoclaved aerated concrete wall panel with— (a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the autoclaved aerated concrete wall panel; and (b) 75 mm thick glass wool insulation with a density of 11 kg/m^3 positioned between studs; and (c) one layer of 10 mm moisture resistant plasterboard or 13 mm fire protective grade plasterboard fixed to outside face of studs and outside face of autoclaved aerated concrete wall panel.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
75 mm thick autoclaved aerated concrete wall panel with— (a) a row of 64 mm steel studs at 600 mm centres, spaced 35 mm from the autoclaved aerated concrete panel wall; and (b) 28 mm metal furring channels fixed to the outside face of the autoclaved aerated concrete wall panel, with 50 mm thick polyester insulation with a density of 9 kg/m^3 positioned between furring channels and one layer of 13 mm fire protective grade plasterboard fixed to furring channels; and (c) 105 mm thick glass wool insulation with a density of 7 kg/m3 positioned between studs; and (d) one layer of 13 mm	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	

Deemed-to-Satisfy Provisions

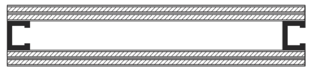
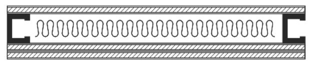
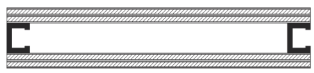
Description	**$R_w + C_{tr}$ (not less than)**	**R_w (not less than)**	**Construction**
fire protective grade plasterboard fixed to the outside face of the studs.			
Two leaves of 75 mm autoclaved aerated concrete wall panel with— (a) a cavity not less than 30 mm between panels containing 50 mm glass wool insulation with a density of 11 kg/m^3; and (b) one layer of 10 mm plasterboard fixed to outside face of each panel.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
75 mm thick autoclaved aerated concrete wall panel with— (a) one layer of 10 mm moisture resistant plasterboard on one face; and (b) 28 mm metal furring channels and resilient mounts, 75 mm polyester insulation with a density of 9 kg/m^3 and 13 mm fire-protective grade plasterboard fixed to the other face.	N/A	50 R_w (not less than)	

Deemed-to-Satisfy Provisions

Table 2d Acceptable forms of construction for timber and steel framing walls

Description	$R_w + C_{tr}$ (not less than)	R_w (not less than)	Construction
Two rows of 90×35 mm timber studs or two rows of 64 mm steel studs at 600 mm centres with— (a) an air gap not less than 20 mm between the rows of studs; and (b) 50 mm thick glass wool insulation or 60 mm thick polyester insulation with a density of 11 kg/m³; positioned between one row of studs; and (c) two layers of 13 mm fire-protective grade plasterboard or one layer of 6 mm fibre cement sheet and one layer of 13 mm fire-protective grade plasterboard, fixed to outside face of studs.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
Two rows of 64 mm steel studs at 600 mm centres with— (a) an air gap not less than 80 mm between the rows of studs; and (b) 200 mm thick polyester insulation with a density of 14 kg/m³; positioned between studs; and (c) one layer of 13 mm fire-protective grade plasterboard and one layer 13 mm plasterboard on one outside face and one layer of 13 mm fire-protective grade plasterboard on the other outside face.	50 $R_w + C_{tr}$ (not less than)	50 R_w (not less than)	
One row of 92 mm steel studs at 600 mm centres with— (a) 50 mm thick glass wool insulation with a density of 11 kg/m³ or 60 mm thick polyester insulation with a density of 8 kg/m3, positioned between studs; and	N/A	50 R_w (not less than)	

Deemed-to-Satisfy Provisions

Description	**R_w + C_{tr} (not less than)**	**R_w (not less than)**	**Construction**
(b) two layers of 13 mm fire-protective grade plasterboard or one layer of 6 mm fibre-cement sheet and one layer of 13 mm fire-protective grade plasterboard, fixed to each face.			
One row of 64 mm steel studs with 2 layers of 16 mm fire-protective grade plasterboard fixed to each face.	N/A	45 R_w (not less than)	
One row of 64 mm steel studs with— (a) one layer of 16 mm fire-protective grade plasterboard fixed to one face; and (b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 positioned between the studs; and (c) two layers of fire-protective grade plasterboard fixed to the other face, the inner layer being 16 mm thick and the outer layer being 13 mm.	N/A	45 R_w (not less than)	
One row of 64 mm steel studs with two layers of 13 mm plasterboard on each face.	N/A	45 R_w (not less than)	

Deemed-to-Satisfy Provisions

~~Table 2 ACCEPTABLE FORMS OF CONSTRUCTION FOR WALLS~~

~~Description~~	~~$R_w + C_{tr}$ (not less than)~~	~~R_w (not less than)~~	~~Construction~~
~~**Wall construction type: Masonry**~~			
~~Two leaves of 110 mm clay brick masonry with—~~ ~~(a) cavity not less than 50 mm between leaves; and~~ ~~(b) 50 mm thick glass wool insulation with a density of 11 kg/m³ or 50 mm thick polyester insulation with a density of 20 kg/m³ in the cavity.~~	~~50~~	~~50~~	
~~Two leaves of 110 mm clay brick masonry with—~~ ~~(a) cavity not less than 50 mm between leaves and;~~ ~~(b) 13 mm cement render on each outside face.~~	~~50~~	~~50~~	
~~Single leaf of 110 mm clay brick masonry with—~~ ~~(a) a row of 70 mm × 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced 20 mm from the masonry wall; and~~ ~~(b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m³ positioned between studs; and~~ ~~(c) one layer of 13 mm plasterboard fixed to outside face of studs and outside face of masonry.~~	~~50~~	~~50~~	
~~Single leaf of 90 mm clay brick masonry with—~~ ~~(a) a row of 70 mm × 35 mm timber studs or 64 mm steel studs at 600 mm centres, spaced 20 mm from each face of the masonry wall; and~~ ~~(b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m³ positioned between studs in each row; and~~ ~~(c) one layer of 13 mm plasterboard fixed to studs on each outside face.~~	~~50~~	~~50~~	
~~Single leaf of 150 mm brick masonry with 13 mm cement render on each face.~~	-	~~50~~	
~~Single leaf of 220 mm brick masonry with 13 mm cement render on each face.~~	~~50~~	~~50~~	
~~110 mm thick brick masonry with 13 mm cement render on each face.~~	-	~~45~~	
~~110 mm thick concrete brickwork.~~	-	~~45~~	
~~**Wall construction type: Concrete**~~			
~~150 mm thick concrete panel.~~	~~50~~	~~50~~	
~~150 mm thick concrete panel with one layer of 10 mm plasterboard fixed to 28 mm metal furring channels on each face.~~	-	~~50~~	
~~200 mm thick concrete panel with one layer of 13 mm plasterboard or 13 mm cement render on each face.~~	~~50~~	~~50~~	
~~100 mm thick concrete panel with—~~ ~~(a) a row of 64 mm steel studs at 600 mm centres, spaced 25 mm from the concrete panel; and~~ ~~(b) 80 mm thick polyester insulation or 50 mm thick glass wool insulation with a density of 11 kg/m³, positioned between studs; and~~ ~~(c) two layers of 13 mm plasterboard fixed to outside face of studs and one layer of 13 mm plasterboard fixed to outside face of concrete panel.~~	~~50~~	~~50~~	
~~125 mm thick concrete panel with—~~			

Deemed-to-Satisfy Provisions

~~**Description**~~	~~**$R_w + C_{tr}$ (not less than)**~~	~~**R_w (not less than)**~~	~~**Construction**~~
~~(a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the concrete panel; and~~ ~~(b) 70 mm polyester insulation with a density of 9 kg/m^3, positioned between studs; and~~ ~~(c) one layer of 13 mm plasterboard fixed to the outside face of the studs.~~	~~50~~	~~50~~	
~~125 mm thick concrete panel.~~	~~-~~	~~50~~	
~~100 mm concrete panel with 13 mm cement render or one layer of 13 mm plasterboard on each face.~~	~~-~~	~~50~~	
~~190 mm thick concrete blockwork.~~	~~-~~	~~45~~	
~~140 mm thick concrete blockwork, the face shell thickness of the blocks being not less than 44 mm and with —~~ ~~(a) 50 mm x 50 mm timber battens spaced at not more than 610 mm centres screw fixed on one face of the blocks into resilient plugs with rubber inserts between battens and the wall; and~~ ~~(b) the face of the battens clad with 13 mm plasterboard.~~	~~-~~	~~45~~	
~~Concrete panel – 100 mm thick.~~	~~-~~	~~45~~	
~~**Note:** For the purposes of this table the term "concrete panel" is a reference to a solid in-situ concrete panel or solid precast concrete panel.~~			
~~**Wall construction type: Autoclaved aerated concrete**~~			
~~75 mm thick autoclaved aerated concrete wall panel with —~~ ~~(a) a row of 64 mm steel studs at 600 mm centres, spaced 20 mm from the autoclaved aerated concrete wall panel; and~~ ~~(b) 75 mm thick glass wool insulation with a density of 11 kg/m^3 positioned between studs; and~~ ~~(c) one layer of 10 mm moisture resistant plasterboard or 13 mm fire protective grade plasterboard fixed to outside face of studs and outside face of autoclaved aerated concrete wall panel.~~	~~50~~	~~50~~	
~~75 mm thick autoclaved aerated concrete wall panel with —~~ ~~(a) a row of 64 mm steel studs at 600 mm centres, spaced 35 mm from the autoclaved aerated concrete panel wall; and~~ ~~(b) 28 mm metal furring channels fixed to the outside face of the autoclaved aerated concrete wall panel, with 50 mm thick polyester insulation with a density of 9 kg/m^3 positioned between furring channels and one layer of 13 mm fire protective grade plasterboard fixed to furring channels; and~~ ~~(c) 105 mm thick glass wool insulation with a density of 7 kg/m^3 positioned between studs; and~~ ~~(d) one layer of 13 mm fire protective grade plasterboard fixed to the outside face of the studs.~~	~~50~~	~~50~~	
~~Two leaves of 75 mm autoclaved aerated concrete wall panel with —~~ ~~(a) a cavity not less than 30 mm between panels~~	~~50~~	~~50~~	

Deemed-to-Satisfy Provisions

~~Description~~	~~$R_w + C_{tr}$ (not less than)~~	~~R_w (not less than)~~	~~Construction~~
~~containing 50 mm glass wool insulation with a density of 11 kg/m^3; and~~ ~~(b) one layer of 10 mm plasterboard fixed to outside face of each panel.~~			
~~75 mm thick autoclaved aerated concrete wall panel with —~~ ~~(a) one layer of 10 mm moisture resistant plasterboard on one face; and~~ ~~(b) 28 mm metal furring channels and resilient mounts, 75 mm polyester insulation with a density of 9 kg/m^3 and 13 mm fire-protective grade plasterboard fixed to the other face.~~	~~-~~	~~50~~	
~~Wall construction type: Timber and steel framing~~			
~~Two rows of 90×35 mm timber studs or two rows of 64 mm steels studs at 600 mm centres with —~~ ~~(a) an air gap not less than 20 mm between the rows of studs; and~~ ~~(b) 50 mm thick glass wool insulation or 60 mm thick polyester insulation with a density of 11 kg/m^3; positioned between one row of studs; and~~ ~~(c) two layers of 13 mm fire-protective grade plasterboard or one layer of 6 mm fibre cement sheet and one layer of 13 mm fire-protective grade plasterboard, fixed to outside face of studs.~~	~~50~~	~~50~~	
~~Two rows of 64 mm steel studs at 600 mm centres with —~~ ~~(a) an air gap not less than 80 mm between the rows of studs; and~~ ~~(b) 200 mm thick polyester insulation with a density of 14 kg/m^3; positioned between studs; and~~ ~~(c) one layer of 13 mm fire-protective grade plasterboard and one layer 13 mm plasterboard on one outside face and one layer of 13 mm fire-protective grade plasterboard on the other outside face.~~	~~50~~	~~50~~	
~~One row of 92 mm steel studs at 600 mm centres with —~~ ~~(a) 50 mm thick glass wool insulation with a density of 11 kg/m^3 or 60 mm thick polyester insulation with a density of 8 kg/m^3, positioned between studs; and~~ ~~(b) two layers of 13 mm fire-protective grade plasterboard or one layer of 6 mm fibre cement sheet and one layer of 13 mm fire-protective grade plasterboard, fixed to each face.~~	~~-~~	~~50~~	
~~One row of 64 mm steel studs with 2 layers of 16 mm fire-protective grade plasterboard fixed to each face.~~	~~-~~	~~45~~	
~~One row of 64 mm steel studs with —~~ ~~(a) one layer of 16 mm fire-protective grade plasterboard fixed to one face; and~~ ~~(b) 50 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 positioned between the studs; and~~ ~~(c) two layers of fire-protective grade plasterboard fixed to the other face, the inner layer being 16 mm thick~~	~~-~~	~~45~~	

Deemed-to-Satisfy Provisions

~~Description~~	~~$R_w + C_{tr}$ (not less than)~~	~~R_w (not less than)~~	~~Construction~~
~~and the outer layer being 13 mm.~~			
~~One row of 64 mm steel studs with two layers of 13 mm plasterboard on each face.~~	~~-~~	~~45~~	

Deemed-to-Satisfy Provisions

Table 3a Acceptable forms of construction for concrete floors

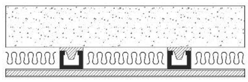
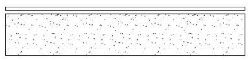
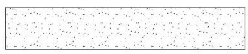
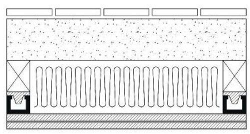
Description	$R_w + C_{tr}$ (not less than)	$L_{n,w}$ (not more than)	R_w (not less than)	Construction
150 mm thick concrete slab with— (a) 28 mm metal furring channels and isolation mounts fixed to underside of slab, at 600 mm centres; and (b) 65 mm thick polyester insulation with a density of 8 kg/m^3, positioned between furring channels; and (c) one layer of 13 mm plasterboard fixed to furring channels.	50 $R_w + C_{tr}$ (not less than)	62 $L_{n,w}$ (not more than)	50 R_w (not less than)	
200 mm thick concrete slab with carpet on underlay.	50 $R_w + C_{tr}$ (not less than)	62 $L_{n,w}$ (not more than)	50 R_w (not less than)	
100 mm thick concrete slab.	45 $R_w + C_{tr}$ (not less than)	N/A	45 R_w (not less than)	

Table 3b Acceptable forms of construction for autoclaved aerated concrete floors

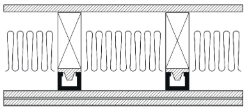
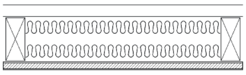
Description	$R_w + C_{tr}$ (not less than)	$L_{n,w}$ (not more than)	R_w (not less than)	Construction
75 mm thick autoclaved aerated concrete floor panel with— (a) 8 mm ceramic tiles with flexible adhesive and waterproof membrane, located above the slab; and (b) timber joists at 600 mm centres; and (c) R1.5 glass wool insulation positioned between timber joists; and (d) 28 mm metal furring channels and resilient mounts fixed to	50 $R_w + C_{tr}$ (not less than)	62 $L_{n,w}$ (not more than)	50 R_w (not less than)	

Deemed-to-Satisfy Provisions

Description	$R_w + C_{tr}$ (not less than)	$L_{n,w}$ (not more than)	R_w (not less than)	Construction
underside of joists; and (e) two layers of 13 mm plasterboard fixed to furring channels.				

Deemed-to-Satisfy Provisions

Table 3c Acceptable forms of construction for timber floors

Description	$R_w + C_{tr}$ (not less than)	$L_{n,w}$ (not more than)	R_w (not less than)	Construction
19 mm thick chipboard floor sheeting with— (a) 190×45 mm timber joists at 450 mm centres; and (b) R2.5 glass wool insulation positioned between timber joists; and (c) 28 mm metal furring channels and isolation mounts fixed to underside of joists, isolation mounts to be of natural rubber with a dynamic factor of not more than 1.1 and static deflection of not less than 3 mm at actual operating load; and (d) two layers of 16 mm fire-protective grade plasterboard fixed to furring channels.	50 $R_w + C_{tr}$ (not less than)	62 $L_{n,w}$ (not more than)	50 R_w (not less than)	
19 mm thick tongued and grooved boards with— (a) timber joists not less than 175 mm x 50 mm; and (b) 75 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 positioned between joists and laid on 10 mm thick plasterboard fixed to underside of joists; and	45 $R_w + C_{tr}$ (not less than)	N/A	45 R_w (not less than)	

Deemed-to-Satisfy Provisions

Description	$R_w + C_{tr}$ (not less than)	$L_{n,w}$ (not more than)	R_w (not less than)	Construction
(c) 25 mm thick glass or mineral wool insulation with a density of 11 kg/m³ laid over entire floor, including tops of joists before flooring is laid; and (d) secured to 75 mm × 50 mm battens; and (e) the assembled flooring laid over the joists, but not fixed to them, with the battens lying between the joists.				

Deemed-to-Satisfy Provisions

~~Table 3 ACCEPTABLE FORMS OF CONSTRUCTION FOR FLOORS~~

~~Description~~	~~$R_w + C_{tr}$ (not less than)~~	~~$L_{n,w}$ (not more than)~~	~~R_w (not less than)~~	~~Construction~~
~~**Floor construction type: Concrete**~~				
~~150 mm thick concrete slab with —~~ ~~(a) 28 mm metal furring channels and isolation mounts fixed to underside of slab, at 600 mm centres; and~~ ~~(b) 65 mm thick polyester insulation with a density of 8 kg/m³, positioned between furring channels; and~~ ~~(c) one layer of 13 mm plasterboard fixed to furring channels.~~	~~50~~	~~62~~	~~50~~	
~~200 mm thick concrete slab with carpet on underlay.~~	~~50~~	~~62~~	~~50~~	
~~100 mm thick concrete slab.~~	~~45~~	~~-~~	~~45~~	
~~**Floor construction type: Autoclaved aerated concrete**~~				
~~75 mm thick autoclaved aerated concrete floor panel with —~~ ~~(a) 8 mm ceramic tiles with flexible adhesive and waterproof membrane, located above the slab; and~~ ~~(b) timber joists at 600 mm centres; and~~ ~~(c) R1.5 glass wool insulation positioned between timber joists; and~~ ~~(d) 28 mm metal furring channels and resilient mounts fixed to underside of joists; and~~ ~~(e) two layers of 13 mm plasterboard fixed to furring channels.~~	~~50~~	~~62~~	~~50~~	
~~**Floor construction type: Timber**~~				
~~19 mm thick chipboard floor sheeting with —~~ ~~(a) 190×45 mm timber joists at 450 mm centres; and~~ ~~(b) R2.5 glass wool insulation positioned between timber joists; and~~ ~~(c) 28 mm metal furring channels and isolation mounts fixed to underside of joists, isolation mounts to be of natural rubber with a dynamic factor of not more than 1.1 and static deflection of not less than 3 mm at actual operating load; and~~ ~~(d) two layers of 16 mm fire-protective grade plasterboard fixed to furring channels.~~	~~50~~	~~62~~	~~50~~	
~~19 mm thick tongued and grooved boards with —~~ ~~(a) timber joists not less than 175 mm x 50 mm; and~~ ~~(b) 75 mm thick glass or mineral wool insulation with a density of 11 kg/m³ positioned between joists and laid on 10 mm thick plasterboard fixed to underside of joists; and~~	~~45~~	~~-~~	~~45~~	

Deemed-to-Satisfy Provisions

~~Description~~		~~$R_w + C_{tr}$ (not less than)~~	~~$L_{n,w}$ (not more than)~~	~~R_w (not less than)~~	~~Construction~~
~~(c)~~	~~25 mm thick glass or mineral wool insulation with a density of 11 kg/m^3 laid over entire floor, including tops of joists before flooring is laid; and~~				
~~(d)~~	~~secured to 75 mm × 50 mm battens; and~~				
~~(e)~~	~~the assembled flooring laid over the joists, but not fixed to them, with the battens lying between the joists.~~				

PART F6 CONDENSATION MANAGEMENT

PERFORMANCE REQUIREMENTS

FP6.1 Condensation and water vapour management

In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, risks associated with water vapour and *condensation* must be managed to minimise its impact on occupants.

VERIFICATION METHODS

FV6

(a) Compliance with *Performance Requirement* FP6.1 is verified when it is demonstrated via modelling that assesses the effects of:

(i) indoor and outdoor temperature and humidity conditions; and

(ii) heating and cooling set points; and

(iii) rain absorption; and

(iv) wind pressure; and

(v) solar radiation; and

(b) determines that moisture will not accumulate:

(i) interior to the primary *water control layer* within a building envelope; or

(ii) on the interior surface of the *water control layer*.

F6 CONDENSATION MANAGEMENT

Deemed-to-Satisfy Provisions

F6.0 Deemed-to-Satisfy Provisions

Compliance with *Performance Requirement* FP6.1 is satisfied via compliance with *Deemed-to-Satisfy Provisions* F6.1 to F6.4.

F6.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part only apply to Class 2 buildings and a Class 4 part of a building.

F6.2 Installation of water control membrane

(a) Where a *water control membrane* is installed as a sarking in accordance with AS 4200.2, it must:

  (i) comply with AS 4200.1; and

  (ii) be a vapour permeable membrane for *climate zones* 6, 7 and 8; and

  (iii) be located on the exterior side of the primary insulation layer of wall assemblies that form the external envelope of a building.

(b) Where a *water control membrane* is not installed, the primary *water control layer* must be separated from *water sensitive materials* by a drained cavity.

F6.3 Ventilation of roof spaces

Where an exhaust system, provided in accordance with F6.3, discharges directly into a roof space, the roof space must be ventilated through regularly distributed openings to outside air that has—

(a) a total unobstructed vented area of 1/300 of the respective ceiling area if the roof pitch is greater than 22 degrees, or 1/150 of the respective ceiling area if the roof pitch is less than or equal to 22 degrees; and

(b) 30% of the total unobstructed area must be located no more than 900 mm below the ridge or highest point of the roof space, measured vertically, with the remaining required area provided by eave vents.

F6.4 Discharge of exhaust systems

Exhaust systems installed in kitchens, bathrooms, toilets or laundries must have a minimum flow rate of—

(a) 25 l/s for kitchens, bathrooms and toilets; and

(b) 40 l/s for laundries; and

(c) discharge to open space external to the building envelope or a roof space ventilated in accordance with F6.3.

PART G1 MINOR STRUCTURES AND COMPONENTS

PERFORMANCE REQUIREMENTS

GP1.1 Swimming pool drainage

NT GP1.1

A *swimming pool* must have adequate means of draining the pool in a manner which will not—

(a) cause illness to people; or

(b) affect *other property*.

GP1.2 Swimming pool access and water recirculation systems

ACT GP1.2(a)

NSW GP1.2(a)

NT GP1.2(a)

Qld GP1.2(a)

SA GP1.2(a), (b)

Tas GP1.2(a)

Vic GP1.2(a)

(a) A barrier must be provided to a *swimming pool* and must—

  (i) be continuous for the full extent of the hazard; and

  (ii) be of a strength and rigidity to withstand the foreseeable impact of people; and

  (iii) restrict the access of young children to the pool and the immediate pool surrounds; and

  (iv) have any gates and doors fitted with latching devices not readily operated by young children, and constructed to automatically close and latch.

(b) A *swimming pool* water recirculation system must incorporate safety measures to avoid entrapment of, or injury to, a person.

Application

GP1.2(b) only applies to a *swimming pool* with a depth of water more than 300 mm.

GP1.3 Cool rooms

Any refrigerated or cooling chamber, or the like which is of sufficient size for a person to enter must—

(a) have adequate means of communicating with or alerting other occupants in the building in the case of an emergency; and

(b) have a door which is—

  (i) of adequate dimensions to allow occupants to readily escape; and

  (ii) openable from inside without a key at all times.

GP1.4 Vaults

Any strong-room, vault or the like which is of sufficient size for a person to enter must—

(a) have adequate means of communicating with or alerting other occupants in the building in the case of an emergency; and

(b) have internal lighting controllable only from within the room; and

(c) have an external indicator that the room is occupied.

GP1.5 Outdoor play spaces in early childhood centres

Fencing or other barriers must be provided around any outdoor play space, in which the design and height of the fencing or other barriers, including the—

(a) design of gates and fittings; and

PART G1 MINOR STRUCTURES AND COMPONENTS

Deemed-to-Satisfy Provisions

G1.0 Deemed-to-Satisfy Provisions

(a) *Performance Requirement* GP1.1 must be complied with.

There is no *Deemed-to-Satisfy Provision* for this *Performance Requirement*.

Tas G1.0(b)

(b) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* GP1.2 to GP1.5 are satisfied by complying with G1.1 to G1.3.

(c) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

NSW G1.101

PART G2 BOILERS, PRESSURE VESSELS, HEATING APPLIANCES, FIREPLACES, CHIMNEYS AND FLUES

PERFORMANCE REQUIREMENTS

GP2.1 Combustion heating appliances

Where provided in a building, a combustion appliance and its associated components, including an open fire-place, chimney, flue, chute, hopper or the like, must be installed—

(a) to withstand the temperatures likely to be generated by the appliance; and

(b) so that it does not raise the temperature of any building element to a level that would adversely affect the element's physical or mechanical properties or function; and

(c) so that hot products of combustion will not—

  (i) escape through the walls of the associated components; and

  (ii) discharge in a position that will cause fire to spread to nearby *combustible* materials or allow smoke to penetrate through nearby *windows*, ventilation inlets, or the like.

GP2.2 Boilers and pressure vessels

When located in a building, *boilers* and *pressure vessels* must be installed to avoid, during reasonably foreseeable conditions, the likelihood of—

(a) leakage from the vessel which could cause damage to the building; and

(b) rupture or other mechanical damage of the vessel which could cause damage to the building or injury to occupants.

VERIFICATION METHOD

GV2 Combustion appliances

1. Compliance with GP2.1(a) and GP2.1(b) is verified when—

(a) components used within an appliance and its installation are constructed from—

  (i) heat-resistant materials for maximum operating temperatures not less than 600 ℃, where the material complies with (c); or

  (ii) heat-tolerant materials for maximum operating temperatures between 150 ℃ and 600 ℃, where the material complies with (c); and

(b) the building elements surrounding the appliance maintain their designed function and material properties when exposed to the heat effects of the appliance; and

(c) when a sample of the material is tested to the maximum operating temperature, from (a)(i) or (b)(ii), the tested sample must comply with the following:

  (i) The temperature is sustained for at least 96 hours.

  (ii) When allowed to cool, is compared to an unheated sample to determine whether the heated sample is free from—

    (A) visible cracks and fractures; and

    (B) visible indication of de-lamination; and

    (C) linear distortion in excess of the equivalent of 10 mm per metre, and

    (D) deterioration of the appearance of any surface finish.

PART G2 BOILERS, PRESSURE VESSELS, HEATING APPLIANCES, FIREPLACES, CHIMNEYS AND FLUES

Deemed-to-Satisfy Provisions

G2.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* GP2.1 and GP2.2 are satisfied by complying with G2.1 to G2.4.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

G2.4 Incinerator rooms

(a) If an incinerator is installed in a building, any hopper giving access to a charging chute must be—

  (i) *non-combustible*; and

  (ii) gas-tight when closed; and

  (iii) designed to return to the closed position after use; and

  (iv) not attached to a chute that connects directly to a flue unless the hopper is located in the open air; and

  (v) not located in a *required exit*.

(b) A room containing an incinerator must be separated from other parts of the building by construction with an FRL of not less than 60/60/60.

SPECIFICATION G2.2 INSTALLATION OF BOILERS AND PRESSURE VESSELS

Deemed-to-Satisfy Provisions

2. BOILERS AND PRESSURE VESSELS

2.1 Explosion relief

The distance between the vent of any explosion relief device and any adjacent wall, roof, ceiling or other solid construction shall be calculated in accordance with Table 2.1~~Table 2.1~~.

~~**Table 2.1 MINIMUM CLEARANCES FOR EXPLOSION RELIEF**~~

~~**Clearance from —**~~	~~**Minimum Clearance (metres)**~~
~~Adjacent wall or ceiling/roof~~	~~$0.4(V/3)^{1/3}$ or 0.4 m, whichever is the greater~~
~~Two walls at right angles; or one wall and a ceiling/roof~~	~~$0.6(V/3)^{1/3}$ or 0.6 m, whichever is the greater~~
~~**Note:** V is the internal volume of the *boiler* or *pressure vessel* being vented up to the connection of the flue.~~	

Table 2.1 Minimum clearances for explosion relief

Clearance from	**Minimum Clearance (metres)**
Adjacent wall or ceiling/roof	$0.4(V/3)^{1/3}$ or 0.4 m, whichever is the greater
Two walls at right angles; or one wall and a ceiling/roof	$0.6(V/3)^{1/3}$ or 0.6 m, whichever is the greater

Note: V is the internal volume of the *boiler* or *pressure vessel* being vented up to the connection of the flue.

2.2 Floors and drainage

(a) Floor surfaces beneath *boilers* and *pressure vessels* shall be *water resistant* and formed to drain away from supports and structural building elements.

(b) Where a safe tray is provided to trap liquids, it must be manufactured from a material resistant to corrosion from the contents of the *boiler* or *pressure vessel*.

2.3 Protection from heat

Building elements surrounding a *boiler* must be protected from any surface heat by refractory material or effective air spaces so that—

(a) steel elements do not exceed a temperature of more than 300°C; and

(b) concrete elements do not exceed a temperature of more than 200°C; and

(c) timber elements do not exceed a temperature of more than 150°C.

SPECIFICATION G3.8 FIRE AND SMOKE CONTROL SYSTEMS IN BUILDINGS CONTAINING ATRIUMS

Deemed-to-Satisfy Provisions

2. AUTOMATIC FIRE SPRINKLER SYSTEM

2.1 General requirement

A sprinkler system complying with **Specification E1.5** must be installed in every building containing an *atrium*, except where varied or superseded by this Specification.

2.2 Roof protection

A roof of an *atrium* which does not have the FRL prescribed in **Specification C1.1** or the *Deemed-to-Satisfy Provisions* of **Part C2** must be protected by *automatic* sprinklers arranged to wet both the covering membrane and supporting structure if the roof is—

(a) less than 12 m above the floor of the *atrium* or the floor of the highest *storey* where the bounding construction is set back more than 3.5 m from the *atrium well* if a Class 2, 3, 5 or 9 part of a building is open to the *atrium*; or

(b) less than 20 m above the floor of the *atrium* or the floor of the highest *storey* where the bounding construction is set back more than 3.5 m from the *atrium well* if a Class 6, 7 or 8 part of a building is open to the *atrium*,

and the temperature rating of sprinkler heads providing roof protection must be within the range 79°C–100°C.

2.3 Atrium floor protection

The floor of the *atrium* must be protected by sprinklers with—

(a) the use of sidewall pattern sprinkler heads together with overhead sprinklers where dictated by the dimensions of the *atrium*; and

(b) sprinkler heads of the fast response type~~, installed with suitable *non-combustible* heat collector plates of 200 mm minimum diameter to ensure activation by a rising fire plume~~.

2.4 Sprinkler systems to glazed walls

2.4.1 Location of protection

Where an *atrium* is separated from the remainder of the building by walls or doors incorporating glazing, a wall wetting system ~~with suitable *non-combustible* heat collector plates of 200 mm diameter~~ must be provided to protect the glazing as follows:

(a) On the *atrium* side of the glazing — to all glazed walls which are set back more than 3.5 m from the *atrium well*.

(b) On the *atrium* side of the glazing — to all glazed walls which are not set back, or are set back 3.5 m or less, from the *atrium well*, for all levels which are less than—

(i) 12 m above the floor of an *atrium* or the floor of the highest *storey* where the bounding wall is set back more than 3.5 m from the *atrium well* if a Class 2, 3, 5 or 9 part of the building is open to the *atrium*; or

(ii) 20 m above the floor of an *atrium* or the floor of the highest *storey* where the bounding wall is set back more than 3.5 m from the *atrium well* if a Class 6, 7 or 8 part of the building is open to the *atrium*.

(c) On the side of the glazing away from the *atrium well*—to all glazing forming part of the bounding wall at each *storey*.

2.4.2 Sprinkler head location

Sprinklers must be located in positions allowing full wetting of the glazing surfaces without wetting adjacent sprinkler heads.

2.4.3 Head rating and response time

Sprinkler heads must be of the fast response type and have a maximum temperature rating of 74°C.

PART G4 CONSTRUCTION IN ALPINE AREAS

GP4.2 Structures forming pathways in snow conditions

A building in an *alpine area* containing external trafficable structures forming part of the means of egress must be constructed so that those structures remain, as far as practicable, useable under snow conditions.

Application

GP4.2 applies to a building constructed in an *alpine area* and overrules other provisions of the BCA.

GP4.3 Management of falling ice and snow

A building in an *alpine area* must be constructed so that snow or ice is not shed from the building onto the allotment, any adjoining allotment, road or public space in a location or manner that will—

(a) obstruct a means of egress from any building to a road or *open space;* or

(b) otherwise endanger people.

Application

GP4.3 applies to a building constructed in an *alpine area* and overrules other provisions of the BCA.

GP4.4 Fire safety systems

A building in an *alpine area* must have a *fire safety system* installed to—

(a) facilitate fire-fighting operations; and

(b) alert occupants in the event of an emergency.

Application

GP4.4 applies to a building constructed in an *alpine area* and overrules other provisions of the BCA.

VERIFICATION METHODS

GV4.1

Compliance with GP4.1, GP4.2, GP4.3 and GP4.4 is verified when a building is designed in accordance with the ABCB Fire Safety Verification Method.

Note to Public Comment Draft:

The ABCB Fire Safety Verification Method is included at page 460 of this document. Comment for the ABCB Fire Safety Verification Method is invited.

PART G4 CONSTRUCTION IN ALPINE AREAS

Deemed-to-Satisfy Provisions

G4.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* GP4.1 to GP4.4 are satisfied by complying with— ~~G4.1 to G4.9.~~

(i) G4.1 to G4.9; and

(ii) in a building containing an *occupiable outdoor area*, Part G6; and

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

PART G5 CONSTRUCTION IN BUSHFIRE PRONE AREAS

PERFORMANCE REQUIREMENTS

NSW GP5.1

Qld GP5.1

Tas GP5.1

GP5.1 Bushfire resistance

A building that is constructed in a *designated bushfire prone area* must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the—

(a) potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and

(b) intensity of the bushfire attack on the building.

Application

GP5.1 only applies to—

(a) a Class 2 or 3 building; or

(b) a Class 10a building or deck associated with a Class 2 or 3 building,

located in a *designated bushfire prone area*.

VERIFICATION METHOD

GV5

(a) Compliance with *Performance Requirement* GP5.1 is verified if the probability of fire initiation within a building exposed to bushfire design actions is assessed as not exceeding 10%.

(b) Bushfire design actions must be determined in consideration of the annual probability of a design event derived from—

  (i) assigning the building or structure with an importance level in accordance with GV5(c); and

  (ii) determining the corresponding annual probability of exceedance in accordance with Table GV5.1.

(c) A building or structure's importance level must be identified as one of the following:

  (i) Importance level 1 — where the building or structure presents a low degree of hazard to life and *other property* in the case of failure.

  (ii) Importance level 2 — where the building or structure is not of importance level 1, 3 or 4 and is a—

    (A) Class 1a, Class 1b or Class 2 building accommodating 12 people or less; or

    (B) Class 3 boarding house, guest house, hostel, lodging house or backpackers accommodation; or

    (C) Class 3 residential part of a hotel or motel; or

    (D) Class 3 residential part of a *school*.

  (iii) Importance level 3 — where the building is designed to contain a large number of people and is a—

    (A) Class 2 building accommodating more than 12 people; or

    (B) Class 3 boarding house, guest house, hostel, lodging house or backpackers accommodation; or

    (C) Class 3 residential part of a hotel or motel; or

    (D) Class 3 residential part of a *school*.

  (iv) Importance level 4 — where the building or structure is—

    (A) essential to emergency management or post-disaster recovery; or

    (B) associated with hazardous facilities; or

    (C) subject to a necessary 'defend in place' strategy and is a—

      (aa) Class 3 accommodation building for the aged, children or people with disabilities; or

      (bb) Class 3 residential part of a health-care building which accommodates members of staff; or

      (cc) Class 3 residential part of a *detention centre*; or (dd) Class 9a or 9c building; or

(ee) Class 10c building; or

(ff) building that operates in the event of a bushfire emergency, such as a public bushfire shelter or a bushfire emergency control centre.

Table GV5.1 Annual Probability of Exceedance (APE) for design actions

Importance level	Complex analysis APE for bush fire exposure	Simple analysis APE for weather conditions
1	No requirement	No requirement
2	1:500	1:50
3	1:1000	1:100
4	1:2000	1:200

Note:

Complex analysis must consider the probability of ignition, fire spread to the urban interface and penetration of the urban interface coincident with severe fire conditions.

(d) The probability of fire initiation within a building must be assessed by application of the following:
  (i) An event tree analysis of relevant bushfire scenarios.
  (ii) Design fire actions that include combinations of the following actions appropriate to the distance between the building and the bushfire hazard:
    (A) Direct attack from airborne burning embers.
    (B) Burning debris and accumulated embers adjacent to a building element.
    (C) Radiant heat from a bushfire front.
    (D) Direct flame attack from a bushfire front.

(e) Applied fire actions must allow for reasonable variations in—
  (i) design fire weather; and
  (ii) vegetation, including fuel load, burning behavior of vegetation and potential for crown fires; and
  (iii) the distance of the building from vegetation; and
  (iv) topography, including slopes and features that may shield; and
  (v) ignition of adjacent buildings, building elements, plants, mulch and other materials; and
  (vi) effective size of fire front; and
  (vii) duration of exposure; and
  (viii) flame height; and
  (ix) flame tilt; and
  (x) flame adhesion to sloping land.

(f) The assessment process must include consideration of—
  (i) the probability of non-complying construction of critical aspects of an approved design; and
  (ii) the probability of critical aspects of an approved design being fully functional during the life of the building; and
  (iii) inclusion of safety factors; and
  (iv) sensitivity analysis of critical aspects of a proposed design.

PART G5 CONSTRUCTION IN BUSHFIRE PRONE AREAS

Deemed-to-Satisfy Provisions

G5.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* GP5.1 is satisfied by complying with G5.1 and G5.2.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.4(3)~~A0.7~~.

PART G6 OCCUPIABLE OUTDOOR AREAS

[Deemed-to-Satisfy Provisions]

Note.

Part G6 contains *Deemed-to-Satisfy Provisions* additional to those contained in **Section C**, **D**, **E**, **F** and **G** for *occupiable outdoor areas*.

G6.1 Application of Part

(a) The *Deemed-to-Satisfy Provisions* of this Part apply to buildings containing an *occupiable outdoor area* in addition to the other *Deemed-to-Satisfy Provisions* of the BCA.

(b) The *Deemed-to-Satisfy Provisions* of this Part take precedence where there is a difference to the *Deemed-to-Satisfy Provisions* of **Sections C**, **D**, **E**, **F** and **G**.

(c) Except for **G6.2**, the *Deemed-to-Satisfy Provisions* of this Part do not apply to—

  (i) an *occupiable outdoor area* of a *sole-occupancy unit* in a Class 2 or 3 building, Class 9c building or Class 4 part of a building; or

  (ii) an *occupiable outdoor area* with an area less than 10m^2.

G6.2 Fire hazard properties

(a) A lining, material or assembly in an *occupiable outdoor area* must comply with **C1.10**.

(b) The following *fire hazard properties* of a lining, material or assembly in an *occupiable outdoor area* are not *required* to comply with **C1.10**:

  (i) *Average specific extinction area*.

  (ii) *Smoke-Developed Index*.

  (iii) *Smoke development rate*.

  (iv) *smoke growth rate index* ($SMOGRA_{RC}$).

G6.3 Separation of classifications

For the purposes of the *Deemed-to-Satisfy Provisions* of **C2.7**, **C2.8** and **C2.9**, a reference to a *storey* includes an *occupiable outdoor area*.

G6.4 Provision for escape

For the purposes of the *Deemed-to-Satisfy Provisions* of **Part D1**, a reference to a *storey* or room includes an *occupiable outdoor area*.

G6.5 Construction of exits

For the purposes of the *Deemed-to-Satisfy Provisions* of **Part D2**, a reference to a *storey* or room includes an *occupiable outdoor area*.

G6.6 Fire fighting equipment

Except for **Clause 7(a)(i)** of **Specification E1.5**, for the purposes of the *Deemed-to-Satisfy Provisions* of **Part E1**, a reference to a *storey* includes an *occupiable outdoor area*.

G6.7 Lift installations

For the purposes of the *Deemed-to-Satisfy Provisions* of **Part E3**, a reference to a *storey* includes an *occupiable outdoor area*.

G6.8 Visibility in an emergency, exit signs and warning systems

For the purposes of the *Deemed-to-Satisfy Provisions* of **Part E4**, a reference to a *storey* includes an *occupiable outdoor area*.

[Deemed-to-Satisfy Provisions]

G6.9 Light and ventilation

For the purposes of the *Deemed-to-Satisfy Provisions* of **F4.4**, **F4.8** and **F4.9**, a reference to a room includes an *occupiable outdoor area*.

G6.10 Fire orders

For the purposes of the *Deemed-to-Satisfy Provisions* of **G4.9**, a reference to a *storey* includes an *occupiable outdoor area*.

PART H2 PUBLIC TRANSPORT BUILDINGS

Deemed-to-Satisfy Provisions

Note.
Part H2 contains *Deemed-to-Satisfy Provisions* for Class 9b and Class 10 public transport buildings additional to those contained in Parts D3, E3 and F2 that apply to public transport buildings.

H2.1 Application of Part

(a) The *Deemed-to-Satisfy Provisions* of this Part apply to the passenger use areas of a Class 9b or Class 10 building used for public transport.

(b) The *Deemed-to-Satisfy Provisions* of this Part take precedence where there is a difference to the *Deemed-to-Satisfy Provisions* of Parts D3, E3 and F2.

(c) For an airport that does not accept regular public transport services, as defined in the Disability Standards for Accessible Public Transport 2002, only H2.8(a), H2.9, H2.10, H2.11, H2.12 and H2.13 of this Part apply.

(d) A3.3(a)(i) does not apply to this Part.

H2.8 Unisex accessible toilet

(a) If toilets are provided, there must be at least one unisex *accessible* toilet without an airlock that complies with AS 1428.1 clause 10, sanitary facilities.

(b) In a Class 9b public transport building where a unisex *accessible* toilet is *required* by (a), there must also be at least one unisex *accessible* toilet that complies with Specification F2.4.

PART H3 FARM BUILDINGS AND FARM SHEDS

Deemed-to-Satisfy Provisions

SA Part H3

H3.9 Fire hydrants and water supplies

(a) A *farm building*—
  (i) with a total *floor area* greater than 500 m^2; and
  (ii) located where a *fire brigade station*~~*fire brigade*~~ is— ~~available to attend a building fire,~~
    (A) no more than 50 km from the building as measured along roads; and
    (B) equipped with equipment capable of utilising a fire hydrant,

  must be—
  (iii) provided with a fire hydrant system installed in accordance with AS 2419.1, except reference to '4 hours' water supply in clause 4.2 is replaced with '2 hours'; or
  (iv) located on the same allotment as an access point to a water supply which—
    (A) has a minimum total capacity of 144 000 litres; and
    (B) is situated so as to enable emergency services vehicles access to within 4 m; and
    (C) is located within 60 m of the building and not more than 90 m from any part of the building.

(b) For the purposes of (a)(iv), water supply for a *farm building* must consist of one or any number of the following:
  (i) A water storage tank.
  (ii) A dam.
  (iii) A reservoir.
  (iv) A river.
  (v) A lake.
  (vi) A bore.
  (vii) A sea.

(c) If the whole or part of the water supply referred to in (a)(iv) is contained in a water storage tank, it must be—
  (i) located not less then 10 m from the building; and
  (ii) fitted with at least one small bore suction connection and one large bore suction connection where—
    (A) each suction connection is located in a position so as to enable emergency service vehicles access to within 4 m; and
    (B) the suction connections are located not less than 10 m from the building; and
    (C) 'small bore suction connection' and 'large bore suction connection' have the meanings contained in AS 2419.1.

H3.15 Design and operation of exit signs

(a) In a *farm building*, each *required exit* sign provided under E4.5 and H3.14 need not comply with E4.8 if—
  (i) the use of illuminated *exit* signs may adversely impact the behaviour or welfare of animals being kept in the building; and
  (ii) ~~*non-illuminated exit signs*~~ non-illuminated *exit* signs are installed in accordance with the requirements of Appendix D of AS 2293.1 as for an externally illuminated *exit* sign, and clauses 5.6 and 5.8 ~~6.5, 6.6, 6.8 and 6.9~~ of AS 2293.1.

(b) In a *farm shed*, each *required exit* sign provided under E4.5 and H3.14 need not comply with E4.8 if ~~*exit* signs complying with Section 6 and Appendix D of AS 2293.1 are provided except~~—
  (i) ~~the *exit* sign need not be illuminated; and~~non-illuminated *exit* signs are installed in accordance with the requirements of Appendix D of AS 2293.1 as for an externally illuminated *exit* sign, and clauses 5.6 and 5.8 of AS 2293.1; and
  (ii) the maximum viewing distance in clause 5~~6~~.6 of AS 2293.1 ~~must be~~ is not more than 24 m~~; and~~.
  ~~(iii) clauses 6.3 and 6.7 of AS 2293.1 do not apply.~~

SECTION J

ENERGY EFFICIENCY

SECTION J CONTENTS

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PERFORMANCE REQUIREMENTS

JP1

~~A building, including its *services*, must have~~, to the degree necessary, ~~features that facilitate the efficient use of energy appropriate to—~~

~~(a) the function and use of the building and *services*; and~~

~~(b) the internal environment; and~~

~~(c) the geographic location of the building; and~~

~~(d) the effects of nearby permanent features such as topography, structures and buildings; and~~

~~(e) solar radiation being—~~

(i) ~~utilised for heating; and~~

(ii) ~~controlled to minimise energy for cooling; and~~

~~(f) the sealing of the building *envelope* against air leakage; and~~

~~(g) the energy source of the *services*.~~

A building, including its *services*, must have features that facilitate the efficient use of energy appropriate to—

(a) the function and use of the building and *services*; and

(b) the level of human comfort required for the building use; and

(c) for a building with a *conditioned space*, achieving an hourly *regulated energy* consumption, averaged over all *hours of operation* in a year, of not more than—

(i) for a Class 2 common area, Class 5, 6, 7b, 8 or 9a building, or a Class 9b school, 30 kJ/m^2.hr; and

(ii) for all other building classifications, 8 kJ/m^2.hr.

~~JP2 * * * * *~~

~~This clause has deliberately been left blank.~~

~~JP3~~

~~Heating such as for a conditioned space must, to the degree necessary, obtain energy from—~~

~~(a) a source that has a greenhouse gas intensity that does not exceed 100 g CO2-e/MJ of thermal energy load; or~~

~~(b) an on-site renewable energy source; or~~

~~(c) another process as reclaimed energy.~~

VERIFICATION METHODS

JV1 ~~* * * * *~~NABERS Energy

~~This clause has deliberately been left blank.~~

(a) For a Class 5 building, compliance with **JP1** is verified when—

(i) a minimum 5.5-star *NABERS Energy for Offices* base building Commitment Agreement is obtained; and

(ii) the energy model required for **(i)** demonstrates—

(A) the base building's greenhouse gas emissions are not more than 67% of the 5.5-star level when excluding—

(aa) tenant condenser water loop; and

(bb) external lighting; and

(cc) *carpark services*; and

(B) a *thermal comfort level* of between a *PMV* of -1 to +1 is achieved across not less than 95% of the *floor area* of all occupied zones not less than 98% of the *hours of operation* of the building; and

(iii) the building complies with the additional requirements in **Specification JVa**.

(b) The calculation method for **(a)** must comply with—

(i) ANSI/ASHRAE Standard 140; and

(ii) Clauses 3 and 4 of **Specification JVb** for the proposed building.

JV2 ~~* * * * *~~Green Star

~~This clause has deliberately been left blank.~~

(a) For a Class 3, 5, 6, 7, 8 or 9 building, compliance with **JP1** is verified when—

(i) the building complies with the simulation requirements, and is registered, for a *Green Star –* Design & As-Built rating; and

(ii) the *annual greenhouse gas emissions* of the proposed building are less than 90% of the *annual greenhouse gas emissions* of the *reference building*; and

(iii) in the proposed building, a *thermal comfort level* of between a *PMV* of -1 to +1 is achieved across not less than 95% of the *floor area* of all occupied zones not less than 98% of the *hours of operation* of the building; and

(iv) the building complies with the additional requirements in **Specification JVa**.

(b) The calculation method used for **(a)** must comply with—

(i) ANSI/ASHRAE Standard 140; and

(ii) **Specification JVb.**

JV3 Verification using a reference building

(a) For a Class 3, 5, 6, 7, 8 or 9 building, compliance with **JP1** is verified when—

(i) it is determined that the *annual greenhouse gas emissions* ~~*energy consumption*~~ of the proposed building ~~with its *services* is~~ are not more than the *annual greenhouse gas emissions* ~~*energy consumption*~~ of a *reference building* when—

(A) the proposed building is modelled with the proposed *services*; and

(B) the proposed building is modelled with the same *services* as the *reference building*; and

(ii) in the proposed building, a *thermal comfort level* of between a *PMV* of -1 to +1 is achieved across not less than 95% of the *floor area* of all occupied zones not less than 98% of the *hours of operation* of the building; and

(iii) the building complies with the additional requirements in **Specification JVa**.

(b) The *annual greenhouse gas emissions* of the proposed building may be offset by *renewable energy* generated and used on *site*.

(c) The calculation method used for **(a)** and **(b)** must comply with—

(i) ANSI/ASHRAE Standard 140; and

(ii) **Specification JVb.**

~~(d) The *annual energy consumption* of the proposed building in **(a)** may be reduced by the amount of energy obtained from—~~

~~(i) an on-site *renewable energy* source; or~~

~~(ii) another process as reclaimed energy.~~

~~(e) The *annual energy consumption* calculation method must comply with the ABCB Protocol for Building Energy Analysis Software.~~

~~(f) The *annual energy consumption* in **(a)** must be calculated—~~

~~(i) for the *reference building*, using—~~

~~(A) the *Deemed-to-Satisfy Provisions* for **Parts J1** to **J7** but including only the minimum amount of mechanical ventilation *required* by **Part F4**; and~~

(B) ~~a solar absorptance of— 0.6 for external walls and 0.7 for roofs; and~~

(C) ~~the maximum *illumination power density* without any increase for a control device illumination power density adjustment factor; and~~

(D) ~~*air-conditioning* with the conditioned space temperature within the range of 18° CDB to 26° CDB for 98% of the plant operation time; and~~

~~(E) the profiles for occupancy, *air-conditioning*, lighting and internal heat gains from people, hot meals, appliances, equipment and heated water supply systems—~~

~~(aa) of the actual building—~~

~~(AA) if the operating hours per year are not less than 2500; or~~

~~(BB) if the daily operating profiles are not listed in **Specification JV**; or~~

~~(bb) of Specification JV; and~~

~~(F) infiltration values —~~

~~(aa) for a perimeter zone of depth equal to the floor-to-ceiling height, when pressurising plant is operating, 1.0 air change per hour; and~~

~~(bb) of for the whole building, when pressurising plant is not operating, 1.5 air change per hour; and~~

~~(ii) for both the proposed building and the reference building using the same—~~

~~(A) annual *energy consumption* calculation method; and~~

~~(B) location, being either the location where the building is to be constructed if appropriate climatic data is available, or the nearest location with similar climatic conditions, for which climatic data is available; and~~

~~(C) adjacent structures and features; and~~

~~(D) environmental conditions such as ground reflectivity, sky and ground form factors, temperature of external bounding surfaces, air velocities across external surfaces and the like; and~~

~~(E) orientation; and~~

~~(F) building form, including—~~

(aa) ~~the roof geometry; and~~

(bb) ~~the floor plan; and~~

(cc) ~~the number of *storeys*; and~~

(dd) ~~the ground to lowest floor arrangements; and~~

(ee) ~~the size and location of *glazing*; and~~

~~(G) external doors; and~~

~~(H) testing standards including for insulation, *glazing*, water heater and package *air-conditioning* equipment; and~~

~~(I) thermal resistance of air films including any adjustment factors, moisture content of materials and the like; and~~

~~(J) dimensions of external, internal and separating walls; and~~

~~(K) surface density of *envelope* walls over 220 kg/m~~ ^{2} ~~; and~~

~~(L) quality of insulation installation; and~~

~~(M) assumptions and means of calculating the temperature difference across *air- conditioning* zone boundaries; and~~

~~(N) floor coverings and furniture and fittings density; and~~

~~(O) internal shading devices, their colour and their criteria for operation; and~~

~~(P) number, sizes and floors served by lifts and escalators; and~~

~~(Q) range and type of *services* and energy sources, other than energy generated on-site from sources that do not emit greenhouse gases, such as solar and wind power; and~~

~~(R) internal artificial lighting levels; and~~

~~(S) internal heat gains including people, lighting, appliances, meals and other electric power loads; and~~

~~(T) *air-conditioning* system configuration and zones; and~~

~~(U) daily and annual profiles of the—~~

~~(aa) building occupancy; and~~

~~(bb) operation of services; and~~

~~(V) range of internal temperatures and plant operating times; and~~

~~(W) supply heated water temperature and rate of use; and~~

~~(X) infiltration values, unless there are specific additional sealing provisions or pressure testing to be undertaken; and~~

~~(Y) unit capacity and sequencing for water heaters, refrigeration chillers and heat rejection equipment such as cooling towers; and~~

~~(Z) for people; and~~

~~(iii) for the proposed building using a solar absorptance for the roof and walls 0.05 higher than that proposed; and~~

~~(g) Where the *annual energy consumption* of the heated water supply or the lifts and escalators are the same in the proposed building and the *reference building*, they may be omitted from the calculation of both the proposed building and the *reference building*.~~

~~(h) A lift in a building with more than one classification may be proportioned according to the number of *storeys* of the part for which the *annual*~~ energy consumption, ~~is being calculated.~~

~~(i) The design must include—~~

(i) ~~the ability to achieve all the criteria used in the *annual*~~ energy consumption ~~calculation method such as having an automatic operation controlling device capable of turning lighting, and *air-conditioning* plant on and off in accordance with the occupancy and operating profiles used; and~~

(ii) ~~compliance with—~~

~~(A) **J1.2** for general thermal construction; and~~

~~(B) **J1.3(c)** for compensation for a loss of ceiling insulation; and~~

~~(C) **J1.6(a)(ii)**, **J1.6(c)**, **J1.6(d)** and **J1.6(e)** for floor edge insulation; and~~

~~(D) BS 7190 for testing a water heater; and~~

~~(E) AS/NZS 3823.1.2 at test condition T1 for testing package *air-conditioning* equipment not less than 65 kWr; and~~

~~(F) AHRI 550/590 for testing a refrigeration chiller; and~~

~~(G) **Part J8** for facilities for energy monitoring.~~

JV4 Building envelope sealing

Compliance with JP1 for building sealing is verified when the *envelope* is sealed at an air leakage permeance rate, tested in accordance with AS/NZS ISO 9972, of not more than—

(a) for a Class 2 building or a Class 4 part of a building, 10 $m^3/hr.m^2$ at 50 Pa reference pressure; or

(b) for a Class 5, 6 or 9 building, other than a *ward area*, in *climate zones* 1, 7 and 8, 5 $m^3/hr.m^2$ at 50 Pa reference pressure; or

(c) for a Class 3 or 9c building or a Class 9a *ward area* in *climate zones* 1, 3, 4, 6, 7 and 8, 5 $m^3/hr.m^2$ at 50 Pa reference pressure.

SPECIFICATION JVa ADDITIONAL REQUIREMENTS

1. Scope

This Specification contains requirements which must be carried out in addition to the modelling requirements of **JV1**, **JV2** and **JV3**.

2. Additional requirements - general

In addition to the modelling requirements for **JV1**, **JV2** and **JV3**, a building must comply with—

(a) for general thermal construction, **J1.2**; and

(b) for floor edge insulation, **J1.6(a)(ii)**, **J1.6(b)**, **J1.6(c)** and **J1.6(d)**; and

(c) for building sealing, **J3**; and

(d) for deactivation, control and insulation of *air-conditioning* and mechanical ventilation systems—

(i) **J5.2(a)(i)**; and

(ii) **J5.2(a)(ii)(A)**; and

(iii) **J5.2(a)(iv)**; and

(iv) **J5.2(a)(vi)**; and

(v) **J5.2(b)**; and

(vi) **J5.2(d)**; and

(vii) **J5.3(b)**; and

(viii) **J5.3(d)** ; and

(ix) **J5.5**; and

(x) **J5.6**; and

(xi) **J5.8**; and

(e) for testing a water heater, AS/NZS 5263.1.2; and

(f) for testing package *air-conditioning* equipment not less than 65 kWr, AS/NZS 3823.1.2 at test condition T1; and

(g) for testing a refrigeration chiller; AHRI 551/591; and

(h) for interior artificial lighting and power control, J6.3; and

(i) for interior decorative and display lighting, J6.4; and

(j) for artificial lighting around the exterior of a building, J6.5; and

(k) for boiling water and chilled water storage units, J6.6; and

(l) for deactivation of *swimming pool* heating and pumping, J7.3(b)(ii) and J7.3(c); and

(m) for deactivation of spa pool heating and pumping, J7.4(b)(ii) and J7.4(c); and

(n) for facilities for energy monitoring, Part J8; and

(o) for deactivation of fixed outdoor space heating appliances, clause J5.9(c).

3. Additional requirements – NABERS Energy

Where not simulated to satisfy **JV1(a)**, compliance must be achieved with—

(a) for tenant condenser water loop, J5.7; and

(b) for carpark ventilation and lighting—

  (i) **J5.3**; and

  (ii) **J5.4**; and

  (iii) **J6.2**; and

  (iv) **J6.3**; and

(c) for artificial lighting not covered by the *NABERS Energy for Offices* base building rating, **Part J6**.

(d) for heating, cooling and ventilation equipment not covered by the *NABERS Energy for Offices* base building rating, **Part J5**.

4. Additional requirements – Green Star

Where not simulated to satisfy **JV1(a)**, compliance must be achieved with—

(a) for heating, cooling and ventilation equipment outside the scope of the *Green Star* model, Part J5.

(b) for artificial lighting outside the scope of the Green Star model, Part J6

SPECIFICATION JVb MODELLING PARAMETERS

1. Scope

This Specification contains the *required* modelling parameters for **JV1**, **JV2** and **JV3**.

2. Reference building

The *annual greenhouse gas emissions* must be calculated for the *reference building* in accordance with the following:

(a) The *reference building* must—

  (i) comply with *Deemed-to-Satisfy Provisions* in **Parts J1** to **J7;** and

  (ii) have the minimum amount of mechanical ventilation *required* by **Part F4**.

(b) The *external walls* must have a solar absorptance of 0.6.

(c) The *air-conditioning* must—

  (i) for 98% of the *hours of operation*, achieve temperatures between—

    (A) 18° CDB to 25° CDB for *conditioned spaces* with transitory occupancy; and

    (B) subject to **(ii)**, 21° CDB to 24° CDB in all other *conditioned spaces*; and

  (ii) if the proposed building has no mechanically provided cooling or has mixed mode cooling, have the same control of non-mechanical cooling as the proposed building.

(d) The infiltration rates must be—

  (i) 0.7 air changes per hour throughout all zones when there is no mechanically supplied *outdoor air*; and

  (ii) 0.35 air changes per hour at all other times.

(e) The artificial lighting must achieve the *required* maximum *illumination power density* in **Part J6** without applying the control device adjustment factors.

(f) *MEPS* must be applied to *service*s not covered by **Parts J5** to **J7**.

3. Proposed building and reference building

The *annual greenhouse gas emissions* must be calculated for the proposed building and the *reference building* using the same:

(a) **General —**

  (i) annual *greenhouse gas emissions* calculation method; and

(ii) greenhouse gas emissions factors based on either—

(A) the factors in **Table 3a**; or

(B) the current scope 1, 2 and 3 factors published by the Australian Government,

except, where the greenhouse gas intensity of electricity is less than half the greenhouse gas intensity of natural gas—

(C) electricity is to be weighted as 1; and

(D) natural gas is to be weighted as 2.

Table 3a GREENHOUSE GAS EMISSIONS FACTORS (kgCO_2-e/GJ)

Energy source	**Location**							
	ACT	**NSW**	**NT**	**Qld**	**SA**	**Tas**	**Vic**	**WA**
Electricity	265	265	213	262	177	37	330	220
Natural gas	51.53	51.53	51.53	51.53	51.53	51.53	51.53	51.53

(iii) location, being either—

(A) the location where the building is to be constructed if appropriate climatic data is available; or

(B) the nearest location with similar climatic conditions, for which climatic data is available; and

(iv) adjacent structures and features; and

(v) environmental conditions such as ground reflectivity, sky and ground form factors, temperature of external bounding surfaces, air velocities across external surfaces and the like; and

(vi) orientation; and

(vii) building form, including—

(A) the roof geometry; and

(B) the floor plan; and

(C) the number of *storeys*; and

(D) the ground to lowest floor arrangements; and

(E) the size and location of *glazing*; and

(F) external doors; and

(G) testing standards including for insulation, *glazing*, water heater and package *air-conditioning* equipment; and

(b) **Fabric and glazing —**

(i) quality of insulation installation; and

(ii) thermal resistance of air films including any adjustment factors, moisture content of materials and the like; and

(iii) dimensions of external, internal and separating walls; and

(iv) internal shading devices, their colour and their criteria for operation; and

(v) number, sizes, floors and traffic served by lifts and escalators; and

(c) **Services —**

(i) range and type of *services* and energy sources, other than *renewable energy* generated on *site*; and

(ii) assumptions and means of calculating the temperature difference across *air-conditioning* zone boundaries; and

(iii) floor coverings and furniture and fittings density; and

(iv) internal artificial lighting illumination levels; and

(v) internal heat gains including people, lighting, appliances, meals and other electric power loads; and

(vi) *air-conditioning* system configuration and zones; and

(vii) profiles for occupancy, *air-conditioning*, lighting and internal heat gains from people, hot meals, appliances, equipment and heated water supply systems based on—

(A) **Specification JVc**; or

(B) *NABERS Energy for Offices* simulation requirements; or

(C) *Green Star* simulation requirements; or

(D) the actual building if—

(aa) the operating hours per year are not less than 2500; or

(aa) the daily operating profiles are not listed in **Specification JVc**; and

(viii) supply heated water temperature and rate of use; and

(ix) infiltration values, unless the following have been specified—

(A) additional sealing provisions to those required by **Part J3**; and

(B) an intended building leakage of less than $10m^3/hr.m^2$ at 50Pa; and

(C) pressure testing to verify achievement of the intended building leakage,

in which case the intended building leakage at 50Pa may be converted into a whole building infiltration value for the proposed building infiltration using Tables 4.16 to 4.24 of CIBSE Guide A; and

(x) unit capacity and sequencing for water heaters, refrigeration chillers and heat rejection equipment such as cooling towers; and

(xi) representation of clothing and metabolic rate of the occupants; and

(xii) control of *air-conditioning* except—

(A) the *reference building* must have variable temperature control for chilled and heated water; and

(B) if the controls for the proposed building are not adequately specified or cannot be simulated, the controls specified in Appendix B of AIRAH DA28 must be used; and

(C) if the controls specified for the proposed building are incompatible with the *reference building air-conditioning*, the controls applied to the *reference building* must replicate the controls of the proposed building to the full extent possible.

4. Services – reference and proposed building

For the modelling of *services* for the purposes of calculating *annual greenhouse gas emissions*—

(a) system demand and response for all items of plant must be calculated on a not less frequent than hourly basis; and

(b) energy usage of all items of plant must be calculated with an allowance for—

(i) part load performance; and

(ii) staging to meet system demand; and

(c) energy usage of cooling plant must be calculated with an allowance for—

(i) the impact of chilled water temperature on chiller efficiency; and

(ii) the impact of condenser water temperature on water-cooled plant efficiency; and

(iii) the impact of ambient temperature on air-cooled plant efficiency; and

(iv) the energy use of primary pumps serving individual chillers; and

(v) the energy use of auxiliary equipment, including controls and oil heating for chillers; and

(vi) thermal losses in the chilled water system; and

(vii) the impact of chilled water temperature on thermal losses in the chilled water system; and

(d) energy usage of water heating systems for space heating must be calculated with an allowance for—

(i) the impact of water temperature on water heater efficiency; and

(ii) the energy use of primary or feedwater pumps serving individual water heaters; and

(iii) thermal losses in water heating systems; and

(iv) the thermal mass of water heating systems, accounting for thermal losses during periods when the system is not operating; and

(e) energy usage of fan and pump systems must be calculated with an allowance for—

(i) the method of capacity regulation; and

(ii) the use of either fixed or variable pressure control; and

(f) energy usage of pump systems must be calculated with an allowance for the system fixed static pressure head; and

(g) energy usage of auxiliary equipment associated with co-generation and tri-generation systems, including pumps, cooling towers and jacket heaters, must be calculated; and

(h) where the energy usage of the heated water supply or the lifts and escalators is the same in the proposed building and the *reference building*, they may be omitted from the calculation of both the proposed building and the *reference building*; and

(i) a lift in a building with more than one classification may be proportioned according to the number of *storeys* of the part for which the *annual greenhouse gas emissions* and *thermal comfort level* is being calculated.

SPECIFICATION JVC ~~ANNUAL ENERGY CONSUMPTION CRITERIA~~ MODELLING PROFILES

1. Scope

~~This Specification contains the requirements for calculating the *annual* energy consumption of *services* in a building.~~

This Specification contains the *required* modelling profiles for **JV1**, **JV2** and **JV3**.

2. ~~Annual energy consumption of services~~ Modelling profiles

~~The annual energy consumption~~—

(a) ~~for~~ The *air-conditioning* must be ~~calculated~~modelled on the basis of—

- (i) the daily occupancy and operation profiles in **Tables 2a** to **2j~~g~~**; and
- (ii) ~~plant serving public areas of a Class 3 or 9c building being available on thermostatic control 24 hours per day; and~~
- (ii) the internal heat gains in a building—
  - (A) from occupants and hot meals, in accordance with one of the options in **Table 2m~~j~~**; and
  - (B) from appliances and equipment, in accordance with **Table 2k~~h~~**; and
  - (C) from artificial lighting, ~~that is calculated in~~ determined in accordance with **(b)**; and

(b) ~~for~~ The artificial lighting must be ~~calculated~~modelled on the basis of the proposed level of artificial lighting in the building with the daily profile in **Tables 2a** to **2j~~g~~**; and

(c) ~~for~~ The heated water supply must be ~~calculated~~modelled on the basis of the consumption rates of **Table 2l~~i~~**.

Table 2a OCCUPANCY AND OPERATION PROFILES OF A CLASS 3 ~~OR 9c~~ BUILDING

Time period (local standard time)	Occupancy	Artificial lighting	Appliances and equipment	*Air-conditioning*
12:00am to 1:00am	90%	5%	20%	On
1:00am to 2:00am	90%	5%	20%	On
2:00am to 3:00am	90%	5%	15%	On
3:00am to 4:00am	90%	5%	15%	On
4:00am to 5:00am	90%	5%	15%	On
5:00am to 6:00am	80%	25%	15%	On
6:00am to 7:00am	70%	80%	40%	On
7:00am to 8:00am	60%	80%	80%	On
8:00am to 9:00am	60%	50%	50%	On
9:00am to 10:00am	30%	20%	30%	On
10:00am to 11:00am	10%	20%	20%	Off
11:00am to 12:00pm	10%	20%	20%	Off
12:00pm to 1:00pm	10%	20%	20%	Off
1:00pm to 2:00pm	10%	20%	20%	Off
2:00pm to 3:00pm	10%	20%	20%	Off
3:00pm to 4:00pm	10%	20%	20%	Off
4:00pm to 5:00pm	20%	20%	20%	On
5:00pm to 6:00pm	30%	50%	40%	On
6:00pm to 7:00pm	40%	50%	40%	On
7:00pm to 8:00pm	50%	50%	50%	On
8:00pm to 9:00pm	60%	50%	60%	On
9:00pm to 10:00pm	70%	50%	60%	On
10:00pm to 11:00pm	70%	50%	40%	On
11:00pm to 12:00am	90%	50%	20%	On

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the Class 3 building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**.

~~**Time period (local standard time)**~~	~~**Occupancy**~~		~~**Artificial lighting**~~	~~Air-conditioning~~	
	~~Monday to Friday~~	~~Saturday, Sunday and holidays~~		~~Monday to Friday~~	~~Saturday, Sunday and holidays~~
~~**12:00am to 1:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~
~~**1:00am to 2:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~
~~**2:00am to 3:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~
~~**3:00am to 4:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~
~~**4:00am to 5:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~
~~**5:00am to 6:00am**~~	~~85%~~	~~85%~~	~~25%~~	~~On~~	~~On~~
~~**6:00am to 7:00am**~~	~~85%~~	~~85%~~	~~80%~~	~~On~~	~~On~~
~~**7:00am to 8:00am**~~	~~80%~~	~~85%~~	~~80%~~	~~On~~	~~On~~
~~**8:00am to 9:00am**~~	~~50%~~	~~50%~~	~~50%~~	~~On~~	~~On~~
~~**9:00am to 10:00am**~~	~~10%~~	~~50%~~	~~20%~~	~~Off~~	~~On~~
~~**10:00am to 11:00am**~~	~~10%~~	~~20%~~	~~20%~~	~~Off~~	~~Off~~
~~**11:00am to 12:00pm**~~	~~10%~~	~~20%~~	~~20%~~	~~Off~~	~~Off~~
~~**12:00pm to 1:00pm**~~	~~10%~~	~~20%~~	~~20%~~	~~Off~~	~~Off~~
~~**1:00pm to 2:00pm**~~	~~10%~~	~~20%~~	~~20%~~	~~Off~~	~~Off~~
~~**2:00pm to 3:00pm**~~	~~10%~~	~~20%~~	~~20%~~	~~Off~~	~~Off~~
~~**3:00pm to 4:00pm**~~	~~10%~~	~~30%~~	~~20%~~	~~Off~~	~~Off~~
~~**4:00pm to 5:00pm**~~	~~50%~~	~~50%~~	~~20%~~	~~On~~	~~On~~
~~**5:00pm to 6:00pm**~~	~~50%~~	~~50%~~	~~50%~~	~~On~~	~~On~~
~~**6:00pm to 7:00pm**~~	~~70%~~	~~50%~~	~~50%~~	~~On~~	~~On~~
~~**7:00pm to 8:00pm**~~	~~70%~~	~~70%~~	~~50%~~	~~On~~	~~On~~
~~**8:00pm to 9:00pm**~~	~~80%~~	~~80%~~	~~50%~~	~~On~~	~~On~~
~~**9:00pm to 10:00pm**~~	~~85%~~	~~80%~~	~~50%~~	~~On~~	~~On~~
~~**10:00pm to 11:00pm**~~	~~85%~~	~~85%~~	~~50%~~	~~On~~	~~On~~
~~**11:00pm to 12:00am**~~	~~85%~~	~~85%~~	~~5%~~	~~On~~	~~On~~

~~**Note:** The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the Class 3~~ or 9c ~~building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**.~~

Table 2b WEEKDAY OCCUPANCY AND OPERATION PROFILES OF A CLASS 5 BUILDING, A CLASS 7 WAREHOUSE, A CLASS 8 LABORATORY OR A CLASS 9a CLINIC, DAY SURGERY OR PROCEDURE UNIT

Time period (local standard time)	Occupancy (Monday to Friday)	Artificial lighting (Monday to Friday)	Appliances and equipment (Monday to Friday)	*Air-conditioning* (Monday to Friday)
12:00am to 1:00am	0%	15%~~10%~~	25%~~10%~~	Off
1:00am to 2:00am	0%	15%~~10%~~	25%~~10%~~	Off
2:00am to 3:00am	0%	15%~~10%~~	25%~~10%~~	Off
3:00am to 4:00am	0%	15%~~10%~~	25%~~10%~~	Off
4:00am to 5:00am	0%	15%~~10%~~	25%~~10%~~	Off
5:00am to 6:00am	0%	15%~~10%~~	25%~~10%~~	Off
6:00am to 7:00am	0%	15%~~10%~~	25%~~10%~~	Off
7:00am to 8:00am	10%~~15%~~	40%	65%~~25%~~	On
8:00am to 9:00am	20%~~60%~~	90%~~80%~~	80%~~70%~~	On
9:00am to 10:00am	70%~~100%~~	100%	100%	On
10:00am to 11:00am	70%~~100%~~	100%	100%	On
11:00am to 12:00pm	70%~~100%~~	100%	100%	On
12:00pm to 1:00pm	70%~~100%~~	100%	100%	On
1:00pm to 2:00pm	70%~~100%~~	100%	100%	On
2:00pm to 3:00pm	70%~~100%~~	100%	100%	On
3:00pm to 4:00pm	70%~~100%~~	100%	100%	On
4:00pm to 5:00pm	70%~~100%~~	100%	100%	On
5:00pm to 6:00pm	35%~~50%~~	80%	80%~~60%~~	On
6:00pm to 7:00pm	10%~~15%~~	60%	65%~~25%~~	Off
7:00pm to 8:00pm	5%	60%~~40%~~	55%~~15%~~	Off
8:00pm to 9:00pm	5%	50%~~20%~~	25%~~15%~~	Off
9:00pm to 10:00pm	0%	15%~~10%~~	25%~~10%~~	Off
10:00pm to 11:00pm	0%	15%~~10%~~	25%~~10%~~	Off
11:00pm to 12:00am	0%	15%~~10%~~	25%~~10%~~	Off

	~~**Notes:**~~ ~~1. The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2h**. The *air-conditioning* profile is expressed as the plant status.~~ ~~2. Saturday and Sunday profiles are 10% continuous artificial lighting and 10% continuous appliances and equipment. There is no occupancy and the air-conditioning is "off".~~

Note:

The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2k**. The *air-conditioning* profile is expressed as the plant status.

Table 2c WEEKEND OCCUPANCY AND OPERATION PROFILES OF A CLASS 5 BUILDING, A CLASS 7 WAREHOUSE, A CLASS 8 LABORATORY OR A CLASS 9a CLINIC, DAY SURGERY OR PROCEDURE UNIT

Time period (local standard time)	Occupancy (Saturday, Sunday and holidays)	Artificial lighting (Saturday, Sunday and holidays)	Appliances and equipment (Saturday, Sunday and holidays)	*Air-conditioning* (Saturday, Sunday and holidays)
12:00am to 1:00am	0%	15%	25%	OFF
1:00am to 2:00am	0%	15%	25%	OFF
2:00am to 3:00am	0%	15%	25%	OFF
3:00am to 4:00am	0%	15%	25%	OFF
4:00am to 5:00am	0%	15%	25%	OFF
5:00am to 6:00am	0%	15%	25%	OFF
6:00am to 7:00am	0%	15%	25%	OFF
7:00am to 8:00am	0%	15%	25%	OFF
8:00am to 9:00am	5%	25%	25%	OFF
9:00am to 10:00am	5%	25%	25%	OFF
10:00am to 11:00am	5%	25%	25%	OFF
11:00am to 12:00pm	5%	25%	25%	OFF
12:00pm to 1:00pm	5%	25%	25%	OFF
1:00pm to 2:00pm	5%	25%	25%	OFF
2:00pm to 3:00pm	5%	25%	25%	OFF
3:00pm to 4:00pm	5%	25%	25%	OFF
4:00pm to 5:00pm	5%	25%	25%	OFF
5:00pm to 6:00pm	0%	15%	25%	OFF
6:00pm to 7:00pm	0%	15%	25%	OFF
7:00pm to 8:00pm	0%	15%	25%	OFF
8:00pm to 9:00pm	0%	15%	25%	OFF
9:00pm to 10:00pm	0%	15%	25%	OFF
10:00pm to 11:00pm	0%	15%	25%	OFF
11:00pm to 12:00am	0%	15%	25%	OFF

Note:
The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal

heat gain in **Table 2k**. The *air-conditioning* profile is expressed as the plant status.

Table 2d~~c~~ OCCUPANCY AND OPERATION PROFILES OF A CLASS 6 SHOP OR SHOPPING CENTRE

Time period (local standard time)	Occupancy (Daily)	Artificial lighting (Daily)	Appliances and equipment (Daily)	*Air-conditioning* (Daily)
12:00am to 1:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
1:00am to 2:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
2:00am to 3:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
3:00am to 4:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
4:00am to 5:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
5:00am to 6:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
6:00am to 7:00am	0%	25%~~10%~~	25%~~10%~~	25%~~Off~~
7:00am to 8:00am	10%	100%	70%	On
8:00am to 9:00am	20%	100%	70%	On
9:00am to 10:00am	20%	100%	70%	On
10:00am to 11:00am	15%	100%	70%	On
11:00am to 12:00pm	25%	100%	70%	On
12:00pm to 1:00pm	25%	100%	70%	On
1:00pm to 2:00pm	15%	100%	70%	On
2:00pm to 3:00pm	15%	100%	70%	On
3:00pm to 4:00pm	15%	100%	70%	On
4:00pm to 5:00pm	15%	100%	70%	On
5:00pm to 6:00pm	5%	100%	70%	On
6:00pm to 7:00pm	5%	100%	70%	Off
7:00pm to 8:00pm	0%	10%	10%	Off
8:00pm to 9:00pm	0%	10%	10%	Off
9:00pm to 10:00pm	0%	10%	10%	Off
10:00pm to 11:00pm	0%	10%	10%	Off
11:00pm to 12:00am	0%	10%	10%	Off

~~**Note:** The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2h**. The *air-conditioning* profile is expressed as the plant status.~~

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2k**. The *air-conditioning* profile is expressed as the plant status.

Table 2~~d~~e OCCUPANCY AND OPERATION PROFILES OF A CLASS 6 RESTAURANT OR CAFE

Time period (local standard time)	Occupancy (Monday to Saturday)	Artificial lighting (Monday to Saturday)	Appliances and equipment (Monday to Saturday)	*Air-conditioning* (Monday to Saturday)
12:00am to 1:00am	0%	5%	15%	Off
1:00am to 2:00am	0%	5%	15%	Off
2:00am to 3:00am	0%	5%	15%	Off
3:00am to 4:00am	0%	5%	15%	Off
4:00am to 5:00am	0%	5%	15%	Off
5:00am to 6:00am	0%	5%	15%	Off
6:00am to 7:00am	5%	40%	40%	Off
7:00am to 8:00am	5%	40%	40%	On
8:00am to 9:00am	5%	60%	60%	On
9:00am to 10:00am	5%	60%	60%	On
10:00am to 11:00am	20%	90%	90%	On
11:00am to 12:00pm	50%	90%	90%	On
12:00pm to 1:00pm	80%	90%	90%	On
1:00pm to 2:00pm	70%	90%	90%	On
2:00pm to 3:00pm	40%	90%	90%	On
3:00pm to 4:00pm	20%	90%	90%	On
4:00pm to 5:00pm	25%	90%	90%	On
5:00pm to 6:00pm	50%	90%	90%	On
6:00pm to 7:00pm	80%	90%	90%	On
7:00pm to 8:00pm	80%	90%	90%	On
8:00pm to 9:00pm	80%	90%	90%	On
9:00pm to 10:00pm	50%	90%	90%	On
10:00pm to 11:00pm	35%	50%	50%	On
11:00pm to 12:00am	20%	30%	30%	On

~~**Notes:**~~

1. ~~The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2h**. The *air-conditioning* profile is expressed as the plant status.~~
2. ~~Sunday profiles is 5% continuous artificial lighting and 5% continuous appliances and equipment. There is no occupancy and the *air-conditioning* is "off".~~

Notes:

1. The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2k**. The *air-conditioning* profile is expressed as the plant status.
2. Sunday profiles is 5% continuous artificial lighting and 5% continuous appliances and equipment. There is no occupancy and the *air-conditioning* is "off".

Table 2f~~e~~ OCCUPANCY AND OPERATION PROFILES OF A CLASS 9a WARD AREA

Time period (local standard time)	Occupancy		Artificial lighting	*Air-conditioning*	
	~~Monday to Friday~~	~~Saturday and Sunday~~		~~Monday to Friday~~	~~Saturday and Sunday~~
12:00am to 1:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
1:00am to 2:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
2:00am to 3:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
3:00am to 4:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
4:00am to 5:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
5:00am to 6:00am	70%~~85%~~	~~85%~~	25%	On	~~On~~
6:00am to 7:00am	70%~~85%~~	~~85%~~	80%	On	~~On~~
7:00am to 8:00am	70%~~85%~~	~~85%~~	80%	On	~~On~~
8:00am to 9:00am	70%~~85%~~	~~85%~~	50%	On	~~On~~
9:00am to 10:00am	70%~~85%~~	~~85%~~	20%	On	~~On~~
10:00am to 11:00am	70%~~85%~~	~~85%~~	20%	On	~~On~~
11:00am to 12:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
12:00pm to 1:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
1:00pm to 2:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
2:00pm to 3:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
3:00pm to 4:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
4:00pm to 5:00pm	70%~~85%~~	~~85%~~	20%	On	~~On~~
5:00pm to 6:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
6:00pm to 7:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
7:00pm to 8:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
8:00pm to 9:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
9:00pm to 10:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
10:00pm to 11:00pm	70%~~85%~~	~~85%~~	50%	On	~~On~~
11:00pm to 12:00am	70%~~85%~~	~~85%~~	5%	On	~~On~~
~~**Note:** The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The *air-conditioning* profile is expressed as the plant status.~~					

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The *air-conditioning* profile is expressed as the plant status.

Table 2g~~f~~ OCCUPANCY AND OPERATION PROFILES OF A CLASS 9b THEATRE OR CINEMA

Time period (local standard time)	~~Occupancy~~		~~Artificial lighting~~		~~*Air-conditioning*~~	
	Occupancy (Monday to Friday)	Occupancy (Sat. & Sun.)	Artificial lighting (Monday to Friday)	Artificial lighting (Sat. & Sun.)	*Air-conditioning* (Monday to Friday)	*Air-conditioning* (Sat. & Sun.)
12:00am to 1:00am	0%	0%	5%	5%	Off	Off
1:00am to 2:00am	0%	0%	5%	5%	Off	Off
2:00am to 3:00am	0%	0%	5%	5%	Off	Off
3:00am to 4:00am	0%	0%	5%	5%	Off	Off
4:00am to 5:00am	0%	0%	5%	5%	Off	Off
5:00am to 6:00am	0%	0%	5%	5%	Off	Off
6:00am to 7:00am	0%	0%	5%	5%	Off	Off
7:00am to 8:00am	0%	0%	5%	5%	Off	On
8:00am to 9:00am	0%	20%	100%	100%	Off	On
9:00am to 10:00am	0%	70%~~80%~~	10%	10%	Off	On
10:00am to 11:00am	0%	70%~~80%~~	10%	10%	Off	On
11:00am to 12:00pm	0%	70%~~80%~~	10%	10%	On	On
12:00pm to 1:00pm	20%	20%	100%	100%	On	On
1:00pm to 2:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
2:00pm to 3:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
3:00pm to 4:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
4:00pm to 5:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
5:00pm to 6:00pm	20%	20%	100%	100%	On	On
6:00pm to 7:00pm	20%	20%	100%	100%	On	On
7:00pm to 8:00pm	70%~~80%~~	70%~~80%~~	100%	100%	On	On
8:00pm to 9:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
9:00pm to 10:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
10:00pm to 11:00pm	70%~~80%~~	70%~~80%~~	5%	5%	On	On
11:00pm to 12:00am	10%	10%	100%	100%	On	On

~~**Note:** The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The *air- conditioning* profile is expressed as the plant status.~~

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The *air-conditioning* profile is expressed as the plant status.

Table 2h OCCUPANCY AND OPERATION PROFILES OF A CLASS 9b CONFERENCE FACILITY

Hour	Occupancy	Artificial lighting and equipment	*Air-conditioning*
12:00am to 1:00am	0%	15%	Off
1:00am to 2:00am	0%	15%	Off
2:00am to 3:00am	0%	15%	Off
3:00am to 4:00am	0%	15%	Off
4:00am to 5:00am	0%	15%	Off
5:00am to 6:00am	0%	15%	Off
6:00am to 7:00am	5%	25%	On
7:00am to 8:00am	10%	45%	On
8:00am to 9:00am	20%	45%	On
9:00am to 10:00am	20%	45%	On
10:00am to 11:00am	25%	60%	On
11:00am to 12:00pm	30%	60%	On
12:00pm to 1:00pm	30%	60%	On
1:00pm to 2:00pm	35%	60%	On
2:00pm to 3:00pm	30%	45%	On
3:00pm to 4:00pm	30%	60%	On
4:00pm to 5:00pm	35%	60%	On
5:00pm to 6:00pm	25%	60%	On
6:00pm to 7:00pm	20%	60%	On
7:00pm to 8:00pm	15%	25%	On
8:00pm to 9:00pm	10%	25%	On
9:00pm to 10:00pm	10%	25%	On
10:00pm to 11:00pm	10%	25%	On
11:00pm to 12:00am	5%	25%	Off

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6.** The *air-conditioning* profile is expressed as the plant status.

Table 2i~~g~~ OCCUPANCY AND OPERATION PROFILES OF A CLASS 9b SCHOOL

Time period (local standard time)	Occupancy (Monday to Friday)	Artificial lighting (Monday to Friday)	Appliances and equipment (Monday to Friday)	*Air-conditioning* (Monday to Friday)
12:00am to 1:00am	0%	5%	5%	Off
1:00am to 2:00am	0%	5%	5%	Off
2:00am to 3:00am	0%	5%	5%	Off
3:00am to 4:00am	0%	5%	5%	Off
4:00am to 5:00am	0%	5%	5%	Off
5:00am to 6:00am	0%	5%	5%	Off
6:00am to 7:00am	0%	5%	5%	Off
7:00am to 8:00am	5%	30%	30%	On
8:00am to 9:00am	75%	85%	85%	On
9:00am to 10:00am	90%	95%	95%	On
10:00am to 11:00am	90%	95%	95%	On
11:00am to 12:00pm	90%	95%	95%	On
12:00pm to 1:00pm	50%	80%	70%	On
1:00pm to 2:00pm	50%	80%	70%	On
2:00pm to 3:00pm	90%	95%	95%	On
3:00pm to 4:00pm	70%	90%	80%	On
4:00pm to 5:00pm	50%	70%	60%	On
5:00pm to 6:00pm	20%	20%	20%	Off
6:00pm to 7:00pm	20%	20%	20%	Off
7:00pm to 8:00pm	20%	20%	20%	Off
8:00pm to 9:00pm	10%	10%	10%	Off
9:00pm to 10:00pm	5%	5%	5%	Off
10:00pm to 11:00pm	5%	5%	5%	Off
11:00pm to 12:00am	5%	5%	5%	Off

~~**Notes:**~~

1. ~~The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2h**. The *air-conditioning* profile is expressed as the plant status.~~

~~2. Saturday and Sunday profiles are 5% continuous artificial lighting and 5% continuous appliances and equipment. There is no occupancy and the *air-conditioning* is "off".~~

Notes:

1. The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**. The appliances and equipment profile is expressed as a percentage of the maximum internal heat gain in **Table 2k**. The *air-conditioning* profile is expressed as the plant status.
2. Saturday and Sunday profiles are 5% continuous artificial lighting and 5% continuous appliances and equipment. There is no occupancy and the *air-conditioning* is "off".

Table 2j OCCUPANCY AND OPERATION PROFILES OF A CLASS 9c BUILDING

Time period (local standard time)	Occupancy (Monday to Friday)	Occupancy (Saturday, Sunday and holidays)	Artificial lighting	*Air-conditioning* (Monday to Friday)	*Air-conditioning* (Saturday, Sunday and holidays)
12:00am to 1:00am	85%	85%	5%	On	On
1:00am to 2:00am	85%	85%	5%	On	On
2:00am to 3:00am	85%	85%	5%	On	On
3:00am to 4:00am	85%	85%	5%	On	On
4:00am to 5:00am	85%	85%	5%	On	On
5:00am to 6:00am	85%	85%	25%	On	On
6:00am to 7:00am	85%	85%	80%	On	On
7:00am to 8:00am	80%	85%	80%	On	On
8:00am to 9:00am	50%	50%	50%	On	On
9:00am to 10:00am	10%	50%	20%	Off	On
10:00am to 11:00am	10%	20%	20%	Off	Off
11:00am to 12:00pm	10%	20%	20%	Off	Off
12:00pm to 1:00pm	10%	20%	20%	Off	Off
1:00pm to 2:00pm	10%	20%	20%	Off	Off
2:00pm to 3:00pm	10%	20%	20%	Off	Off
3:00pm to 4:00pm	10%	30%	20%	Off	Off
4:00pm to 5:00pm	50%	50%	20%	On	On
5:00pm to 6:00pm	50%	50%	50%	On	On
6:00pm to 7:00pm	70%	50%	50%	On	On
7:00pm to 8:00pm	70%	70%	50%	On	On
8:00pm to 9:00pm	80%	80%	50%	On	On
9:00pm to 10:00pm	85%	80%	50%	On	On
10:00pm to 11:00pm	85%	85%	50%	On	On
11:00pm to 12:00am	85%	85%	5%	On	On

Note: The occupancy profile is expressed as a percentage of the maximum number of people that can be accommodated in the Class 9c building. The artificial lighting profile is expressed as a percentage of the maximum *illumination power density* permitted under **Part J6**.

Table 2k~~h~~ INTERNAL HEAT GAINS FOR APPLIANCES AND EQUIPMENT

Application	Internal sensible heat gain rate (W/m^2)
Sole-occupancy unit of a Class 3 building, a Class 9a building *ward area* or Class 9c building	5 W/m^2 averaged for 24 hours per day, 7 days per week, continuous operation
~~Class 5 building,~~ Class 8 laboratory and a Class 9a clinic, day surgery and a procedure unit	15 W/m^2
Class 6 shop and shopping centre, Class 6 cafe and restaurant and Class 9b *school*	5 W/m^2
Other applications	No load
Class 3 (guest room)	160 W per room
Class 3 (dormitories)	No load
Class 5 building,	11 W/m^2
Class 9c	160 W per room
Class 9b (conference facilities only)	150 W per room plus 10 W per person

Table 2l~~i~~ HEATED WATER SUPPLY CONSUMPTION RATES

Application	Daily consumption rate
Residential part of a hotel or motel	~~75~~ 100 L/*sole-occupancy unit*
Dormitory, boarding house, guest house, hostel, lodging house and backpackers accommodation	50 L/person
Residential part of a *school*, accommodation for the aged, children or people with a disability and a *detention centre* or a *health care building* which accommodates members of staff	50 L/person
Class 9c building	50 L/person
Office, laboratory, shop and *assembly building*	4 L/person
Dining room, restaurant and cafe	9 L/meal
Health care building ward area	70 L/patient
School	7 L/person
Other applications	4 L/person

Table 2~~j~~m INTERNAL HEAT GAINS FOR OCCUPANTS AND HOT MEALS

Application		Internal heat gains per person
Dining room, restaurant or cafe	(a)	80 W *sensible heat gain* and 80 W *latent heat gain*
	(b)	The average adjusted metabolic rate for sedentary work from Table 45 of AIRAH-DA09
	(c)	The heat emission rate for sedentary work from Table 6.3 of CIBSE Guide A
Other applications	(a)	75 W *sensible heat gain* and 55 W *latent heat gain*
	(b)	An average adjusted metabolic rate from Table 45 of AIRAH-DA09
	(c)	A heat emission rate from Table 6.3 of CIBSE Guide A

~~**Notes:**~~

~~1. The number of people must be calculated in accordance with **D1.13**.~~

~~2. For a dining room, restaurant or cafe, the internal heat gains per person account for heat gains from both occupants and hot meals. For other applications, the internal heat gains per person only account for heat gains from occupants.~~

Notes:

1. The number of people must be calculated in accordance with **D1.13**.
2. For a dining room, restaurant or cafe, the internal heat gains per person account for heat gains from both occupants and hot meals. For other applications, the internal heat gains per person only account for heat gains from occupants.

J0.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement~~s~~* **JP1** ~~and **JP3** are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1. 6**; and

(iii) ~~J2.1 to J2.5; and~~J3.1 to J3.7; and

(iv) **J5.1** to **J5.~~4~~12**;

(v) and **J6.1** to **J6.~~6~~8**;

(vi) and **J7.1** to **J7.4**;

(vii) and **J8.1** to **J8.3**.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J0.1 Application of Section J

Performance Requirement~~s~~ **JP1** is ~~and JP3 are~~ satisfied by complying with—

(a) for reducing the heating or cooling loads—

(i) of *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, **J0.2** and **J0.3**; and

(ii) of a Class 2 to 9 building, other than the *sole-occupancy units* of a Class 2 building or a Class 4 part of a building, **Parts J1**, ~~J2~~ and **J3**; and

(b) for *air-conditioning* and ventilation, **Part J5**; and

(c) for artificial lighting and power, **Part J6**; and

(d) for heated water supply and *swimming pool* and spa pool plant, **Part J7**; and

(e) for facilities for monitoring, **Part J8**.

J0.2 Heating and cooling loads of sole-occupancy units of a Class 2 building or a Class 4 part

The *sole-occupancy units* of a Class 2 building or a Class 4 part of a building must—

(a) for reducing the heating or cooling loads—

(i) collectively achieve an average energy rating of not less than 6 stars, including the separate heating and cooling load limits; and

(ii) individually achieve an energy rating of not less than 5 stars, including the separate heating and cooling load limits,

using *house energy rating software*; and

(b) for general thermal construction, comply with **J1.2**; and

~~(c) for thermal breaks, comply with **J1.3(d)** and **J1.5(c)**; and~~

~~(d) for compensating for a loss of ceiling insulation, comply with **J1.3(c)**, other than where the *house energy rating software* used can automatically compensate for a loss of ceiling insulation; and~~

(c) for floor edge insulation, comply with **J1.6(b)**, **J1.6(c)** and **J1.6(d)**; and

(d) for building sealing, comply with **Part J3**.

J0.3 Ceiling fans

Ceiling fans *required* as part of compliance with **J0.2(a)**, must—

(a) be permanently installed; and

(b) have a speed controller; and

(c) serve the whole room, with the *floor area* that a single fan serves not exceeding—

(i) 15 m^2 if it has a blade rotation diameter of not less than 900 mm; and

(ii) 25 m^2 if it has a blade rotation diameter of not less than 1200 mm.

PART J1 BUILDING FABRIC AND GLAZING

J1.0 Deemed-to-Satisfy Provisions

Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement~~s~~* **JP1** ~~and~~ ~~**JP3** are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

~~(iii) **J2.1** to **J2.5**; and~~

(iii) **J3.1** to **J3.7**; and

(iv) **J5.1** to **J5.~~4~~12**; and

(v) **J6.1** to **J6.~~6~~8**; and

(vi) **J7.1** to **J7.4**; and

(vii) **J8.1** to **J8.3**.

Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J1.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to building elements forming the *envelope* of a Class 2 to 9 building.

J1.2 Thermal construction — general

(a) Where *required*, insulation must comply with AS/NZS 4859.1 and be installed so that it—

(i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and

(ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and

(iii) does not affect the safe or effective operation of a *service* or fitting.

(b) Where *required*, *reflective insulation* must be installed with—

(i) the necessary airspace to achieve the *required R-Value* between a reflective side of the *reflective insulation* and a building lining or cladding; and

(ii) the *reflective insulation* closely fitted against any penetration, door or *window* opening; and

(iii) the *reflective insulation* adequately supported by framing members; and

(iv) each adjoining sheet of roll membrane being—

(A) overlapped not less than 50 mm; or

(B) taped together.

(c) Where *required*, bulk insulation must be installed so that—

(i) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and

(ii) in a ceiling, where there is no bulk insulation or *reflective insulation* in the wall beneath, it overlaps the wall by not less than 50 mm.

(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in **Specification J1.2a**.

(e) The means of achieving the *required Total R-Value* must be determined in accordance with—

(i) NZS 4214; or

(ii) for metal framed roof and ceiling construction, **Specification J1.2b**; or

(iii) for metal framed external wall construction, **Specification J1.2c**; or

(iv) for spandrel panels, **Specification J1.2d**.

J1.3 Roof and ceiling construction

(a) A roof or ceiling that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must achieve a *Total R-Value* of—

(i) in *climate zones* 1, 2, 3, 4 and 5, 3.7 for a downward direction of heat flow; and

(ii) in *climate zone* 6, 3.2 for a downward direction of heat flow; and

(iii) in *climate zone* 7, 3.7 for an upward direction of heat flow; and

(iv) in *climate zone* 8, 4.8 for an upward direction of heat flow.

~~**Table J1.3a ROOFS AND CEILINGS - MINIMUM TOTAL R-VALUE FOR EACH CLIMATE ZONE**~~

~~***Climate zone***~~	~~***Climate zones* 1, 2, 3, 4 and 5**~~	~~***Climate zone* 6**~~	~~***Climate zone* 7**~~	~~***Climate zone* 8**~~
~~Direction of heat flow~~	~~Downwards~~	~~Downwards~~	~~Upwards~~	~~Upwards~~
~~Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar~~	~~3.2~~	~~3.2~~	~~3.7~~	~~4.8~~

~~absorptance value of not more than 0.4~~				
~~Minimum roof or ceiling *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.4 but not more than 0.6~~	~~3.7~~	~~3.2~~	~~3.7~~	~~4.8~~
~~Minimum *Total R-Value* for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.6~~	~~4.2~~	~~3.2~~	~~3.7~~	~~4.8~~

~~(a) For compliance with **Table J1.3a**, roof and ceiling construction is deemed to have the thermal properties listed in **Specification J1.3**.~~

~~Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of *required* ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of the insulation in the remainder of the ceiling in accordance with **Table J1.3b**.~~

(b) In *climate zones* 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.4.

~~**Table J1.3b ADJUSTMENT OF MINIMUM R-VALUE FOR LOSS OF CEILING INSULATION**~~

~~**Percentage of ceiling area uninsulated**~~	~~**Minimum *R-Value* of ceiling insulation *required* to satisfy J1.3(a)**~~										
	~~**1.0**~~	~~**1.5**~~	~~**2.0**~~	~~**2.5**~~	~~**3.0**~~	~~**3.5**~~	~~**4.0**~~	~~**4.5**~~	~~**5.0**~~	~~**5.5**~~	~~**6.0**~~
	~~**Adjusted minimum *R-Value* of ceiling insulation *required* to compensate for loss of ceiling insulation area**~~										
~~0.5% to less than 1.0%~~	~~1.0~~	~~1.6~~	~~2.2~~	~~2.8~~	~~3.4~~	~~4.0~~	~~4.7~~	~~5.4~~	~~6.2~~	~~6.9~~	
~~1.0% to less than 1.5%~~	~~1.1~~	~~1.7~~	~~2.3~~	~~2.9~~	~~3.6~~	~~4.4~~	~~5.2~~	~~6.1~~	~~7.0~~		
~~1.5% to less than 2.0%~~	~~1.1~~	~~1.7~~	~~2.4~~	~~3.1~~	~~3.9~~	~~4.8~~	~~5.8~~	~~6.8~~			
~~2.0% to less than 2.5%~~	~~1.1~~	~~1.8~~	~~2.5~~	~~3.3~~	~~4.2~~	~~5.3~~	~~6.5~~				
~~2.5% to less than 3.0%~~	~~1.2~~	~~1.9~~	~~2.6~~	~~3.6~~	~~4.6~~	~~5.9~~					
~~3.0% to less than 4.0%~~	~~1.2~~	~~2.0~~	~~3.0~~	~~4.2~~	~~5.7~~			~~Not Permitted~~			
~~4.0% to less than 5.0%~~	~~1.3~~	~~2.2~~	~~3.4~~	~~5.0~~							
~~5.0% or more~~											

~~**Note:** Where the minimum *R-Value* of ceiling insulation *required* to satisfy **J1.3(a)** is between the values stated, interpolation may be used to determine the adjusted minimum *R-Value*.~~

~~A roof that—~~

~~(i) is *required* to achieve a minimum *Total R-Value*; and~~

~~(ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and~~

~~(iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see **Specification J1.3 Figure 2(c)** and **(f)**),~~

~~must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.~~

SA J1.3(e)

J1.4 Roof lights

Roof lights~~, including any associated shaft and diffuser,~~ that form part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must—

(a) have a total area not more than 5% of the *floor area* of the room or space served; and

(b) where the total area is more than 2% of the *floor area* of the room or space served, have transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—

(i) for *Total System SHGC*, in accordance with **Table J1.4**; and

(ii) for *Total System U-Value*, of not more than 3.9.

~~(a) if the *roof lights* are not *required* for compliance with **Part F4**, comply with **Table J1.4**; or~~

~~(b) if the *roof lights* are *required* for compliance with Part **F4**—~~

~~(i) have an area not more than 150% of the minimum area *required* by **F4.6**; and~~

~~(ii) have transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of not more than—~~

~~(A) 0.29 *Total System SHGC*; and~~

~~(B) 2.9 *Total System U-Value*.~~

Table J1.4 ROOF LIGHTS – TOTAL SYSTEM SHGC

Roof light **shaft index (see Note 1)**	**Total area of *roof lights* serving the room or space as more than 2% and up to 3.5% of the *floor area* of the room or space**	**Total area of *roof lights* serving the room or space as more than 3.5% and up to 5% of the *floor area* of the room or space**
Less than 1.0	Not more than 0.29	Not more than 0.20
1.0 to less than 2.5	Not more than 0.35	Not more than 0.25
2.5 and more	Not more than 0.70	Not more than 0.49

Notes:

1. The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.
2. The area of a *roof light* is the area of the roof opening that allows light to enter the building. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.

~~Table J1.4 ROOF LIGHTS - THERMAL PERFORMANCE OF TRANSPARENT AND TRANSLUCENT ELEMENTS~~

~~***Roof light*** **shaft index (see Note 1)**~~	~~**Constant**~~	~~**Total area of *roof lights* serving the room or space as a percentage of the *floor area* of the room or space**~~			
		~~**Up to 2%**~~	~~**More than 2% to and up to 3%**~~	~~**More than 3% and up to 4%**~~	~~**More than 4% and up to 5%**~~
~~Less than 0.5~~	~~*Total System SHGC*~~	~~Not more than 0.83~~	~~Not more than 0.57~~	~~Not more than 0.43~~	~~Not more than 0.34~~
	~~*Total System U-Value*~~	~~Not more than 8.5~~	~~Not more than 5.7~~	~~Not more than 4.3~~	~~Not more than 3.4~~
~~0.5 to less than 1.0~~	~~*Total System SHGC*~~	~~Not more than 0.83~~	~~Not more than 0.72~~	~~Not more than 0.54~~	~~Not more than 0.43~~
	~~*Total System U-Value*~~	~~Not more than 8.5~~	~~Not more than 5.7~~	~~Not more than 4.3~~	~~Not more than 3.4~~
~~1.0 to less than 2.5~~	~~*Total System SHGC*~~	~~Not more than 0.83~~	~~Not more than 0.83~~	~~Not more than 0.69~~	~~Not more than 0.55~~
	~~*Total System U-Value*~~	~~Not more than 8.5~~	~~Not more than 5.7~~	~~Not more than 4.3~~	~~Not more than 3.4~~

~~2.5 and more~~	~~*Total System SHGC*~~	~~Not more than 0.83~~	~~Not more than 0.83~~	~~Not more than 0.83~~	~~Not more than 0.83~~
	~~*Total System U-Value*~~	~~Not more than 8.5~~	~~Not more than 5.7~~	~~Not more than 4.3~~	~~Not more than 3.4~~

~~**Notes:**~~

~~3. The *roof light* shaft index is determined by measuring the distance from the centre of the shaft at the roof to the centre of the shaft at the ceiling level and dividing it by the average internal dimension of the shaft opening at the ceiling level (or the diameter for a circular shaft) in the same units of measurement.~~

~~4. The total area of *roof lights* is the combined area for all *roof lights* serving the room or space.~~

~~5. The area of a *roof light* is the area of the roof opening that allows light to enter the building.~~

~~6. The thermal performance of an imperforate ceiling diffuser may be included in the *Total System U-Value* and *Total System SHGC* of the *roof light*.~~

~~7. The total area of *roof lights* serving the room or space as a percentage of the *floor area* of the room or space must not exceed 5% unless allowed by **J1.4(b)**.~~

J1.5 Wall-glazing construction

~~(a) Each part of an *external wall* that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must satisfy one of the options in **Table J1.5a** except for—~~

~~(i) opaque non-glazed openings in *external walls* such as doors (including garage doors), vents, penetrations, shutters and the like; and~~

~~(ii) glazing; and~~

~~(iii) an earth retaining wall or earth-berm, in other than *climate zone* 8.~~

(a) The thermal performance of the *glazing* and walls forming part of the *envelope* must be assessed—

(i) together as *wall-glazing construction*; and

(ii) in accordance with **(c)** or **(g)**.

(b) The requirements of **(a)** do not apply to—

(i) a *sole-occupancy unit* in a Class 2 building; or

(ii) a Class 4 part of a building; or

(iii) opaque non-glazed openings such as doors, vents, penetrations and shutters.

(c) **Method 1** —

(i) The *required facade solar admittance* of *wall-glazing construction* must be applied separately to each—

(A) *storey*; and

(B) facade aspect, where—

(aa) the northern façade is within 45^{o} of true north; and

(bb) the southern façade is within 45^{o} of true south; and

(cc) the eastern façade is within 45^{o} of true east; and

(dd) the western façade is within 45^{o} of true west; or

(ii) The *required Total System U-Value* of *wall-glazing construction* must be applied across all *storeys* and façade aspects as an area-based average.

(d) A *wall-glazing construction*—

(i) containing *glazing*, other than display *glazing* for a shop or showroom, must achieve—

(A) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a *ward area*—

(aa) a *façade solar admittance* less than or equal to the allowance in **Table J1.5a**; and

(bb) a *Total System U-Value* less than or equal to 2.0; and

(B) for a Class 3 or 9c building or a Class 9a *ward area*—

(aa) a *façade solar admittance* less than or equal to the allowance in **Table J1.5b**; and

(bb) a *Total System U-Value* less than or equal to—

(AA) in *climate zones* 1, 3, 4, 6 or 7, 1.1; or

(BB) in *climate zones* 2 or 5, 2.0; or

(CC) in *climate zone* 8, 0.9; and

(ii) containing *glazing* used to display retail goods in a shop or showroom must achieve—

(A) a *façade solar admittance* less than or equal to 0.62; and

(B) a *Total System U-Value* less than or equal to 4.3; and

(iii) where the wall area is—

(A) less than 80% of the wall-glazing construction area, the wall must achieve a minimum *Total R-Value* of 1.0; or

(B) not less than 80% of the *wall-glazing construction* area, the wall must achieve the minimum *Total R-Value* in **Table J1.5c**.

TABLE J1.5a MAXIMUM WALL-GLAZING CONSTRUCTION FAÇADE SOLAR ADMITTANCE – CLASS 2 COMMON AREA, CLASS 5, 6, 7, 8 OR 9B BUILDING OR CLASS 9A BUILDING OTHER THAN A WARD AREA

Climate zone	Eastern *façade* *solar admittance*	Northern *façade* *solar admittance*	Southern *façade* *solar admittance*	Western *façade* *solar admittance*
1	0.12	0.12	0.12	0.12
2	0.13	0.13	0.13	0.13
3	0.16	0.16	0.16	0.16
4	0.13	0.13	0.13	0.13
5	0.13	0.13	0.13	0.13
6	0.13	0.13	0.13	0.13
7	0.13	0.13	0.13	0.13
8	0.2	0.2	0.42	0.36

TABLE J1.5b MAXIMUM WALL-GLAZING CONSTRUCTION FAÇADE SOLAR ADMITTANCE – CLASS 3 OR 9C BUILDING OR CLASS 9A WARD AREA

Climate zone	Eastern *façade* *solar admittance*	Northern *façade* *solar admittance*	Southern *façade* *solar admittance*	Western *façade* *solar admittance*
1	0.07	0.07	0.10	0.07
2	0.10	0.10	0.10	0.10
3	0.07	0.07	0.07	0.07
4	0.07	0.07	0.07	0.07
5	0.10	0.10	0.10	0.10
6	0.07	0.07	0.07	0.07
7	0.07	0.07	0.08	0.07
8	0.08	0.08	0.08	0.08

TABLE J1.5c MINIMUM WALL TOTAL R-VALUE - WALL AREA GREATER THAN 80% OF WALL-GLAZING CONSTRUCTION AREA

Climate zone	**Class 2 common area, Class 5, 6, 7, 8 or 9b building or Class 9a building other than a *ward area* (m^2K/W)**	**Class 3 or 9c building or Class 9a *ward area* (m^2K/W)**
1	2.4	3.3
2	1.4	1.4
3	1.4	3.3
4	1.4	2.8
5	1.4	1.4
6	1.4	2.8
7	1.4	2.8
8	1.4	3.8

(e) The *façade solar admittance* of a *wall-glazing construction* must be calculated in accordance with the following formula:

$$FSA = \frac{A_{W1} \times S_{W1} \times SHGC_{W1}}{A_{Wall}} + \frac{A_{W2} \times S_{W2} \times SHGC_{W2}}{A_{Wall}} + \cdots$$

where—

FSA = the *wall-glazing construction facade solar admittance*; and

$A_{W1,W2,etc}$ = the area of each *glazing* element; and

$S_{W1,W2,etc}$ = the shading multiplier for each *glazing* element in accordance with **(f)**;

and

$SHGC_{W1,W2,etc}$ = the *Total System SHGC* of each *glazing* element; and

A_{Wall} = the total *wall-glazing construction* area.

(f) For the purpose of **(e)**, the shading multiplier is—

(i) the value in **Table J1.5d** for shading provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves or shading hood, which—

(A) extends horizontally on both sides of the *glazing* for the same projection distance P in **Figure J1.5**; or

(B) provides the equivalent shading to **(A)** with a reveal or the like; or

(ii) 0.35 for shading that is provided by an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which—

(A) is capable of restricting at least 80% of summer solar radiation; and

(B) if adjustable, will operate automatically in response to the level of solar radiation.

Table J1.5d SHADING MULTIPLIERS

G/H	P/H = 0	P/H = 0.1	P/H = 0.2	P/H = 0.3	P/H = 0.4	P/H = 0.5	P/H = 0.6	P/H = 0.7	P/H = 0.8	P/H = 0.9	P/H = 1
0	1.00	0.90	0.80	0.72	0.64	0.57	0.51	0.46	0.41	0.38	0.35
0.1	1.00	0.95	0.89	0.81	0.74	0.66	0.59	0.52	0.47	0.42	0.40
0.2	1.00	0.98	0.94	0.89	0.82	0.75	0.68	0.62	0.56	0.51	0.47
0.3	1.00	1.00	0.97	0.94	0.89	0.84	0.78	0.72	0.66	0.61	0.57
0.4	1.00	1.00	0.99	0.97	0.94	0.90	0.86	0.82	0.77	0.73	0.68
0.5	1.00	1.00	1.00	0.99	0.97	0.95	0.92	0.90	0.86	0.83	0.79

(g) **Method 2 —**

(i) The *required facade solar admittance* of *wall-glazing construction* must—

(A) be applied across all *storeys* and façade aspects; and

(B) achieve a representative *air-conditioning* energy value less than achieved through **(c)** using the following formula:

$$E_R = A_N \alpha_N FSA_N + A_E \alpha_E FSA_E + A_S \alpha_S FSA_S + A_W \alpha_W FSA_W$$

where—

E_R = the representative *air-conditioning* energy value; and

$A_{N,E,S,W}$ = the area of the *wall-glazing construction* in each façade aspect; and

$\alpha_{N,E,S,W}$ = the *façade solar admittance* weighting coefficient of each façade aspect equal to—

(aa) where the *glazing* area on a façade aspect is less than 20% of the *wall-glazing construction* area, 0; or

(bb) the values in **Table J1.5e** and **Table J1.5f**; and

$FSA_{N,E,S,W}$ = the *wall-glazing construction façade solar admittance* of each façade aspect, which must be calculated in both cases using the same—

(aa) *glazing* areas; and

(bb) *wall-glazing construction* areas; and

(cc) shading multiplier values.

(ii) The *required Total System U-Value* of *wall-glazing construction* must be applied across all *storeys*, and façade aspects as an area-based average.

Table J1.5e FAÇADE SOLAR ADMITTANCE WEIGHTING COEFFICIENT – CLASS 2 COMMON AREA, CLASS 5, 6, 7, 8 OR 9B BUILDING OR CLASS 9A BUILDING OTHER THAN A WARD AREA

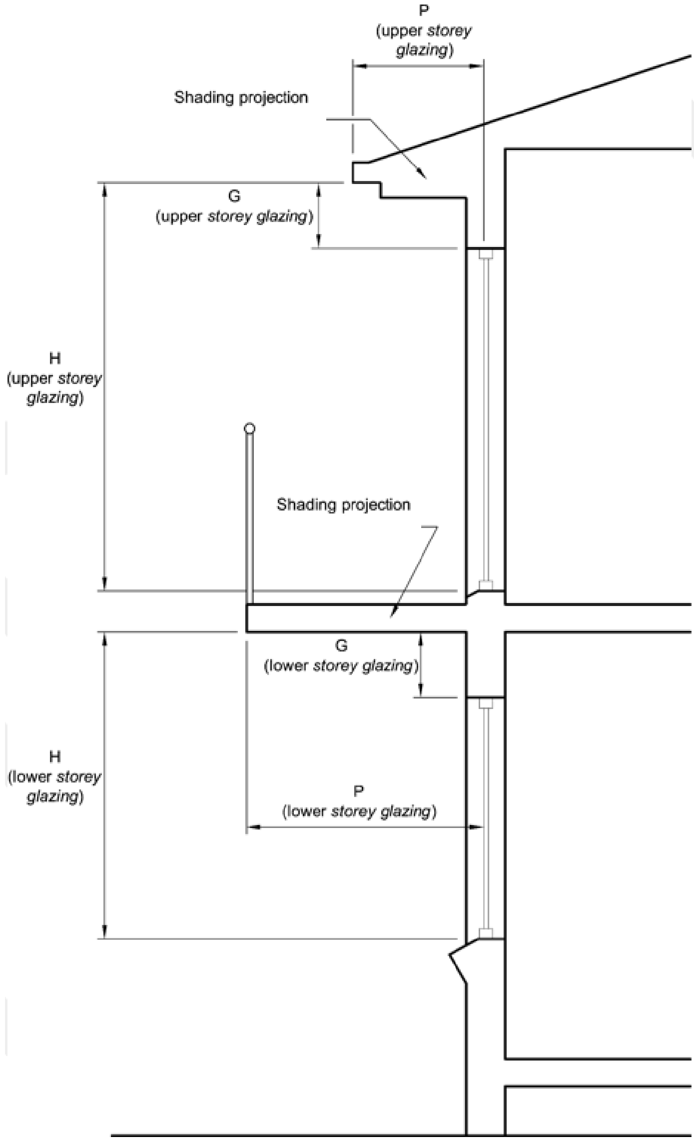
	Climate zone 1	***Climate zone 2***	***Climate zone 3***	***Climate zone 4***	***Climate zone 5***	***Climate zone 6***	***Climate zone 7***	***Climate zone 8***
Northern façade	1.47	1.95	1.95	2.05	2.28	2.12	2.40	1.88
Southern facade	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eastern façade	1.39	1.58	1.63	1.72	1.72	1.62	1.84	1.92
Western façade	1.41	1.68	1.65	1.69	1.75	1.67	1.92	1.25

TABLE J1.5f FAÇADE SOLAR ADMITTANCE WEIGHTING COEFFICIENT – CLASS 3 OR 9C BUILDING OR CLASS 9A WARD AREA

	Climate zone 1	***Climate zone 2***	***Climate zone 3***	***Climate zone 4***	***Climate zone 5***	***Climate zone 6***	***Climate zone 7***	***Climate zone 8***
Northern façade	1.42	1.77	1.72	1.55	1.88	1.52	1.60	1.24
Southern facade	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Eastern façade	1.30	1.49	1.48	1.37	1.48	1.28	1.35	1.26
Western façade	1.37	1.54	1.50	1.36	1.52	1.33	1.40	1.05

Figure J1.5

METHOD OF MEASURING P AND H



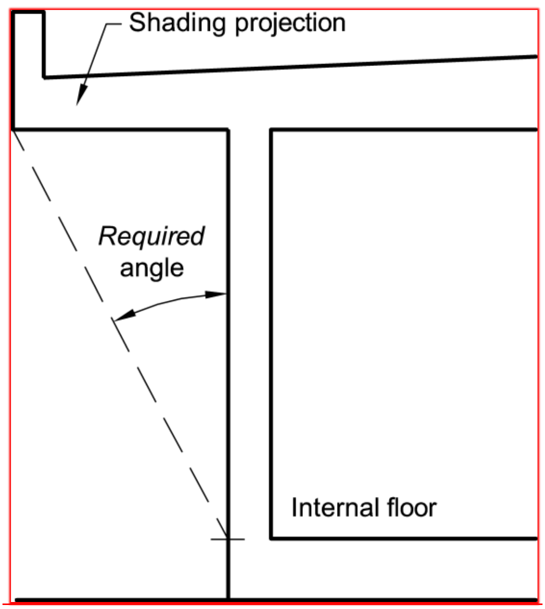
~~OPTIONS FOR EACH PART OF AN EXTERNAL WALL THAT IS PART OF AN ENVELOPE~~

~~*Climate zone*~~	~~Options~~
~~1, 2 and 3~~	~~(a)—~~ ~~(i) Achieve a minimum *Total R-Value* of 3.3.~~ ~~(ii) The minimum *Total R-Value* in (i) is reduced—~~ ~~(A) for a wall with a surface density of not less than 220 kg/m²,~~ ~~by 0.5; and~~ ~~(B) for a wall that is—~~ ~~(aa) facing the south orientation as described in **Figure J2.3**, by 0.5; or~~ ~~(bb) shaded with a projection shade angle in accordance with **Figure J1.5** of—~~ ~~(AA) 15 degrees to not more than 45 degrees, by 0.5; or~~ ~~(BB) more than 45 degrees, by 1.0; and~~ ~~(C) if the outer surface solar absorptance value is not more than 0.6, by 0.5.~~
	~~Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—~~ ~~(i) achieve a minimum *Total R-Value* of 1.4; and~~ ~~(ii) satisfy *glazing* energy index Option B of **Table J2.4a**.~~
~~4, 5 and 6~~	~~(a)—~~ ~~(i) Achieve a minimum *Total R-Value* of 2.8.~~ ~~(ii) The minimum *Total R-Value* in (i) is reduced—~~ ~~(A) for a wall with a surface density of not less than 220 kg/m²,~~ ~~by 0.5; and~~ ~~(B) for a wall that is—~~ ~~(aa) facing the south orientation as described in Figure J2.3, by 0.5; or~~ ~~(bb) shaded with a projection shade angle in accordance with Figure J1.5 of—~~ ~~(AA) 30 degrees to not more than 60 degrees, by 0.5; or~~ ~~(BB) more than 60 degrees, by 1.0.~~

~~***Climate zone***~~	~~**Options**~~
	~~Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—~~ ~~(i) achieve a minimum *Total R-Value* of 1.4; and~~ (i) ~~satisfy *glazing* energy index Option B of **Table J2.4a**.~~
~~7~~	~~(a) Achieve a minimum *Total R-Value* of 2.8.~~
	~~Where the only space for insulation is provided by a furring channel, top hat section, batten or the like—~~ ~~(i) achieve a minimum *Total R-Value* of 1.4; and~~ ~~(ii) satisfy *glazing* energy index Option B of **Table J2.4a**.~~
~~8~~	~~(a) Achieve a minimum *Total R-Value* of 3.8.~~
	~~Where the wall is an earth retaining wall or earth-berm, achieve a minimum *Total R-Value* of 2.0.~~

~~**Figure J1.5**~~

~~**MEASUREMENT OF PROJECTION FOR WALL SHADING**~~



~~(b) Any wall, other than an *external wall*, that is part of the *envelope* must achieve the *Total R-Value* in **Table J1.5b**.~~

~~**Table J1.5b AN ENVELOPE WALL OTHER THAN AN EXTERNAL WALL – MINIMUM TOTAL R-VALUE**~~

~~**Location**~~	~~***Climate zone***~~							
	~~**1**~~	~~**2**~~	~~**3**~~	~~**4**~~	~~**5**~~	~~**6**~~	~~**7**~~	~~**8**~~
~~(a) Where the adjacent enclosed non-*conditioned space* has—~~ ~~(i) ventilation of not more than 1.5 air changes per hour of outside air during occupied hours; and~~ ~~(ii) glazing in the external *fabric* as *required* by **Part J2**; and~~ ~~(iii) roof lights in the external fabric as required by **J1.4**.~~	~~1.0~~	~~1.0~~	~~Nil~~	~~Nil~~	~~1.0~~	~~1.0~~	~~1.5~~	~~2.5~~
~~(b) For other than (a)~~	~~2.3~~	~~2.3~~	~~2.3~~	~~1.8~~	~~1.8~~	~~1.8~~	~~2.8~~	~~3.8~~
~~**Note:** When assessing the glazing and *roof lights as required* by **Part J2** and **J1.4**, assess the glazing and *roof lights* as if the non-*conditioned space* is the same separate *conditioned space*.~~								

~~(c) A wall that—~~

~~(i) is *required* to achieve a minimum *Total R-Value*; and~~

~~(ii) has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame; and~~

~~(iii) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame,~~

~~must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the external cladding and the metal frame.~~

~~(d) For compliance with **Table J1.5a** and **Table J1.5b**, wall construction is deemed to have the thermal properties listed in **Specification J1.5**.~~

J1.6 Floors

(a) A floor that is part of the *envelope* of a building, other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, including a floor above or below a *carpark* or a plant room—

(i) must achieve the *Total R-Value* specified in **Table J1.6**; and

(ii) with an in-slab or in-screed heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an *R-Value* of not less than 1.0.

~~(b) In *climate zones* 1 to 6, the minimum *Total R-Value required* in (a) may be reduced by R0.5 provided R0.75 is added to the *Total R-Value required* for the roof and ceiling construction.~~

(b) A concrete slab-on-ground—

(i) with an in-slab or in-screed heating or cooling system; or

(ii) located in climate zone 8,

must have insulation installed around the vertical edge of its perimeter.

(c) Insulation *required* by (~~c~~b) must—

(i) have an *R-Value* of not less than 1.0; and

(ii) be water resistant; and

(iii) be continuous from the adjacent finished ground level—

(A) to a depth of not less than 300 mm; or

(B) for the full depth of the vertical edge of the concrete slab-on-ground.

(d) The requirements of (a)(ii) and ~~(c)~~(b)(i) do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.

~~(c) Floor construction is deemed to have the thermal properties listed in **Specification J1.6**.~~

~~**Table J1.6 FLOORS — MINIMUM TOTAL R-VALUE**~~

~~**Location**~~	~~***Climate zone***~~							
	~~**1**~~	~~**2**~~	~~**3**~~	~~**4**~~	~~**5**~~	~~**6**~~	~~**7**~~	~~**8**~~
~~**Direction of heat flow**~~	~~**Upwards**~~	~~**Downwards and upwards**~~		~~**Downwards**~~				
~~(a) A slab on ground:~~ ~~(i) Without an in-slab or in-screed heating or cooling system~~	~~Nil~~	~~Nil~~	~~Nil~~	~~Nil~~	~~Nil~~	~~Nil~~	~~1.0~~	~~2.0~~
~~(ii) With an in-slab or in-screed heating or cooling system~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~2.25~~

~~(b) A suspended floor without an in-slab or in-screed heating or cooling system where the non-*conditioned space* is—~~ ~~(i) enclosed; and~~ ~~(ii) where mechanically ventilated by not more than 1.5 air changes per hour.~~	~~1.0~~	~~1.0~~	~~Nil~~	~~Nil~~	~~1.0~~	~~1.0~~	~~1.5~~	~~2.5~~
~~(c) A suspended floor with an in-slab or in-screed heating or cooling system where the non-*conditioned space* is—~~ ~~(i) enclosed; and~~ ~~(ii) where mechanically ventilated by not more than 1.5 air changes per hour~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.25~~	~~1.75~~	~~2.75~~
~~(d) For other than (a), (b) or (c)~~	~~2.0~~	~~2.0~~	~~2.0~~	~~2.0~~	~~2.0~~	~~2.0~~	~~2.0~~	~~3.5~~
~~**Note:** A subfloor space with not more than 150% of the *required* subfloor ventilation is considered enclosed.~~								

Table J1.6 FLOORS — MINIMUM TOTAL R-VALUE

Location	***Climate zone* 1—upwards heat flow**	***Climate zones* 2 and 3—upwards and downwards heat flow**	***Climate zones* 4, 5, 6 and 7—downwards heat flow**	***Climate zone* 8—downwards heat flow**
A floor without an in-slab heating or cooling system	2.0	2.0	2.0	3.5

A floor with an in-slab heating or cooling system	3.25	3.25	3.25	4.75

Note: The *R-Value* of a subfloor space, for suspended floor construction, or the ground, for slab-on-ground construction, is to be determined in accordance with Section 3.5 of CIBSE Guide A.

SPECIFICATION J1.2a MATERIAL PROPERTIES

1. Scope

This Specification lists the thermal properties of some common construction materials.

2. Construction Deemed-to-Satisfy

(a) **Table 2a** to **Table 2e** list the thermal conductivity considered to be achieved by some common construction materials.

Table 2a Thermal conductivity of typical framing materials

Material description	**Material density kg/m^3**	**Thermal conductivity W/m.K**
Steel	7850 kg/m^3	47.5 W/m.K
Timber – kiln dried hardwood (across the grain)	677 kg/m^3	0.16 W/m.K
Timber – radiata pine (across the grain)	506 kg/m^3	0.10 W/m.K

Table 2b Thermal conductivity of typical roof cladding materials

Material description	**Material density kg/m^3**	**Thermal conductivity W/m.K**
Aluminium sheeting	2680 kg/m^3	210 W/m.K
Concrete or terracotta tiles	1922 kg/m^3	0.81 W/m.K
Steel sheeting	7850 kg/m^3	47.5 W/m.K

Table 2c Thermal conductivity of typical wall cladding materials

Material description	**Material density kg/m^3**	**Thermal conductivity W/m.K**
Aluminium sheeting	2680 kg/m^3	210 W/m.K
Autoclaved aerated concrete	350 kg/m^3	0.10 W/m.K

Material description	Material density kg/m^3	Thermal conductivity W/m.K
Autoclaved aerated concrete	900 kg/m^3	0.27 W/m.K
Cement render (1 cement : 4 sand)	1570 kg/m^3	0.53 W/m.K
Clay brick – 2.75 kg	1430 kg/m^3	0.55 W/m.K
Clay brick – 3.25 kg	1690 kg/m^3	0.65 W/m.K
Clay brick – 3.75 kg	1950 kg/m^3	0.78 W/m.K
Concrete blocks – 190 mm dense or 90 mm dense solid	1100/2200 kg/m^3	1.1 W/m.K
Concrete blocks – 140 mm dense or 190 mm lightweight	1250/910 kg/m^3	0.85 W/m.K
Concrete blocks – 90 mm dense hollow or 90 mm lightweight solid	1650/1800 kg/m^3	0.75 W/m.K
Concrete blocks – 140 mm lightweight	1050 kg/m^3	0.67 W/m.K
Concrete blocks – 90 mm lightweight	1360 kg/m^3	0.55 W/m.K
Fibre-cement	1360 kg/m^3	0.25 W/m.K
Gypsum plasterboard	880 kg/m^3	0.17 W/m.K
Pine weatherboards	506 kg/m^3	0.10 W/m.K
Plywood	530 kg/m^3	0.14 W/m.K
Solid concrete	2400 kg/m^3	1.44 W/m.K
Steel sheeting	7850 kg/m^3	47.5 W/m.K
Prestressed hollow core concrete panel	1680 kg/m^3	0.80 W/m.K

Table 2d Thermal conductivity of typical flooring materials

Material description	**Material density kg/m³**	**Thermal conductivity W/m.K**
Carpet underlay	N/A	0.04 W/m.K
Carpet	N/A	0.05 W/m.K
Prestressed hollow core concrete planks	1680 kg/m^3	0.80 W/m.K
Particleboard	640 kg/m^3	0.12 W/m.K
Plywood	530 kg/m^3	0.14 W/m.K
Timber – kiln dried hardwood (across the grain)	677 kg/m^3	0.16 W/m.K
Timber – radiata pine (across the grain)	506 kg/m^3	0.10 W/m.K
Solid concrete	2400 kg/m^3	1.44 W/m.K
Vinyl floor tiles	2050 kg/m^3	0.79 W/m.K

Table 2e Thermal conductivity of other materials

Material description	**Material density kg/m^3**	**Thermal conductivity W/m.K**
Clay soil (10% moisture content)	1300 kg/m^3	0.6 W/m.K
PMMA (polymethylmethacrylate)	1180 kg/m^3	1.00 W/m.K
Polycarbonates	1200 kg/m^3	0.2 W/m.K
Sand (6% moisture content)	1800 kg/m^3	1.64 W/m.K
Soda lime glass	2500 kg/m^3	1.0 W/m.K

Notes:

1. For materials which incorporate cores or hollows in regular patterns (such as cored brickwork, hollow blockwork and cored floor or wall panels), the tabulated material densities and thermal conductivities are based on the gross density (mass divided by external dimensions).
2. The *R-Value* of a material is determined by dividing the thickness of the material in metres by the thermal conductivity in W/m.K.

~~Table 2a THERMAL CONDUCTIVITY OF TYPICAL WALL, ROOF/CEILING AND FLOOR MATERIALS~~

~~**Material description**~~	~~**Material density kg/m**~~^{3}	~~**Thermal conductivity W/m.K**~~
~~**1. Framing**~~		
~~(a) Steel~~	~~7850~~	~~47.5~~
~~(b) Timber – kiln dried hardwood (across the grain)~~	~~677~~	~~0.16~~
~~(c) Timber – Radiata pine (across the grain)~~	~~506~~	~~0.10~~
~~**2. Roof Cladding**~~		
~~(a) Aluminium sheeting~~	~~2680~~	~~210~~
~~(b) Concrete or terra cotta tiles~~	~~1922~~	~~0.81~~
~~(c) Steel sheeting~~	~~7850~~	~~47.5~~
~~**3. Wall Cladding**~~		
~~(a) Aluminium sheeting~~	~~2680~~	~~210~~
~~(b) Autoclaved aerated concrete~~	~~350~~	~~0.10~~
	~~900~~	~~0.27~~
~~(c) Cement render (1 cement : 4 sand)~~	~~1570~~	~~0.53~~
~~(d) Clay bricks~~		
~~(i) Clay brick – 2.75 kg~~	~~1430~~	~~0.55~~
~~(ii) Clay brick – 3.25 kg~~	~~1690~~	~~0.65~~
~~(iii) Clay brick – 3.75 kg~~	~~1950~~	~~0.78~~
~~(e) Concrete blocks~~		
~~(i) 190 mm dense or 90 mm dense solid~~	~~1100/2200~~	~~1.1~~
~~(ii) 140 mm dense or 190 mm lightweight~~	~~1250/910~~	~~0.85~~
~~(iii) 90 mm dense hollow or 90 mm lightweight solid~~	~~1650/1800~~	~~0.75~~
~~(iv) 140 mm lightweight~~	~~1050~~	~~0.67~~
~~(v) 90 mm lightweight~~	~~1360~~	~~0.55~~
~~(f) Fibre-cement~~	~~1360~~	~~0.25~~
~~(g) Gypsum plasterboard~~	~~880~~	~~0.17~~
~~(h) Pine weatherboards~~	~~506~~	~~0.10~~
~~(i) Plywood~~	~~530~~	~~0.14~~

~~**Material description**~~	~~**Material density kg/m³**~~	~~**Thermal conductivity W/m.K**~~
~~(j) Solid concrete~~	~~2400~~	~~1.44~~
~~(k) Steel sheeting~~	~~7850~~	~~47.5~~
~~(l) Prestressed hollow core concrete panel~~	~~1680~~	~~0.80~~
~~**4. Flooring Materials**~~		
~~(a) Carpet underlay~~	~~-~~	~~0.04~~
~~(b) Carpet~~	~~-~~	~~0.05~~
~~(c) Prestressed hollow core concrete planks~~	~~1680~~	~~0.80~~
~~(d) Particleboard~~	~~640~~	~~0.12~~
~~(e) Plywood~~	~~530~~	~~0.14~~
~~(f) Timber – kiln dried hardwood (across the grain)~~	~~677~~	~~0.16~~
~~(g) Timber – Radiata pine (across the grain)~~	~~506~~	~~0.10~~
~~(h) Solid concrete~~	~~2400~~	~~1.44~~
~~(i) Vinyl floor tiles~~	~~2050~~	~~0.79~~
~~**5. Other Materials**~~		
~~(a) Clay soil (10% moisture content)~~	~~1300~~	~~0.6~~
~~(b) PMMA (polymethylmethacrylate)~~	~~1180~~	~~1.00~~
~~(c) Polycarbonates~~	~~1200~~	~~0.2~~
~~(d) Sand (6% moisture content)~~	~~1800~~	~~1.64~~
~~(e) Soda lime glass~~	~~2500~~	~~1.0~~

~~**Notes:**~~

1. ~~For materials which incorporate cores or hollows in regular patterns (such as cored brickwork, hollow blockwork and cored floor or wall panels), the tabulated material densities and thermal conductivities are based on the gross density (mass divided by external dimensions).~~
2. ~~The *R-Value* of a material is determined by dividing the thickness of the material in metres by the thermal conductivity in W/m.K.~~

~~**Table 2b** lists the *R-Values* considered to be achieved by air films and airspaces.~~

~~**Table 2b TYPICAL R-VALUES FOR AIRSPACES AND AIR FILMS**~~

~~**Position of airspace**~~	~~**Direction of heat flow**~~	~~***R-Value***~~
~~**1. Airspaces non-reflective unventilated**~~		

~~Position of airspace~~	~~Direction of heat flow~~	~~*R-Value*~~
~~In a roof with a pitch of not more than 5°~~	~~Up~~	~~0.15~~
	~~Down~~	~~0.22~~
~~In a roof with a ceiling that is parallel with a roof with a pitch more than 5° and not more than 15°~~	~~Up~~	~~0.15~~
	~~Down~~	~~0.21~~
~~In a roof with a ceiling that is parallel with a roof with a pitch more than 22° and not more than 45°~~	~~Up~~	~~0.15~~
	~~Down~~	~~0.18~~
~~In any roof space with a horizontal ceiling, with a pitch more than 5°~~	~~Up~~	~~0.18~~
	~~Down~~	~~0.28~~
~~In a wall~~	~~Horizontal~~	~~0.17~~
~~**2. Airspaces non-reflective ventilated**~~		
~~In any roof with a pitch not more than 5° and 100 mm deep airspace~~	~~Up~~	~~Nil~~
	~~Down~~	~~0.19~~
~~In any roof space with a horizontal ceiling, with a pitch more than 5°~~	~~Up~~	~~Nil~~
	~~Down~~	~~0.46~~
~~In a wall~~	~~Horizontal~~	~~0.14~~
~~**3. Air films – Still air**~~		
~~On a surface with a pitch of not more than 5°~~	~~Up~~	~~0.11~~
	~~Down~~	~~0.16~~
~~On a surface with a pitch of more than 5° and not more than 30°~~	~~Up~~	~~0.11~~
	~~Down~~	~~0.15~~
~~On a surface with a pitch of more than 30° and not more than 45°~~	~~Up~~	~~0.11~~
	~~Down~~	~~0.13~~
~~On a wall~~	~~Horizontal~~	~~0.12~~
~~**4. Air films – Moving air**~~		
~~Not more than 3 m/s wind~~	~~Any direction~~	~~0.04~~
~~More than 3 m/s wind speed and not more than 7 m/s wind speed~~	~~Any direction~~	~~0.03~~
~~**Note:** *R-Values* are for a temperature of 10°C and temperature difference of 15K.~~		

(b) <u>**Table 2f to Table 2i lists the R-Values considered to be achieved by air films and airspaces.**</u>

Table 2f Typical R-Values for airspaces non-reflective unventilated.

Position of airspace	**Direction of heat flow**	***R-Value***
In a roof with a pitch of not more than 5°	Up	0.15
In a roof with a pitch of not more than 5°	Down	0.22
In a roof with a ceiling that is parallel with a roof with a pitch more than 5° and not more than 15°	Up	0.15
In a roof with a ceiling that is parallel with a roof with a pitch more than 5° and not more than 15°	Down	0.21
In a roof with a ceiling that is parallel with a roof with a pitch more than 22° and not more than 45°	Up	0.15
In a roof with a ceiling that is parallel with a roof with a pitch more than 22° and not more than 45°	Down	0.18
In any roof space with a horizontal ceiling, with a pitch more than 5°	Up	0.18
In any roof space with a horizontal ceiling, with a pitch more than 5°	Down	0.28
In a wall	Horizontal	0.17

Note: *R-Values* are for a temperature of 10°C and temperature difference of 15K.

Table 2g Typical R-Values for airspaces non-reflective ventilated

Position of airspace	**Direction of heat flow**	***R-Value***
In any roof with a pitch not more than 5° and 100 mm deep airspace	Up	Nil
In any roof with a pitch not more than 5° and 100 mm deep airspace	Down	0.19
In any roof space with a horizontal ceiling, with a pitch more than 5°	Up	Nil
In any roof space with a horizontal ceiling, with a pitch more than 5°	Down	0.46
In a wall	Horizontal	0.14

Note: *R-Values* are for a temperature of 10°C and temperature difference of 15K.

Table 2h Typical R-Values for air films – still air

Position of airspace	**Direction of heat flow**	***R-Value***
On a surface with a pitch of not more than 5°	Up	0.11
On a surface with a pitch of not more than 5°	Down	0.16
On a surface with a pitch of more than 5° and not more than 30°	Up	0.11
On a surface with a pitch of more than 5° and not more than 30°	Down	0.15
On a surface with a pitch of more than 30° and not more than 45°	Up	0.11
On a surface with a pitch of more than 30° and not more than 45°	Down	0.13
On a wall	Horizontal	0.12

Note: *R-Values* are for a temperature of 10°C and temperature difference of 15K.

Table 2i Typical R-Values for air films – moving air

Position of airspace	**Direction of heat flow**	***R-Value***
Not more than 3 m/s wind speed	Any direction	0.04
More than 3 m/s wind speed and not more than 7 m/s wind speed	Any direction	0.03

Note: *R-Values* are for a temperature of 10°C and temperature difference of 15K.

(c) The thermal properties considered to be achieved by reflective surfaces are—

(i) within a wall—

(A) with an inner reflective surface of 0.05 emittance and a 20 mm airspace to the wall lining, an added *R-Value* of 0.48; and

(B) with an inner reflective surface of 0.05 emittance and a 70 mm airspace to the wall lining, an added *R-Value* of 0.43; and

(C) with an inner reflective surface of 0.05 emittance and a 70 mm airspace to the wall lining and an outer anti-glare reflective surface of 0.20 emittance and a 25 mm airspace to the wall cladding, an added *R-Value* of 0.95; and

(D) with an outer anti-glare reflective surface of 0.20 emittance and a 35 mm airspace to the wall cladding, an added *R-Value* of 0.50; and

(ii) within a roof where the *reflective insulation* is laid directly under the roof, those in Table 2j to Table 2l. ~~**Table 2c**~~.

Table 2j Typical thermal properties for reflective surfaces with airspaces in roofs—Pitched roof (>10°) with horizontal ceiling

Emittance of added *reflective insulation*	**Direction of heat flow**	**R-Value added—unventilated roof space**	**R-Value added—ventilated roof space**
0.2 outer / 0.05 inner	Down	1.12	1.21
0.2 outer / 0.05 inner	Up	0.75	0.59
0.9 outer / 0.05 inner	Down	0.92	1.01
0.9 outer / 0.05 inner	Up	0.55	0.40

Table 2k Typical thermal properties for reflective surfaces with airspaces in roofs—Flat or skillion pitched roof (≤10°) with horizontal ceiling

Emittance of added *reflective insulation*	**Direction of heat flow**	**R-Value added**
0.2 outer / 0.05 inner	Down	1.28
0.2 outer / 0.05 inner	Up	0.68
0.9 outer / 0.05 inner	Down	1.06
0.9 outer / 0.05 inner	Up	0.49

Table 2l Typical thermal properties for reflective surfaces with airspaces in roofs—Pitched roof with cathedral ceiling

Emittance of added *reflective insulation*	**Direction of heat flow**	**R-Value added — pitch = 15° to ≤ 25°**	**R-Value added — pitch = ≥ 25° to ≤ 35°**	**R-Value added — pitch = ≥ 35° to ≤ 45°**
0.2 outer / 0.05 inner	Down	0.96	0.86	0.66
0.2 outer / 0.05 inner	Up	0.72	0.74	0.77
0.9 outer / 0.05 inner	Down	0.74	0.64	0.44
0.9 outer / 0.05 inner	Up	0.51	0.52	0.53

~~Table 2c TYPICAL THERMAL PROPERTIES FOR REFLECTIVE SURFACES WITH AIRSPACES IN ROOFS~~

~~**Emittance of added *reflective insulation***~~	~~**Direction of heat flow**~~	~~***R-Value* added by a reflective surface**~~					
		~~**Pitched roof (>10°) with horizontal ceiling**~~		~~**Flat, skillion or pitched roof (≤10°) with horizontal ceiling**~~	~~**Pitched roof with cathedral ceiling**~~		
		~~**Ventilated roof space**~~	~~**Non-ventilated roof space**~~		~~**15° to not more than 25° pitch**~~	~~**more than 25° to not more than 35° pitch**~~	~~**more than 35° to 45° pitch**~~
~~0.2 outer 0.05 inner~~	~~Downwards~~	~~1.21~~	~~1.12~~	~~1.28~~	~~0.96~~	~~0.86~~	~~0.66~~
~~0.2 outer 0.05 inner~~	~~Upwards~~	~~0.59~~	~~0.75~~	~~0.68~~	~~0.72~~	~~0.74~~	~~0.77~~
~~0.9 outer 0.05 inner~~	~~Downwards~~	~~1.01~~	~~0.92~~	~~1.06~~	~~0.74~~	~~0.64~~	~~0.44~~
~~0.9 outer 0.05 inner~~	~~Upward~~	~~0.40~~	~~0.55~~	~~0.49~~	~~0.51~~	~~0.52~~	~~0.53~~

(d) A ventilated roof space is a roof space with—

(i) gable vents, ridge vents, eave vents, roof vents or the like that—

(A) are evenly distributed to allow an unobstructed flow of air; and

(B) are located to ensure, where practicable, there are no dead airspaces; and

(C) have an aggregate fixed open area of not less than 1.0% of the ceiling area; or

(ii) not less than 2 wind-driven roof ventilators having an aggregate opening area of not less than 0.14 m^2 in conjunction with gable vents, ridge vents, eave vents, roof vents or the like having an aggregate fixed open area of not less than 0.2% of the ceiling area; or

(iii) a tiled roof without *sarking-type material* at roof level.

SPECIFICATION J1.2b METAL FRAMED ROOF AND CEILING CONSTRUCTION

1. Scope

This Specification describes the thermal performance of metal framed roof and ceiling construction when the effects of thermal bridging and compressed insulation are taken into account in accordance with NZS 4214.

2. Construction Deemed-to-Satisfy

(a) Roof rack construction —

(i) Typical roof rack construction is illustrated in **Figures 2a** and **2b**.

(ii) The *Total R-Values* achieved with roof rack construction are listed in—

(A) **Table 2a** for low emittance insulation; and

(B) **Table 2b** for high emittance insulation.

(iii) Interpolation may be used where the emittance and *R-Value* of insulation is between the values stated in **Tables 2a** and **2b**.

(b) Loose mesh construction —

(i) Typical loose mesh construction is illustrated in **Figure 2c**.

(ii) The *Total R-Values* achieved with loose mesh construction are listed in—

(A) **Table 2c** for low emittance insulation; and

(B) **Table 2d** for high emittance insulation; and

(iii) Interpolation may be used where the emittance and *R-Value* of insulation is between the values stated in **Tables 2c** and **2d**.

Figure 2a: TYPICAL ROOF RACK CONSTRUCTION – FRONT VIEW

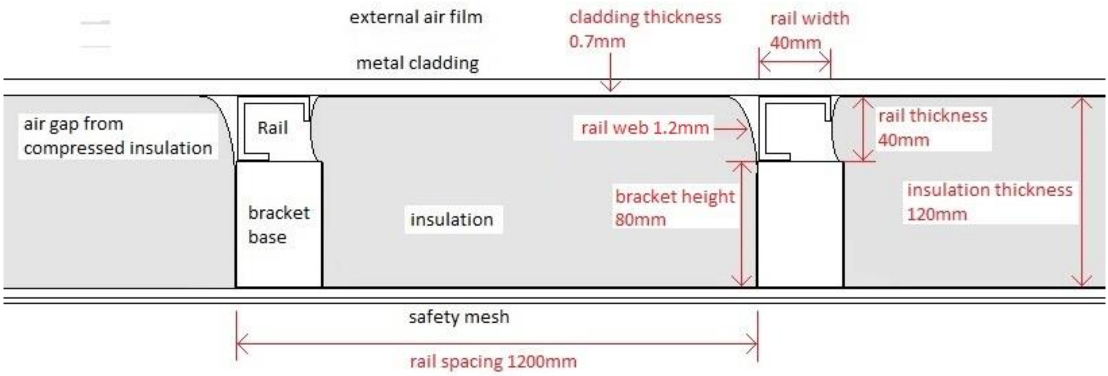


Figure 2b: TYPICAL ROOF RACK CONSTRUCTION – SIDE VIEW

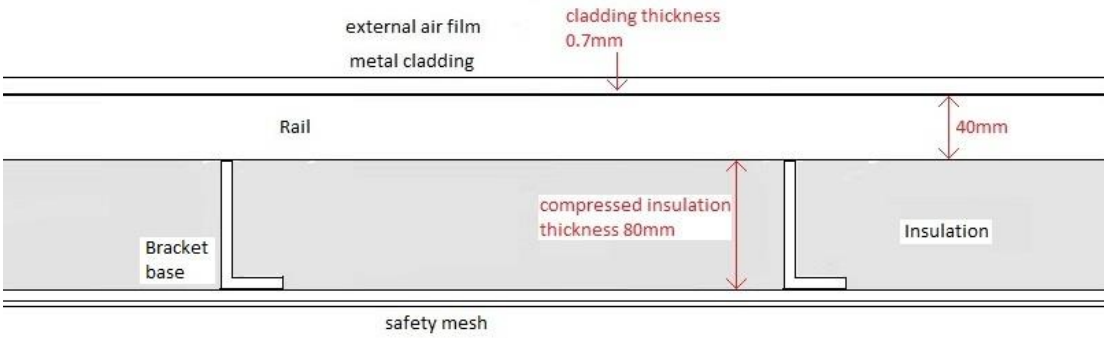


Figure 2c: TYPICAL LOOSE MESH CONSTRUCTION – SIDE VIEW

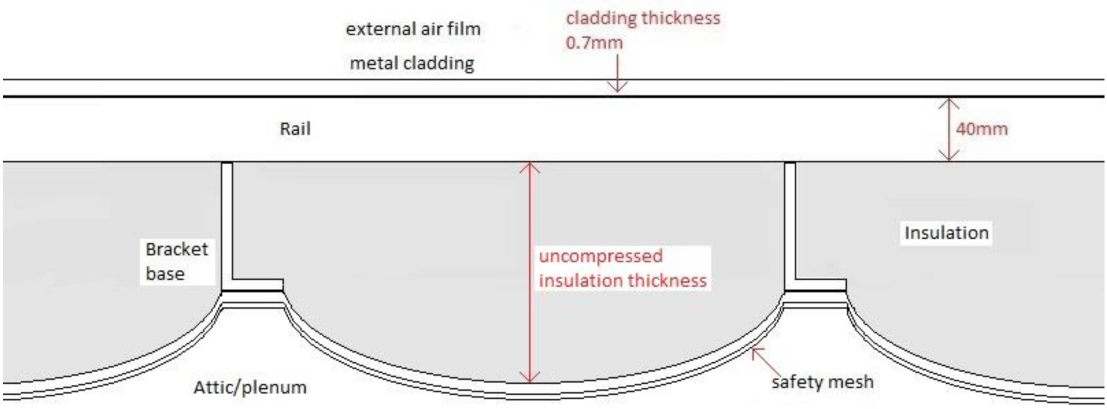


Table 2a TOTAL R-VALUE ACHIEVED – ROOF RACK CONSTRUCTION WITH AN INSULATION EMITTANCE OF 0.05

Heat Flow Direction (bracket type)	R2.1 Insulation	R2.3 Insulation	R2.6 Insulation	R2.8 Insulation	R3.0 Insulation	R3.2 Insulation	R3.4 Insulation	R3.6 Insulation	R3.8 Insulation	R4.0 Insulation	R4.3 Insulation	R4.5 Insulation	R4.7 Insulation	R4.9 Insulation	R5.1 Insulation
Down (no bracket)	3.12	3.29	3.36	3.47	3.57	3.68	3.79	3.89	4.00	4.11	4.21	4.32	4.43	4.53	4.64
Up (no bracket)	2.53	2.72	2.79	2.89	3.00	3.11	3.21	3.32	3.43	3.53	3.64	3.75	3.85	3.96	4.07
Down (with bracket)	2.96	3.10	3.13	3.24	3.34	3.44	3.54	3.64	3.74	3.83	3.93	4.03	4.13	4.23	4.32
Up (with bracket)	2.37	2.53	2.57	2.67	2.77	2.87	2.98	3.08	3.18	3.28	3.38	3.48	3.57	3.67	3.77
Down (with cyclonic bracket)	2.81	2.93	2.94	3.03	3.13	3.22	3.32	3.41	3.50	3.60	3.69	3.78	3.87	3.96	4.05
Up (with cyclonic bracket)	2.23	2.37	2.38	2.48	2.58	2.67	2.77	2.87	2.96	3.05	3.15	3.24	3.33	3.42	3.52

Table 2b TOTAL R-VALUE ACHIEVED – ROOF RACK CONSTRUCTION WITH AN INSULATION EMITTANCE OF 0.90

Heat Flow Direction (bracket type)	R2.1 Insulation	R2.3 Insulation	R2.6 Insulation	R2.8 Insulation	R3.0 Insulation	R3.2 Insulation	R3.4 Insulation	R3.6 Insulation	R3.8 Insulation	R4.0 Insulation	R4.3 Insulation	R4.5 Insulation	R4.7 Insulation	R4.9 Insulation	R5.1 Insulation
Down (no bracket)	2.48	2.65	2.72	2.83	2.93	3.04	3.15	3.25	3.36	3.47	3.57	3.68	3.79	3.89	4.00
Up (no bracket)	2.41	2.60	2.71	2.80	2.92	3.03	3.15	3.27	3.38	3.50	3.61	3.73	3.85	3.96	4.08
Down (with bracket)	2.32	2.47	2.50	2.60	2.71	2.81	2.91	3.01	3.11	3.21	3.31	3.41	3.51	3.61	3.71
Up (with bracket)	2.25	2.41	2.49	2.57	2.68	2.79	2.90	3.00	3.11	3.22	3.32	3.43	3.54	3.64	3.74
Down (with cyclonic bracket)	2.18	2.30	2.31	2.41	2.51	2.61	2.71	2.80	2.90	2.99	3.08	3.18	3.27	3.36	3.45
Up (with cyclonic bracket)	2.11	2.25	2.30	2.37	2.48	2.58	2.68	2.78	2.88	2.98	3.08	3.17	3.27	3.37	3.46

Table 2c TOTAL R-VALUE ACHIEVED – LOOSE MESH ROOF CONSTRUCTION WITH AN INSULATION EMITTANCE OF 0.05

Heat Flow Direction (bracket type)	R2.1 Insulation	R2.3 Insulation	R2.6 Insulation	R2.8 Insulation	R3.0 Insulation	R3.2 Insulation	R3.4 Insulation	R3.6 Insulation	R3.8 Insulation	R4.0 Insulation	R4.3 Insulation	R4.5 Insulation	R4.7 Insulation	R4.9 Insulation	R5.1 Insulation
Down (no bracket)	3.12	3.29	3.36	3.56	3.76	3.96	4.16	4.35	4.55	4.75	4.95	5.14	5.34	5.54	5.73
Up (no bracket)	2.53	2.72	2.79	2.99	3.19	3.38	3.58	3.78	3.98	4.17	4.37	4.57	4.76	4.96	5.16
Down (with bracket)	2.96	3.10	3.13	3.30	3.46	3.62	3.77	3.93	4.08	4.23	4.37	4.52	4.66	4.80	4.94
Up (with bracket)	2.37	2.53	2.57	2.73	2.89	3.05	3.21	3.36	3.51	3.66	3.81	3.96	4.10	4.24	4.38
Down (with cyclonic bracket)	2.81	2.93	2.94	3.07	3.20	3.33	3.45	3.58	3.69	3.81	3.92	4.03	4.13	4.24	4.34
Up (with cyclonic bracket)	2.23	2.37	2.38	2.51	2.65	2.78	2.90	3.03	3.15	3.26	3.38	3.49	3.60	3.71	3.81

Table 2d TOTAL R-VALUE ACHIEVED – LOOSE MESH ROOF CONSTRUCTION WITH AN INSULATION EMITTANCE OF 0.90

Heat Flow Direction (bracket type)	R2.1 Insulation	R2.3 Insulation	R2.6 Insulation	R2.8 Insulation	R3.0 Insulation	R3.2 Insulation	R3.4 Insulation	R3.6 Insulation	R3.8 Insulation	R4.0 Insulation	R4.3 Insulation	R4.5 Insulation	R4.7 Insulation	R4.9 Insulation	R5.1 Insulation
Down (no bracket)	2.48	2.65	2.72	2.92	3.12	3.32	3.52	3.71	3.91	4.11	4.31	4.50	4.70	4.90	5.09
Up (no bracket)	2.41	2.60	2.71	2.87	3.07	3.26	3.46	3.66	3.86	4.05	4.25	4.45	4.64	4.84	5.04
Down (with bracket)	2.32	2.47	2.50	2.66	2.83	2.99	3.14	3.30	3.45	3.60	3.75	3.89	4.04	4.18	4.32
Up (with bracket)	2.25	2.41	2.49	2.61	2.77	2.93	3.09	3.24	3.40	3.55	3.69	3.84	3.98	4.13	4.27
Down (with cyclonic bracket)	2.18	2.30	2.31	2.45	2.58	2.71	2.84	2.96	3.08	3.20	3.32	3.43	3.54	3.64	3.75
Up (with cyclonic bracket)	2.11	2.25	2.30	2.40	2.53	2.66	2.79	2.91	3.03	3.15	3.27	3.38	3.49	3.60	3.70

SPECIFICATION J1.2c METAL FRAMED EXTERNAL WALL CONSTRUCTION

1. Scope

This Specification describes the thermal performance of metal frame *external wall* construction when the effects of thermal bridging and compressed insulation are taken into account in accordance with NZS 4214.

2. Construction Deemed-to-Satisfy

(a) Typical metal frame wall construction is illustrated in **Figure 2**.

(b) The *Total R-Values* achieved by typical metal frame wall construction are listed in **Tables 2a**, **2b** and **2c**.

(c) Interpolation may be used where the *R-Value* of insulation is between the values stated in **Tables 2a**, **2b** and **2c**.

(d) Where a furring channel is included as a part of the wall construction, R0.15 may be added to the *Total R-Values* in Tables 2a, 2b and 2c.

Figure 2 TYPICAL METAL FRAME WALL

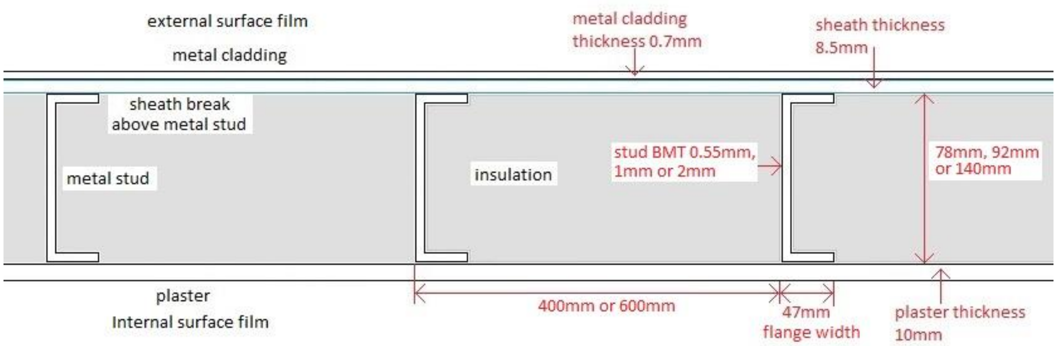


Table 2a TOTAL R-VALUE ACHIEVED – METAL FRAME WALL CONSTRUCTION WITH A 78MM FRAME DEPTH

Stud Spacing (mm)	Stud Base Metal Thickness (mm)	R1.25 Insulation	R1.375 Insulation	R1.5 Insulation	R1.625 Insulation	R1.75 Insulation	R1.875 Insulation	R2 Insulation	R2.125 Insulation	R2.25 Insulation	R2.3 Insulation	R2.5 Insulation	R2.75 Insulation	R3 Insulation	R3.25 Insulation	R3.5 Insulation	R3.75 Insulation
400	0.55	1.36	1.41	1.45	1.48	1.52	1.53	1.54	1.56	1.58	1.59	1.61	1.64	1.67	1.70	1.73	1.76
400	1.0	1.29	1.33	1.36	1.40	1.42	1.44	1.45	1.46	1.48	1.48	1.51	1.53	1.56	1.58	1.61	1.63
400	2.0	1.24	1.27	1.31	1.33	1.36	1.37	1.38	1.39	1.41	1.41	1.43	1.46	1.48	1.50	1.52	1.54
600	0.55	1.45	1.50	1.55	1.60	1.64	1.66	1.67	1.69	1.72	1.72	1.76	1.80	1.84	1.88	1.91	1.95
600	1.0	1.38	1.43	1.47	1.51	1.55	1.57	1.58	1.60	1.62	1.63	1.66	1.69	1.72	1.76	1.79	1.82
600	2.0	1.33	1.38	1.42	1.46	1.49	1.50	1.51	1.53	1.55	1.56	1.58	1.62	1.65	1.68	1.70	1.73

Table 2b TOTAL R-VALUE ACHIEVED – METAL FRAME WALL CONSTRUCTION WITH A 92MM FRAME DEPTH

Stud Spacing (mm)	Stud Base Metal Thickness (mm)	R1.25 Insulation	R1.375 Insulation	R1.5 Insulation	R1.625 Insulation	R1.75 Insulation	R1.875 Insulation	R2 Insulation	R2.125 Insulation	R2.25 Insulation	R2.3 Insulation	R2.5 Insulation	R2.75 Insulation	R3 Insulation	R3.25 Insulation	R3.5 Insulation	R3.75 Insulation
400	0.55	1.39	1.43	1.48	1.52	1.56	1.60	1.63	1.66	1.67	1.67	1.70	1.73	1.76	1.79	1.82	1.84
400	1.0	1.30	1.35	1.38	1.42	1.46	1.49	1.51	1.54	1.55	1.55	1.57	1.60	1.62	1.64	1.67	1.69
400	2.0	1.25	1.28	1.32	1.35	1.38	1.41	1.43	1.45	1.46	1.46	1.48	1.50	1.52	1.55	1.56	1.58
600	0.55	1.47	1.53	1.58	1.64	1.69	1.73	1.77	1.81	1.82	1.82	1.86	1.90	1.93	1.97	2.01	2.04
600	1.0	1.39	1.45	1.49	1.54	1.58	1.62	1.66	1.69	1.70	1.70	1.73	1.76	1.80	1.83	1.86	1.89
600	2.0	1.34	1.39	1.43	1.47	1.51	1.55	1.58	1.61	1.62	1.62	1.64	1.67	1.70	1.73	1.76	1.78

Table 2c TOTAL R-VALUE ACHIEVED – METAL FRAME WALL CONSTRUCTION WITH A 140MM FRAME DEPTH

Stud Spacing (mm)	Stud Base Metal Thickness (mm)	R1.25 Insulation	R1.375 Insulation	R1.5 Insulation	R1.625 Insulation	R1.75 Insulation	R1.875 Insulation	R2 Insulation	R2.125 Insulation	R2.25 Insulation	R2.3 Insulation	R2.5 Insulation	R2.75 Insulation	R3 Insulation	R3.25 Insulation	R3.5 Insulation	R3.75 Insulation
400	0.55	1.46	1.52	1.57	1.62	1.67	1.71	1.76	1.80	1.84	1.85	1.91	1.97	2.03	2.08	2.11	2.13
400	1.0	1.36	1.40	1.45	1.49	1.53	1.56	1.60	1.63	1.66	1.67	1.72	1.77	1.82	1.86	1.87	1.89
400	2.0	1.28	1.32	1.35	1.39	1.42	1.45	1.48	1.51	1.53	1.54	1.58	1.62	1.66	1.69	1.71	1.72
600	0.55	1.54	1.60	1.67	1.73	1.78	1.84	1.89	1.94	1.99	2.01	2.08	2.16	2.24	2.31	2.34	2.37
600	1.0	1.44	1.50	1.55	1.60	1.65	1.70	1.74	1.78	1.82	1.84	1.90	1.96	2.03	2.08	2.10	2.13
600	2.0	1.37	1.42	1.47	1.51	1.55	1.59	1.63	1.66	1.70	1.71	1.76	1.82	1.87	1.91	1.93	1.95

SPECIFICATION J1.2d SPANDREL PANELS

1. Scope

This Specification describes methods of determining the thermal performance of *spandrel panels.*

2. Construction Deemed to Satisfy

The *Total System U-Value* of a *spandrel panel* must be determined in accordance with—

(a) **Tables 2a, 2b, 2c, 2d, 2e** or **2f**; or

(b) the following formula:

$$U_{sp} = \frac{U_{cs}A_{cs} + \sum U_{es}A_{es} + \sum U_{fs}A_{fs}}{A_{cs}+\Sigma A_{es}+\Sigma A_{fs}}$$

where—

A_{XX} = the area of each region; and

U_{XX} = the U-value of each region; and

sp = the *spandrel panel* total system; and

cs = the centre region of the *spandrel panel; and*

es = the edge region of the *spandrel panel*, with a defined width of 100 mm; and

fs = the frame region of the *spandrel panel.*

Table 2a TOTAL R-VALUE ACHIEVED –SPANDREL PANEL CONFIGURATION ONE

1. Thermally unbroken (bridged) frame.
2. Centre of *spandrel panel* consisting of—
    a. 6 mm aluminium composite panel; and
    b. 2 mm aluminium sheet.

Type	**No Insulation**	**R0.5 Insulation**	**R1.0 Insulation**	**R1.5 Insulation**	**R2.0 Insulation**
Framed	0.3	0.4	0.43	0.44	0.45
Unframed	0.5	1.01	1.51	2.01	2.51

Table 2b TOTAL R-VALUE ACHIEVED – SPANDREL PANEL CONFIGURATION TWO

1. Thermally unbroken (bridged) frame.
2. Centre of *spandrel panel* consisting of—
    a. a single-glazed opaque face; and

b. a 100 mm air gap; and
c. a 3 mm aluminium back pan.

Type	No Insulation	R0.5 Insulation	R1.0 Insulation	R1.5 Insulation	R2.0 Insulation
Framed	0.3	0.39	0.42	0.44	0.45
Unframed	0..34	0.88	1.40	1.90	2.42

Table 2c TOTAL R-VALUE ACHIEVED – SPANDREL PANEL CONFIGURATION THREE

1. Thermally unbroken (bridged) frame.
2. Centre of *spandrel panel* consisting of—
   a. a single-glazed clear face; and
   b. a 100 mm air gap; and
   c. a 3 mm aluminium back pan.

Type	No Insulation	R0.5 Insulation	R1.0 Insulation	R1.5 Insulation	R2.0 Insulation
Framed	0.3	0.39	0.42	0.44	0.45
Unframed	0.34	0.88	1.40	1.90	2.42

Table 2d TOTAL R-VALUE ACHIEVED – SPANDREL PANEL CONFIGURATION FOUR

1. Thermally unbroken (bridged) frame.
2. Centre of *spandrel panel* consisting of—
   a. a double-glazed opaque face; and
   b. a 50 mm air gap; and
   c. a 2 mm aluminium sheet.

Type	No Insulation	R0.5 Insulation	R1.0 Insulation	R1.5 Insulation	R2.0 Insulation
Framed	0.35	0.41	0.43	0.44	0.45
Unframed	0.54	1.08	1.60	2.11	2.62

Table 2e TOTAL R-VALUE ACHIEVED – SPANDREL PANEL CONFIGURATION FIVE

1. Thermally broken (unbridged) frame.
2. Centre of *spandrel panel* consisting of—
   a. a double-glazed clear face; and
   b. a 50 mm air gap; and
   c. a 3 mm aluminium back pan.

Type	No Insulation	R0.5 Insulation	R1.0 Insulation	R1.5 Insulation	R2.0 Insulation
Framed	0.84	0.96	1.03	1.07	1.09
Unframed	1.12	1.69	2.25	2.77	3.01

Table 2f TOTAL R-VALUE ACHIEVED – SPANDREL PANEL CONFIGURATION SIX

1. Thermally broken (unbridged) frame.
2. Centre of *spandrel panel* consisting of—
   a. a double-glazed low-e clear face; and
   b. a 50 mm air gap; and
   c. a 3 mm aluminum back pan.

Type	No Insulation	R0.5 Insulation	R1.0 Insulation	R1.5 Insulation	R2.0 Insulation
Framed	0.91	1.00	1.05	1.09	1.11
Unframed	1.41	1.98	2.54	3.05	3.29

~~SPECIFICATION J1.3 ROOF AND CEILING CONSTRUCTION~~

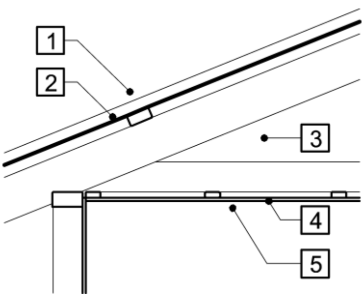
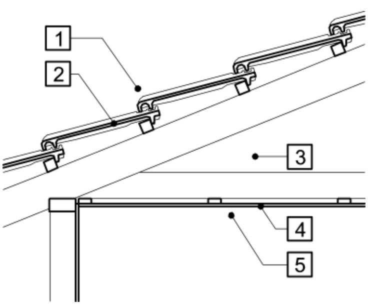
~~1. Scope~~

~~This Specification describes the thermal performance of some common forms of roof and ceiling construction~~

~~2. Construction Deemed-to-Satisfy~~

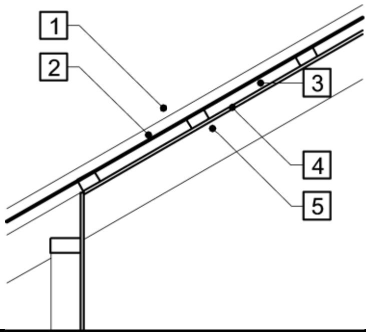
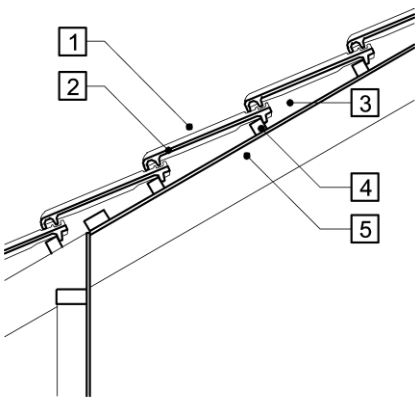
~~**Figure 2** details the *R-Values* considered to be achieved by some common forms of roof and ceiling construction.~~

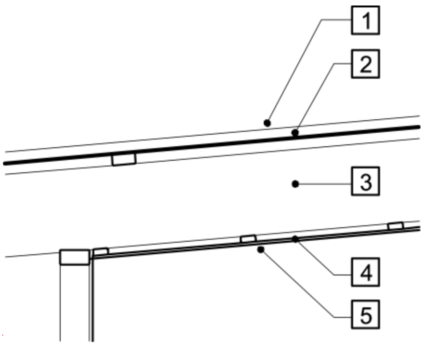
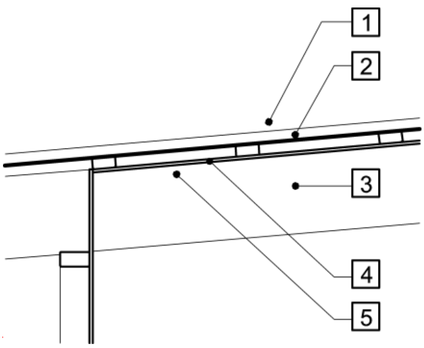
~~Figure 2 TYPICAL R-VALUES FOR ROOF AND CEILING CONSTRUCTION~~

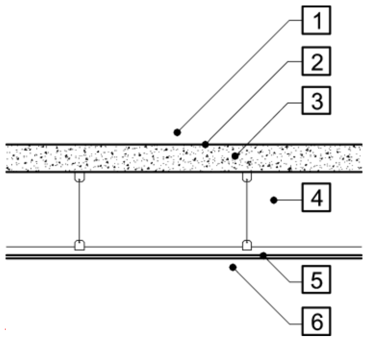
~~Roof construction description~~	~~Item~~	~~Item description~~	~~*R-Value* Unventilated~~		~~*R-Value* Ventilated~~	
			~~Up~~	~~Down~~	~~Up~~	~~Down~~
~~(a) Roof 15° to 45° pitch~~ ~~– Horizontal ceiling~~ ~~– Metal cladding~~  	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Metal cladding~~	~~0.00~~	~~0.00~~	~~0.00~~	~~0.00~~
	~~3.~~	~~Roof airspace (non-reflective)~~	~~0.18~~	~~0.28~~	~~0.00~~	~~0.46~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.39~~	~~0.54~~	~~0.21~~	~~0.72~~
~~(b) Roof 15° to 45° pitch~~ ~~– Horizontal ceiling~~ ~~– Clay tiles 19 mm~~  	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Roof tile, clay or concrete (1922 kg/m^3)~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~
	~~3.~~	~~Roof airspace (non-reflective)~~	~~0.18~~	~~0.28~~	~~0.00~~	~~0.46~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~	~~0.06~~	~~0.06~~

	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.41~~	~~0.56~~	~~0.23~~	~~0.74~~

~~Figure 2 TYPICAL R-VALUES FOR ROOF AND CEILING CONSTRUCTION~~

~~Roof construction description~~	~~Item~~	~~Item description~~	~~*R-Value* Unventilated~~	
			~~Up~~	~~Down~~
~~(c)~~ ~~Cathedral ceiling 15° to 45° pitch~~ ~~– 10 mm plaster on top of rafters~~ ~~– Metal external cladding~~ 	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Metal cladding~~	~~0.00~~	~~0.00~~
	~~3.~~	~~Roof airspace (30 mm to 100 mm, non-reflective)~~	~~0.15~~	~~0.18~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.14~~
		~~*Total R-Value*~~	~~0.36~~	~~0.42~~
~~(d)~~  ~~Cathedral ceiling 15° to 45° pitch~~ ~~– 10 mm plaster on top of rafters~~ ~~– Tiles external cladding~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Roof tile, clay or concrete (1922 kg/m^3)~~	~~0.02~~	~~0.02~~
	~~3.~~	~~Roof airspace (30 mm to 100 mm, non-reflective)~~	~~0.15~~	~~0.18~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.14~~
		~~*Total R-Value*~~	~~0.38~~	~~0.44~~
~~(e) Skillion roof less than 5° pitch~~ ~~– 10 mm plaster below rafters~~ ~~– Metal external cladding~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Metal cladding~~	~~0.00~~	~~0.00~~

~~Roof construction description~~	~~Item~~	~~Item description~~	~~*R-Value* Unventilated~~	
			~~Up~~	~~Down~~
	~~3.~~	~~Roof airspace (100 mm to 300 mm, non-reflective)~~	~~0.15~~	~~0.22~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.36~~	~~0.48~~
~~(f) Skillion roof 5° to 15° pitch~~ ~~– 10 mm plaster on top of rafters~~ ~~– Metal external cladding~~ 	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Metal cladding~~	~~0.00~~	~~0.00~~
	~~3.~~	~~Roof airspace (30 mm to 100 mm non-reflective)~~	~~0.15~~	~~0.21~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.36~~	~~0.47~~
~~(g) 100 mm solid concrete roof to 5°~~ ~~– 10 mm plaster, suspended ceiling~~ ~~– Applied external waterproof membrane~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
	~~2.~~	~~Waterproof membrane, rubber synthetic (4 mm, 961 kg/m^3)~~	~~0.03~~	~~0.03~~
	~~3.~~	~~Solid concrete, (100 mm, 2400 kg/m^3)~~	~~0.07~~	~~0.07~~
	~~4.~~	~~Ceiling airspace (100 mm to 300 mm, non-reflective)~~	~~0.15~~	~~0.22~~
	~~5.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~

~~**Roof construction description**~~	~~**Item**~~	~~**Item description**~~	~~***R-Value* Unventilated**~~	
			~~**Up**~~	~~**Down**~~
	~~**6.**~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.46~~	~~0.58~~

~~**Notes:**~~

1. ~~The *R-Value* of an item, other than an airspace, air film or air cavity, may be increased in proportion to the increased thickness of the item.~~
2. ~~The *Total R-Value* of a form of construction may be increased by the amount that the *R-Value* of an individual item is increased.~~
3. ~~Where an airspace is filled, the *R-Value* listed for the airspace must be deducted from the *Total R-Value* of the roof construction.~~
4. ~~For information on a roof space that is considered to be ventilated, see **Specification J1.2, Clause 2(d)**.~~

~~SPECIFICATION J1.5 WALL CONSTRUCTION~~

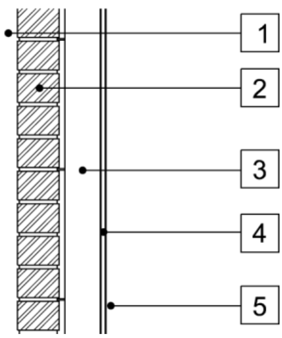
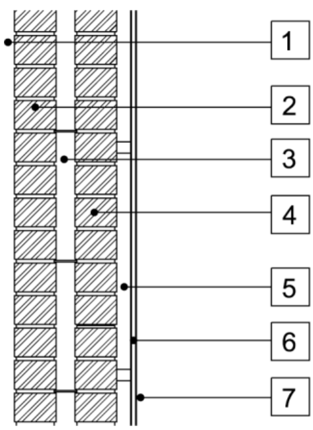
~~1. Scope~~

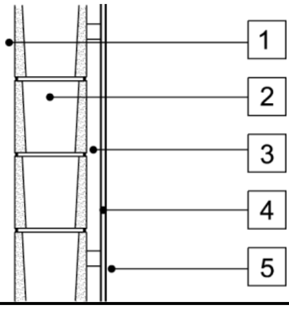
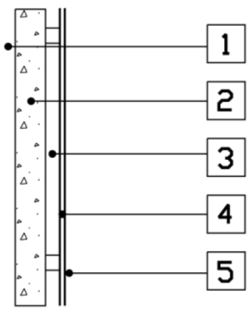
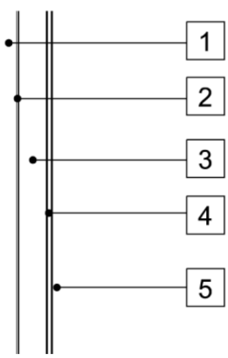
~~This Specification describes the thermal performance of some common forms of external wall construction~~

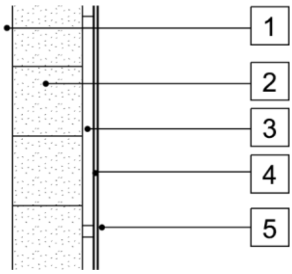
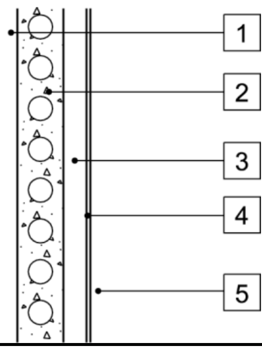
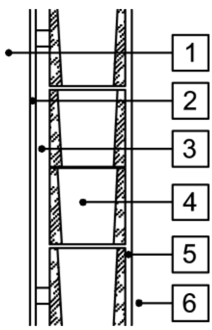
~~2. Construction Deemed-to-Satisfy~~

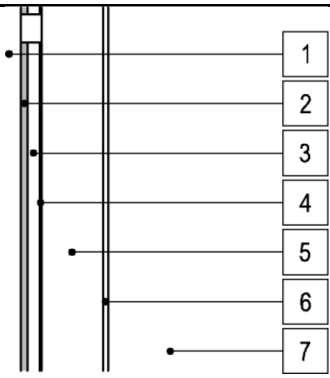
~~**Figure 2** details the *R-Values* considered to be achieved by some common forms of wall construction.~~

~~**Figure 2 TYPICAL R-VALUES FOR WALL CONSTRUCTION**~~

~~**External wall construction description**~~	~~**Item**~~	~~**Item description**~~	~~***R-Value***~~
~~(a) Masonry veneer – 25 mm to 50 mm cavity, 10 mm internal plaster on 90 mm stud frame~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Masonry (See Notes 3 and 4)~~	~~0.09~~
	~~3.~~	~~Cavity and airspace (115 to 140 mm, made up of 90 mm stud + 25 mm to 50 mm airspace non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.48~~
~~(b) Cavity masonry – 20 mm to 50 mm cavity, 10 mm internal plaster on battens or furring channels~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Masonry (See Notes 3 and 4)~~	~~0.09~~
	~~3.~~	~~Masonry cavity (20 mm to 50 mm, non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Masonry (See Note 4)~~	~~0.09~~
	~~5.~~	~~Airspace (20 mm to 35 mm, non-reflective and unventilated)~~	~~0.17~~
	~~6.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~7.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.74~~

~~External wall construction description~~	~~Item~~	~~Item description~~	~~*R-Value*~~
~~(c) Dense weight hollow concrete block with internal plaster on battens or furring channels~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Dense weight hollow concrete block (See Notes 3 and 4)~~	~~0.15~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.54~~
~~(d) 125 mm solid reinforced concrete (dense weight) – 10 mm internal plaster on battens or furring channels~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~125 mm minimum solid reinforced concrete (See Note 3)~~	~~0.09~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.48~~
~~(e) Timber wall – external 6 mm cement sheet cladding, 90 mm stud frame, 10 mm plaster~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Fibre-cement (6 mm, 1360 kg/m^3)~~	~~0.03~~
	~~3.~~	~~Airspace (90 mm nonreflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.42~~

~~External wall construction description~~	~~Item~~	~~Item description~~	~~*R-Value*~~
~~(f) 200 mm autoclaved aerated concrete block – 10 mm internal plaster on battens or furring channels~~ 	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Autoclaved aerated concrete block (200 mm, 350 kg/m³)~~	~~2.00~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m³)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~2.39~~
~~(g) 150 mm hollow-core concrete panels – 10 mm internal plaster on battens or furring channels~~ 	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Prestressed hollow-core concrete panels (150 mm, 1,680 kg/m³, 30% cores)~~	~~0.14~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m³)~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.53~~
~~(h) Dense weight hollow concrete block with external 6 mm cement sheet cladding on battens or furring channels~~ 	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Fibre-cement (6 mm, 1360 kg/m³)~~	~~0.03~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Dense weight hollow concrete block (See Note 4)~~	~~0.15~~
	~~5.~~	~~10 mm render~~	~~0.02~~
	~~6.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.53~~
~~(i) Glazed construction within a metal frame – 10 mm internal plaster on battens or furring channels~~	~~1.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~
	~~2.~~	~~Clear or opaque glass (10 mm, 2500 kg/m³)~~	~~0.01~~

~~External wall construction description~~	~~Item~~	~~Item description~~	~~*R-Value*~~
	~~3.~~	~~Airspace (20 mm to 40 mm non-reflective and unventilated)~~	~~0.17~~
	~~4.~~	~~Steel sheet (1 mm to 3 mm, 7850 kg/m^3)~~	~~0.00~~
	~~5.~~	~~Airspace (2 mm to 100 mm non-reflective and unventilated)~~	~~0.17~~
	~~6.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~
	~~7.~~	~~Indoor air film (still air)~~	~~0.12~~
		~~*Total R-Value*~~	~~0.57~~

~~**Notes:**~~

1. ~~The *R-Value* of an item, other than an airspace, air film or air cavity, may be increased in proportion to the increased thickness of the item.~~
2. ~~The *Total R-Value* of a form of construction may be increased by the amount that an individual item is increased.~~
3. ~~The addition of 10 mm of render to a concrete or masonry wall will increase the *Total R-Value* by 0.02.~~
4. ~~(a) The typical *R-Value* in Figure 2(a) and (b) is for 90 mm dense weight concrete block.~~

   ~~(b) The typical *R-Value* in Figure 2(c) and (h) is for 140 mm dense weight hollow concrete block.~~

   ~~(c) The typical *R-Value* in Figure 2(d) is for 125 mm solid reinforced concrete (2400 kg/m^3).~~

   ~~(d) Other typical *R-Values* for masonry and concrete are as follows and may be substituted for those above:~~

   ~~90 mm clay brick:~~

   ~~(density 1430 kg/m^3) — 0.16~~

   ~~(density 1690 kg/m^3) — 0.14~~

   ~~(density 1950 kg/m^3) — 0.12~~

   ~~110 mm clay brick:~~

   ~~(density 1430 kg/m^3, 2.75 kg/brick) — 0.20~~

   ~~(density 1690 kg/m^3, 3.25 kg/brick) — 0.17~~

   ~~(density 1950 kg/m^3, 3.75 kg/brick) — 0.14~~

   ~~Dense weight hollow concrete block:~~

   ~~110 mm — 0.12~~

   ~~190 mm — 0.20~~

5. ~~The *Total R-Values* in this Figure are for *external walls*. The *Total R-Value* for an internal wall of the same construction would be 0.08 greater because the *R-Value* for an outdoor air film would be replaced by that of an indoor air film.~~
6. ~~Where a cavity or airspace is filled, the *R-Value* listed for the cavity must be deducted from the *Total R-Value* of the wall.~~

~~SPECIFICATION J1.6 FLOOR CONSTRUCTION~~

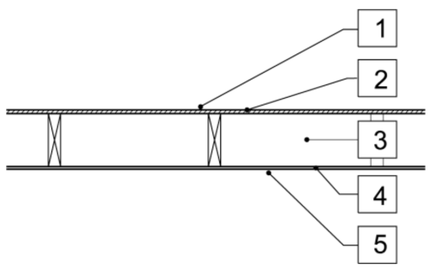
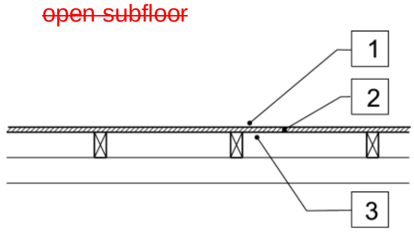
~~1. Scope~~

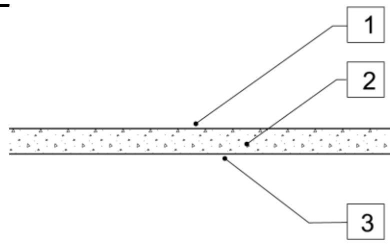
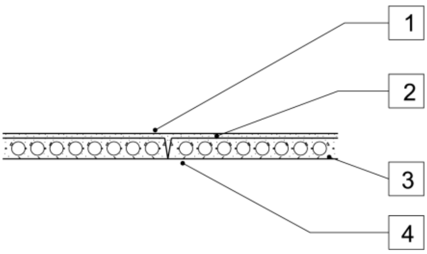
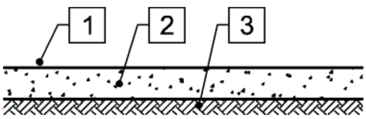
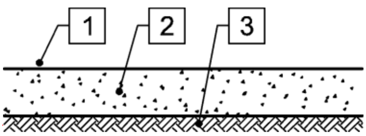
~~This Specification describes the thermal performance of some common forms of floor construction.~~

~~2. Construction Deemed-to-Satisfy~~

~~**Figure 2** details the *R-Values* considered to be achieved by some common forms of floor construction.~~

~~**Figure 2 TYPICAL R-VALUES FOR FLOOR CONSTRUCTION**~~

~~**Floor construction description**~~	~~**Item**~~	~~**Item description**~~	~~***R-Value***~~	
			~~**Up**~~	~~**Down**~~
~~(a) Timber internal floor, 10 mm internal plaster~~ 	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Particleboard flooring (19 mm, 640 kg/m^3)~~	~~0.15~~	~~0.15~~
	~~3.~~	~~Floor airspace, 100 mm to 300 mm (non reflective)~~	~~0.15~~	~~0.22~~
	~~4.~~	~~Plasterboard, gypsum (10 mm, 880 kg/m^3)~~	~~0.06~~	~~0.06~~
	~~5.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
		~~*Total R-Value*~~	~~0.58~~	~~0.75~~
~~(b) Timber, suspended ground floor, open subfloor~~ 	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Particleboard flooring (19 mm, 640 kg/m^3)~~	~~0.15~~	~~0.15~~
	~~3.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
		~~*Total R-Value*~~	~~0.30~~	~~0.35~~
~~(c) Solid concrete suspended slab~~	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Solid concrete (150 mm, 2400 kg/m^3)~~	~~0.10~~	~~0.10~~
	~~3.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~

~~Floor construction description~~	~~Item~~	~~Item description~~	~~*R-Value*~~	
			~~Up~~	~~Down~~
		~~*Total R-Value*~~	~~0.25~~	~~0.30~~
~~(d) 150 mm hollow-core concrete planks~~ 	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Concrete topping (60 mm, 2,400 kg/m^3)~~	~~0.04~~	~~0.04~~
	~~3.~~	~~Hollow-core concrete planks (150 mm, 1,680 kg/m^3, 30% cores)~~	~~0.14~~	~~0.14~~
	~~4.~~	~~Outdoor air film (7 m/s)~~	~~0.04~~	~~0.04~~
		~~*Total R-Value*~~	~~0.33~~	~~0.38~~
~~(e) 100 mm solid concrete slab-on-ground~~ 	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Solid concrete (100 mm, 2400 kg/m^3)~~	~~0.07~~	~~0.07~~
	~~3.~~	~~Ground thermal resistance~~	~~-~~	~~-~~
		~~*Total R-Value*~~	~~0.18~~	~~0.23~~
~~(f) 150 mm solid concrete slab-on-ground~~ 	~~1.~~	~~Indoor air film (still air)~~	~~0.11~~	~~0.16~~
	~~2.~~	~~Solid concrete (150 mm, 2400 kg/m^3)~~	~~0.10~~	~~0.10~~
	~~3.~~	~~Ground thermal resistance~~	~~-~~	~~-~~
		~~*Total R-Value*~~	~~0.21~~	~~0.26~~

~~**Notes:**~~

1. ~~The *R-Value* of an item, other than an airspace, air film or air cavity, may be increased in proportion to the increased thickness of the item.~~

2. ~~The *Total R-Value* of a form of construction may be increased by the amount that an individual item is increased.~~

3. ~~For floor types (c) and (d) that are located over an internal space, the *Total R-Value* can be calculated by replacing the value for outdoor air film (R0.04) on the underside of the floor with the value for indoor air film (R0.11 for heat flow up or R0.16 for heat flow down).~~

4. ~~For floor types (b), (c) and (d) located over ground with an enclosed perimeter, the *Total R-Value* can be calculated by replacing the value for outdoor air film (R0.04) on the underside of the floor with the value for indoor air film plus ground thermal resistance (i.e. R0.11+R0.56=R0.67 for heat flow up, or R0.16+R0.58=R0.74 for heat flow down).~~

5. ~~Where reflective building membrane is attached beneath the floor with a 100 mm~~

~~Floor construction description~~	~~Item~~	~~Item description~~	~~*R-Value*~~	
			~~Up~~	~~Down~~

~~reflective airspace, add R0.38 for heat flow up and R1.14 for heat flow down.~~

~~6. Where ground floor construction with an enclosed perimeter makes the airspace adjacent to the ground reflective, the face down subfloor air films will be R0.23 instead of R0.11 for heat flow up, and R0.80 instead of R0.16 for heat flow down.~~

~~7. The addition of 10 mm of render to the ceiling of a suspended internal concrete floor will increase the *Total R-Value* by 0.02.~~

~~8. Solid concrete slab includes concrete beam and infill floors and concrete precast permanent formwork panels. For the purposes of calculating the *Total R-Value* of a floor, the *R-Value* attributable to an in-slab or in-screed heating or cooling system is ignored.~~

~~9. Where an airspace is filled, the *R-Value* listed for the airspace must be deducted from the *Total R- Value* of the floor construction.~~

PART J2 ~~GLAZING~~ * * * * *

The Content of **Part J2** for *glazing*, which existed in NCC 2016, has been removed. *Glazing* provisions are now included in **Part J1**.

The Part number **Part J2** has been retained so as not to change the numbering of the current NCC from that of NCC 2016.

Part J3 Building Sealing

J3.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement~~s~~* **JP1** ~~and JP3~~ ~~are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

~~(iii) **J2.1** to **J2.5**; and~~

(iii) J3.1 to J3.7; and

(iv) **J5.1** to **J5.~~4~~12**; and

(v) **J6.1** to **J6.~~6~~8**; and

(vi) **J7.1** to **J7.4**; and

(vii) **J8.1** to **J8.3**.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J3.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 to 9 building, other than—

(a) a building in *climate zones* 1, 2, 3 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; or

(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or

(c) a building or space where the mechanical ventilation *required* by **Part F4** provides sufficient pressurisation to prevent infiltration.

NSW J3.1(d)

J3.2 Chimneys and flues

The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

J3.3 Roof lights

(a) A *roof light* must be sealed, or capable of being sealed~~, when serving~~—

(i) when serving a *conditioned space*; or

(ii) ~~a habitable room~~ in *climate zones* 4, 5, 6, 7 and 8.

(b) A *roof light required* by **(a)** to be sealed, or capable of being sealed, must ~~be constructed with~~—

(i) be constructed with—

(A) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or

(B) a weatherproof seal; or

(C) a shutter system readily operated either manually, mechanically or electronically by the occupant; and

(ii) have all junctions between the ceiling or internal lining, framing and architraves sealed with expanding foam, rubber compressible strip, caulking or the like.

J3.4 Windows and doors

(a) ~~A seal to restrict air infiltration must be fitted to each edge of an~~ A door, openable *window* or the like must be sealed—

(i) when forming part of the *envelope* of a *conditioned space*; or

(ii) ~~the external fabric of a habitable room or public area~~ in *climate zones* 4, 5, 6, 7 or 8.

(b) The requirements of **(a)** do not apply to—

(i) a *window* complying with AS 2047; or

(ii) a fire door or smoke door; or

(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.

(c) A seal *required* by **(a)**—

(i) for the bottom edge of ~~an external swing~~ a door, must be a draft protection device; and

(ii) for the other edges of ~~an external swing~~ a door or the edges of an openable *window* or other such opening, may be a foam or rubber compressible strip, fibrous seal or the like.

(d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* door, rapid roller door, revolving door or the like, other than—

(i) where the *conditioned space* has a *floor area* of not more than 50 m^2; or

(ii) where a café, restaurant, open front shop or the like has—

(A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and

(B) at all other entrances to the café, restaurant, open front shop or the like, *self- closing* doors.

(e) A loading dock entrance, if leading to a *conditioned space*, must be fitted with a rapid roller door or the like.

(f) Sealing must be installed—

(i) between door and *window* jambs and the adjoining framing; and

(ii) around the cavity framing of cavity sliding doors

with expanding foam, rubber compressible strip, caulking or the like.

J3.5 Exhaust fans

(a) An exhaust fan must be sealed ~~fitted with a sealing device such as a self-closing damper, filter or the like when serving~~—

(i) when serving a *conditioned space*; or

(ii) ~~a habitable room~~ in *climate zones* 4, 5, 6, 7 and 8.

(b) An exhaust fan must be fitted with a sealing device such as a self-closing damper, filter or the like.

(c) Where an exhaust fan duct penetrates an internal ceiling or wall, gaps around ductwork must be sealed with expanding foam, rubber compressible strip, caulking or the like.

J3.6 Construction of roofs, ceilings, walls and floors

(a) Roofs, ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with **(b)**—

(i) when forming part of the *envelope*; or

(ii) ~~the external fabric of a habitable room or a public area in~~ in *climate zones* 4, 5, 6, 7 or 8.

(b) Construction *required* by **(a)** must be—

(i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or

(ii) sealed ~~by caulking,~~ with expanding foam, rubber compressible strip, caulking or the like.at—

(A) bottom plates or skirting~~, architraves,~~; and

(B) cornices and shadow lines; and

(C) gaps around ceiling, wall or floor penetrations ~~or the like~~.

(c) The requirements of **(a)** do not apply to openings, grilles or the like *required* for smoke hazard management.

J3.7 Evaporative coolers

An evaporative cooler must be fitted with a self-closing damper or the like~~ when serving~~—

(a) when serving a heated space; or

(b) ~~*a habitable room*~~ in *climate zones* 4, 5, 6, 7 or 8.

PART J5 AIR-CONDITIONING AND VENTILATION SYSTEMS

J5.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement~~s~~* **JP1** ~~and **JP3** are~~is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

~~(iii) **J2.1** to **J2.5**; and~~

(iii) **J3.1** to **J3.7**; and

(iii) **J5.1** to **J5.~~4~~12**; and

(iv) **J6.1** to **J6.~~6~~8**; and

(v) **J7.1** to **J7.4**; and

(vi) **J8.1** to **J8.3**.

(b) Where a Performance Solution is proposed, the relevant Performance Requirements must be determined in accordance with **A0.7**.

J5.1 Application of Part

(a) The *Deemed-to-Satisfy Provisions* of this Part do not apply to a Class 8 *electricity network substation*.

J5.2 Air-conditioning system~~s~~ control

~~(a) Control —~~

(a) An *air-conditioning* system—

(i) must be capable of being deactivated when the building or part of a building served by that system is not occupied; and

(ii) when serving more than one *air-conditioning* zone or area with different heating or cooling needs, must—

(A) thermostatically control the temperature of each zone or area; and

(B) not control the temperature by mixing actively heated air and actively cooled air; and

(C) limit reheating to not more than—

(aa) for a fixed supply air rate, a 7.5 K rise in temperature; and

(bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and

(iii) which provides the *required* mechanical ventilation, other than in *climate zones* 1, 2 or 3 or ~~in process- related applications~~ where humidity control is needed, must have an *outdoor air economy cycle* if the total air flow rate of any airside component of an *air-conditioning* system is greater than or equal to the figures in **Table J5.2**; and~~—~~

(aa) ~~in *climate zones* 2 or 3, when the *air-conditioning* system capacity is more than 50 kWr; or~~

(bb) ~~in *climate zones* 4, 5, 6, 7 or 8, when the *air-conditioning* system capacity is more than 35 kWr; and~~

(iv) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and

(v) except for a unitary ~~packaged~~ *air-conditioning* system, must have a variable speed fan when its supply air quantity is capable of being varied; and

(vi) when serving a *sole-occupancy unit* in a Class 3 building, must not operate when any external door of the *sole-occupancy unit* that opens to a balcony or the like, is open for more than one minute~~.~~; and

(vii) must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant; and

(viii) must have a minimum control dead band of 1°C, except where a smaller range is required for specialised applications; and

(ix) must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded at each component as required to meet the needs of the system at its maximum operating condition; and

(x) must ensure that each independently operating space of over 1000 m^2 and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times; and

(xi) must have automatic variable temperature operation of heated water and chilled water circuits; and

(xii) when deactivated, must close any motorised outdoor air and return air damper.

Table J5.2 REQUIREMENT FOR AN OUTDOOR AIR ECONOMY CYCLE

Climate zone	Total air flow rate *requiring* an economy cycle (l/s)
4	5500
5	3500
6	2500
7	3000
8	7500

~~(ii) When an *air-conditioning* system is deactivated, any motorised outside air and return dampers must close.~~

(b) Compliance with (~~i~~a) must not adversely affect—

(i) smoke hazard management measures *required* by **Part E2**; and

(ii) ventilation *required* by **Part E3** and **Part F4**.

(c) When two or more air-conditioning systems serve the same space they must utilise control sequences that prevent the systems from operating in opposing heating and cooling modes.

~~(e) **Fans** — Fans of an *air-conditioning* system must comply with **Specification J5.2a**.~~

~~(f) **Pumps** —~~

~~a. An *air-conditioning* system, where water is circulated by pumping at more than 2 L/s, must be designed so that the maximum *pump power* to the pump complies with **Table J5.2**.~~

~~b. An *air-conditioning* system pump that is rated at more than 3 kW of *pump power* and circulates water at more than 2 L/s must be capable of varying its speed in response to varying load.~~

~~c. A spray water pump of an *air-conditioning* system's closed circuit cooler or evaporative condenser must not use more than 150 W of *pump power* for each L/s of spray water circulated.~~

Table J5.2 MAXIMUM PUMP POWER

~~Cooling or heating load (W/m² of the *floor area* of the *conditioned space*)~~	~~Maximum *pump power* (W/m² of the *floor area* of the *conditioned space*)~~		
	~~Chilled water~~	~~Condenser water~~	~~Heating water~~
~~Up to 100~~	~~1.3~~	~~0.9~~	~~1.0~~
~~101 to 150~~	~~1.9~~	~~1.2~~	~~1.3~~
~~151 to 200~~	~~2.2~~	~~2.2~~	~~1.7~~
~~201 to 300~~	~~4.3~~	~~3.0~~	~~2.5~~
~~301 to 400~~	~~5.0~~	~~3.6~~	~~3.2~~
~~More than 400~~	~~5.6~~	~~5.6~~	~~3.6~~
~~Note: Values do not include any motor losses.~~			

~~(g) **Insulation** —~~

~~d. The ductwork of an *air-conditioning* system must be insulated and sealed in accordance with **Specification J5.2b**.~~

~~e. *Piping*, vessels, heat exchangers and tanks containing heating or cooling fluid that are part of an *air-conditioning* system, other than those with insulation levels covered by MEPS, must be insulated in accordance with **Specification J5.2c**.~~

~~(h) **Space heating** — A heater used for *air-conditioning* or as part of an *air-conditioning* system must comply with **Specification J5.2d**.~~

~~(i) Energy efficiency ratios —~~

~~f. refrigerant chillers used as part of an *air-conditioning* system; and~~

~~g. packaged *air-conditioning* equipment, must comply with **Specification J5.2e**.~~

(d) **Time switches—**

(i) A time switch must be provided to control—

(A) an *air-conditioning* system of more than 2 kWr; and

(B) a heater of more than 1 $kW_{heating}$ used for *air-conditioning*.

(ii) The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

(iii) The requirements of **(i)** and **(ii)** do not apply to—

(A) an *air-conditioning* system that serves—

(aa) only one *sole-occupancy unit* in a Class 2, 3 or 9c building; or

(bb) a Class 4 part of a building; or

(B) a building where *air-conditioning* is needed for 24 hour occupancy.

J5.3 Mechanical ventilation system control

(a) ~~**Control**~~ **General**— A mechanical ventilation system, including one that is part of an *air-conditioning* system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must—

(i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and

(ii) when serving a *conditioned space*—

(A) where specified in **Table J5.3**, have—

(aa) an energy reclaiming system that preconditions *outdoor air* at a minimum efficacy of 60%; or

(bb) demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and

(B) not exceed the minimum *outdoor air* quantity *required* by **Part F4**~~, where relevant,~~ by more than 20%~~; and~~, except where—

(aa) additional unconditioned *outdoor air* is supplied for free cooling; or

(bb) additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or

(cc) an energy reclaiming system preconditions all the *outdoor air*.

~~(A) in other than *climate zone* 2, where the number of square metres per person is not more than 1 as specified in **D1.13** and the air flow rate is more than 1000 L/s, have—~~

~~(aa) an energy reclaiming system that preconditions outside air; or~~

~~(bb) the ability to automatically modulate the mechanical~~

~~ventilation~~

~~*required* by **Part F4** in proportion to the number of occupants.~~

Table J5.3 REQUIRED OUTDOOR AIR TREATMENT

Climate zone	***Outdoor air* airflow (l/s)**	***Required* measure**
1	>500	Modulating control
2	-	No *required* measure
3	>1000	Modulating control
4 and 6	>500	Modulating control or energy reclaiming system
5	>1000	Modulating control or energy reclaiming system
7 and 8	>250	Modulating control or energy reclaiming system

~~(b) The requirements of **(a)(ii)(A)** do not apply where—~~

~~(i) additional unconditioned outside air is supplied for free cooling or to balance process exhaust; or~~

~~(ii) additional exhaust ventilation is needed to balance the *required* mechanical ventilation; or~~

~~(iii) an energy reclaiming system preconditions all the outside air.~~

~~(c) Compliance with **(a)** must not adversely affect—~~

~~(i) smoke hazard management measures *required* by **Part E2**; and~~

~~(ii) ventilation *required* by **Part E3** and **Part F4**.~~

(b) **Exhaust systems**— An exhaust system with an air flow rate of more than 1000 l/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a *sole-occupancy unit* in a Class 2, 3 or 9c building.

(c) ***Carpark* exhaust systems—** *Carpark* exhaust systems must have an atmospheric contaminant monitoring system in accordance with AS 1668.2.

~~(e) Fans — Fans of a mechanical ventilation system covered by (a) must comply with Specification J5.2a.~~

(d) **Time switches—**

(i) A time switch must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.

(ii) The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

(iii) The requirements of **(i)** and **(ii)** do not apply to—

(A) a mechanical ventilation system that serves—

(aa) only one *sole-occupancy* unit in a Class 2, 3 or 9c building; or (bb) a Class 4 part of a building; or

(B) a building where mechanical ventilation is needed for 24 hour occupancy.

~~(f) Time switches —~~

~~(i) A time switch complying with **Specification J6** must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.~~

~~(ii) The requirements of **(i)** do not apply to—~~

~~(A) a mechanical ventilation system that serves—~~

~~(aa) only one *sole-occupancy unit* in a Class 2 or 3 building; or~~

~~(bb) a Class 4 part of a building; or~~

~~(cc) only one *sole-occupancy unit* in a Class 9c building; or~~

~~(B) a building where mechanical ventilation is needed for 24 hour occupancy.~~

~~J5.4 Miscellaneous exhaust systems~~

~~(a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand, must—~~

~~(i) be capable of stopping the motor when the system is not needed; and~~

~~(ii) have a variable speed fan or the like.~~

~~(b) The requirements of **(a)** do not apply—~~

~~(i) to a miscellaneous exhaust system in—~~

~~(A) a *sole-occupancy unit* in a Class 2, 3 or 9c building; or~~

~~(B) a Class 4 part of a building; or~~

~~(ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation.~~

J5.4 Fan systems

(a) Fans, ductwork and duct components that form part of an *air-conditioning* system or mechanical ventilation system must—

(i) separately comply with (b), (c), (d), (e) and (f); or

(ii) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying (b), (c), (d), (e) and (f) together.

(b) **Fans—**

(i) Fans with an airflow of more than 1000 L/s must be provided with variable speed control unless the downstream airflow is *required* by **Part F4** to be constant.

(ii) Fans must have an operating efficiency equal to or greater than the efficiency calculated with the following formula:

$$\eta_{min} = 0.85 \times (a \times \ln(P) - b + N)/100$$

where—

η_{min} = the minimum *required* fan operating efficiency; and

P = the motor input power of the fan (kW); and

N = the minimum performance grade obtained from **Table J5.4a**; and

a = regression coefficient a, obtained from **Table J5.4b**; and

b = regression coefficient b, obtained from **Table J5.4c**.

(iii) The requirements of (i) and (ii) do not apply to fans that need to be explosion proof.

Table J5.4a MINIMUM FAN PERFORMANCE GRADE

Fan type	**Installation type A or C**	**Installation type B or D**
Axial - as a component of an air handling unit or fan coil unit	46.0	51.5
Axial – other	42.0	61.0
Mixed flow - as a component of an air handling unit or fan coil unit	46.0	51.5
Mixed flow – other	52.5	65.0
Centrifugal forward-curved	46.0	51.5
Centrifugal radial bladed	46.0	51.5
Centrifugal backward-curved	64.0	64.0

Notes:

1. **Installation type A** means an arrangement where the fan is installed with free inlet and outlet conditions.

2. **Installation type B** means an arrangement where the fan is installed with a free inlet and a duct at its outlet.

3. **Installation type C** means an arrangement where the fan is installed with duct fitted to its inlet and with free outlet conditions.

4. **Installation type D** means an arrangement where the fan is installed with duct fitted to its inlet and outlet.

Table J5.4b FAN REGRESSION COEFFICIENT a

Fan type	Fan motor input power less than 10 kW	Fan motor input power greater than or equal to 10 kW
Axial	2.74	0.78
Mixed flow	4.56	1.1
Centrifugal forward-curved	2.74	0.78
Centrifugal radial bladed	2.74	0.78
Centrifugal backward-curved	4.56	1.1

Table J5.4c FAN REGRESSION COEFFICIENT b

Fan type	Fan motor input power less than 10 kW	Fan motor input power greater than or equal to 10 kW
Axial	6.33	1.88
Mixed flow	10.5	2.6
Centrifugal forward-curved	6.33	1.88
Centrifugal radial bladed	6.33	1.88
Centrifugal backward-curved	10.5	2.6

(c) **Ductwork—**

(i) The average pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed a pressure drop of 1 Pa/m. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.

(ii) Flexible ductwork must not account for more than 6m in length in any duct run.

(iii) The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.

(iv) Turning vanes must be included in all rigid ductwork bends of 90^{o} or greater except where the inclusion of turning vanes presents a fouling risk.

(d) **Ductwork Components—**

(i) The pressure drop across coils and filters must not exceed—

(A) for coils, the value specified in **Table J5.4d**; or

(B) for filters, the value specified in **Table J5.4e**; or

(C) for high efficiency particulate air filters, 200 Pa.

Table J5.4d MAXIMUM COIL PRESSURE DROP

Number of rows	Maximum pressure drop (Pa)
1	30
2	50
4	90
6	130
8	175
10	220

Table J5.4e MAXIMUM FILTER PRESSURE DROP

Filter Minimum Efficiency Reporting Value	Maximum pressure drop (Pa)
9	55
11	65
13	95
14	110

(ii) The pressure drop across intake louvres must not exceed—

(A) for single stage weatherproof louvres, 30 Pa; and

(B) for two stage weatherproof louvres, 60 Pa; and

(C) for acoustic louvres, 50 Pa; and

(D) for other non-weatherproof louvres, 30 Pa.

(iii) The pressure drop across variable air volume boxes must not exceed—

(A) for units with electric reheat, 100 Pa; and

(B) for other units, 25 Pa not including coil pressure losses.

(iv) Rooftop cowls must not exceed a pressure drop of 30 Pa.

(v) Attenuators must not exceed a pressure drop of 40 Pa.

(vi) Fire dampers must not exceed a pressure drop of 15 Pa.

(vii) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the open position.

(viii) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.

(ix) Exhaust grilles must not exceed a pressure drop of 30 Pa.

(x) Transfer ducts must not exceed a pressure drop of 20 Pa.

(xi) Door grilles must not exceed a pressure drop of 20 Pa.

(xii) Active chilled beams must not exceed a pressure drop of 150 Pa.

(e) The requirements of (a), (b), (c) and (d) do not apply to—

(i) fans systems with a fan motor input power of less than 125 W; and

(ii) fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 l/s; and

(iii) smoke spill fans, except where also used for *air-conditioning* or ventilation; and

(iv) the power for a fan in an energy reclaiming system that preconditions *outdoor air*; and

(v) the power for process-related components; and

(vi) kitchen exhaust systems.

J5.5 Ductwork insulation

(a) Ductwork and fittings in an *air-conditioning* system must be provided with insulation—

(i) complying with AS/NZS 4859.1; and

(ii) having a material *R-Value* not less than—

(A) that specified in **Table J5.5**; or

(B) 1.0, for flexible ductwork.

(b) Insulation must—

(i) be protected against the effects of weather and sunlight; and

(ii) be installed so that it—

(A) abuts adjoining insulation to form a continuous barrier; and

(B) maintains its position and thickness, other than at flanges and supports; and

(iii) when conveying cooled air—

(A) be protected by a vapour barrier on the outside of the insulation; and

(B) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—

(aa) overlap by at least 50 mm; and

(bb) are bonded or taped together.

(c) The requirements of **(a)** do not apply to—

(i) ductwork and fittings located within the only or last room served by the system; or

(ii) fittings that form part of the interface with the *conditioned space*; or

(iii) return air ductwork in, or passing through, a *conditioned space*; or

(iv) ductwork for outdoor air and exhaust air associated with an *air-conditioning* system; or

(v) the floor of an in-situ air-handling unit; or

(vi) unitary *air-conditioning* equipment complying with *MEPS*; or

(vii) flexible fan connections.

(d) For the purposes of **(a), (b)** and **(c)**, fittings—

(i) include non-active components of a ductwork system such as cushion boxes; and

(ii) exclude active components such as air-handling unit components.

Table J5.5 DUCTWORK AND FITTINGS - MINIMUM INSULATION R-VALUE

Location of ductwork and fittings	***Climate zone* 1, 2, 3, 4, 5, 6 or 7**	***Climate zone* 8**
Within a *conditioned space*	1.2	1.6
Where exposed to direct sunlight	3.0	3.4
All other locations	2.0	2.4

J5.6 Ductwork sealing

Ductwork in an *air-conditioning* system, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254 Parts 1 and 2 for the static pressure in the system.

J5.7 Pump systems

(a) **General**— Pumps and pipework that form part of an *air-conditioning* system must either—

(i) separately comply with (b), (c) and (d); or

(ii) achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (b), (c) and (d) together.

(b) **Circulator pumps**— A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index less than or equal to 0.27 in accordance with European Union Commission Regulation No. 622/2012.

(c) **Other pumps—** Pumps with**—**

(i) a design operating flow of between 6 m^3/hour (1.7 L/s) to 400 m^3/hour (111 L/s); and

(ii) a design operating head of between 5 m (49 kPa) and 175 m (1,716 kPa); and

(iii) a 2 or 4 pole motor;

must have an efficiency at the design operating point equal to or greater than the minimum pump efficiency, calculated in accordance with the following formula:

$$\eta_{min} = a \times Q_{duty} + b \times ln(Q_{duty}) + c \times H_{duty} + d \times Q_{duty}^2 + e$$

where—
η_{min} = the minimum required pump efficiency at design duty
Q_{duty} = the design operating flow of the pump (m^3/h); and
H_{duty} = the design operating head of the pump (m); and
a, b, c, d and e = regression coefficients, obtained from **Table J5.7a**.

Table J5.7a PUMP REGRESSION COEFFICIENTS

Regression coefficient	**2 pole motor**	**4 pole motor**
A	-6.49×10^{-4}	-4.52×10^{-4}
B	1.69×10^{-1}	1.51×10^{-1}
C	-2.21×10^{-3}	-1.08×10^{-2}
D	1.46×10^{-6}	9.65×10^{-5}
E	1.48×10^{-1}	2.97×10^{-1}

(d) **Pipework—** Straight segments of pipework, forming part of an *air-conditioning* system—

(i) in pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve a pressure drop of not more than—

(A) for constant speed systems, the values nominated in **Table J5.7b**; or

(B) for variable speed systems, the values nominated in **Table J5.7c**; or

(ii) in any other pipework system must achieve a pressure drop of not more than—

(A) for constant speed systems, the values nominated in **Table J5.7d**; or

(B) for variable speed systems, the values nominated in **Table J5.7e**.

(iii) the requirements of **(i)** and **(ii)** do not apply to—

(A) valves and fittings; or

(B) pipework with a velocity of 0.7 m/s or less.

Table J5.7b MAXIMUM PIPEWORK PRESSURE DROP – NON-DISTRIBUTIVE CONSTANT SPEED SYSTEMS

Nominal Pipe Diameter	**Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)**	**Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)**
20mm or less	400	400
25mm	400	400
32mm	400	400
40mm	400	400
50mm	400	350
65mm	400	350
80mm	400	350
100mm	400	200
125mm	400	200

150mm or greater	400	200

Table J5.7c MAXIMUM PIPEWORK PRESSURE DROP – NON-DISTRIBUTIVE VARIABLE SPEED SYSTEMS

Nominal Pipe Diameter	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
20mm or less	400	400
25mm	400	400
32mm	400	400
40mm	400	400
50mm	400	400
65mm	400	400
80mm	400	400
100mm	400	300
125mm	400	300
150mm or greater	400	300

Table J5.7d MAXIMUM PIPEWORK PRESSURE DROP – DISTRIBUTIVE CONSTANT SPEED SYSTEMS

Nominal Pipe Diameter	Maximum pressure drop in systems operating 2000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating between 2000 hours/annum and 5000 hrs/yr (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
20mm or less	400	300	150
25mm	400	220	100
32mm	400	220	100
40mm	400	220	100
50mm	400	220	100
65mm	400	400	170
80mm	400	400	170
100mm	400	400	170
125mm	400	400	170
150mm or greater	400	400	170

Table J5.7e MAXIMUM PIPEWORK PRESSURE DROP – DISTRIBUTIVE VARIABLE SPEED SYSTEMS

Nominal Pipe Diameter	Maximum pressure drop in systems operating 5000 hours/annum or less (Pa/m)	Maximum pressure drop in systems operating more than 5000 hours/annum (Pa/m)
20mm or less	400	250
25mm	400	180
32mm	400	180
40mm	400	180
50mm	400	180
65mm	400	300
80mm	400	300
100mm	400	300
125mm	400	300
150mm or greater	400	300

J5.8 Pipework insulation

(a) *Piping*, vessels, heat exchangers and tanks containing heating or cooling fluid that are part of an *air-conditioning* system, other than in appliances covered by *MEPS*, must be provided with insulation—

(i) complying with AS/NZS 4859.1; and

(ii) for *piping* of heating and cooling fluids, having an *R-Value* in accordance with **Table J5.8a.**

(iii) for vessels, heat exchangers or tanks, having an *R-Value* in accordance with **Table J5.8b**; and

(iv) for refill or pressure relief *piping*, having an *R-Value* equal to the *required R-Value* of the connected pipe, vessel or tank within 500 mm of the connection.

(b) Insulation must—

(i) be protected against the effects of weather and sunlight; and

(ii) be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.

(c) Insulation provided to piping, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.

(d) The requirements of **(a)** and **(b)** do not apply to *piping*—

(i) located within the only or last room served by the system; or

(ii) encased within a concrete slab or panel which is part of a heating or cooling system; or

(iii) supplied as an integral part of a piece of plant; or

(iv) inside an air-handling unit, fan-coil unit, or the like.

(e) For the purposes of (a), (b), (c) and (d)—

(i) heating fluids include refrigerant, heated water, steam and condensate; and

(ii) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.

Table J5.8a PIPING— MINIMUM INSULATION R- VALUE

Fluid temperature range	**Minimum insulation *R-Value* - nominal pipe diameter between 15 mm and 40 mm**	**Minimum insulation *R-Value* - nominal pipe diameter between 41 mm and 80 mm**	**Minimum insulation *R-Value* - nominal pipe diameter between 81 mm and 150 mm**	**Minimum insulation *R-Value* - nominal pipe diameter greater than 150 mm**
Low temperature chilled - not more than 2°C	1.3	1.7	2.0	2.7
Chilled - more than 2°C but not more than 20°C	1.0	1.5	2.0	2.0
Heated - more than 30°C but not more than 85°C	2.7	2.7	2.7	2.7
High temperature heated - more than 85°C	2.7	2.7	2.7	2.7

Table J5.8b VESSELS, HEAT EXCHANGERS AND TANKS – MINIMUM INSULATION R-VALUE

Fluid temperature range	**Minimum insulation *R-Value***
Low temperature chilled - not more than 2°C	2.7
Chilled - more than 2°C but not more than 20°C	1.8
Heated - more than 30°C but not more than 85°C	3.0
High temperature heated - more than 85°C	3.0

J5.9 Space heating

(a) A heater used for *air-conditioning* or as part of an *air-conditioning* system must be—

(i) a solar heater; or

(ii) a gas heater; or

(iii) a heat pump heater; or

(iv) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or

(v) an electric heater if—

(A) the heating capacity is not more than—

(aa) 10 W/m^2 of the floor area of the conditioned space in *climate zone* 1; or

(bb) 40 W/m^2 of the floor area of the conditioned space in *climate zone* 2; or

(cc) the value specified in **Table J5.9** where reticulated gas is not available at the allotment boundary; or

(B) the annual energy consumption for heating is not more than 15 kWh/m^2 of the *floor area* of the *conditioned space* in *climate zones* 1, 2, 3, 4 and 5; or

(C) the in-duct heater complies with **J5.2(a)(i)(C)**; or

(vi) any combination of **(i)** to **(v)**.

(b) An electric heater may be used for heating a bathroom in a Class 2, 3 or Class 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer or is interlocked with the bathroom lighting.

(c) A fixed space heating appliance installed outdoors must be capable of automatically shutting down when either—

(i) there are no occupants in the space served; or

(ii) the space served has reached the design temperature.

(d) A gas water heater, that is used as part of an *air-conditioning* system, when tested in accordance with AS/NZS 5263.1.2, must—

(i) if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or

(ii) if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.

Table J5.9 MAXIMUM ELECTRIC HEATING CAPACITY

Floor area* of the *conditioned space	**W/m^2 of *floor area* in *climate zone* 3**	**W/m^2 of *floor area* in *climate zone* 4**	**W/m^2 of *floor area* in *climate zone* 5**	**W/m^2 of *floor area* in *climate zone* 6**	**W/m^2 of *floor area* in *climate zone* 7**
Not more than 500 m^2	50	60	55	65	70
More than 500 m^2	40	50	45	55	60

J5.10 Refrigerant chillers

An *air-conditioning* system refrigerant chiller must comply with the energy efficiency ratios in **Table J5.10a** or **Table J5.10b** when determined in accordance with AHRI 551/591.

Table J5.10a MINIMUM ENERGY EFFICIENCY RATIO FOR REFRIGERANT CHILLERS – OPTION 1

Chiller type	**Full load operation ($W_r/W_{input\ power}$)**	**Integrated part load ($W_r/W_{input\ power}$)**
Air-cooled chiller with a capacity not greater than 528 kWr	2.985	4.048
Air-cooled chiller with a capacity greater than 528 kWr	2.985	4.137
Water-cooled positive displacement chiller with a capacity not greater than 264 kWr	4.694	5.867
Water-cooled positive displacement chiller with a capacity greater than 264 kWr but not greater than 528 kWr	4.889	6.286
Water-cooled positive displacement chiller with a capacity greater than 528 kWr but not greater than 1055 kWr	5.334	6.519
Water-cooled positive displacement chiller with a capacity greater than 1,055 kWr but not greater than 2,110 kWr	5.771	6.770
Water-cooled positive displacement chiller with a capacity greater than 2,110 kWr	6.286	7.041
Water-cooled centrifugal chiller with a capacity not greater than 528 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity greater than 528 kWr but not greater than 1,055 kWr	5.771	6.401
Water-cooled centrifugal chiller with a capacity greater than 1,055 kWr but not greater than 1,407 kWr	6.286	6.770
Water-cooled centrifugal chiller with a capacity greater than 1,407 kWr	6.286	7.041

Table J5.10b MINIMUM ENERGY EFFICIENCY RATIO FOR REFRIGERANT CHILLERS – OPTION 2

Chiller type	**Full load operation ($W_r/W_{input\ power}$)**	**Integrated part load ($W_r/W_{input\ power}$)**
Air-cooled chiller with a capacity not greater than 528 kWr	2.866	4.669
Air-cooled chiller with a capacity greater than 528 kWr	2.866	4.758
Water-cooled positive displacement chiller with a capacity not greater than 264 kWr	4.513	7.041
Water-cooled positive displacement chiller with a capacity greater than 264 kWr but not greater than 528 kWr	4.694	7.184
Water-cooled positive displacement chiller with a capacity greater than 528 kWr but not greater than 1055 kWr	5.177	8.001
Water-cooled positive displacement chiller with a capacity greater than 1,055 kWr but not greater than 2,110 kWr	5.633	8.586
Water-cooled positive displacement chiller with a capacity greater than 2,110 kWr	6.018	9.264
Water-cooled centrifugal chiller with a capacity not greater than 528 kWr	5.065	8.001
Water-cooled centrifugal chiller with a capacity greater than 528 kWr but not greater than 1,055 kWr	5.544	8.801
Water-cooled centrifugal chiller with a capacity greater than 1,055 kWr but not greater than 1,407 kWr	5.917	9.027
Water-cooled centrifugal chiller with a capacity greater than 1,407 kWr	6.018	9.264

J5.11 Unitary air-conditioning equipment

Unitary *air-conditioning* equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must, for a capacity of—

(a) less than 65 kWr, have a minimum energy efficiency ratio complying with *MEPS*; or

(b) greater than or equal to 65 kWr—

(i) where water cooled, have a minimum energy efficiency ratio of 4.0 $W_r/W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1; or

(ii) where air cooled, have a minimum energy efficiency ratio of 2.9 $W_r/W_{input\ power}$ for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1.

J5.12 Heat rejection equipment

(a) The fan motor power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances set in **Table J5.12**.

(b) The fan in an air-cooled condenser must not use more than 42 W of *fan motor power* for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for—

(i) a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in **J5.10**; or

(ii) unitary *air-conditioning* equipment that complies with the energy efficiency ratios in **J5.11.**

Table J5.12 MAXIMUM *FAN MOTOR POWER* – COOLING TOWERS, CLOSED CIRCUIT COOLERS AND EVAPORATIVE CONDENSERS

Type	**Cooling tower maximum fan motor power (W/kW_{rej})**	**Closed circuit cooler maximum fan motor power (W/kW_{rej})**	**Evaporative condenser maximum fan motor power (W/kW_{rej})**
Induced draft	10.4	16.9	11.0
Forced draft	19.5	- Note	11.0

Note: A closed circuit, forced draft cooling tower must not be used.

~~SPECIFICATION J5.2a FANS~~

~~1. Scope~~

~~This Specification contains the requirements for fans used as part of an *air-conditioning* system or a mechanical ventilation system.~~

~~2. Application~~

~~(a) This Specification does not apply to—~~

~~(i) fans in unducted *air-conditioning* systems with a supply air capacity of less than 1000 L/s; or~~

~~(ii) the power for a fan in an energy reclaiming system that preconditions outside air; or~~

~~(iii) the power for process related components.~~

~~(b) Compliance with this Specification must not adversely affect—~~

~~(i) smoke hazard management measures *required* by **Part E2**; and~~

~~(ii) ventilation *required* by **Part E3** and **Part F4**.~~

~~3. Air-conditioning system fans~~

~~(a) An air-conditioning system must be designed so that the fan motor power of—~~

~~(i) the supply and return air fans as a combined total is in accordance with **Table 3a**; and~~

~~(ii) the fan in a cooling tower, closed circuit cooler or an evaporative condenser is in accordance with **Table 3b**; and~~

~~(iii) the fan in an air-cooled condenser does not use more than 42 W of *fan motor power* for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460.~~

~~(b) The requirements of (a)(iii) do not apply to the fan of an air-cooled condenser that is part of—~~

~~(i) a refrigerant chiller in an *air-conditioning* system that complies with the energy efficiency ratios in **Specification J5.2e**; or~~

~~(ii) packaged *air-conditioning* equipment that complies with the energy efficiency ratios in **Specification J5.2e**.~~

~~Table 3a MAXIMUM FAN MOTOR POWER – SUPPLY AND RETURN AIR FANS~~

~~***Air-conditioning* sensible heat load (W/m^2 of the *floor area* of the *conditioned space*)**~~	~~**Maximum *fan motor power* (W/m^2 of the *floor area* of the *conditioned space*)**~~	
	~~**For an *air-conditioning* system serving not more than 500 m^2**~~	~~**For an *air-conditioning* system serving more than 500 m^2**~~
~~Up to 100~~	~~5.3~~	~~8.3~~
~~101 to 150~~	~~9.5~~	~~13.5~~
~~151 to 200~~	~~13.7~~	~~18.3~~
~~201 to 300~~	~~22.2~~	~~28.0~~
~~301 to 400~~	~~30.7~~	~~37.0~~
~~More than 400~~	~~See Note~~	

~~**Note:** Where the *air-conditioning* sensible heat load is more than 400 W/m^2, the maximum *fan motor power* must be determined—~~

~~(a) in a building of not more than 500 m^2 *floor area*, using 0.09 W of *fan motor power* for each Watt of *air-conditioning* sensible heat load; and~~

~~*(b)* in a building of more than 500 m^2 *floor area*, using 0.12 W of *fan motor power* for each Watt of *air-conditioning* sensible heat load.~~

~~**Table 3b MAXIMUM FAN MOTOR POWER – COOLING TOWER, CLOSED CIRCUIT COOLER AND EVAPORATIVE CONDENSERS**~~

~~**Type of fan**~~	~~**Maximum *fan motor power* per L/s of cooling fluid circulated**~~		~~**Maximum *fan motor power* per kW of heat rejected**~~
	~~**Cooling tower**~~	~~**Closed circuit cooler**~~	~~**Evaporative condenser**~~
~~Propeller or axial~~	~~310 W~~	~~500 W~~	~~18 W~~
~~Centrifugal~~	~~590 W~~	~~670 W~~	~~22 W~~

~~**Note:** The cooling fluid circulated may be refrigerant, chilled water, brines or glycol mixtures.~~

~~4. Mechanical ventilation system fans~~

~~(a) When the air flow rate of a mechanical ventilation system is more than 1000 L/s, the system must—~~

~~(i) have a *fan motor power* to air flow rate ratio in accordance with—~~

~~(A) for general mechanical ventilation systems, **Table 4a**; or~~

~~(B) for *carpark* mechanical ventilation systems, **Table 4b**; and~~

~~(ii) for *carpark* exhaust, when serving a *carpark* with more than 40 vehicle spaces, have an atmospheric contaminant monitoring system in accordance with AS 1668.2.~~

~~(b) The requirements of (a) do not apply to—~~

~~(i) a mechanical ventilation system that is part of an *air-conditioning* system; or~~

~~(ii) the power for a miscellaneous exhaust system complying with **J5.4**; or~~

~~(iii) a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building.~~

~~Table 4a MAXIMUM FAN MOTOR POWER TO AIR FLOW RATE RATIO – GENERAL MECHANICAL VENTILATION SYSTEMS~~

~~Filtration~~	**~~Maximum *fan motor power* to air flow rate ratio (W/(L/s))~~**
~~With filters~~	~~0.98~~
~~Without filters~~	~~0.65~~

~~Table 4b MAXIMUM FAN MOTOR POWER TO AIR FLOW RATE RATIO – CARPARK MECHANICAL VENTILATION SYSTEMS~~

~~Filtration~~	**~~Maximum *fan motor power* to air flow rate ratio (W/(L/s))~~**		
	~~Air flow rate (L/s)~~		
	~~1,000 to less than 5,000~~	**~~5,000 to 50,000~~**	**~~More than 50,000~~**
~~With filters~~	~~0.78~~	~~1.12~~	~~1.81~~
~~Without filters~~	~~0.52~~	~~0.74~~	~~1.2~~

~~SPECIFICATION J5.2b DUCTWORK INSULATION AND SEALING~~

~~1. Scope~~

~~(c) This Specification contains the requirements for the sealing and insulating of supply and return ductwork and fittings used in an *air-conditioning* system.~~

~~(d) For the purposes of this Specification, fittings—~~

~~(i) include passive components of a ductwork system; and~~

~~(ii) exclude active components such as air-handling unit components.~~

~~2. Sealing of ductwork~~

~~(a) Ductwork in an air-conditioning system must be sealed against air loss in accordance with the duct sealing requirements of AS 4254 Parts 1 and 2 for the static pressure in the system.~~

~~(b) The requirements of (a) do not—~~

~~(i) apply to ductwork located within the only or last room served by the system; and~~

~~(ii) include the air leakage testing requirements of clause 2.2.4 of AS 4254.2.~~

~~3. Insulation of ductwork and fittings~~

~~(a) Ductwork and fittings in an *air-conditioning* system must be provided with insulation—~~

~~(i) complying with AS/NZS 4859.1; and~~

~~(ii) having a material *R-Value* not less than—~~

~~(A) that specified in **c 3**; or~~

~~(B) 1.0, for flexible ductwork with a length to an outlet or from an inlet of not more than 3 m.~~

~~(b) Insulation must—~~

~~(i) be protected against the effects of weather and sunlight; and~~

~~(ii) be installed so that it—~~

~~(A) abuts adjoining insulation to form a continuous barrier; and~~

~~(B) maintains its position and thickness, other than at flanges and supports; and~~

~~(iii) when conveying cooled air—~~

~~(A) be protected by a vapour barrier on the outside of the insulation; and~~

~~(B) where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—~~

~~(aa) overlap by 50 mm; and~~

~~(bb) are bonded or taped together.~~

~~(c) The requirements of **(a)** do not apply to—~~

~~(i) ductwork and fittings located within the only or last room served by the system; or~~

~~(ii) fittings that form part of the interface with the *conditioned space*; or~~

~~(iii) return air ductwork in, or passing through, a *conditioned space*; or~~

~~(iv) ductwork for outside air and exhaust air associated with an *air-conditioning* system; or~~

~~(v) the floor of an in-situ air-handling unit; or~~

~~(vi) packaged *air-conditioning* equipment complying with MEPS; or~~

~~(vii) flexible fan connections.~~

~~**Table 3 DUCTWORK AND FITTINGS - MINIMUM MATERIAL R-VALUE**~~

~~**Location of ductwork and fittings**~~	~~***Climate zone***~~	
	~~**1, 2, 3, 4, 5, 6 and 7**~~	~~**8**~~
~~Within a *conditioned space*~~	~~1.2~~	~~1.6~~
~~Where exposed to direct sunlight~~	~~3.0~~	~~3.4~~
~~All other locations~~	~~2.0~~	~~2.4~~

~~Specification J5.2c — PIPING, VESSEL, HEAT EXCHANGER AND TANK INSULATION~~

~~1. Scope~~

~~(a) This Specification contains the requirements for the insulating of *piping*, vessels, heat exchangers and tanks containing heating fluids or cooling fluids used in an *air-conditioning* system.~~

~~(b) For the purposes of this Specification—~~

~~(i) heating fluids include heated water, steam and condensate; and~~

~~(ii) cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.~~

~~2. Insulation~~

~~(a) *Piping*, vessels, heat exchangers and tanks must be provided with insulation—~~

~~(i) complying with AS/NZS 4859.1; and~~

~~(ii) for heated or chilled water *piping*, having a material *R-Value* not less than that specified in **Table 2a**; and~~

~~(iii) for refrigerant, steam or condensate *piping*, having a material *R-Value* not less than that specified in **Table 2b**; and~~

~~(iv) for vessels, heat exchangers or tanks, having a material *R-Value* not less than that specified in **Table 2c**.~~

~~(b) Insulation must—~~

~~(i) be protected against the effects of weather and sunlight; and~~

~~(ii) be able to withstand the temperatures within the *piping*, vessel, heat exchanger or tank.~~

~~(c) Insulation provided to *piping*, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.~~

~~(d) The requirements of **(a)** and **(b)** do not apply to *piping*—~~

~~(i) located within the only or last room served by the system; or~~

~~(ii) encased within a concrete slab or panel which is part of a heating or cooling system; or~~

~~(iii) supplied as an integral part of a piece of plant; or~~

~~(iv) inside an air-handling unit, fan-coil unit or the like.~~

~~Table 2a WATER PIPING - MINIMUM MATERIAL R-VALUE~~

~~**Type of water *piping***~~	~~**Minimum material *R-Value***~~

~~Heated water *piping* of all diameters~~	~~1.5~~
~~Chilled water *piping* with nominal diameters not more than 40 mm~~	~~1.0~~
~~Chilled water *piping* with nominal diameters more than 40 mm but not more than 80 mm~~	~~1.5~~
~~Chilled water *piping* with nominal diameters more than 80 mm~~	~~2.0~~

~~**Notes:**~~

1. ~~*Piping required* to be insulated includes all supply and return *piping*, chilled water supply *piping* within 500 mm of the connection to the *air-conditioning* system and pressure relief *piping* within 500 mm of the connection to the *air-conditioning* system.~~
2. ~~The *required* minimum material *R-Value* may be halved—~~
   - ~~(a) for *piping* with nominal diameters not more than 40 mm, for the last 750 mm adjoining items of plant; and~~
   - ~~(b) for *piping* penetrating a structural member; and~~
   - (c) ~~for supply and return chilled water *piping* located internally, if the chilled water supply temperature is more than 14ºC.~~

~~Table 2b REFRIGERANT, STEAM AND CONDENSATE PIPING— MINIMUM MATERIAL R- VALUE~~

~~**Temperature range**~~	~~**Nominal pipe size**~~				
	~~**15 mm to 40 mm**~~	~~**41 mm to 80 mm**~~	~~**81 mm to 125 mm**~~	~~**126 mm to 150 mm**~~	~~**151 mm to 200 mm**~~
~~Refrigerant not more than 2°C~~	~~1.3~~	~~1.7~~	~~2.0~~	~~2.0~~	~~2.7~~
~~Refrigerant more than 2°C but not more than 20°C~~	~~1.0~~	~~1.5~~	~~2.0~~	~~2.0~~	~~2.0~~
~~Steam and condensate not more than 120°C~~	~~1.0~~	~~1.0~~	~~1.3~~	~~1.3~~	~~1.3~~
~~Steam more than 120°C~~	~~1.5~~	~~1.5~~	~~1.5~~	~~1.8~~	~~2.1~~

~~Table 2c VESSELS, HEAT EXCHANGERS AND TANKS – MINIMUM MATERIAL R-VALUE~~

~~**Content of vessel, heat exchanger or tank**~~	~~**Minimum material *R-Value***~~
~~Refrigerant, brine or glycol that is not more than 2°C~~	~~2.7~~
~~Refrigerant or chilled water that is more than 2°C but not more than 20°C~~	~~1.8~~

~~Heated water~~	~~1.4~~
~~Steam~~	~~2.5~~

~~SPECIFICATION J5.2d SPACE HEATING~~

~~1. Scope~~

~~This Specification contains the requirements for heaters used for *air-conditioning* or as part of an *air-conditioning* system.~~

~~2. Heaters~~

~~(a) A heater used for *air-conditioning* must be—~~

~~(i) a solar heater; or~~

~~(ii) a gas heater; or~~

~~(iii) an oil heater, but only if reticulated gas is not available at the allotment boundary; or~~

~~(iv) a heat pump heater; or~~

~~(v) a solid-fuel burning heater; or~~

~~(vi) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or~~

~~(vii) an electric heater if—~~

~~(A) the heating capacity is not more than—~~

~~(aa) 10 W/m^2 of the floor area of the conditioned space in climate zone 1; or~~

~~(bb) 40 W/m^2 of the floor area of the conditioned space in climate zone 2; or~~

~~(cc) the value specified in **Table 2a** where reticulated gas is not available at the allotment boundary; or~~

~~(B) the annual energy consumption for heating is not more than 15 kWh/m^2 of the *floor area* of the *conditioned space* in *climate zones* 1 to 5; or~~

~~(C) the in-duct heater complies with **J5.2(a)(i)(B)(cc)**; or~~

~~(viii) any combination of **(i)** to **(vii)**.~~

~~(b) An electric heater may be used for heating a bathroom in a Class 3 building or Class 9c building if the heating capacity is not more than 1.2 kW.~~

~~(c) A fixed space heating appliance installed outdoors must be capable of automatic shutdown.~~

~~(d) A water heater, such as a boiler, that is used as part of an *air-conditioning* system must—~~

~~(i) achieve a thermal efficiency complying with **Table 2b** when tested in accordance with BS 7190; and~~

~~(ii) use reticulated gas where it is available at the allotment boundary.~~

~~**Table 2a MAXIMUM ELECTRIC HEATING CAPACITY**~~

~~***Floor area* of the *conditioned space***~~	~~***Climate zone***~~				
	~~**3**~~	~~**4**~~	~~**5**~~	~~**6**~~	~~**7**~~
	~~**W/m² of *floor area***~~				
~~Not more than 500 m²~~	~~50~~	~~60~~	~~55~~	~~65~~	~~70~~
~~More than 500 m²~~	~~40~~	~~50~~	~~45~~	~~55~~	~~60~~

~~**Table 2b MINIMUM THERMAL EFFICIENCY OF A WATER HEATER**~~

~~**Fuel type**~~	~~**Rated capacity ($kW_{heating}$)**~~	~~**Minimum gross thermal efficiency (%)**~~
~~Gas~~	~~Not more than 750~~	~~80~~
	~~More than 750~~	~~83~~
~~Oil~~	~~All capacities~~	~~80~~

~~SPECIFICATION J5.2e — ENERGY EFFICIENCY RATIOS~~

~~1. Scope~~

~~(a) This Specification contains the requirements for the energy efficiency ratios of—~~

~~(i) refrigerant chillers used as part of an *air-conditioning* system; and~~

~~(ii) packaged *air-conditioning* equipment.~~

~~2. Energy efficiency ratios~~

~~(a) An *air-conditioning* system refrigerant chiller with a capacity not more than 350 kWr must have an energy efficiency ratio complying with **Table 2a** when determined in accordance with AHRI 550/590.~~

~~Table 2a MINIMUM ENERGY EFFICIENCY RATIO FOR REFRIGERANT CHILLERS~~

~~Equipment~~	~~Minimum energy efficiency ratio ($W_r/W_{input\ power}$)~~	
	~~For full load operation~~	~~For integrated part load~~
~~Water cooled chiller~~	~~4.2~~	~~5.2~~
~~Air cooled or evaporatively cooled chiller~~	~~2.5~~	~~3.4~~

~~(b) Package *air-conditioning* equipment with a capacity of not less than 65 kWr, including a split unit and a heat pump, must have a minimum energy efficiency ratio when cooling complying with **Table 2b** when tested in accordance with AS/NZS 3823.1.2 at test condition T1.~~

~~Table 2b MINIMUM ENERGY EFFICIENCY RATIO FOR PACKAGED AIR-CONDITIONING EQUIPMENT~~

~~Equipment~~	~~Minimum energy efficiency ratio ($W_r/W_{input\ power}$)~~	
	~~65 kWr to 95 kWr capacity~~	~~More than 95 kWr capacity~~
~~Air-conditioner — cooling~~	~~2.70~~	~~2.80~~
~~Heat pump — cooling~~	~~2.60~~	~~2.70~~

PART J6 ARTIFICIAL LIGHTING AND POWER

J6.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement*~~s~~ **JP1** ~~and **JP3** are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

(iii) ~~**J2.1** to **J2.5**; and~~

(iii) **J3.1** to **J3.7**; and

(iv) **J5.1** to **J5.**~~**4**~~**12**; and

(v) **J6.1** to **J6.**~~**6**~~**8**; and

(vi) **J7.1** to **J7.4**; and

(vii) **J8.1** to **J8.3**.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J6.1 Application of Part

J6.2, **J6.3** and **J6.5(a)(ii)** do not apply to a Class 8 *electricity network substation*.

J6.2 Artificial lighting

(a) In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—

(i) the *lamp power density* or *illumination power density* of artificial lighting must not exceed the allowance of—

(A) 5 W/m^2 within a *sole-occupancy unit*; and

(B) 4 W/m^2 on a verandah, balcony or the like attached to a *sole-occupancy unit*; and

(ii) the *illumination power density* allowance in **(i)** may be increased by dividing it by the *illumination power density* adjustment factor for a control device in **Table J6.2b** as applicable; and

(iii) when designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and

(iv) halogen lamps must be separately switched from fluorescent lamps.

(b) In a building, other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building—

(i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum *illumination power density* in **Table J6.2a**; and

(ii) the aggregate design illumination power load in **(i)** is the sum of the design illumination power loads in each of the spaces served; and

(iii) in determining the design illumination power load for **(ii)** the following must be used:

(A) Where there are multiple lighting systems serving the same space—

(aa) the total illumination power load of all systems; or

(bb) for a control system that permits only one system to operate at a time, the design illumination power load is—

(AA) based on the highest illumination power load; or

(BB) determined by the formula—

[H x T/2 + P x (100 - T/2)] / 100

Where:

H = the highest illumination power load; and

T = the time for which the maximum illumination power load will occur, expressed as a percentage; and

P = the predominant illumination power load.

(B) Where there is adjustable position lighting such as trapeze lighting or track lighting, the lower of ~~other than trunking systems that accept fluorescent lamps~~—

(aa) the rating of the circuit breaker protecting the track or trapeze; or

(bb) ~~of extra low voltage~~ 80% of the power rating of the luminaire control gear. ~~transformer; or~~

~~(cc) of mains voltage, 100 W per metre of track.~~

(c) The requirements of **(a)** and **(b)** do not apply to the following:

(i) Emergency lighting in accordance with **Part E4**.

(ii) Signage, ~~and~~ display lighting within cabinets and display cases that are fixed in place.

(iii) Lighting for accommodation within the residential part of a *detention centre*.

(iv) A heater where the heater also emits light, such as in bathrooms.

(v) Lighting of a specialist process nature such as in a~~n~~ surgical operating theatre, fume cupboard or clean workstation.

(vi) Lighting of performances such as theatrical or sporting.

(vii) Lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.

(viii) Lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.

(d) For the purposes of **Table J6.2b**, the following control devices must comply with **Specification J6**:

(i) Lighting timer.

(ii) Motion detector.

(iii) Daylight sensor and dynamic lighting control device.

Table J6.2a MAXIMUM ILLUMINATION POWER DENSITY

Space	Maximum *illumination power density* (W/m^2)
Auditorium, church and public hall	~~10~~2.5
Board room and conference room	~~10~~4.5
Carpark - general	~~6~~2
Carpark - entry zone (first 15 m of travel) during daytime	~~25~~11.5
Carpark - entry zone (next 4 m of travel) during the day	2.5
Carpark - entry zone (first 20 m of travel) during nighttime	2.5
Common rooms, spaces and corridors in a Class 2 building	~~8~~2.5
Control room, switch room, and the like – intermittent monitoring	~~9~~3
Control room, switch room, and the like – constant monitoring	4.5
Corridors	~~8~~2.5
Courtroom	~~12~~4.5
Dormitory of a Class 3 building used for sleeping only	~~6~~1.5
Dormitory of a Class 3 building used for sleeping and study	~~9~~4.5
Entry lobby from outside the building	~~15~~6
Health-care – infant's and children's wards, emergency department and operating room	~~10~~3
Health-care - examination room	~~10~~4.5
Health-care - ~~patient ward~~ examination rooms in intensive care and high dependency wards	~~7~~6
Health-care - all other patient care areas including wards and corridors ~~where cyanosis lamps are used~~	~~13~~2.5
Kitchen and food preparation area	~~8~~4
Laboratory - artificially lit to an ambient level of 400 lx or more	~~12~~6
Library - stack and shelving area	~~12~~2.5
Library - reading room and general areas	~~10~~4.5
Lounge area for communal use in a Class 3 or 9c building	~~10~~3

Space	Maximum *illumination power density* (W/m^2)
Museum and gallery - circulation, cleaning and service lighting	~~8~~2.5
Office - artificially lit to an ambient level of 200 lx or more	~~9~~4.5
Office - artificially lit to an ambient level of less than 200 lx	~~7~~2.5
Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms	~~5~~4
Plant rooms with a horizontal illuminance target of 80 lx	2
Restaurant, café, bar, hotel lounge and a space for the serving and consumption of food or drinks	~~18~~6
Retail space including a museum and gallery whose purpose is the sale of objects	~~22~~16
School - general purpose learning areas and tutorial rooms	~~8~~4.5
Sole-occupancy unit of a Class 3 or 9c building	~~5~~2.5
~~*Sole-occupancy unit* of a Class 9c building~~	~~7~~
Storage ~~with shelving no higher than 75% of the height of the aisle lighting~~	~~8~~1.5
~~Storage with shelving higher than 75% of the height of the aisle lighting~~	~~10~~
Service area, cleaner's room and the like	~~5~~1.5
Toilet, locker room, staff room, rest room and the like	~~6~~2
Wholesale storage ~~and display~~ area with a vertical illuminance target of 160 lx	~~10~~4
Stairways, including *fire-isolated stairways*	2
Lift cars	3

~~**Notes:**~~

1. ~~In areas not listed above, the maximum *illumination power density* is—~~
   - ~~(a) for an illuminance of not more than 80 lx, 7.5 W/m^2; and~~
   - ~~(b) for an illuminance of more than 80 lx and not more than 160 lx, 9 W/m^2; and~~
   - ~~(c) for an illuminance of more than 160 lx and not more than 240 lx, 10 W/m^2; and~~
   - ~~(d) for an illuminance of more than 240 lx and not more than 320 lx, 11 W/m^2; and~~
   - ~~(e) for an illuminance of more than 320 lx and not more than 400 lx, 12 W/m^2; and~~
   - ~~(f) for an illuminance of more than 400 lx and not more than 480 lx, 13 W/m^2; and~~
   - ~~(g) for an illuminance of more than 480 lx and not more than 540 lx, 14 W/m^2; and~~
   - ~~(h) for an illuminance of more than 540 lx and not more than 620 lx, 15 W/m^2.~~

   ~~For illuminance levels greater than 620 lx, the average *light source efficacy* must not be less than 80 Lumens/W.~~

Space	Maximum *illumination power density* (W/m²)
2. ~~For enclosed spaces with a Room Aspect Ratio of less than 1.5, the maximum *illumination power density* may be increased by dividing it by an adjustment factor for room aspect which is:~~ ~~0.5 + (Room Aspect Ratio/3)~~ ~~The Room Aspect Ratio of the enclosed space is determined by the formula:~~ ~~A/(H x C)~~ ~~Where:~~ ~~A is the area of the enclosed space~~ ~~H is the height of the space measured from the floor to the highest part of the~~ ~~ceiling C is the perimeter of the enclosed space at floor level~~ 3. ~~In addition to 3, the maximum *illumination power density* may be increased by dividing it by the *illumination power density* adjustment factor in **Table J6.2b** where applicable and where the control device is not installed to comply with **J6.3**.~~ 4. ~~Circulation spaces are included in the allowances listed in the Table.~~	

Notes:

1. In areas not listed above, the maximum *illumination power density* is—
   (a) for an illuminance of not more than 40 lx, 1 W/m^2; and
   (b) for an illuminance of more than 40 lx and not more than 80 lx, 1.5 W/m^2; and
   (c) for an illuminance of more than 80 lx and not more than 160 lx, 2.5 W/m^2; and
   (d) for an illuminance of more than 160 lx and not more than 240 lx, 3 W/m^2; and
   (e) for an illuminance of more than 240 lx and not more than 320 lx, 4.5 W/m^2; and
   (f) for an illuminance of more than 320 lx and not more than 400 lx, 6 W/m^2; and
   (g) for an illuminance of more than 400 lx and not more than 600 lx, 10 W/m^2; and
   (h) for an illuminance of more than 600 lx and not more than 800 lx, 11.5 W/m^2.
2. For enclosed spaces with a Room Aspect Ratio of less than 1.5, the maximum *illumination power density* may be increased by dividing it by an adjustment factor for room aspect which is—

   0.5 + (Room Aspect Ratio/3)

   The Room Aspect Ratio of the enclosed space is determined by the formula:

   A/(H x C),

   where—

   (a) A is the area of the enclosed space; and

(b) H is the height of the space measured from the floor to the highest

(c) part of the ceiling; and

C is the perimeter of the enclosed space at floor level.

3. In addition to 2, the maximum *illumination power density* may be increased–
   (a) by dividing it by the *illumination power density* adjustment factor in **Table J6.2b**; and
   (b) by multiplying it by the *illumination power density* adjustment factor in **Table J6.2c**;

   where applicable and where the control device is not installed to comply with **J6.3**.
4. Circulation spaces are included in the allowances listed in the Table.

~~**Table J6.2b ILLUMINATION POWER DENSITY ADJUSTMENT FACTOR FOR A CONTROL DEVICE**~~

~~**Item**~~ ~~Note 1~~	~~**Description**~~	~~***Illumination power density* adjustment factor**~~
~~Lighting timer~~	~~For corridor lighting~~	~~0.7~~
~~Motion detector~~	~~(a) Where~~ ~~(i) at least 75% of the area of a space is controlled by one or more motion detectors; or~~ ~~(ii) an area of less than 200 m2 is switched as a block by one or more detectors.~~	~~0.9~~
~~Motion detector~~	~~Where up to 6 lights are switched as a block by one or more detectors.~~	~~0.7~~
~~Motion detector~~	~~Where up to 2 lights are switched as a block by one or more detectors.~~	~~0.55~~
~~Manual dimming system~~ ~~Note 1~~	~~(a) Where at least 75% of the area of a space, in other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, is controlled by manually operated dimmers.~~	~~0.95~~
	~~(b) Where at least 75% of the area of a space, in a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, is controlled by manually operated dimmers.~~	~~0.85~~
~~Programmable dimming system~~ ~~Note 2~~	~~Where at least 75% of the area of a space is controlled by programmable dimmers.~~	~~0.85~~

~~**Item**~~ ~~Note 1~~	~~**Description**~~	~~***Illumination power density* adjustment factor**~~
~~Dynamic dimming system~~ ~~Note 3~~	~~Automatic compensation for lumen depreciation.~~	~~The design lumen depreciation factor of not less than—~~ ~~(i) For fluorescent lights, 0.9; or~~ ~~(ii) for high pressure discharge lights, 0.8.~~
~~Fixed dimming~~ ~~Note 4~~	~~Where at least 75% of the area is controlled by fixed dimmers that reduce the overall lighting level and the power consumption of the lighting.~~	~~% of full power to which the dimmer is set divided by 0.95~~
~~Daylight sensor and dynamic lighting control device – dimmed or stepped switching of lights adjacent *windows*~~	~~(a) Lights within the space adjacent to *windows* other than *roof lights* for a distance from the *window* equal to the depth of the floor to window head height~~	~~0.5~~ ~~Note 5~~
	~~(b) Lights within the space adjacent to *roof lights*.~~	~~0.6~~ ~~Note 5~~

~~Item~~ ~~Note 1~~	~~Description~~	~~*Illumination power density* adjustment factor~~

~~**Notes:**~~

1. ~~Manual dimming is where lights are controlled by a knob, slider or other mechanism or where there are pre-selected scenes that are manually selected.~~
2. ~~Programmed dimming is where pre-selected scenes or levels are automatically selected by the time of day, photoelectric cell or occupancy sensor.~~
3. ~~Dynamic dimming is where the lighting level is varied automatically by a photoelectric cell to either proportionally compensate for the availability of daylight or the lumen depreciation of the lamps.~~
4. ~~Fixed dimming is where lights are controlled to a level and that level cannot be adjusted by the user.~~
5. ~~The *illumination power density* adjustment factor is only applied to lights controlled by that item. This adjustment factor does not apply to tungsten halogen or other incandescent sources.~~
6. ~~A maximum of two other *illumination power density* adjustment factors for a control device can be applied to an area. Where more than one *illumination power density* adjustment factor (other than for room aspect) apply to an area, they are to be combined using the following formula:~~

   ~~A x (B + [(1 - B) / 2])~~

   ~~Where:~~

   ~~A is the lowest applicable *illumination power density* adjustment factor; and~~

   ~~B is the second lowest applicable *illumination power density* adjustment factor.~~

Table J6.2b ILLUMINATION POWER DENSITY ADJUSTMENT FACTOR FOR A CONTROL DEVICE

Item Note 1	**Description**	***Illumination power density* adjustment factor**
Motion detector	In a toilet or change room, other than a public toilet, in a Class 6 building.	0.4
Motion detector	Serving a *carpark* entry zone.	0.4

Item Note 1	Description	*Illumination power density* adjustment factor
Motion detector	Where a group of light fittings serving less than 100 m^2 is controlled by one or more detectors.	0.6
Motion detector	Where a group of light fittings serving 100 m^2 or more is controlled by one or more detectors.	0.7
Programmable dimming system Note 2	Where at least 75% of the area of a space is controlled by programmable dimmers.	0.85
Fixed dimming	All fittings with fixed dimming.	(a) 0.5; or (b) 0.2+0.8L where L = the illuminance turndown for the fixed dimming.
Lumen depreciation dimming	All fittings with lumen depreciation dimming.	0.85
Two stage sensor-equipped lights with minimum power of 30% of peak power or less	Fire stairs and other spaces not used for regular transit.	0.4
Two stage sensor-equipped lights with minimum power of 30% of peak power or less	Transitory spaces in regular use or in a *carpark*	0.7
Daylight sensor and dynamic lighting control device – dimmed or stepped switching of lights adjacent *windows*	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height.	0.5 Note 2
Daylight sensor and dynamic lighting control device – dimmed or stepped switching of lights adjacent *windows*	Serving a Class 3 or 9c building, or a Class 9a *ward area*, where the lights are adjacent *windows*, other than *roof lights*, for a distance from the *window* equal to the depth of the floor to *window* head height.	0.75 Note 2
Daylight sensor and dynamic lighting	In a Class 5, 6, 7, 8 or 9b building or a Class 9a building, other than a *ward area*,	0.6 Note 2

Item [Note 1]	Description	*Illumination power density* adjustment factor
control device – dimmed or stepped switching of lights adjacent *windows*	where the lights are adjacent *roof lights.*	
Daylight sensor and dynamic lighting control device – dimmed or stepped switching of lights adjacent *windows*	In a Class 3 or 9c building, or a Class 9a *ward area,* where the lights are adjacent *roof lights.*	0.8 [Note 2]

Notes

1. A maximum of two *illumination power density* adjustment factors for a control device can be applied to an area between 8:00 am and 7:00 pm. Where more than one *illumination power density* adjustment factor (other than for room aspect) apply to an area, they are to be combined using the following formula:

   A x (B + [(1 - B) / 2]),

   where—

   (a) A is the lowest applicable *illumination power density* adjustment factor; and

   (b) B is the second lowest applicable *illumination power density* adjustment factor.

2. The *illumination power density* adjustment factor is only applied to lights controlled by that item between 8:00 am and 7:00 pm. This adjustment factor does not apply to tungsten, halogen or other incandescent sources.

Table J6.2c ILLUMINATION POWER DENSITY ADJUSTMENT FACTOR FOR LIGHT COLOUR

Light source	Description	*Illumination power density* adjustment factor
CRI greater than 90 [Note 1]	Where lighting with good colour rendering is required, such as for clinical observations or to comply with *Green Star.*	1.1
CCT below 3,000 K	Where lighting with a warm appearance is required, such as to comply with *Green Star.*	1.2
CCT above 5,300 K	Where lighting with a cool appearance is used.	0.9

Note

1. Includes luminaires that can adjust their CRI to greater than 90.

J6.3 Interior artificial lighting and power control

(a) All ~~A~~artificial lighting of a room or space must be individually operated by—

(i) a switch; or

(ii) other control device; or

(iii) a combination of **(i)** and **(ii)**.

(b) An occupant activated device, such as a room security device, a motion detector in accordance with **Specification J6**, or the like, must be provided in the *sole-occupancy unit* of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the *sole-occupancy unit* is unoccupied.

(c) An artificial lighting switch or other control device in **(a)** must—

(i) if an artificial lighting switch, be located in a visible and easily accessed position—

(A) in the room or space being switched; or

(B) in an adjacent room or space from where 90% of the lighting being switched is visible; and

(ii) for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse—

(A) not operate lighting for an area of more than 250 m^2 if in a Class 5 building or a Class 8 laboratory; or

(B) not operate lighting for an area of more than—

(aa) 250 m^2 for a space of not more than 2000 m^2; or

(bb) 1000 m^2 for a space of more than 2000 m^2,

if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.

(d) 95% of the light fittings in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part of a building, of more than 250 m^2 must be controlled by—

(i) a time switch in accordance with **Specification J6**; or

(ii) an occupant sensing device such as—

(A) a security key card reader that registers a person entering and leaving the building; or

(B) a motion detector in accordance with **Specification J6**.

(e) In a Class 5, 6 or 8 building of more than 250 m^2, artificial lighting in a natural lighting zone adjacent to *windows* must be separately controlled from artificial lighting not in a natural lighting zone in the same *storey* except where—

(i) the room containing the natural lighting zone is less than 20 m^2; or

(ii) the room's natural lighting zone contains less than 4 luminaires; or

(iii) 70% or more of the luminaires in the room are in the natural lighting zone.

(f) Artificial lighting in a *fire-isolated stairway*, *fire-isolated passageway* or *fire-isolated ramp*, must be controlled by a motion detector in accordance with **Specification J6**.

(g) Artificial lighting in a foyer, corridor and other circulation spaces—

(i) of more than 250 W within a single zone; and

(ii) adjacent to *windows*,

must be controlled by a daylight sensor and dynamic lighting control device in accordance with **Specification J6**.

(h) Artificial lighting in the first 19 m of travel in a *carpark* entry zone must be controlled by a motion sensor in accordance with **Specification J6**.

(i) The requirements of **(a)**, **(b)**, **(c)**, **(d)**, ~~and~~ **(e)**, **(f)**, **(g)** and **(h)** do not apply to the following:

(i) Emergency lighting in accordance with **Part E4**.

(ii) Where artificial lighting is needed for 24 hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a *detention centre*.

(j) The requirements of **(d)** do not apply to the following:

(i) Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation, such as—

(A) in a *patient care area* in a Class 9a building or in a Class 9c building; or

(B) a plant room or lift motor room; or

(C) a workshop where power tools are used.

(ii) A heater where the heater also emits light, such as in bathrooms.

J6.4 Interior decorative and display lighting

(a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled—

(i) separately from other artificial lighting; and

(ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and

(iii) by a time switch in accordance with **Specification J6** where the display lighting exceeds 1 kW.

(b) Window display lighting must be controlled separately from other display lighting.

J6.5 Exterior ~~A~~artificial lighting ~~around the perimeter of a building~~

(a) Exterior ~~A~~artificial lighting ~~around the perimeter of~~ attached to or directed at the *façade* of a building, must—

(i) be controlled by—

(A) a daylight sensor; or

(B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and

(ii) when the total ~~perimeter~~ lighting load exceeds 100 W—

(A) ~~have an average *light source efficacy* of not less than 60 Lumens/W~~ use LED luminaires for 90% of the total lighting load; or

(B) be controlled by a motion detector in accordance with **Specification J6**; and

(iii) when used for decorative purposes, such as facade lighting or signage lighting, have a separate time switch in accordance with **Specification J6**.

(b) The requirements of **(a)(ii)** do not apply to the following:

(i) Emergency lighting in accordance with **Part E4**.

(ii) Lighting around a *detention centre*.

J6.6 Boiling water and chilled water storage units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with **Specification J6**.

J6.7 Lifts

Lifts must—

(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and

(b) achieve the idle and standby energy performance level in **Table 6.7a**; and

(c) achieve—

(i) the energy efficiency class in **Table 6.7b**, or

(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.

Table 6.7a LIFT IDLE AND STANDBY ENERGY PERFORMANCE LEVEL

Rated load	Idle and standby[Note 1] energy performance level in accordance with ISO 25745-2
Less than or equal to 800 kg	2
801 kg to less than or equal to 2000 kg	3
2001 kg to less than or equal to 4000 kg	4
Greater than 4000 kg	5

Note:

1. Applies to the standby power used after 30 minutes.

Table 6.7b LIFT ENERGY EFFICIENCY CLASS

Usage category in accordance with ISO 25745-2	Energy efficiency class in accordance with ISO 25745-2
1 to 4	C
Greater than 5	D

J6.8 Escalators and moving walkways

Escalators and moving walkways must slow to between 0.2 m/s and 0.05 m/s when unused for 15 minutes.

Specification J6 Lighting and Power Control Devices

1. Scope

This Specification contains the requirements for lighting and power control devices including timers, time switches, motion detectors and daylight control devices.

2. Lighting timers

A lighting timer must—

(a) be located within 2 m of every entry door to the space; and

(b) have an indicator light that is illuminated when the artificial lighting is off; and

(c) not control more than—

(i) an area of 100 m^2 with a single push button timer; and

(ii) 95% of the lights in spaces of area more than 25 m^2; and

(d) be capable of maintaining the artificial lighting—

(i) for not less than 5 minutes ~~and not more than 15 minutes unless it is reset~~; and

(ii) ~~without interruption~~ not more than 12 hours if the timer is reset.

3. Time switch

(a) A time switch must be—

(i) capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days; and

(ii) configured so that the lights are switched off at any time the space is designated to be unoccupied.

(b) A time switch for internal lighting must be capable of being overridden by—

(i) a means of turning the lights on, either by—

(A) a manual switch, remote control or an occupant sensing device that on sensing a person's presence, overrides the time switch for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control; or

(B) an occupant sensing device that overrides the time switch upon a person's entry and returns control to the time switch upon the person's exiting, such as a security card reader or remote control; and

(ii) a manual "off" switch.

(c) A time switch for external lighting must be ~~capable of~~—

(i) configured to limit~~ing~~ the period the system is switched on to between 30 minutes before sunset and 30 minutes after sunrise is determined or detected including any pre- programmed period between these times; and

(ii) capable of being overridden by a manual switch, remote control or security access system for a period of up to ~~30 minutes~~ 8 hours, after which the time switch must resume control.

(d) A time switch for boiling water and chilled water storage units must be capable of being overridden by a manual switch or a security access system that senses a person's presence, overrides for a period of up to 2 hours, after which if there is no further presence detected, the time switch must resume control.

4. Motion detectors

(a) In a Class 2, 3 or 9c *aged care building* other than within a *sole-occupancy unit*, a motion detector must—

(i) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and

(ii) be capable of detecting a person before they are 1 m into the space; and

(iii) other than within a *sole-occupancy unit* of a Class 3 building, not control more than—

(A) an area of 100 m^2; and

(B) 95% of the lights in spaces of area more than 25 m^2; and

(iv) be configured so that the lights are turned off when the space is unoccupied for more than 15 minutes; and ~~be capable of maintaining the artificial lighting when activated—~~

~~(C) for not less than 5 minutes and not more than 15 minutes unless it is reset; and~~

~~(D) without interruption if the motion detector is reset by movement.~~

(v) be capable of being overridden by a manual switch only enabling the lights to be turned off.

(b) In a Class 5, 6, 7, 8, 9a or 9b building, a motion detector must—

(i) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and

(ii) be capable of detecting—

(A) a person before they have entered 1 m into the space; and

(B) movement of 500 mm within the useable part of the space; and

(iii) not control more than—

(A) in other than a *carpark*, an area of 500 m^2 with a single sensor or group of parallel sensors; and

(B) 75% of the lights in spaces using high intensity discharge; and

(iv) be configured so that the lights are turned off when the space is unoccupied for more than 15 minutes ~~be capable of maintaining the artificial lighting when activated—~~

~~(C) for a maximum of 30 minutes unless it is reset; and~~

~~without interruption if the motion detector is reset by movement~~; and

(v) ~~not~~ be capable of being overridden by a manual switch that only enables the lights to be turned off ~~to permanently leave the lights on~~.

(c) When outside a building, a motion detector must—

(i) be capable of sensing movement such as by infra-red, ultrasonic or microwave detection or by a combination of these means; and

(ii) be capable of detecting a person within a distance from the light equal to—

(A) twice the mounting height; or

(B) 80% of the ground area covered by the light's beam; and

(iii) not control more than five lights; and

(iv) be operated in series with a photoelectric cell or astronomical time switch so that the light will not operate in daylight hours; and

(v) be configured so that the lights are turned off when the area is unoccupied for up to 15 minutes ~~be capable of maintaining the artificial lighting when the switch is on for a maximum of 10 minutes unless it is reset~~; and

(vi) have a manual override switch which is reset after a maximum period of 4 hours.

5. Daylight sensor and dynamic lighting control device

(a) A daylight sensor and dynamic control device for artificial lighting must—

(i) for switching on and off—

(A) be capable of having the switching level set point adjusted between 50 and 1000 Lux; and

(B) have—

(aa) a delay of more than 2 minutes; and

(bb) a differential of more than 100 Lux for a sensor controlling high pressure discharge lighting, and 50 Lux for a sensor controlling other than high pressure discharge lighting; and

(ii) for dimmed or stepped switching, be capable of reducing the power consumed by the controlled lighting in proportion to the incident daylight on the working plane either—

(A) continuously down to a power consumption that is less than 50% of full power; or

(B) in no less than 4 steps down to a power consumption that is less than 50% of full power.

(b) Where a daylight sensor and dynamic control device has a manual override switch, the manual override switch must not be able to switch the lights permanently on or bypass the lighting controls.

PART J7 HEATED WATER SUPPLY AND SWIMMING POOL AND SPA POOL PLANT

J7.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement~~s~~* **JP1** ~~and **JP3** are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

(iii) ~~**J2.1** to **J2.5**; and~~

(iii) **J3.1** to **J3.7**; and

(iv) **J5.1** to **J5.~~4~~12**; and

(v) **J6.1** to **J6.~~6~~8**; and

(vi) **J7.1** to **J7.4**; and

(vii) **J8.1** to **J8.3**.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J7.1 * * * * *

This clause has deliberately been left blank.

J7.2 Heated water supply

A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

J7.3 Swimming pool heating and pumping

(a) Heating for a *swimming pool* must be by—

(i) a solar heater ~~not boosted by electric resistance heating~~; or

(ii) a heater ~~using reclaimed energy; or~~ using reclaimed heat from another process such as reject heat from a refrigeration plant; or

(iii) a geothermal heater; or

(iv) a gas heater that—

(A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or

(B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or

(v) a heat pump; or

(vi) a combination of **(i)** to **(~~i~~v)**.

(b) Where some or all of the heating *required* by **(a)** is by a gas heater or a heat pump, the *swimming pool* must have—

(i) a cover with a minimum *R-Value* of 0.50 ~~unless located in a conditioned space~~; and

(ii) a time switch ~~in accordance with **Specification J6**~~ to control the operation of the heater.

(c) A time switch must be provided ~~in accordance with **Specification J6**~~ to control the operation of a circulation pump for a *swimming pool*.

(d) For the purpose of **J7.3**, a *swimming pool* does not include a spa pool.

(e) Where *required*, a time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

(f) Pipework carrying heated water for a *swimming pool* must comply with the insulation requirements of **J5.8.**

J7.4 Spa pool heating and pumping

(a) Heating for a spa pool that shares a water recirculation system with a *swimming pool* must be by—

(i) a solar heater; or

(ii) a heater ~~using reclaimed energy; or~~ using reclaimed heat from another process such as reject heat from a refrigeration plant; or

(iii) a geothermal heater; or

(iii) a gas heater that—

(A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or

(B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or

(iv) a heat pump; or

(v) a combination of **(i)** to **(~~i~~v)**.

(b) Where some or all of the heating *required* by **(a)** is by a gas heater or a heat pump, the spa pool must have—

(i) a cover with a minimum *R-Value* of 0.50; and

(ii) a push button and a time switch ~~in accordance with **Specification J6**~~ to control the operation of the heater.

(c) A time switch must be provided ~~in accordance with **Specification J6**~~ to control the operation of a circulation pump for a spa pool having a capacity of 680 L or more.

(d) Where *required*, a time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

(e) Pipework carrying heated water for a spa pool must comply with the insulation requirements of **J5.8.**

Part J8 FACILITIES FOR ENERGY MONITORING

J8.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, Performance Requirement~~s~~ **JP1** ~~and **JP3** are~~ is satisfied by complying with—

(i) **J0.1** to **J0.3**; and

(ii) **J1.1** to **J1.6**; and

~~(iii) **J2.1** to **J2.5**; and~~

(iii) **J3.1** to **J3.7**; and

(iv) **J5.1** to **J5.**~~**4**~~**12**; and

(v) **J6.1** to **J6.**~~**6**~~**8**; and

(vi) **J7.1** to **J7.4**; and

(vii) **J8.1** to **J8.3**.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with **A0.7**.

J8.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply—

(a) within a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building; or

(b) to a Class 8 *electricity network substation*.

J8.2 * * * * *

J8.3 Facilities for energy monitoring

(a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m^2 must have an energy meter configured ~~the facility~~ to record the time-of-use consumption of gas and electricity.

(b) A building with a *floor area* of more than 2,500 m^2 must have energy meters configured ~~the facility~~ to separately record ~~individually~~ the time-of-use energy consumption of—

(i) *air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and

(ii) artificial lighting; and

(iii) appliance power; and

(iv) central hot water supply; and

(v) internal transport devices including lifts, escalators and ~~travelators~~ moving walkways where there is more than one serving the building; and

(vi) other ancillary plant.

(c) Energy meters *required* by **(b)** must be interlinked by a communication system that collates the data to a single interface where it can be stored, analysed and reviewed.

(d) The provisions of **(b)** do not apply to a Class 2 building with a *floor area* of more than 2,500 m^2 where the total area of the common areas is less than 500 m^2.

SCHEDULE 2 ABBREVIATIONS AND SYMBOLS

Abbreviations and Symbols used in the NCC include:

Abbreviations

Abbreviation	Definition
ABCB	Australian Building Codes Board
AISC	Australian Institute of Steel Construction
ALGA	Australian Local Government Association
AS	Australian Standard
ASTM	American Society for Testing and Materials
BCA	Building Code of Australia
BCC	Building Codes Committee
CCT	Correlated Colour Temperature
CHF	Critical Heat Flux
CRF	Critical Radiant Flux
CRI	Colour Rendition Index
C_{SHGC}	Constant for solar heat gain
CSIRO	Commonwealth Scientific and Industrial Research Organisation
C_U	Constant for conductance
FRL	Fire Resistance Level
GRP	Glass fibre reinforced polyester
ISO	International Organisation for Standardisation
MEPS	Minimum Energy Performance Standards
NABERS	National Australian Built Environment Rating System
NATA	National Association of Testing Authorities
NCC	National Construction Code
ppm	Parts per million
PCA	Plumbing Code of Australia
PVC	Polyvinyl chloride
R_w	Weighted sound reduction index
SHGC	Solar Heat Gain Coefficient
STC	Sound Transmission Class
UPVC	Unplasticized polyvinyl chloride
U-Value	Thermal transmittance

SCHEDULE 3 DEFINITIONS

Definitions

Note: States and Territories may vary or add to the definitions contained in Schedule 3 at the relevant State or Territory Appendix.

In the NCC unless the contrary intention appears—

Accessible means having features to enable use by people with a disability.

Accessway means a continuous *accessible* path of travel (as defined in AS 1428.1) to, into or within a building.

Accredited Testing Laboratory means—

(a) an organisation accredited by the National Association of Testing Authorities (NATA) to undertake the relevant tests; or

(b) an organisation outside Australia accredited to undertake the relevant tests by an authority recognised by NATA through a mutual recognition agreement; or

(c) an organisation recognized as being an *Accredited Testing Laboratory* under legislation at the time the test was undertaken.

Activity traits, for the purposes of Volume One, means the features of the activities that will be undertaken in a *habitable room* or space.

Activity traits, for the purposes of Volume Two, means the features of the activities that will be undertaken in a room or space.

Explanatory information:

This term is used to describe the characteristics of the activities that will be undertaken in a room or space.

For example, the activities likely to be undertaken in a bedroom, and the associated features are—

- sleeping — a person laying horizontally; and
- resting — a person laying horizontally or sitting upright on the bed; and
- leisure activities, such as reading a book — a person sitting upright on the bed, with enough space to stretch their arms vertically; and
- dressing/changing clothes — a person standing with enough space to stretch their arms vertically.

Activity support level means the degree to which occupants can undertake activities with respect to the likely *activity traits* and *occupant traits*.

Explanatory information:

This term is used to articulate whether the height of a room or space is sufficient and by what degree. This is achieved by having regard to the room or space's intended use by occupants, through consideration of the defined terms 'activity traits' and 'occupant traits'.

Administering body means the body responsible for administering the *WaterMark Certification Scheme*.

Aged care building means a Class 9c building for residential accommodation of aged persons who, due to varying degrees of incapacity associated with the ageing process, are provided with *personal care services* and 24 hour staff assistance to evacuate the building during an emergency.

Air-conditioning, for the purposes of Section J of Volume One, means a *service* that actively cools or heats the air within a space, but does not include a *service* that directly—

(a) cools or heats cold or hot rooms; or

(b) maintains specialised conditions for equipment or processes, where this is the main purpose of the *service*.

Alpine area, for the purposes of Parts 2.7 and 3.10 of Volume Two, means an area given in Figure 1.1.6 and in Table 1.1.3 for specific locations, and is~~means land —~~

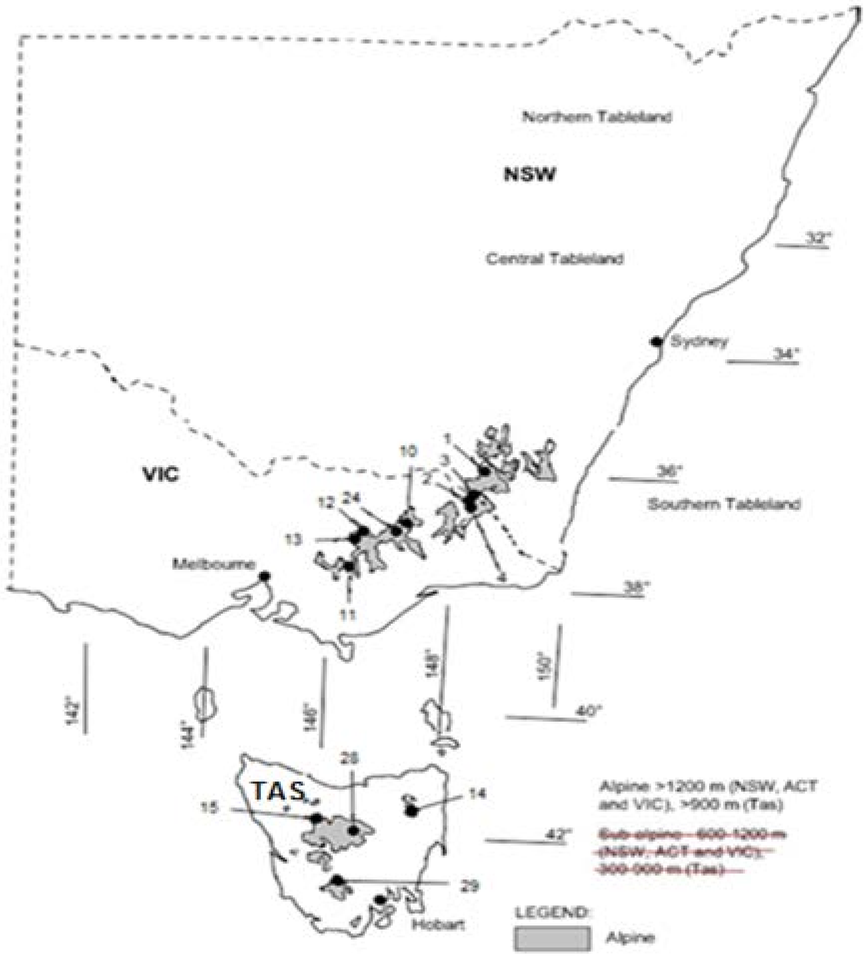
(a) likely to be subject to significant snowfalls; and

(b) in New South Wales, A.C.T. or Victoria more than 1200 m above the Australian Height Datum; and

(c) in Tasmania more than 900 m above the Australian Height Datum.

Figure 1.1.6

Alpine areas



Note:

This map in approximate only and altitude above Australian Height Datum shall be used to determine whether the building falls into an *alpine area* region.

Table 1.1.3 Alpine areas where snow loads are significant

Location	**Map Identifier**	**Location**	**Map Identifier**
New South Wales	-	-	-
Kiandra	1	Mount Selwyn	10
Mount Kosiuszko	2	Perisher Range	11
Perisher Valley	3	Rules Point	12
Thredbo	4	Sawpit Creek	13
Cabramurra	5	Smiggin Holes	14
Charlotte Pass Village	6	Smiggin Range	15
Diggers Creek	7	Three Mile Dam	16
Guthega Village	8	Wilsons Valley	17
Mount Blue Cow	9	-	-
Victoria	-	-	-
Falls Creek: Summit Area Sun Valley Village Bowl	18	Mount Hotham: Davenport Village Centre	22
Mount Baw Baw	19	Dinner Plain	23
Mount Buffalo: Chalet Dingo Dell Tatra	20	Lake Mountain	24

Mount Buller: Baldy Village	21	Mount Stirling	25
Tasmania	-	-	-
Ben Lomond Ski Field	26	Great Lake Area	28
Cradle Valley	27	Mount Field Ski Field	29

Explanatory information:

Alpine areas are located in New South Wales, Victoria and Tasmania.

Alpine areas are areas 1200 m or more above Australian Height Datum (AHD) for New South Wales, Australian Capital Territory and Victoria, and 900 m or more above AHD for Tasmania, as shown in Figure 1.1.6.

Alpine areas are considered to receive significant snowfalls (snowfalls which result in an average snow accumulation on the ground of 175 mm or greater). Regions in New South Wales, the Australian Capital Territory and Victoria between 600–1200 m AHD are considered to be sub-*alpine areas* and may receive significant snowfalls, however unlike *alpine area* the snow is unlikely to accumulate.

It is recommended that the *appropriate authority* be consulted to determine whether the building is located in an *alpine area*. AS/NZS 1170.3 also contains further detail in the identification of *alpine areas* and the altitude of the alpine regions of Australia.

It is noted that in the Australian Capital Territory, the Canberra area is not designed as an *alpine area* as snow loads are not considered significant.

Alteration, in relation to a building, includes an addition or extension to a building.

Ancillary element means an element that is secondary to and not an integral part of another element to which it is attached.

Amenity means an attribute which contributes to the health, physical independence, comfort and well-being of people.

~~**Annual greenhouse gas emissions**~~~~**Annual energy consumption**~~ means the theoretical amount of greenhouse gas emissions attributable to the energy used annually by the building's *services*, excluding kitchen exhaust and the like.

Appropriate authority means the relevant authority with the statutory responsibility to determine the particular matter.

State and Territory variations

For Volume One see *(NSW, Appropriate authority)*

For Volume Two the definition of *appropriate authority* has been replaced in New South Wales as follows:

Appropriate authority means the relevant authority with the responsibility to determine the particular matter.

Appropriately qualified person means a person recognised by the *appropriate authority* as having qualifications and/or experience in the relevant discipline in question.

Approved disposal system means a system for the disposal of sewage, sullage or stormwater approved by an authority having jurisdiction.

Articulated masonry means masonry construction in which special provisions have been made for movement by articulation.

Assembly building means a building where people may assemble for—

(a) civic, theatrical, social, political or religious purposes including a library, theatre, public hall or place of worship; or

(b) educational purposes in a *school*, *early childhood centre*, preschool, or the like; or

(c) entertainment, recreational or sporting purposes including—

  (i) a discotheque, nightclub or a bar area of a hotel or motel providing live entertainment or containing a dance floor; or

  (ii) a cinema; or

  (iii) a sports stadium, sporting or other club; or

(d) transit purposes including a bus station, railway station, airport or ferry terminal.

State and Territory variation

For Volume One see *(NSW, Assembly building)* and *(SA, Assembly building)*

Assessment Method means a method that can be used for determining that a *Performance Solution* or *Deemed-to-Satisfy Solution* complies with the *Performance Requirements*.

Atrium means a space within a building that connects 2 or more *storeys* and—

(a) is ~~wholly or substantially~~ enclosed at the top by a floor or roof (including a glazed roof structure) which is greater than 50% of the area of the space measured in plan; and
(b) includes any adjacent part of the building not separated by an appropriate barrier to fire; but
(c) does not include a stairwell, rampwell or the space within a *shaft*.

Atrium well means a space in an *atrium* bounded by the perimeter of the openings in the floors or by the perimeter of the floors and the *external walls*.

Automatic means designed to operate when activated by a heat, smoke or fire sensing device.

Average recurrence interval, applied to rainfall, means the expected or average interval between exceedances for a 5 minute duration rainfall intensity.

Average specific extinction area means the *average specific extinction area* for smoke as determined by AS/NZS 5637.1.

Backflow prevention device means an air gap, break tank or mechanical device that is designed to prevent the unplanned reversal of flow of water or *contaminants* into the water service or a *Network Utility Operator's* water supply.

Backpressure means a reversal of water flow caused by the downstream pressure becoming greater than the supply pressure.

Backsiphonage means a reversal of flow of water caused by negative pressure in the distributing pipes of a water service or supply.

Backstage means a space associated with, and adjacent to, a *stage* in a Class 9b building for scenery, props, equipment, dressing rooms, or the like.

Blockage means an obstruction within a *drainage* system.

Boiler means a vessel or an arrangement of vessels and interconnecting parts, wherein steam or other vapour is generated, or water or other liquid is heated at a pressure above that of the atmosphere, by the application of fire, the products of combustion, electrical power, or similar high temperature means, and—
(a) includes superheaters, reheaters, economisers, *boiler* piping, supports, mountings, valves, gauges, fittings, controls, the *boiler* settings and directly associated equipment; but
(b) excludes a fully flooded or pressurised system where water or other liquid is heated to a temperature lower than the normal atmospheric boiling temperature of the liquid.

~~**Building Solution** means a solution which complies with the *Performance Requirements* and is a—~~
(a) ~~*Performance Solution*; or~~
(b) ~~*Deemed-to-Satisfy Solution*; or~~
(c) ~~combination of (a) and (b).~~

Breaking surf means any area of salt water in which waves break on an average of at least 4 days per week but does not include white caps or choppy water.

Explanatory information:

Breaking surf normally occurs in areas exposed to the open sea. *Breaking surf* does not normally occur in sheltered areas, such as that which occurs around Port Phillip Bay, Sydney Harbour, Swan River, Derwent River and similar locations.

State and Territory variation

For Volume Two in South Australia insert brush fence as follows:

Brush fence means a fence or gate that is primarily constructed of Broombrush (Melaleuca Uncinata).

Carpark means a building that is used for the parking of motor vehicles but is neither a *private garage* nor used for the servicing of vehicles, other than washing, cleaning or polishing.

Cavity means a void between 2 leaves of masonry, or in masonry veneer construction, a void between a leaf of masonry and the supporting frame.

Cavity wall, for the purposes of FV1 in Volume One and V2.2.1 in Volume Two, means a wall that incorporates a drained cavity.

Certificate of Accreditation, for the purposes of Volume One, means a certificate issued by a State or Territory accreditation authority stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of the BCA.

Certificate of Accreditation, for the purposes of Volume Two, means a certificate issued by a State or Territory accreditation authority stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of the *Housing Provisions*.

Certificate of Conformity means a certificate issued under the ABCB scheme for products and systems certification stating that the properties and performance of a building material or method of construction or design fulfil specific requirements of the *Housing Provisions*.

Certification body means a person or organisation operating in the field of material, product, form of construction or design certification that has been accredited by the Joint Accreditation System of Australia and New Zealand (JAZ-ANZ), and is accredited for a purpose other than as part of the CodeMark Australia ~~or CodeMark~~ Certification Scheme.

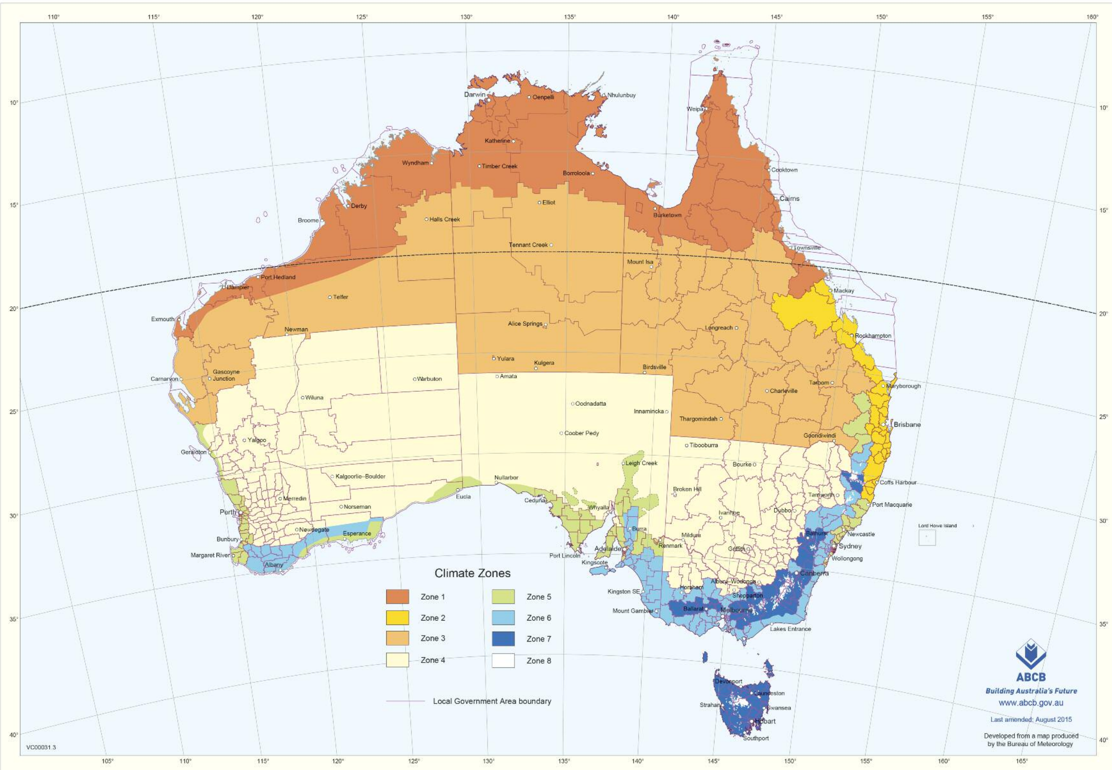
Characteristic means the occupant data to be used in the modelling of access solutions which define how an occupant interacts with a building, i.e. occupant movement speeds, turning ability, reach capability, luminance contrast, hearing threshold.

Circulation Space means a clear unobstructed area, to enable persons using mobility aids to manoeuver.

Clad frame means timber or metal frame construction with exterior timber or sheet wall cladding that is not sensitive to minor movement and includes substructure masonry walls up to 1.5 m high.

Climate zone means an area defined in Figure A1.1 and in Table A1.1 for specific locations, having energy efficiency provisions based on a range of similar climatic characteristics.

Figure A1.1 — Climate zones for thermal design



Notes:

1. This map can be viewed in enlargeable form on the ABCB website at www.abcb.gov.au.
2. A Zone 4 area in South Australia, other than a council area, at an altitude greater than 300 m above the Australian Height Datum is to be considered as Zone 5.

   These areas have been defined in an enlarged format on the following maps produced by the Department of Planning, Transport and Infrastructure:

   Adelaide Hills Council Climate Zone Map

   Barossa Council Climate Zone Map

   Regional Council of Goyder Climate Zone Map

These maps can be viewed on the Government of South Australia website at www.sa.gov.au

3. Locations in *climate zone* 8 are in *alpine areas*.

Table A1.1 Climate zones for thermal design - various locations

Location	Climate zone
Northern Territory Darwin, Katherine	1
Queensland Cairns, Cooktown, Normanton, Townsville, Weipa	1
Western Australia Broome, Christmas Island, Cocos Island, Derby, Exmouth, Karratha, Port Hedland, Wyndham	1
New South Wales Bellingen Shire - Valley & seaboard, Byron Bay, Coffs Harbour, Grafton, Lismore, Lord Howe Island	2
Queensland Brisbane, Bundaberg, Gladstone, ~~Labrador~~Southport, Mackay, ~~Maryborough~~Hervey Bay, Rockhampton	2
Northern Territory Alice Springs, Elliot, Renner Springs, Tennant Creek	3
Queensland Birdsville, Cunnamulla, Longreach, Mount Isa, Roma, ~~Torrens Creek~~Hughenden	3
Western Australia Carnarvon, Halls Creek	3
New South Wales Albury, Bourke, Broken Hill, Cobar, Dubbo, Griffith, Ivanhoe, Moree, Tamworth, Wagga Wagga	4
South Australia Cook, Marree, Oodnadatta, Port Augusta, Tarcoola, Whyalla	4
Victoria Echuca, Mildura, Shepparton, Swan Hill	4
Western Australia Balladonia, Kalgoorlie-Boulder, Meekatharra, Northam, Wagin	4
New South Wales Newcastle, Port Macquarie, Sydney East, Williamtown, Wollongong	5
South Australia Adelaide, Ceduna, Elliston, Leigh Creek, Loxton, Port Lincoln, Renmark	5
Queensland Toowoomba, Warwick	5
Western Australia Bunbury, Esperance, Geraldton, Perth	5
New South Wales Batemans Bay, Bega, Nowra, Sydney West, Yass	6
South Australia Bordertown, Kingscote, Lobethal, Naracoorte, Mount Gambier, Murray Bridge, Victor Harbour	6
Victoria Anglesea, Bairnsdale, Benalla, Bendigo, Colac, Dandenong, Geelong, Horsham, Melbourne, Portland, Sale, Traralgon, Warrnambool, Wodonga	6
Western Australia Albany, Pemberton	6
Australian Capital Territory	7

Location	Climate zone
Canberra	
New South Wales Armidale, Bathurst, Bellingen Shire - Dorrigo Plateau, Goulburn, Orange	7
Tasmania Burnie, Bicheno, Deloraine, Devonport, Flinders Island, Hobart, Huonville, King Island, Launceston, New Norfolk, Oatlands, Orford, Rossarden, Smithton, St Marys, Zeehan	7
Victoria Ararat, Ballarat, Bright, Hamilton, Wangaratta	7
New South Wales Perisher Smiggins, Thredbo	8

Combustible means—
(a) applied to a material — *combustible* as determined by AS 1530.1; and
(b) applied to construction or part of a building — constructed wholly or in part of *combustible* materials.

Common wall, for the purposes of Volume One, means a wall that is common to adjoining buildings.

Common wall, for the purposes of Volume Two, means a wall that is common to adjoining buildings other than Class 1 buildings.

Condensation means the process used to describe moisture formation on the surface as a result of moist air coming into contact with a surface which is at a lower temperature.

Conditioned space, for the purposes of Volume One, means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by *air-conditioning*.~~, but does not include —~~
(a) ~~a non-*habitable room* of a Class 2 building or Class 4 part of a building in which a heater with a capacity of not more than 1.2 kW or 4.3 MJ/hour provides the *air-conditioning*; or~~
(b) ~~a space in a Class 6, 7, 8 or 9b building where the input energy to an *air-conditioning* system is not more than 15 W/m² or 15 J/s.m² (54 KJ/hour.m²); or~~
(c) ~~a lift *shaft*.~~

Conditioned space, for the purposes of Volume Two, means a space within a building that is heated or cooled by the building's *domestic services*, excluding a non-*habitable room* in which a heater with a capacity of not more than 1.2 kW or 4.3 MJ/hour is installed.

Containment protection means the installation of a *backflow prevention device* at the *point of connection* of a *Network Utility Operator's* water supply to a site.

Contaminant means any substance (including gases, liquids, solids or micro-organisms), energy (excluding noise) or heat, that either by itself or in combination with the same, similar or other substances, energy or heat changes or is likely to change the physical, chemical or biological condition of water.

Construction activity actions means actions due to stacking of building materials or the use of equipment, including cranes and trucks, during construction or actions which may be induced by floor to floor propping.

Controlled fill means material that has been placed and compacted in layers with compaction equipment (such as a vibrating plate) within a defined moisture range to a defined density requirement.

Cooling load means the calculated amount of energy removed from the cooled spaces of the building annually by artificial means to maintain the desired temperatures in those spaces.

Critical radiant flux (CRF) means the critical heat flux at extinguishment (CHF in kW/m²) as determined by AS ISO 9239.1.

Cross-connection means any actual or potential connection between a water supply and any *contaminant*.

Curtain wall means a non-*loadbearing external wall* that is not a *panel wall*.

Daytime operating building, for the purposes of Section J of Volume One, means a building that is not an *overnight operating building*.

Damp-proof course (DPC) means a continuous layer of impervious material placed in a masonry wall or pier, or between a wall or pier and a floor, to prevent the upward or downward migration of water.

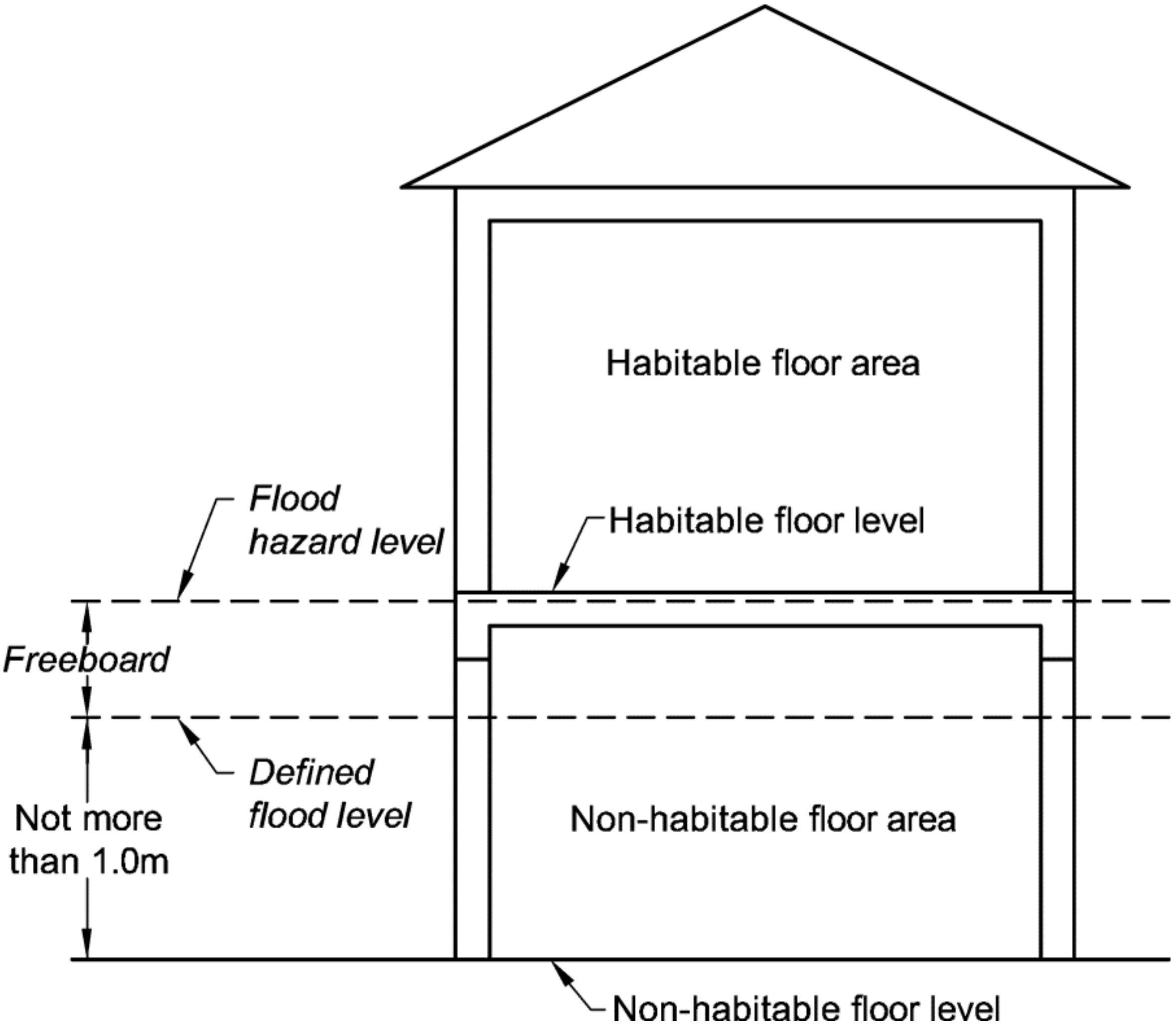
Deemed-to-Satisfy Provisions ~~means provisions which are deemed to satisfy the Performance Requirements.~~has the meaning described in A2.3.

Deemed-to-Satisfy Solution means a method of satisfying the *Deemed-to-Satisfy Provisions*.

Defined flood event (DFE) means the flood event selected for the management of flood hazard for the location of specific development as determined by the *appropriate authority*.

Defined flood level (DFL) means the flood level associated with a *defined flood event* relative to a specified datum (see Figure 1.1.5).

Figure 1.1.5 Identification of defined flood level, flood hazard level and freeboard



Designated bushfire prone area means land which has been designated under a power of legislation as being subject, or likely to be subject, to bushfires.

State and Territory variations

For Volume One see *(NSW, Designated bushfire prone area)*

For Volume Two the definition of *designated bushfire prone area* has been replaced in New South Wales as follows:

Designated bushfire prone area means land that:

(a) has been designated under legislation; or

(b) has been identified under an environmental planning instrument, development control plan or in the course of processing and determining a development application,

as land that can support a bushfire or is likely to be subject to bushfire attack.

Design wind speed means the design gust wind speed for the area where the building is located, calculated in accordance with AS/NZS 1170.2 or AS 4055 (see Table 1.1.1 for wind classes).

Table 1.1.1 Wind classes

Non-cyclonic Region A and B	Cyclonic Region C and D
N1, N2, N3~~, **N4, N5, N6**~~	C1~~, **C2, C3, C4**~~
N4, N5, N6 (these wind classes are covered by Part 3.0, High Wind Areas).	**C2, C3, C4** (these wind classes are covered by Part 3.0, High Wind Areas).

Notes:

1. Wind classification map identifying wind regions is contained in Part 3.0 (see Figure 3.0.1).
2. Information on wind classes for particular areas may be available from the *appropriate authority.*
3. ~~Wind classes in bold text denote wind classes covered by Part 3.10.1, High Wind Areas.~~
4. "N" = non-cyclonic winds and "C" = cyclonic winds.

Detention centre means a building in which persons are securely detained by means of the built structure including a prison, remand centre, juvenile *detention centre*, holding cells or psychiatric *detention centre*.

Direct cross-connection means any *cross-connection* where backflow may be induced by *backpressure* or *backsiphonage.*

Direct fix cladding wall for the purposes of FV1 in Volume One and V2.2.1 in Volume Two, means a wall with cladding attached directly to the wall framing without the use of a drained cavity.

Discontinuous construction means the following:

(a) A wall having a minimum 20 mm cavity between 2 separate leaves, and—

  (i) for masonry, where wall ties are used to connect leaves, the ties are of the resilient type; and

  (ii) for other than masonry, there is no mechanical linkage between the leaves, except at the periphery.

(b) A staggered stud wall is deemed not to be *discontinuous construction.*

Domestic services means the basic engineering systems that use energy or control the use of energy; and—

(a) includes—

  (i) heating, air-conditioning, mechanical ventilation and artificial lighting; and

  (ii) pumps and heaters for *swimming pools* and spa pools; and

  (iii) heated water systems; but

(b) excludes cooking facilities and portable appliances.

Drainage means any sanitary *drainage*, liquid trade waste *drainage* or stormwater *drainage* system.

Drinking water means water intended primarily for human consumption but which has other domestic uses.

Explanatory Information:

See also the Australian Drinking Water Guidelines produced by the National Health and Medical Research Council.

Early childhood centre means any premises or part thereof providing or intending to provide a centre-based education and care service within the meaning of the Education and Care Services National Law Act 2010 (Vic), the Education and Care Services National Regulations and centre-based services that are licensed or approved under State and Territory children's services law, but excludes education and care primarily provided to school aged children in outside school hours settings.

State and Territory variations

For Volume One see *(NSW, Early childhood centre)*, *(Tas, Early childhood centre)* and *(Vic, Early childhood centre)*

Effective height means the vertical distance between the floor of the lowest *storey* included in the calculation of *rise in storeys* and the floor of the topmost *storey* (excluding the topmost *storey* if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units).

Electric passenger lift means a power-operated lift for raising or lowering people in a car in which the motion of the car is obtained from an electric motor mechanically coupled to the hoisting mechanism.

Electricity network substation means a building in which high voltage supply is converted or transformed and which is controlled by a licensed network service provider designated under a power of legislation.

Electrohydraulic passenger lift means a power-operated lift for raising or lowering people in a car in which the motion of the car is obtained from the action of liquid under pressure acting on a piston or ram, the pressure being generated by a pump driven by an individual electric motor.

Envelope, for the purposes of Section J in Volume One, means the parts of a building's *fabric* that separate a *conditioned space* or *habitable room* from—

(a) the exterior of the building; or

(b) a non-*conditioned space* including—

  (i) the floor of a rooftop plant room, lift-machine room or the like; and

  (ii) the floor above a *carpark* or warehouse; and

  (iii) the *common wall* with a *carpark*, warehouse or the like.

Envelope, for the purposes of Part 2.6 and Part 3.12 in Volume Two, means the parts of a building's *fabric* that separate artificially heated or cooled spaces from—

(a) the exterior of the building; or

(b) other spaces that are not artificially heated or cooled.

Equivalent means equivalent to the level of health, safety and amenity provided by the *Deemed-to-Satisfy Provisions*.

Evacuation route means the continuous path of travel (including *exits*, *public corridors* and the like) from any part of a building, including within a sole-occupancy unit in a Class 2 or 3 building or Class 4 part, to a *safe place*.

Evacuation time means the time calculated from when the emergency starts for the occupants of the building to evacuate to a *safe place*.

Exit means—

(a) any, or any combination of the following if they provide egress to a road or *open space*—

  (i) an internal or external stairway.

  (ii) a ramp.

  (iii) a*fire-isolated passageway*.

  (iv) a doorway opening to a road or *open space*.

(b) a*horizontal exit* or a *fire-isolated passageway* leading to a *horizontal exit*.

Expert Judgement means the judgement of an expert who has the qualifications and experience to determine whether a *Performance Solution* or *Deemed-to-Satisfy Solution* complies with the *Performance Requirements*.

Explanatory Information:

Contemporary and relevant qualifications and/or experience are necessary to determine whether a *Performance Solution* complies with the *Performance Requirements*. The level of qualification and/or experience may differ depending on the complexity of the proposal and the requirements of the regulatory authority. Practitioners should seek advice from the authority having jurisdiction or *appropriate authority* for clarification as to what will be accepted.

State and Territory variation

For Volume Three see *(Tas, Expert Judgement)*

External wall, for the purposes of Volume One, means an outer wall of a building which is not a *common wall*.

External wall, for the purposes of Volume Two, means an outer wall of a building which is not a *separating wall*.

Fabric means the basic building structural elements and components of a building including the roof, ceilings, walls and floors.

Façade solar admittance means the fraction of incident irradiance on externally facing wall-glazing construction that adds heat to a building's space.

~~**Fan motor power** means the power delivered to a motor of a fan, including the power needed for any drive and impeller losses.~~

Farming means—

(a) cultivating, propagating and harvesting plants or fungi or their products or parts, including seeds, spores, bulbs or the like, but does not include forestry; or

(b) maintaining animals in any physical environment for the purposes of—

  (i) breeding them; or

  (ii) selling them; or

  (iii) acquiring and selling their bodily produce such as milk, wool, eggs or the like; or

(c) a combination of (a) and (b),

but does not include forestry or maintaining animals for sport or recreational purposes.

State and Territory variation

For Volume One see *(SA, Farming)*

Farm building means a Class 7 or 8 building located on land primarily used for *farming*—

(a) that is—

  (i) used in connection with *farming*; or

  (ii) used primarily to store one or more *farm vehicles*; or

  (iii) a combination of (i) and (ii); and

    (A) in which the total number of persons accommodated at any time does not exceed one person per 200 m² of *floor area* or part thereof, up to a maximum of 8 persons; and

    (B) with a total *floor area* of not more than 3500 m².

State and Territory variation

For Volume One see *(SA, Farm building)*

Farm shed means a single *storey* Class 7 or 8 building located on land primarily used for *farming*—

(a) that is—

  (i) used in connection with *farming*; or

  (ii) used primarily to store one or more *farm vehicles*; or

  (iii) a combination of (i) and (ii); and

    (A) occupied neither frequently nor for extended periods by people; and

    (B) in which the total number of persons accommodated at any time does not exceed 2; and

    (C) with a total *floor area* of more than 500 m² but not more than 2000 m².

State and Territory variation

For Volume One see *(SA, Farm shed)*

Farm vehicle means a vehicle used in connection with *farming*.

State and Territory variation

For Volume One see *(SA, Farm vehicle)*

Finished ground level, for the purposes of Part 3.2 in Volume Two, means the ground level adjacent to footing systems at the completion of construction and landscaping.

Fire brigade means a statutory authority constituted under an Act of Parliament having as one of its functions, the protection of life and property from fire and other emergencies.

Fire brigade station for the purposes of E1.3(a)(ii) and H3.9 in Volume One, means a government-owned premises which is a station for a *fire brigade*

Fire compartment means—
(a) the total space of a building; or
(b) when referred to in—
  (i) the *Performance Requirements* — any part of a building separated from the remainder by barriers to fire such as walls and/or floors having an appropriate resistance to the spread of fire with any openings adequately protected; or
  (ii) the *Deemed-to-Satisfy Provisions* — any part of a building separated from the remainder by walls and/or floors each having an FRL not less than that *required* for a *fire wall* for that type of construction and where all openings in the separating construction are protected in accordance with the *Deemed-to-Satisfy Provisions* of the relevant Part.

Fire hazard means the danger in terms of potential harm and degree of exposure arising from the start and spread of fire and the smoke and gases that are thereby generated.

Fire hazard properties means the following properties of a material or assembly that indicate how they behave under specific fire test conditions:
(a) *Average specific extinction area*, *critical radiant flux* and *Flammability Index*, determined as defined in ~~A1.1~~Schedule 3.
(b) *Smoke-Developed Index*, *smoke development rate* and *Spread-of-Flame Index*, determined in accordance with ~~Specification A2.4~~Schedule 6.
(c) *Group number* and *smoke growth rate index* ($SMOGRA_{RC}$), determined in accordance with Specification C1.10 of Volume One.

Fire intensity means the rate release of calorific energy in watts, determined either theoretically or empirically, as applicable.

Fire-isolated passageway means a corridor, hallway or the like, of *fire-resisting construction*, which provides egress to or from a *fire-isolated stairway* or *fire-isolated ramp* or to a road or *open space*.

Fire-isolated ramp means a ramp within a *fire-resisting* enclosure which provides egress from a *storey*.

Fire-isolated stairway means a stairway within a *fire-resisting shaft* and includes the floor and roof or top enclosing structure.

Fire load means the sum of the net calorific values of the *combustible* contents which can reasonably be expected to burn within a *fire compartment*, including furnishings, built-in and removable materials, and building elements. The calorific values must be determined at the ambient moisture content or humidity. (The unit of measurement is MJ.)

Fire-protected timber means *fire-resisting* timber building elements that comply with Volume One Specification A1.1.

Fire-protective covering means—
(a) 13 mm fire-protective grade plasterboard; or
(b) 12 mm cellulose cement flat sheeting complying with AS/NZS 2908.2 or ISO 8336; or
(c) 12 mm fibrous plaster reinforced with 13 mm x 13 mm x 0.7 mm galvanised steel wire mesh located not more than 6 mm from the exposed face; or
(d) other material not less fire-protective than 13 mm fire-protective grade plasterboard, fixed in accordance with the normal trade practice for a *fire-protective covering*.

Fire-resistance level (FRL) means the grading periods in minutes determined in accordance with ~~Specification A2.3~~Schedule 5, for the following criteria—

(a) *structural adequacy*; and

(b) *integrity*; and

(c) *insulation*,

and expressed in that order.

Note

A dash means that there is no requirement for that criterion. For example, 90/–/– means there is no requirement for an FRL for integrity and insulation, and –/–/– means there is no requirement for an FRL.

Fire-resisting, for the purposes of Volume One, applied to a building element, means having an FRL appropriate for that element.

Fire-resisting, for the purposes of Volume Two, applied to a *structural member* or other part of a building, means having the FRL *required* for that *structural member* or other part.

Fire-resisting construction, for the purposes of Volume One, means one of the Types of construction referred to in Part C1 of Volume One.

Fire safety system means one or any combination of the methods used in a building to—

(a) warn people of an emergency; or

(b) provide for safe evacuation; or

(c) restrict the spread of fire; or

(d) extinguish a fire,

and includes both active and passive systems.

Fire-source feature means—

(a) the far boundary of a road, river, lake or the like adjoining the allotment; or

(b) a side or rear boundary of the allotment; or

(c) an *external wall* of another building on the allotment which is not a Class 10 building.

Fire wall means a wall with an appropriate resistance to the spread of fire that divides a *storey* or building into fire compartments.

Flashover, in relation to *fire hazard properties*, means a heat release rate of 1 MW.

Flammability Index means the index number as determined by AS 1530.2.

Flashing means a strip or sleeve of impervious material dressed, fitted or built-in to provide a barrier to moisture movement, or to divert the travel of moisture, or to cover a joint where water would otherwise penetrate to the interior of a building.

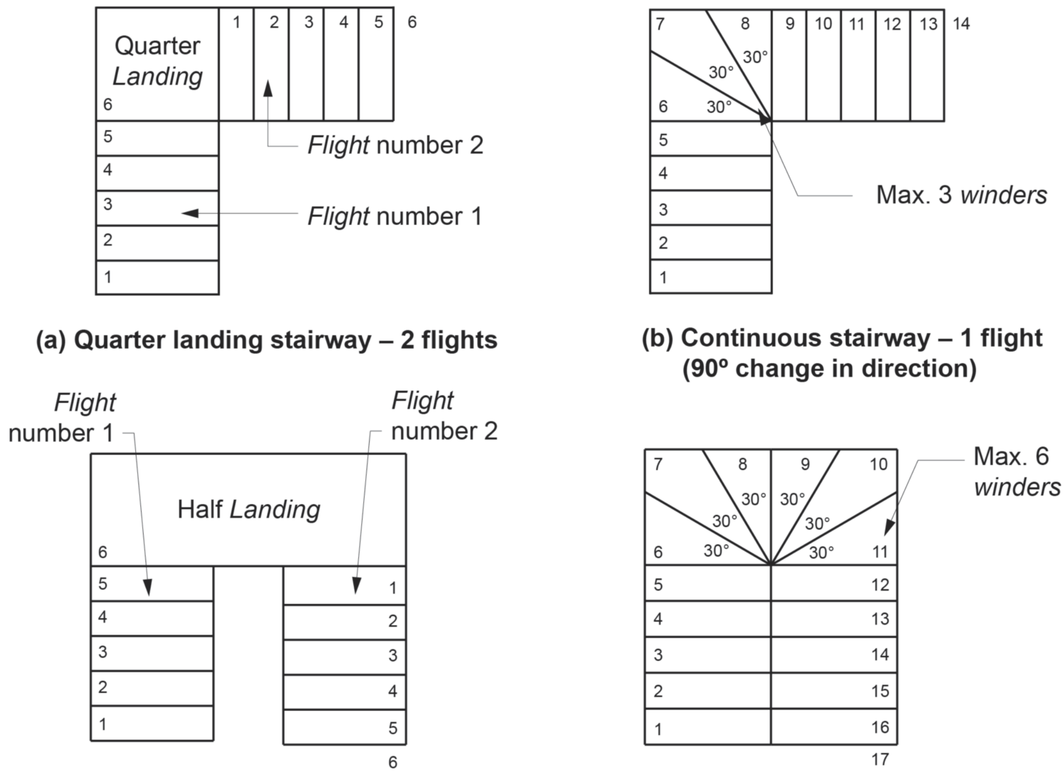
Flight, for the purposes of Volume One, means that part of a stair that has a continuous series of *risers*, including *risers* of *winders*, not interrupted by a *landing* or floor.

Flight, for the purposes of Volume Two, means that part of a stair that has a continuous series of *risers*, including *risers* of *winders*, not interrupted by a *landing* or floor (see Figure 1.1.7).

Explanatory information:

A *flight* is the part of a stair that has a continuous slope created by the nosing line of treads. The length of a *flight* is limited to restrict the distance a person could fall down a stair. Quarter *landings*, as shown in Figure 1.1.7, are considered sufficient to halt a person's fall and therefore are considered for the purposes of this document not to be part of the *flight*.

Figure 1.1.7 Identification of stair flights - plan view



(a) Quarter landing stairway – 2 flights

(b) Continuous stairway – 1 flight (90º change in direction)

(c) Half landing stairway – 2 flights

(d) Continuous stairway – 1 flight (180º change in direction)

Flood hazard area means the *site* (whether or not mapped) encompassing land lower than the *flood hazard level* which has been determined by the *appropriate authority*.

State and Territory variations

For Volume One see *(Vic, Flood hazard area)*

For Volume Two in Victoria the definition of flood hazard area is replaced as follows:

Flood hazard area means the *site* (whether or not mapped) encompassing land in an area liable to flooding within the meaning of Regulation 802 of the Building Regulations 2006.

Flood hazard level (FHL) means the flood level used to determine the height of floors in a building and represents the *defined flood level* plus the *freeboard*. (see Figure 1.1.5)

Floor area, for the purposes of Volume One, means—

(a) in relation to a building — the total area of all *storeys*; and

(b) in relation to a *storey* — the area of all floors of that *storey* measured over the enclosing walls, and includes—

  (i) the area of a *mezzanine* within the *storey*, measured within the finished surfaces of any *external walls*; and

  (ii) the area occupied by any *internal wall* or partitions, any cupboard, or other built-in furniture, fixture or fitting; and

  (iii) if there is no enclosing wall, an area which has a use that—

    (A) contributes to the *fire load*; or

    (B) impacts on the safety, health or amenity of the occupants in relation to the provisions of the BCA; and

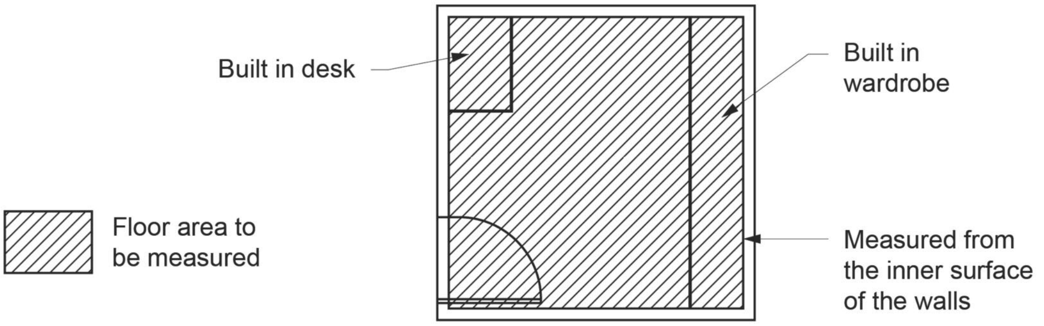
(c) in relation to a room — the area of the room measured within the finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting; and

(d) in relation to a *fire compartment* — the total area of all floors within the *fire compartment* measured within the finished surfaces of the bounding construction, and if there is no bounding construction, includes an area which has a use which contributes to the *fire load*; and

(e) in relation to an *atrium* — the total area of all floors within the *atrium* measured within the finished surfaces of the bounding construction and if no bounding construction, within the *external walls*.

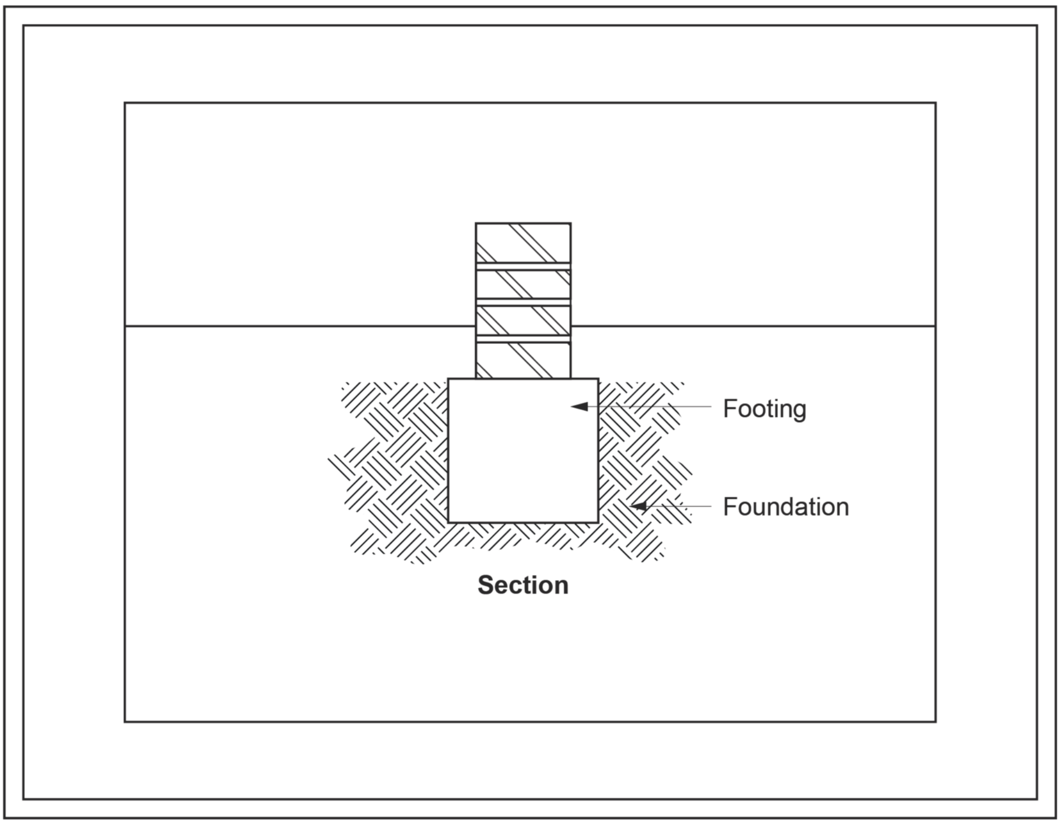
Floor area, for the purposes of Volume Two, means in relation to a room, the area of the room measured within the finished surfaces of the walls, and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting (see Figure 1.1.1).

Figure 1.1.1 Identification of floor area of a room



Foundation means the ground which supports the building (see Figure 1.1.2)

Figure 1.1.2 Identification of foundation



Freeboard means the height above the *defined flood level* as determined by the *appropriate authority*, used to compensate for effects such as wave action and localised hydraulic behaviour.

State and Territory variations

For Volume One see *(Vic, Freeboard)*

For Volume Two in Victoria the definition of freeboard is replaced as follows:

Freeboard means the minimum height of the level of the lowest floor of a building above the *defined flood level*, regulated by the relevant planning scheme, or specified or otherwise determined by the relevant council under Regulation 802 of the Building Regulations 2006 (see Figure 1.1.5).

Glazing, for the purposes of Section J in Volume One, means a transparent or translucent element and its supporting frame located in the *envelope*, and includes a *window* other than a *roof light*.

Glazing, for the purposes of Part 2.6 and Part 3.12 in Volume Two, means a transparent or translucent element and its supporting frame located in the external *fabric* of the building, and includes a *window* other than a *roof light*.

Green Star means the building sustainability rating scheme managed by the Green Building Council of Australia.

Going means the horizontal dimension from the front to the back of a tread less any overhang from the next tread or *landing* above (see Figure 3.9.1.4).

Group number means the number of one of 4 groups of materials used in the regulation of *fire hazard properties* and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling.

Habitable room means a room used for normal domestic activities, and—

(a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but

(b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

Hazard Rating means a rating of either *Low Hazard*, *Medium Hazard* or *High Hazard* determined in accordance with—

(a) *Verification Method* BV1 of Volume Three, wherever BV1 is used as an *Assessment Method* for a *Performance Solution*; or

(b) Specification B1.4 of Volume Three, for any *Deemed-to-Satisfy Solution*.

Health-care building means a building whose occupants or patients undergoing medical treatment generally need physical assistance to evacuate the building during an emergency and includes—

(a) a public or private hospital; or

(b) a nursing home or similar facility for sick or disabled persons needing full-time care; or

(c) a clinic, day surgery or procedure unit where the effects of the predominant treatment administered involve patients becoming non-ambulatory and requiring supervised medical care on the premises for some time after the treatment.

Heated water means water that has been intentionally heated. It is normally referred to as hot water or warm water.

Heating load means the calculated amount of energy delivered to the heated spaces of the building annually by artificial means to maintain the desired temperatures in those spaces.

High Hazard means any condition, device or practice which, in connection with a water supply, has the potential to cause death.

High wind area means a region that is subject to *design wind speed* more than N3 or C1 (see Table 1.1.1).

Horizontal exit means a *required* doorway between 2 parts of a building separated from each other by a *fire wall*.

Hours of operation means the hours when the number of occupants of a building is greater than 20% of the design occupancy.

House energy rating software means software accredited under the Nationwide House Energy Rating Scheme and is limited to assessing the potential thermal efficiency of the dwelling envelope.

Explanatory information:

The Nationwide House Energy Rating Scheme (NatHERS) refers to the Australian governments' scheme that facilitates consistent energy ratings from software tools which are used to assess the potential thermal efficiency of dwelling envelopes.

Housing Provisions means the requirements for Class 1 and 10 buildings contained in Volume Two of the ~~Building Code of Australia~~National Construction Code as published by the Australian Building Codes Board.

Illuminance means the luminous flux falling onto a unit area of surface.

Illumination power density (W/m2) means the total of the power that will be consumed by the lights in a space, including any lamps, ballasts, current regulators and control devices other than those that are plugged into socket outlets for intermittent use such as floor standing lamps, desk lamps or work station lamps, divided by the area of the space.

Explanatory information:

- *Illumination power density* relates to the power consumed by the lighting system and includes the light source or luminaire and any control device. The power for the lighting system is the illumination power load. This approach is more complicated than the *lamp power density* approach but provides more flexibility for a dwelling with sophisticated control systems.
- The area of the space refers to the area the lights serve. This could be considered a single room, open plan space, verandah, balcony or the like, or the total area of all these spaces.

Inclined lift means a power-operated device for raising or lowering people within a carriage that has one or more rigid guides on an inclined plane.

Indirect cross-connection means any *cross-connection* where it is only possible for backflow to be induced by *backsiphonage*.

Individual protection means the installation of a *backflow prevention device* at the point where a water service connects to a single fixture or appliance.

Insulation, in relation to an FRL, means the ability to maintain a temperature on the surface not exposed to the furnace below the limits specified in AS 1530.4.

Integrity, in relation to an FRL, means the ability to resist the passage of flames and hot gases specified in AS 1530.4.

Interconnection means the connection of two or more water systems.

Internal wall, for the purposes of Volume One, excludes a *common wall* or a party wall.

Internal wall, for the purposes of Volume Two, excludes a *separating wall*, *common wall* or party wall.

Interstitial condensation means the *condensation* of moisture on surfaces between material layers inside the building component.

JAS-ANZ means the Joint Accreditation System of Australia and New Zealand.

Lamp power density (W/m2) means the total of the maximum power rating of the lamps in a space, other than those that are plugged into socket outlets for intermittent use such as floor standing lamps, desk lamps or work station lamps, divided by the area of the space.

Explanatory information:

- *lamp power density* is a simple means of setting energy consumption at an efficient level for Class 1 and associated Class 10a buildings.
- Lamp refers to the globe or globes that are to be installed in a permanently wired light fitting. The maximum power of a lamp is usually marked on the fitting as the maximum allowable wattage.
- The area of the space refers to the area the lights serve. This could be considered a single room, open plan space, verandah, balcony or the like, or the total area of all these spaces.

Landing means an area at the top or bottom of a *flight* or between two *flights*.

Latent heat gain means the heat gained by the vapourising of liquid without change of temperature.

~~**Light source efficacy** means the luminous flux of a lamp or the total radiant flux in the visible spectrum weighted by the spectral response of the eye, divided by the electric power that will be consumed by the lamp but excluding ballast and control gear power losses.~~

Lightweight construction means construction which incorporates or comprises—
(a) sheet or board material, plaster, render, sprayed application, or other material similarly susceptible to damage by impact, pressure or abrasion; or
(b) concrete and concrete products containing pumice, perlite, vermiculite, or other soft material similarly susceptible to damage by impact, pressure or abrasion; or
(c) masonry having a ~~thickness~~width of less than 70 mm.

Loadbearing means intended to resist vertical forces additional to those due to its own weight.

Loadbearing wall, for the purposes of Part 3.2 in Volume Two, means any wall imposing on the footing a load greater than 10 kN/m.

Loss means either: physical damage, financial loss or loss of *amenity*.

Low Hazard means any condition, device of practice which, in connection with a water supply, would constitute a nuisance by colour, odour or taste but does not have the potential to injure or endanger health.

Low rainfall intensity area means an area with a 5 minute rainfall intensity for an *average recurrence interval* of 20 years of not more than 125 mm/hour.

Explanatory information:
Rainfall intensity figures can be obtained from Table 3.5.2.1 in Volume Two

Low-rise, low-speed constant pressure lift means a power-operated low-rise, low-speed device for raising or lowering people with limited mobility on a carriage that is controlled by the application of constant pressure to a control.

Low-rise platform lift means a power-operated device for raising or lowering people with limited mobility on a platform, that is controlled automatically or by the application of constant pressure to a control.

Luminaire efficacy means the lumens emitted from the luminous face of the whole luminaire including any diffusers, reflectors or baffles attached to the luminous face divided by the power that is consumed by the whole luminaire including any light sources, ballasts, drivers, current regulators and control devices.

Luminance contrast means the light reflected from one surface or component, compared to the light reflected from another surface or component.

Massive timber means an element not less than 75 mm thick as measured in each direction formed from solid and laminated timber.

Medium Hazard means any condition, device or practice which, in connection with a water supply, has the potential to injure or endanger health.

MEPS means the Minimum Energy Performance Standards for equipment and appliances established through the Greenhouse and Energy Minimum Standards Act 2012.

Mixed construction means a building consisting of more than one form of construction, particularly in double-storey buildings.

Mezzanine means an intermediate floor within a room.

Mould means a fungal growth that can be produced from conditions such as dampness, darkness, or poor ventilation.

NABERS Energy for Offices means the National Australia Built Environment Rating Systems for office energy efficiency, which is managed by the New South Wales Government.

Network Utility Operator means a person who—

(a) undertakes the piped distribution of *drinking water* or *non-drinking water* for supply; or

(b) is the operator of a sewerage system or a stormwater *drainage* system.

Explanatory information:

A *Network Utility Operator* in most States and Territories is the water and sewerage authority licensed to supply water and receive sewage and/or stormwater. The authority operates or proposes to operate a network that undertakes the distribution of water for supply and undertakes to receive sewage and/or stormwater drainage. This authority may be a licensed utility, local government body or council.

State and Territory variation

For Volume Three see *(Tas, Network Utility Operator)*

Non-combustible means—

(a) applied to a material — not deemed *combustible* as determined by AS 1530.1 — Combustibility Tests for Materials; and

(b) applied to construction or part of a building — constructed wholly of materials that are not deemed *combustible*.

Non-drinking water means water which is not *drinking water*.

~~**Non-illuminated exit sign** means an *exit* sign that complies with the requirements for an externally illuminated *exit* sign under AS 2293.3, except clause 3.4.4.~~

Occupant traits, for the purposes of Volume One, means the features, needs and profile of the occupants in a *habitable room* or space.

Occupant traits, for the purposes of Volume Two, means the features, needs and profile of the occupants in a room or space.

Explanatory information:

This term is used to describe the characteristics of the occupants and their associated requirements in relation to a room or space.

For example, in relation to a bedroom, the following occupant characteristics and associated requirements should be considered:

- Characteristics: height, mobility and how often the space will be used.
- Requirements: a sleeping space and a space to undertake leisure activities.

Occupiable outdoor area means a space on a roof, balcony or similar part of a building—

(a) which is open to the sky; and

(b) to which access is provided, other than access only for maintenance; and

(c) which is not *open space*.

On-site wastewater management system means a system installed on premises that receives and/or treats wastewater generated on the premises and applies the resulting effluent to an *approved disposal system* or re-use system.

State and Territory variation

For Volume Three see *(Tas, On-site wastewater management system)*

Open-deck carpark means a carpark in which all parts of the parking *storeys* are cross-ventilated by permanent unobstructed openings in not fewer than 2 opposite or approximately opposite sides, and—

(a) each side that provides ventilation is not less than $^{1}/_{6}$ of the area of any other side; and

(b) the openings are not less than ½ of the wall area of the side concerned.

Open space means a space on the allotment, or a roof or similar part of a building adequately protected from fire, open to the sky and connected directly with a public road.

Open spectator stand means a tiered stand substantially open at the front.

Other property means all or any of the following—
(a) any building on the same or an adjoining allotment; and
(b) any adjoining allotment; and
(c) a road.

Outdoor air means air outside the building.

Outdoor air economy cycle is a mode of operation of an *air-conditioning* system that, when the outside air thermodynamic properties are favourable, increases the quantity of outside air used to condition the space.

Outfall means that part of the disposal system receiving *surface water* from the drainage system and may include a natural water course, kerb and channel, or soakage system.

Overflow devices are devices that provide relief to a water service, sanitary *plumbing* and *drainage* system, *rainwater harvesting system* or stormwater system to avoid the likelihood of uncontrolled discharges.

Overnight operating building, for the purposes of Section J of Volume One, means a building that operates more than 35 hours a week between 6:00 am and 6:00 am.

Panel wall means a non-*loadbearingexternal wall*, in frame or similar construction, that is wholly supported at each *storey*.

Patient care area means a part of a *health-care building* normally used for the treatment, care, accommodation, recreation, dining and holding of patients including a *ward area* and *treatment area*.

Performance Requirement means a requirement which states the level of performance which a *Performance Solution* or *Deemed-to-Satisfy Solution* must meet.

Performance Solution ~~**(Alternative Solution)** means a method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.~~has the meaning described in A2.2.

Perimeter of building, for the purposes of Part 3.6 in Volume Two, means the external envelope of a building.

Personal care services means any of the following:
(a) The provision of nursing care.
(b) Assistance or supervision in—
  (i) bathing, showering or personal hygiene; or
  (ii) toileting or continence management; or
  (iii) dressing or undressing; or
  (iv) consuming food.
(c) The provision of direct physical assistance to a person with mobility problems.
(d) The management of medication.
(e) The provision of substantial rehabilitative or development assistance.

Piping, for the purposes of Section J in Volume One or in Volume Two, means an assembly of pipes, with or without valves or other fittings, connected together for the conveyance of liquids and gases.

Predicted Mean Vote (PMV) means the Predicted Mean Vote of the thermal perception of building occupants determined in accordance with ANSI/ASHRAE Standard 55.

Plumbing means any water *plumbing*, roof *plumbing*, sanitary *plumbing* system or heating, ventilation and air-conditioning *plumbing*.

Plumbing or Drainage Solution means a solution which complies with the *Performance Requirements* and is a—
(a) *Performance Solution*; or
(b) *Deemed-to-Satisfy Solution*; or
(c) combination of (a) and (b).

Point of connection —
(a) for a *heated water* service means the point where the water heater connects to the cold water service downstream

of the isolation valve; and

(b) for sewage disposal means the point where the on-site *drainage* system connects to the *Network Utility Operator's* sewerage system or to an *on-site wastewater management system*; and

(c) for stormwater disposal means the point where the on-site *drainage* system connects to the *Network Utility Operator's* stormwater system or to an *approved disposal system*; and

(d) for a water service means the point where the service pipe within the premises connects to the *Network Utility Operator's* property service or to an alternative water supply system.

Pressure vessel means a vessel subject to internal or external pressure. It includes interconnected parts and components, valves, gauges and other fittings up to the first point of connection to connecting piping, and—

(a) includes fire heaters and gas cylinders; but

(b) excludes—

  (i) any vessel that falls within the definition of a *boiler*; and

  (ii) storage tanks and equipment tanks intended for storing liquids where the pressure at the top of the tank is not exceeding 1.4 kPa above or 0.06 kPa below atmospheric pressure; and

  (iii) domestic-type hot water supply heaters and tanks; and

  (iv) pressure vessels installed for the purposes of fire suppression or which serve a fire suppression system.

Primary building element, for the purposes of Volume One, means a member of a building designed specifically to take part of the loads specified in B1.2 and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

Primary building element, for the purposes of Part 3.1.3 in Volume Two, means a member of a building designed specifically to take part of the building loads and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members.

Explanatory information:

The loads to which a building may be subjected are dead, live, wind, snow and earthquake loads. Further information on building loads can be found in the 1170 series of Standards.

State and Territory variation

For Volume Two in Queensland delete the definition of *primary building element* and replace with the following:

Primary building element means—

(a) a member of a building designed specially to take part of the building loads and includes roof, ceiling, floor, stairway or ramp and wall framing members including bracing members designed for the specific purpose of acting as a brace to those members; and

(b) door jambs, window frames and reveals, architraves and skirtings.

Private bushfire shelter means a structure associated with, but not attached to, or part of a Class 1a dwelling that may, as a last resort, provide shelter for occupants from immediate life threatening effects of a bushfire.

Private garage, for the purposes of Volume One, means—

(a) any garage associated with a Class 1 building; or

(b) any single *storey* of a building of another Class containing not more than 3 vehicle spaces, if there is only one such *storey* in the building; or

(c) any separate single *storey* garage associated with another building where such garage contains not more than 3 vehicle spaces.

Private garage, for the purposes of Volume Two, means—

(a) any garage associated with a Class 1 building; or

(b) any separate single storey garage associated with another building where such garage contains not more than 3 vehicle spaces.

Product means *plumbing* and *drainage* items within the scope of the PCA including but not limited to:

(a) Materials, fixtures and components used in a *plumbing* or *drainage* installation.

(b) Appliances and equipment connected to a *plumbing* or *drainage* system.

Product Technical Statement means a form of documentary evidence stating that the properties and performance of a

building material, product or form of construction fulfil specific requirements of the NCC, and describes—
(a) the application and intended use of the building material, product or form of construction: and
(b) how the use of the building material, product or form of construction complies with the requirements of the NCC Volume One and Volume Two; and
(c) any limitations and conditions of the use of the building material, product or form of construction relevant to (b).

Professional engineer means a person who is—
(a) if legislation is applicable — a registered *professional engineer* in the relevant discipline who has appropriate experience and competence in the relevant field; or
(b) if legislation is not applicable—
  (i) registered in the relevant discipline on the National Engineering Register (NER) ~~a Corporate Member~~ of the Institution of Engineers~~,~~ Australia (which trades as 'Engineers Australia'); or
  (ii) eligible to become ~~a Corporate Member of~~registered on the Institution of Engineers~~,~~ Australia's NER~~,~~ and has appropriate experience and competence in the relevant field.

State and Territory variation

For Volume Three see *(Tas, Professional engineer)*

Public building means a Class 9b *assembly building* that is predominantly used for—
(a) civic, theatrical, social, or political purposes including a theatre, public hall or the like; or
(b) entertainment, recreational or sporting purposes including a cinema, sports stadium, *swimming pool*, sporting club, or the like; or
(c) transit purposes, including a bus station, railway station, airport or ferry terminal.

Public corridor means an enclosed corridor, hallway or the like which—
(a) serves as a means of egress from 2 or more *sole-occupancy units* to a *required exit* from the *storey* concerned; or
(b) is *required* to be provided as a means of egress from any part of a *storey* to a *required exit*.

~~**Pump power** means the power delivered to a pump, including the power needed for any drivetrain.~~

Rainwater harvesting system means a *plumbing* installation that comprises—
(a) any *plumbing* that connects a rainwater tank to any *drinking water* or *non-drinking water* outlets; and
(b) any top-up line that conveys *drinking water* from a *Network Utility Operator's* water supply to a rainwater tank.

R-Value (m2.K/W) means the thermal resistance of a component calculated in accordance with NZS 4214.~~by dividing its thickness by its thermal conductivity.~~

Recognised expert means a person with qualifications and experience in the area of *plumbing* or *drainage* in question recognised by the authority having jurisdiction.

Explanatory information:

A *recognised expert* is a person recognised by the authority having jurisdiction as qualified to provide evidence under A2.2(b). Generally, this means a hydraulic consultant or engineer, however the specific requirements are determined by the authority having jurisdiction.

Under A2.2(b), a report from a *recognised expert* may be used as evidence of suitability that a *product* listed on the *WaterMark Schedule of Excluded Products*, or a *plumbing* or *drainage* system, complies with a *Performance Requirement* or *Deemed-to-Satisfy Provision*.

State and Territory variation

For Volume Three see *(Tas, Recognised expert)*

Reference building, for the purposes of Volume One, means a hypothetical building that is used to calculate the maximum allowable ~~annual energy load, or maximum allowable~~ *annual greenhouse gas emissions* ~~*annual energy consumption*~~ for the proposed building.

Reference building, for the purposes of Volume Two, means a hypothetical building that is used to determine the maximum allowable *heating load* and *cooling load* for the proposed building.

Reflective insulation, for the purposes of Volume One, means a building membrane with a reflective surface such as a reflective foil laminate, reflective barrier, foil batt or the like capable of reducing radiant heat flow.

Reflective insulation for the purposes of Volume Two, means a building membrane with a reflective surface such as a reflective foil laminate, reflective barrier, foil batt or the like capable of reducing radiant heat flow.

Explanatory information:

(a) Typical *R-Values* achieved by adding *reflective insulation* are given in the explanatory information accompanying Figures 3.12.1.1, 3.12.1.3 and 3.12.1.4. Information on specific products may be obtained from *reflective insulation* manufacturers.

(b) The surface of *reflective insulation* may be described in terms of its emittance (or infra-red emittance) or in terms of its reflectance (or solar reflectance). Generally, for the surface of a particular *reflective insulation* –

(c) emittance + reflectance = 1.

(d) Some types of *reflective insulation* may also serve the purposes of waterproofing or vapour proofing.

Regulated energy means the energy consumed by a building's *services* minus the amount of *renewable energy* generated and used on *site*.

~~**Registered Testing Authority** means—~~

(a) ~~an organisation registered by the National Association of Testing Authorities (NATA) to test in the relevant field; or~~

(b) ~~an organisation outside Australia registered by an authority recognised by NATA through a mutual recognition agreement; or~~

(c) ~~an organisation recognised as being a *Registered Testing Authority* under legislation at the time the test was undertaken.~~

Reinforced masonry means masonry reinforced with steel reinforcement that is placed in a bed joint or grouted into a core to strengthen the masonry.

Renewable energy means energy that is derived from sources that are regenerated, replenished, or for all practical purposes cannot be depleted and the energy sources include, but are not limited to, solar, wind, hydroelectric, wave action and geothermal.

Required, for the purposes of Volume One, means *required* to satisfy a *Performance Requirement* or a *Deemed-to-Satisfy Provisions* of the BCA as appropriate.

Required, for the purposes of Volume Two, means required to satisfy a *Performance Requirement* or a *Deemed-to-Satisfy Provision* of the *Housing Provisions* as appropriate.

Required, for the purposes of Volume Three, means *required* to satisfy a *Performance Requirement* or a *Deemed-to-Satisfy Provision* of the NCC as appropriate.

Residential aged care building means a Class 3 or 9a building whose residents, due to their incapacity associated with the ageing process, are provided with physical assistance in conducting their daily activities and to evacuate the building during an emergency.

Residential care building means a Class 3, 9a or 9c building which is a place of residence where 10% or more of persons who reside there need physical assistance in conducting their daily activities and to evacuate the building during an emergency (including any *aged care building* or *residential aged care building*) but does not include a hospital.

Resident use area means part of a Class 9c building normally used by residents, and—

(a) includes *sole-occupancy units*, lounges, dining areas, activity rooms and the like; but

(b) excludes offices, storage areas, commercial kitchens, commercial laundries and other spaces not for the use of residents.

Resistance to the incipient spread of fire, in relation to a ceiling membrane, means the ability of the membrane to insulate the space between the ceiling and roof, or ceiling and floor above, so as to limit the temperature rise of materials in this space to a level which will not permit the rapid and general spread of fire throughout the space.

Explanatory information:

Resistance to the incipient spread of fire refers to the ability of a ceiling to prevent the spread of fire and thermally insulate the space between the ceiling and the roof or floor above. "*Resistance to the incipient spread of fire*" is superior to "fire-resistance" because it requires a higher standard of heat insulation~~ (see **1.2.5**)~~.

The definition is used in Volume Two for separating floors/ceilings for a Class 1a dwelling located above a non-appurtenant *private garage*.

Retail display glazing, for the purposes of Section J of Volume One, means glazing used for the display of goods in a shop or showroom.

Rise in storeys means the greatest number of *storeys* calculated in accordance with C1.2 of Volume One.

Riser means the height between consecutive treads and between each *landing* and continuous tread.

Roof light, for the purposes of Section J and Part F4 in Volume One, and Parts 2.6, 3.8.4 and 3.12 in Volume Two, means a skylight, *window* or the like installed in a roof—

(a) to permit natural light to enter the room below; and

(b) at an angle between 0 and 70 degrees measured from the horizontal plane.

Rolled fill means material placed in layers and compacted by repeated rolling by an excavator.

Safe place means—

(a) a place of safety within a building—

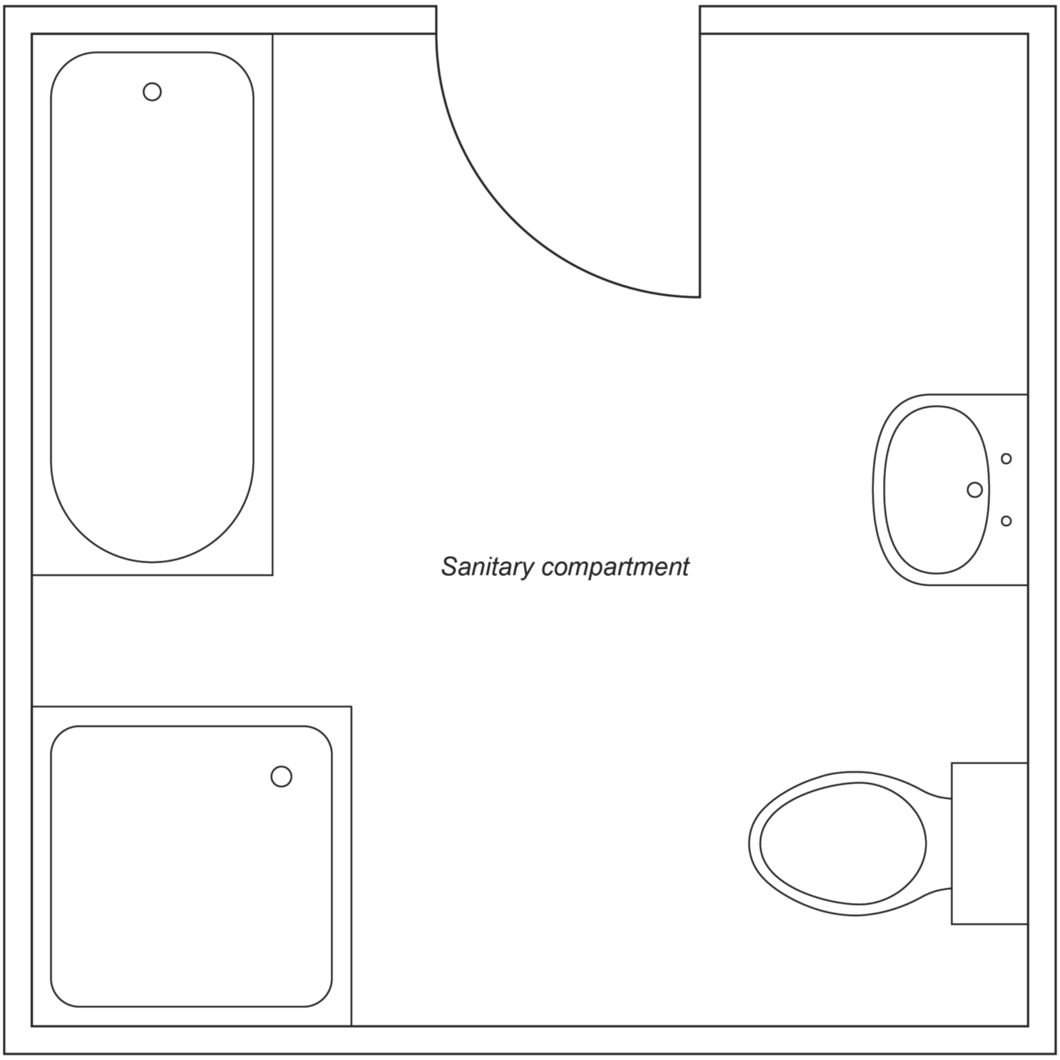
  (i) which is not under threat from a fire; and

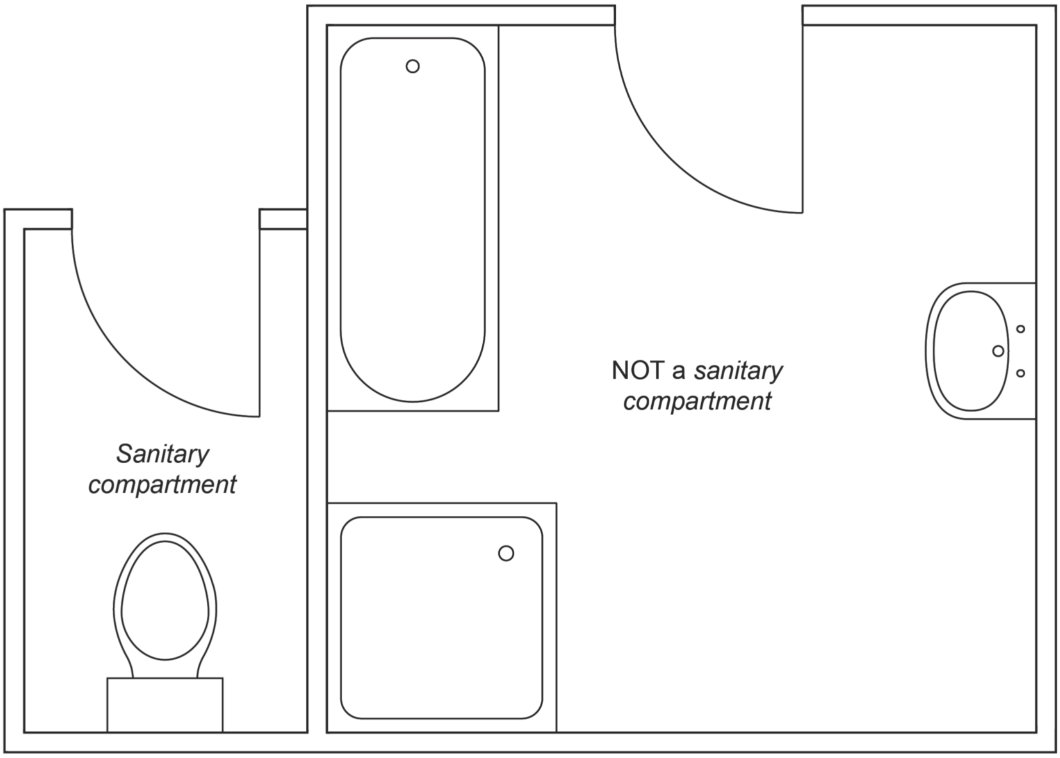
  (ii) from which people must be able to safely disperse after escaping the effects of an emergency to a road or *open space*; or

(b) a road or *open space*.

Sanitary compartment means a room or space containing a closet pan or urinal (see Figure 1.1.6).

Figure 1.1.6 Identification of a sanitary compartment





Sarking-type material means a material such as a *reflective insulation* or other flexible membrane of a type normally used for a purpose such as waterproofing, vapour proofing or thermal reflectance.

School includes a primary or secondary school, college, university or similar educational establishment.

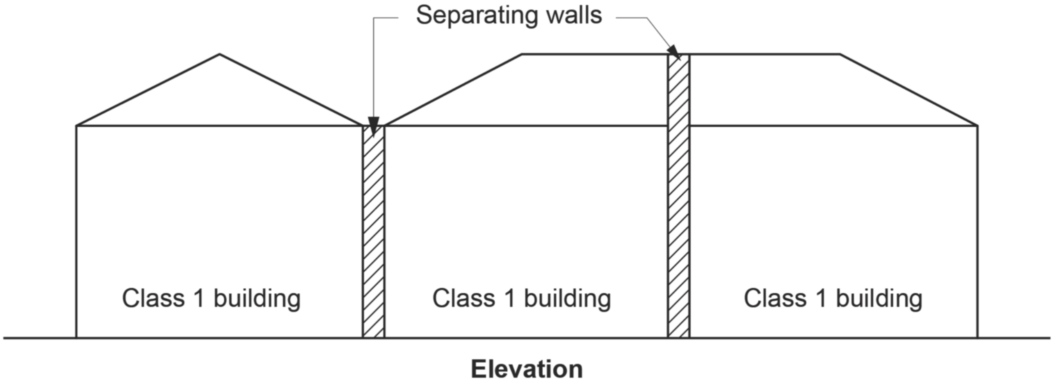
Self-closing, for the purposes of Volume One, applied to a door, means equipped with a device which returns the door to the fully closed position immediately after each opening.

Self-closing, for the purposes of Volume Two, applied to a door or *window*, means equipped with a device which returns the door or *window* to the fully closed and latched position immediately after each manual opening.

Sensible heat gain means the heat gained which causes a change in temperature

Separating wall means a wall that is common to adjoining Class 1 buildings (see Figure 1.1.3).

Figure 1.1.3 Separating wall



Note:

In Volume Two may also be known as a party wall and typically is *required* to be *fire-resisting* construction (see Part 3.7.1)

Service, for the purposes of Section J of Volume One, means a mechanical or electrical system that uses energy to provide *air-conditioning*, mechanical ventilation, heated water supply, artificial lighting, vertical transport and the like within a building, but which does not include—

(a) systems used solely for emergency purposes; and

(b) cooking facilities; and

(c) portable appliances.

Service station means a garage which is not a *private garage* and is for the servicing of vehicles, other than only washing, cleaning or polishing.

Shaft means the walls and other parts of a building bounding—

(a) a well, other than an *atrium well*; or

(b) a vertical chute, duct or similar passage, but not a chimney or flue.

Shower area means the area affected by water from a shower, including a shower over a bath.

Single leaf masonry means outer walls constructed with a single thickness of masonry unit.

Site means the part of the allotment of land on which a building stands or is to be erected.

Sitework means work on or around a *site*, including earthworks, preparatory to or associated with the construction, *alteration*, demolition or removal of a building.

Small-scale Technology Certificate means a certificate issued under the Commonwealth Government's Small-scale Renewable Energy Scheme.

Small-sized, low-speed automatic lift means a restricted use power-operated device for the infrequent raising or lowering of people with limited mobility on a platform that is controlled automatically but has the capability of being electrically isolated by a key-lockable control.

Smoke-and-heat vent means a vent, located in or near the roof for smoke and hot gases to escape if there is a fire in the building.

Smoke-Developed Index means the index number for smoke as determined by AS/NZS 1530.3.

Smoke development rate means the development rate for smoke as determined by testing flooring materials in accordance with AS ISO 9239.1.

Smoke growth rate index (SMOGRA$_{RC}$) means the index number for smoke used in the regulation of *fire hazard properties* and applied to materials used as a finish, surface, lining or attachment to a wall or ceiling.

Sole-occupancy unit means a room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes—

(a) a dwelling; or

(b) a room or suite of rooms in a Class 3 building which includes sleeping facilities; or

(c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building; or

(d) a room or suite of associated rooms in a Class 9c building, which includes sleeping facilities and any area for the exclusive use of a resident.

Spandrel panel, for the purposes of Section J of Volume One, means the combination of wall and *glazing* components comprising the *envelope* of a building.

Spiral stairway means a stairway with a circular plan, winding around a central post with steps that radiate from a common centre or several radii (see Figures 3.9.1.2(a) and (b)).

Spread-of-Flame Index means the index number for spread of flame as determined by AS/NZS 1530.3.

Stage means a floor or platform in a Class 9b building on which performances are presented before an audience.

Stairway platform lift means a power-operated device for raising or lowering people with limited mobility on a platform (with or without a chair) in the direction of a stairway.

Standard Fire Test means the Fire-resistance Tests of Elements of Building Construction as described in AS 1530.4.

Storey means a space within a building which is situated between one floor level and the floor level next above, or if there is no floor above, the ceiling or roof above, but not—

(a) a space that contains only—
  (i) a lift *shaft*, stairway or meter room; or
  (ii) a bathroom, shower room, laundry, water closet, or other *sanitary compartment*; or
  (iii) accommodation intended for not more than 3 vehicles; or
  (iv) a combination of the above; or

(b) a *mezzanine*.

Structural adequacy, in relation to an FRL, means the ability to maintain stability and adequate *loadbearing* capacity as determined by AS 1530.4.

Structural member means a component or part of an assembly which provides vertical or lateral support to a building or structure.

Surface water means all naturally occurring water, other than sub-*surface water*, which results from rainfall on or around the *site* or water flowing onto the *site*.

Swimming pool means any excavation or structure containing water and principally used, or that is designed, manufactured or adapted to be principally used for swimming, wading, paddling, or the like, including a bathing or wading pool, or spa.

Tapered tread means a stair tread with a walking area that grows smaller towards one end.

Tenable environment means, for the purposes of P2.3.5 of Volume Two, an environment within a sealed *private bushfire shelter* that will—

(a) prevent an occupant's core body temperature—
  (i) rising by more than 2°C; and
  (ii) reaching 42°C; and

(b) maintain a minimum 17% oxygen content; and

(c) maintain a maximum 3.5% carbon dioxide content.

Thermal comfort level means the level of thermal comfort in a building expressed as a *PMV* sensation scale.

Total R-Value (m2.K/W) means the sum of the *R-Values* of the individual component layers in a composite element including any building material, insulating material, airspace and associated surface resistances.

Total ~~S~~system Solar Heat Gain Coefficient (SHGC) means the fraction of incident irradiance on a *wall-glazing construction* ~~*glazing*~~ or a *roof light* that adds heat to a building's space.

Total ~~S~~system U-Value (W/m2.K) means the thermal transmittance of the composite element allowing for the effect of any airspaces, thermal bridging and associated surface resistances.

Treatment area means an area within a *patient care area* such as an operating theatre and rooms used for recovery, minor procedures, resuscitation, intensive care and coronary care from which a patient may not be readily moved.

Uncontrolled discharge includes leakage, seepage and any unintentional release of fluid from a plumbing and drainage system.

Unique wall, for the purposes of FV1 in Volume One and V2.2.1 in Volume Two, means a wall which is neither a *cavity wall* nor a *direct fix cladding wall*.

Unobstructed opening, for the purposes of Part 3.6 of Volume Two, means a glazed area that a person could mistake for an open doorway or clearway and walk into the glazed panel.

Unreinforced masonry means masonry that is not reinforced.

Vapour pressure means the pressure at which water vapour is in thermodynamic equilibrium with its condensed state.

Ventilation opening means an opening in the *external wall*, floor or roof of a building designed to allow air movement into or out of the building by natural means including a permanent opening, an openable part of a *window*, a door or other device which can be held open.

Verification Method means a test, inspection, calculation or other method that determines whether a *Performance Solution* complies with the relevant *Performance Requirements*.

Vessel, for the purposes of Volume One and Part 3.8.1 of Volume Two, means an open, pre-formed, pre-finished concave receptacle capable of holding water, usually for the purpose of washing, including a basin, sink, bath, laundry tub and the like.

Waffle raft means a stiffened raft with closely spaced ribs constructed on the ground and with slab panels supported between ribs.

Wall-glazing construction, for the purposes of Section J of Volume One, means the combination of the *glazing* components, and *external wall* components comprising the *envelope* of a building.

Ward area means that part of a *patient care area* for resident patients and may contain areas for accommodation, sleeping, associated living and nursing facilities.

Warm water generator means a water heater that achieves a delivery temperature no greater than 45°C.

Water control layer means a *water control membrane* or the exterior cladding when no *water control membrane* is present.

Water control membrane a water barrier as classified by AS 4200.1.

WaterMark Conformity Assessment Body (WMCAB) means a conformity assessment body registered with and accredited by the *JAS-ANZ* to conduct evaluations leading to *product* certification and contracted with the *administering body* to issue the *WaterMark Licence*.

WaterMark Certification Scheme means the ABCB scheme for certifying and authorising *plumbing* and *drainageproducts*.

WaterMark Licence means a licence issued by a *WaterMark Conformity Assessment Body*.

WaterMark Schedule of Excluded Products means the list maintained by the *administering body* of *products* excluded from the *WaterMark Certification Scheme*.

WaterMark Schedule of Products means the list maintained by the *administering body* of *products* included in the *WaterMark Certification Scheme*, and the specifications to which the *products* can be certified.

Explanatory Information:

The *WaterMark Schedule of Products* and the *WaterMark Schedule of Excluded Products* can be viewed on the ABCB website at www.abcb.gov.au.

Waterproof means the property of a material that does not allow moisture to penetrate through it.

Water resistant means the property of a system or material that restricts moisture movement and will not degrade under conditions of moisture.

Water sensitive materials means materials that have an inherent capacity to absorb water vapour and include: timber, plasterboard, plywood, oriented strand board and the like.

Watertight means will not allow water to pass from the inside to the outside of the component or joint and vice versa.

Wet area means an area within a building supplied with water from a water supply system, which includes bathrooms, showers, laundries and *sanitary compartments* and excludes kitchens, bar areas, kitchenettes or domestic food and beverage preparation areas.

Winders means treads within a straight *flight* that are used to change direction of the stair (see Figure 1.1.7).

Window includes a roof light, glass panel, glass block or brick, glass louvre, glazed sash, glazed door, or other device which transmits natural light directly from outside a building to the room concerned when in the closed position.

Zone protection means the installation of a *backflow prevention device* at the point where a water service is connected to multiple fixtures or appliances, with no *backflow prevention devices* installed as *individual protection* downstream of this point.

A1.2 Adoption of Standards and other references

Where a the NCC references a document, rule, specification or provision, that adoption does not include a provision—

(a) specifying or defining the respective rights, responsibilities or obligations as between themselves of any manufacturer, supplier or purchaser; or

(b) specifying the responsibilities of any trades person or other building operative, architect, engineer, authority, or other person or body; or

(c) requiring the submission for approval of any material, building component, plumbing or drainage component, form or method of construction, to any person, authority or body other than a person or body empowered under State or Territory legislation to give that approval; or

(d) specifying that a material, building component, plumbing or drainage component, form or method of construction must be submitted to any person, authority or body for expression of opinion; or

(e) permitting a departure from the code, rule, specification or provision at the sole discretion of the manufacturer or purchaser, or by arrangement or agreement between the manufacturer and purchaser.

A1.3 Referenced Standards, etc

(a) A reference in a the NCC to a document under A1.2 refers to the edition or issue, together with any amendment, listed in Specification A1.3 and only so much as is relevant in the context in which the document is quoted.

(b) Any—

    (i) reference in a document listed in Specification A1.3 (primary document) to another document (secondary document); and

    (ii) subsequent references to other documents in secondary documents and those other documents,

    is a reference to the secondary and other documents as they existed at the time of publication of the primary document listed in Specification A1.3.

(c) The provisions of (b) do not apply if the secondary referenced document is also a primary referenced document.

(d) Where the NCC references a document under A1.2 which is subject to publication of a new edition or amendment not listed under Specification A1.3, the new edition or amendment is not referenced for the purposes of the NCC clauses listed in Table 1 of Specification A1.3.

A1.4 Differences between referenced documents and the NCC

The NCC overrules in any difference arising between it and any Standard, rule, specification or provision in a document listed in Specification A1.3.

A1.5 Compliance with all Performance Requirements

Subject to A1.6, Class 2–9 buildings must be so designed and constructed that they comply with the relevant provisions of Section A and the *Performance Requirements* of this Volume.

A1.6 Application of the NCC to a particular State or Territory

For application within a particular State or Territory, this Volume of the NCC comprises—

(a) Sections A to J (inclusive); and

(b) the variations, deletions and additions to Sections A to J applicable to that State or Territory specified in the relevant Appendix.

A1.7 Language

(a) A reference to a building in the NCC is a reference to an entire building or part of a building, as the case requires.

(b) A reference in a *Performance Requirement* of the NCC to "the degree necessary" means that consideration of all the criteria referred to in the *Performance Requirement* will determine the outcome appropriate to the circumstances. These words have been inserted to indicate that in certain situations it may not be necessary to incorporate any specific measures to meet the *Performance Requirement*.

(c) A reference to "BCA" in this volume, other than in the **Introduction**, means "Volume One of the Building Code of Australia".

(d) A reference to a Class 1a, 1b, 7a, 7b, 9a, 9b, 9c, 10a, 10b and 10c is a reference to the separate classification.

(e) A reference to—

  (i) Class 1 — is a reference to a Class 1a and 1b; and

  (ii) Class 7 — is a reference to a Class 7a and 7b; and

  (iii) Class 9 — is a reference to a Class 9a, 9b and 9c; and

  (iv) Class 10 — is a reference to a Class 10a, 10b and 10c.

Interpretation of diagrams

Diagrams in the *Housing Provisions* are used to describe specific issues referenced in the associated text. They are not to be construed as containing all design information that is *required* for that particular building element or situation.

Explanatory information:

Diagrams are used to explain the requirements of a particular clause. To ensure the context of the requirement is clearly understood, adjacent construction elements of the building that would normally be required in that particular situation are not always shown.

Accordingly, aspects of a diagram that are not shown should not be interpreted as meaning these construction details are not *required*.

A1.8 Explanatory Information

(a) These elements of the BCA are non-mandatory. They are used to provide additional guidance on the application of the particular Parts and clauses and do not need to be followed to meet the requirements of the BCA.

(b) Explanatory Information identified for cross-volume consideration is provided under certain *Deemed-to-Satisfy Provisions* to identify Parts of NCC Volume Three – the Plumbing Code of Australia (PCA) which may be relevant where the work being undertaken is subject to the requirements of the PCA.

(c) The ABCB gives no warranty or guarantee that the Explanatory Information is correct or complete. The ABCB shall not be liable for any loss howsoever caused whether due to negligence or otherwise arising from the use of or reliance on the Explanatory Information.

(d) The ABCB recommends that anyone seeking to rely on the Explanatory Information obtain their own independent expert advice in relation to building or related activities.

Schedule 4 Referenced documents

Schedule of referenced documents

The Standards and other documents listed in Schedule 4 are referred to in the NCC.

Table 1 Schedule of referenced documents

No.	Date	Title	Volume One	Volume Two	Volume Three
AS/NZS ISO 717 Part 1	~~1996~~2004	Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation See Note 1	F5.2, FV5.1, FV5.2, FV5.3, FV5.4	V2.4.6, 3.8.6.2	N/A
AS ISO 717 Part 2	2004	Acoustics — Rating of sound insulation in buildings and building elements — Impact sound insulation	F5.3, FV5.1	N/A	N/A
AS 1056 Part 1	1991	Storage water heaters — General requirements (incorporating amendments 1, 2, 3, 4 and 5)	N/A	N/A	B2.~~4~~2
AS/NZS 1158 Part 1	2005	Lighting for roads and public spaces	J6.5	N/A	N/A
AS/NZS 1170 Part 0	2002	Structural design actions — General principles (incorporating amendments 1, 3 & 4)	B1.1, B1.2, Spec B1.2	3.0.2, 3.5.1.0	N/A
AS/NZS 1170 Part 1	2002	Structural design actions — Permanent, imposed and other actions (incorporating amendments 1 & 2)	B1.2	3.9.1.2, 3.9.1.3, 3.9.2.3, 3.0.3	N/A
AS/NZS 1170 Part 2	2011	Structural design actions — Wind actions (incorporating amendments 1, 2, 3, 4 & 5)	B1.2, B1.4, Spec B1.2, FV1	Schedule 3~~1.1.1~~, V2.2.1, 3.5.1.0, 3.0.3	N/A
AS/NZS 1170 Part 3	2003	Structural design actions — Snow and ice actions (incorporating amendments 1 & 2)	B1.2	3.0.3	N/A
AS 1170 Part 4	2007	Structural design actions — Earthquake actions in Australia (incorporating amendment 1)	B1.2	3.0.3, 3.4.4.1	N/A
AS 1191	2002	Acoustics — Method for laboratory measurement of airborne sound insulation of building elements	Spec F5.5	N/A	N/A
~~AS/NZS 1200~~	~~2000~~	~~Pressure equipment~~	~~N/A~~	~~N/A~~	~~E1.2~~
~~AS 1271~~	~~2003~~	~~Safety valves, other~~	~~N/A~~	~~N/A~~	~~E1.2~~

No.	Date	Title	Volume One	Volume Two	Volume Three
		~~valves, liquid level gauges, and other fittings for boilers and unfired pressure vessels (incorporating amendment 1)~~			
AS 1273	1991	Unplasticized PVC (UPVC) downpipe and fittings for rainwater	N/A	3.5.2.2	N/A
~~AS/NZS 1276.1~~	~~1999~~	~~Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation~~	~~F5.2, FV5.1, FV5.2~~	~~V2.4.6, 3.8.6.2~~	~~N/A~~
AS 1288	2006	Glass in buildings — Selection and installation (incorporating amendments 1, 2 & 3)	B1.4, Spec C2.5, Spec C3.4	3.6.0, 3.6.1, 3.6.3, 3.9.2.3, ~~3.10.1.0, 3.11.6~~	N/A
AS 1289 Method 6.3.3	1997	Methods of testing soils for engineering purposes — Determination of the penetration resistance of a soil — Perth sand penetrometer test (incorporating amendment 1)	N/A	3.2.2.2	N/A
~~AS 1324 Part 1~~	~~2001~~	~~Air filters for use in general ventilation and air-conditioning — Application, performance and construction~~	~~N/A~~	~~N/A~~	~~E1.2~~
~~AS 1345~~	~~1995~~	~~Identification of the contents of pipes, conduits and ducts~~	~~N/A~~	~~N/A~~	~~E1.2~~
~~AS 1358~~	~~2004~~	~~Bursting discs and bursting disc devices — Application, selection, installation (incorporating amendment 1)~~	~~N/A~~	~~N/A~~	~~E1.2~~
AS 1397	2011	Continuous hot dip metallic coated sheet steel and strip - coatings of zinc and zinc alloyed with aluminium and magnesium (incorporating amendment 1)	N/A	3.4.2.2, 3.5.1.3	N/A
AS 1428 Part 1	2009	Design for access and mobility — General requirements for access — New building work (incorporating amendments 1 & 2)	Schedule 3~~A1.1~~, D2.10, D2.15, D2.17, D3.1, D3.2, D3.3, D3.6, D3.10, D3.12, Spec D3.10, E3.8, F2.4, G4.5	N/A	~~B1.3, B2.3, C1.3~~E1.2
AS 1428 Part 1	2001	Design for access and mobility — General	H2.7, H2.8, H2.10, H2.15	N/A	~~B1.3, B2.3, C1.3~~E1.2

No.	Date	Title	Volume One	Volume Two	Volume Three
		requirements for access — New building work			
AS 1428 Part 1 (Supplement 1)	1993	Design for access and mobility — General requirements for access — Buildings — Commentary	H2.2	N/A	N/A
AS 1428 Part 2	1992	Design for access and mobility — Enhanced and additional requirements — Buildings and facilities	H2.2, H2.3, H2.4, H2.5, H2.7, H2.10, H2.11, H2.12, H2.13, H2.14	N/A	~~B1.3, B2.3, C1.3~~E1.2
AS 1428 Part 4	1992	Design for access and mobility — Tactile ground surface indicators for orientation of people with vision impairment	H2.11	N/A	N/A
AS/NZS 1428.4 Part 1	2009	Design for access and mobility — Means to assist the orientation of people with vision impairment — Tactile ground surface indicators (incorporating amendments 1 & 2)	D3.8	N/A	N/A
AS 1530 Part 1	1994	Methods for fire tests on building materials, components and structures — Combustibility test for materials	Schedule 3~~A1.1~~	Schedule 3~~1.1.1~~	N/A
AS 1530 Part 2	1993	Methods for fire tests on building materials, components and structures — Test for flammability of materials (incorporating amendment 1)	Schedule 3~~A1.1~~	Schedule 3~~1.1.1~~	N/A
AS 1530 Part 4	2014	Methods for fire tests on building materials, components and structures - Fire-resistance tests on elements of construction ~~See Note 2~~	Schedule 3~~A1.1~~, C3.15, C3.16, Spec A2.4, Spec C3.15, Spec D1.12	Schedule 3~~1.1.1~~, 3.7.1.8	N/A
AS/NZS 1530 Part 3	1999	Methods for fire tests on building materials, components and structures — Simultaneous determination of ignitability, flame propagation, heat release and smoke release	Schedule 3~~A1.1~~, Spec A2.4	Schedule 3~~1.1.1~~	N/A

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~~AS/NZS 1546 Part 1~~	~~1998~~	~~On-site domestic wastewater treatment units — Septic tanks~~	~~N/A~~	~~N/A~~	~~C2.2, F1.2~~
~~AS/NZS 1546 Part 2~~	~~2001~~	~~On-site domestic wastewater treatment units — Waterless composting toilets~~	~~N/A~~	~~N/A~~	~~C2.2, F1.2~~
~~AS/NZS 1546 Part 3~~	~~2001~~	~~On-site domestic wastewater treatment units — Aerated wastewater treatment systems~~	~~N/A~~	~~N/A~~	~~C2.2, F1.2~~
~~AS/NZS 1547~~	~~2000~~	~~On-site domestic wastewater management~~	~~N/A~~	~~N/A~~	~~C2.2, F1.2~~
AS 1562 Part 1	1992	Design and installation of sheet roof and wall cladding — Metal (incorporating amendments 1, 2 & 3)	B1.4, F1.5	3.5.1.0, 3.5.3.0	N/A
AS/NZS 1562 Part 2	1999	Design and installation of sheet roof and wall cladding — Corrugated fibre-reinforced cement	F1.5	3.5.1.0	N/A
AS/NZS 1562 Part 3	1996	Design and installation of sheet roof and wall cladding — Plastics	B1.4, F1.5	3.5.1.0	N/A
~~AS/NZS 1571~~	~~1995~~	~~Copper — Seamless tubes for air-conditioning and refrigeration~~	~~N/A~~	~~N/A~~	~~E1.2~~
AS 1603 Part 1 (R2016)	1997	Automatic fire detection and alarm systems — Heat detectors	Spec E2.2d	N/A	N/A
AS 1603 Part 2 (R2016)	1997	Automatic fire detection and alarm systems — Point type smoke detectors	Spec E2.2d	N/A	N/A
AS 1657	2013	Fixed platforms, walkways, stairways and ladders — Design, construction and installation (incorporating amendment 1)	D1.16, D1.17, D2.18, H1.6, H3.5	N/A	N/A
AS/NZS 1664 Part 1	1997	Aluminium structures — Limit state design (incorporating amendment 1)	B1.4	3.0.4~~3.11.6~~	N/A
AS/NZS 1664 Part 2	1997	Aluminium structures — Allowable stress design (incorporating amendment 1)	B1.4	3.0.4~~3.11.6~~	N/A
AS/NZS 1668 Part 1	2015	The use of ~~mechanical~~ ventilation and air-conditioning in buildings — Fire and smoke	C2.12, C3.15, Spec C2.5, D1.7, Spec E1.8, E2.2, F4.12, Spec	N/A	~~E1.2~~

No.	Date	Title	Volume One	Volume Two	Volume Three
		control in ~~multi-compartment~~ buildings	E2.2b, Spec G3.8		
AS 1668 Part 2	2012	The use of ~~mechanical~~ ventilation and air-conditioning in buildings — Mechanical ventilation in buildings (incorporating amendments 1 & 2)	FV4.1, F4.5, F4.11, F4.12, ~~Spec J5.2a~~JV3, J5.3	3.8.5.0, V2.4.5	~~E1.2~~
AS 1668 Part 4	2012	The use of ventilation and airconditioning in buildings — Natural ventilation of buildings	F4.11	N/A	N/A
AS 1670 Part 1	2015	Fire detection, warning, control and intercom systems — Systems design, installation and commissioning - Fire (incorporating amendment 1)	C3.5, C3.6, C3.7, C3.8, C3.11, D2.21, G4.8, Spec C3.4, E2.2, Spec E2.2a, Spec G3.8	3.7.2.2	N/A
AS 1670 Part 3	2004	Fire detection, warning, control and intercom systems — Systems design, installation and commissioning — Fire alarm monitoring	Spec E2.2a	N/A	N/A
AS 1670 Part 4	2015	Fire detection, warning, control and intercom systems — Systems design, installation and commissioning — ~~Sound systems and intercom systems for emergency purposes~~Emergency warning and intercom systems	E4.9, Spec G3.8	N/A	N/A
AS/NZS 1680 Part 0	2009	Interior lighting — Safe movement	F4.4	3.8.4.3	N/A
AS 1684 Part 2	2010	Residential timber-framed construction — Non-cyclonic areas (incorporating amendments 1 & 2)	B1.4, B1.5, F1.12	3.0.5, 3.2.5.6, 3.4.0.2, 3.4.1.2, 3.4.3.0~~3.10.1.0, 3.11.7~~	N/A
AS 1684 Part 3	2010	Residential timber-framed construction — Cyclonic areas (incorporating amendment 1)	B1.4, B1.5, F1.12	3.0.5, 3.2.5.6, 3.4.0.2, 3.4.1.2~~3.10.1.0, 3.11.7~~	N/A
AS 1684 Part 4	2010	Residential timber-framed construction — Simplified — non-cyclonic areas (incorporating amendment 1)	B1.4, B1.5, F1.12	3.0.5, 3.2.5.6, 3.4.0.2, 3.4.1.2, 3.4.3.0~~3.11.7~~	N/A
AS 1720 Part 1	2010	Timber structures — Design methods (incorporating	B1.4	3.4.3.0~~3.11.6~~	N/A

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		amendments 1, 2 & 3)			
AS 1720 Part 4	2006	Timber structures — Fire resistance for structural adequacy of timber members	Spec A2.3	N/A	N/A
AS 1720 Part 5	2015	Timber structures — Nailplated timber roof trusses	B1.4	3.4.3.0~~3.11.6~~	N/A
AS 1735 Part 11	1986	Lifts, escalators and moving walks — Fire-rated landing doors	C3.10	N/A	N/A
AS 1735 Part 12	1999	Lifts, escalators and moving walks — Facilities for persons with disabilities (incorporating amendment 1)	E3.6, H2.6	N/A	N/A
AS/NZS 1859 Part 4	2004	Reconstituted wood-based panels — Specifications — Wet-processed fibreboard	N/A	3.5.3.3, 3.5.3.4	N/A
AS 1860 Part 2	2006	Particleboard flooring — Installation (incorporating amendment 1)	B1.4	N/A	N/A
AS 1905 Part 1	2015	Components for the protection of openings in fire-resistant walls — Fire-resistant doorsets (incorporating amendment 1)	C3.6, Spec C3.4	N/A	N/A
AS 1905 Part 2	2005	Components for the protection of openings in fire-resistant walls — Fire-resistant roller shutters	Spec C3.4	N/A	N/A
AS 1926 Part 1	2012	Swimming pool safety — Safety barriers for swimming pools	G1.1, G1.3	3.10.1.0~~3.9.3.0~~	N/A
AS 1926 Part 2	2007	Swimming pool safety — Location of safety barriers for swimming pools (incorporating amendments 1 & 2)	G1.1	3.10.1.0~~3.9.3.0~~	N/A
AS 1926 Part 3	2010	Swimming pool safety — Water recirculation systems (incorporating amendment 1)	G1.1	3.10.1.0~~3.9.3.0~~	N/A
AS 2047	2014	Windows and external glazed doors in buildings (incorporating amendments 1 & 2) See Note 2	B1.4, FV1, F1.13, J3.4	V2.2.1, 3.6.0, 3.6.1, 3.12.3.3~~3.10.1.0, 3.11.6~~	N/A
AS 2049	2002	Roof tiles (incorporating amendment 1)	B1.4, F1.5	3.5.2.0, 3.5.2.1~~3.5.1.0, 3.5.1.2~~	N/A
AS 2050	2002	Installation of roof tiles	B1.4, F1.5	3.5.2.0,	N/A

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		(incorporating amendments 1 & 2)		3.5.2.1~~3.5.1.0, 3.5.1.2~~	
~~AS 2118 Part 1~~	~~1999~~	~~Automatic fire sprinkler systems - General requirements (incorporating amendment 1)~~ ~~See Note 3~~	~~Spec E1.5, CV3~~	N/A	~~B4.2~~
AS 2118 Part 1	2017	Automatic fire sprinkler systems — General systems (incorporating amendment 1)	Spec E1.5, CV3	N/A	B4.2
AS 2118 Part 4	2012	Automatic fire sprinkler systems — Sprinkler protection for accommodation buildings not exceeding four storeys in height	Spec E1.5	N/A	B4.2
AS 2118 Part 5	1995	Automatic fire sprinkler systems — Domestic	N/A	N/A	B4.2
AS 2118 Part 6	2012	Automatic fire sprinkler systems — Combined sprinkler and hydrant systems in multistorey buildings	Spec E1.5	N/A	B4.2
AS 2118 Part 9	1995	Automatic fire sprinkler systems - Piping support and installation	N/A	N/A	B4.2
AS 2159	2009	Piling — Design and installation (incorporating amendment 1)	B1.4	3.2.0~~3.11.6~~	N/A
AS/NZS 2179 Part 1	2014	Specification for rainwater goods, accessories and fasteners - Metal shape or sheet rainwater goods and metal accessories and fasteners	N/A	3.5.2.2	N/A
AS/NZS 2269 Part 0	2012	Plywood — Structural - Specifications (incorporating amendment 1)	N/A	3.5.3.4	N/A
AS 2293 Part 1	2005	Emergency escape lighting and exit signs for buildings - System design, installation and operation (incorporating amendments 1 & 2)	E4.4, E4.8	N/A	N/A
~~AS 2293 Part 3~~	~~2005~~	~~Emergency escape lighting and exit signs for buildings — Emergency escape luminaires and exit signs (incorporating amendments 1 & 2)~~	~~A1.1, H3.15~~	~~N/A~~	~~N/A~~
AS 2327 Part 1	2003	Composite structures —	Spec A2.3, B1.4	3.0.4~~3.11.6~~	N/A

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		Simply supported beams			
AS 2419 Part 1	2005	Fire hydrant installations — System design, installation and commissioning (incorporating amendment 1)	C2.12, E1.3	N/A	B4.2
AS 2441	2005	Installation of fire hose reels (incorporating amendment 1)	E1.4	N/A	B4.2
AS 2444	2001	Portable fire extinguishers and fire blankets — Selection and location	E1.6	N/A	N/A
AS 2665	2001	Smoke/heat venting systems — Design, installation and commissioning	Spec E2.2c, Spec G3.8	N/A	N/A
AS 2712	2007	Solar and heat pump water heaters - Design and construction (incorporating amendments 1, 2 & 3)	N/A	N/A	Acceptable plumbing practice B2
AS 2870	2011	Residential slabs and footings	F1.10	3.1.2.4, 3.1.3.2, 3.1.3.4, 3.2.0, 3.2.1, 3.2.2.4, 3.2.2.6, 3.2.3.2, 3.2.4.1, 3.2.5, 3.2.5.2, 3.2.5.6~~3.11.6~~	N/A
AS/NZS 2890 Part 6	2009	Parking facilities — Off-street parking for people with disabilities	D3.5	N/A	N/A
AS/NZS 2904	1995	Damp-proof courses and flashings (incorporating amendments 1 & 2)	F1.9	3.5.3.6	N/A
AS/NZS 2908 Part 1	2000	Cellulose cement products — Corrugated sheets	B1.4, F1.5	N/A	N/A
AS/NZS 2908 Part 2	2000	Cellulose cement products — Flat sheets	Schedule 3~~A1.1~~	Schedule 3~~1.1.1~~, 3.5.3.3, 3.5.3.4, 3.5.3.5	N/A
AS/NZS 2918	2001	Domestic solid-fuel burning appliances — Installation	G2.2	3.7.3.0, 3.7.3.4, 3.7.3.5	N/A
AS/NZS 3000	2018	Electrical installations (known as the Australian/New Zealand Wiring Rules)	Spec E2.2d	N/A	N/A
AS/NZS 3013	2005	Electrical installations — Classification of the fire and mechanical performance of wiring system elements	C2.13	N/A	N/A
AS/NZS 3100	2017	Approval and test specification — General requirements for electrical equipment	Spec E2.2d	N/A	N/A

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AS 3498	2009	Authorization requirements for plumbing products - Water heaters and hot-water storage	N/A	N/A	Acceptable plumbing practice B2
AS/NZS 3500 Part 0	2003	Plumbing and drainage — Glossary of terms	N/A	N/A	N/A
AS/NZS 3500 Part 1	2015	Plumbing and drainage — Water services (incorporating amendment 1)	N/A	N/A	B1.4~~2~~, B3.3~~2~~, B4.2, BV5.1, B5.2, B5.3, B5.4, SPEC5.1, B6.4, B6.5, ~~E1.2~~
AS/NZS 3500 Part 2	2015	Plumbing and drainage — Sanitary plumbing and drainage (incorporating amendment 1)	N/A	N/A	C1.~~2~~3, CV2.2, C2.~~2~~3, C2.4, ~~E1.2, F1.2, F2.2~~
AS/NZS 3500 Part 3	2015	Plumbing and drainage — Storm water drainage	F1.1	3.1.2.0, 3.1.2.4, 3.5.2.0, 3.5.2.5	~~D1.2, D2.2~~ N/A
AS/NZS 3500 Part 4	2015	Plumbing and drainage — Heated water services (incorporating amendment 1)	N/A	N/A	B2.2, B2.~~4~~5, B2.6, B2.7, B2.8, B2.9, Acceptable plumbing practice B2, C2.3 ~~E1.2~~
~~AS/NZS 3500 Part 5~~	~~2012~~	~~Plumbing and drainage — Housing installations~~	~~N/A~~	~~3.1.2.0, 3.1.2.4, 3.5.2.0, 3.5.2.5~~	~~B1.2, B2.2, B3.2, C1.2, C2.2, D1.2, D2.2, F1.2~~
AS 3600	2009	Concrete structures (incorporating amendments 1 & 2)	Spec A2.3, B1.4	3.2.2.4, 3.2.3.1, 3.2.5.6~~3.11.6~~	N/A
~~AS 3660 Part 1~~	~~2000~~	~~Termite management — New building work~~ ~~See Note 4~~	~~B1.4, F1.9~~	~~3.1.3.2, 3.1.3.3~~	~~N/A~~
AS 3660 Part 1	2014	Termite management — New building work	B1.4, F1.9	3.1.3.2, 3.1.3.3	N/A
AS 3660.3 Part 3	2014	Termite management — Assessment criteria for termite management systems	N/A	3.1.3.3	N/A
AS/NZS 3666 Part 1	2011	Air handling and water systems of buildings — Microbial control — Design, installation and commissioning	F2.7, F4.5	N/A	~~E1.2~~N/A
~~AS/NZS 3666 Part 2~~	~~2011~~	~~Air handling and water systems of buildings — Microbial control — Operation and maintenance~~	~~N/A~~	~~N/A~~	~~E1.2~~
AS 3700	2011	Masonry structures (incorporating	Spec A2.3, B1.4	3.3.1.0, 3.3.2.0, 3.3.3.0,	N/A

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		amendments 1 & 2)		3.3.4.0~~3.10.1.0, 3.11.6~~	
AS 3740	2010	Waterproofing of domestic wet areas (incorporating amendment 1)	F1.7	3.8.1.2	N/A
~~AS 3786~~	~~1993~~	~~Smoke alarms using scattered light, transmitted light or ionization (incorporating amendments 1, 2, 3 & 4)~~ ~~See Note 5~~	~~Spec E2.2a~~	~~3.7.2.2~~	~~N/A~~
AS 3786	2014	Smoke alarms using scattered light, transmitted light or ionization (incorporating amendment 1)	Spec E2.2a	3.7.2.2	N/A
AS/NZS 3823 Part 1.2	2012	Performance of electrical appliances — Air-conditioners and heat pumps — Ducted air-conditioners and air-to-air heat pumps — Testing and rating for performance	~~JV2, JV3, Spec J5.2e~~J5.11, Spec JVa	N/A	N/A
AS 3959	2009	Construction of buildings in bushfire-prone areas (incorporating amendments 1, 2 & 3)	G5.2	3.7.4.0	Acceptable plumbing practice B1~~N/A~~
AS/NZS 4020	2005	Testing of products in contact with drinking water	N/A	N/A	A5.3~~2.1~~
~~AS 4041~~	~~2006~~	~~Pressure piping~~	~~N/A~~	~~N/A~~	~~E1.2~~
AS 4055	2012	Wind loads for housing (incorporating amendment 1)	N/A	Schedule 3~~1.1.1~~, 3.0.3	N/A
AS 4072 Part 1	2005	Components for the protection of openings in fire-resistant separating elements — Service penetrations and control joints (incorporating amendment 1) ~~See Note 6~~	C3.15	3.7.1.8	N/A
AS 4100	1998	Steel Structures (incorporating amendment 1)	Spec A2.3, B1.4	3.2.5.6, 3.4.2.0, 3.4.4.0~~3.10.1.0, 3.11.6~~	N/A
AS 4118 Part 2.1	1995	Fire Sprinkler Systems — Piping — General (incorporating amendment 1)	N/A	N/A	B4.2
AS/NZS 4200 Part 1	~~1994~~2017	Pliable building membranes and underlays — Materials	F1.6	3.5.1.0	N/A
AS~~/NZS~~ 4200 Part	~~1994~~2017	Pliable building	F1.6	3.5.1.0	N/A

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2		membranes and underlays — Installation requirements			
AS/NZS 4234	2008	Heated water systems — Calculation of energy consumption (incorporating amendments 1, 2 & 3)	N/A	N/A	BV2.~~2~~1, B2.~~4~~2
AS 4254 Part 1	2012	Ductwork for air-handling systems in buildings — Flexible duct	Spec C1.10, J5.6~~Spec J5.2b~~	3.7.1.9, 3.12.5.3	~~E1.2~~N/A
AS 4254 Part 2	2012	Ductwork for air-handling systems in buildings — Rigid duct	Spec C1.10, J5.6~~Spec J5.2b~~	3.7.1.9, 3.12.5.3	~~E1.2~~N/A
AS/NZS 4256 Part 1	1994	Plastic roof and wall cladding materials — General requirements	B1.4, F1.5	3.5.1.0	N/A
AS/NZS 4256 Part 2	1994	Plastic roof and wall cladding materials — Unplasticized polyvinyl chloride (uPVC) building sheets	B1.4, F1.5	3.5.1.0	N/A
AS/NZS 4256 Part 3	1994	Plastic roof and wall cladding materials — Glass fibre reinforced polyester (GRP)	B1.4, F1.5	3.5.1.0	N/A
AS/NZS 4256 Part 5	1996	Plastic roof and wall cladding materials — Polycarbonate	B1.4, F1.5	3.5.1.0	N/A
AS/NZS 4284	2008	Testing of building facades	FV1	V2.2.1	N/A
AS 4426	1997	Thermal insulation of pipework, ductwork and equipment — Selection, installation and finish	N/A	N/A	~~E1.2~~N/A
AS 4428 Part 6	1997	Fire detection, warning, control and intercom systems — Control and indicating equipment — Alarm signalling equipment	Spec E2.2d	N/A	N/A
AS/NZS 4505	2012	Garage doors and other large access doors (incorporating amendment 1)	B1.4	3.0.4~~3.11.6, 3.10.1.0~~	N/A
AS 4508	1999	Thermal resistance of insulation for ductwork used in building air conditioning (incorporating amendment 1)	N/A	N/A	~~E1.2~~N/A
AS 4552	2005	Gas fired water heaters for hot water supply and/or central heating	N/A	N/A	B2.~~4~~2
AS 4586	2013	Slip resistance	D2.10, D2.13,	3.9.1.4	N/A

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		classification of new pedestrian surface materials (incorporating amendment 1) See Note 3	D2.14		
AS/NZS 4600	2005	Cold-formed steel structures (incorporating amendment 1)	B1.4	3.4.2.0, 3.4.2.1, 3.4.4.0~~3.10.1.0, 3.11.6~~	N/A
AS 4654 Part 1	2012	Waterproofing membranes for external above-ground use — Materials	F1.4	3.8.1.3	N/A
AS 4654 Part 2	2012	Waterproofing membranes for external above-ground use — Design and installation	F1.4	3.8.1.3	N/A
AS 4773 Part 1	2015	Masonry for small buildings — Design (incorporating amendment 1)	N/A	3.3.1.0, 3.3.2.0, 3.3.3.0, 3.3.4.0~~3.10.1.0, 3.11.6~~	N/A
AS 4773 Part 2	2015	Masonry for small buildings — Construction	N/A	3.3.1.0, 3.3.2.0, 3.3.3.0, 3.3.4.0~~3.10.1.0, 3.11.6~~	N/A
AS/NZS 4859 Part 1	2002	Materials for the thermal insulation of buildings — General criteria and technical provisions (incorporating amendment 1)	J1.2, J5.5, J5.8~~Spec J5.2b, Spec J5.2c~~	3.12.1.1,3.12.1.5, 3.12.5.1	N/A
AS 5113	2016	Fire propagation testing and classification of external walls of buildings	CV3	N/A	N/A
AS 5146 Part 1	2015	Reinforced autoclaved aerated concrete — Structures	B1.4	3.5.3.0, 3.11.6	N/A
AS/NZS 5263 Part 1.2	2016	Gas appliances — Gas fired water heaters for hot water supply and/or central heating	J5.9	N/A	N/A
~~AS 5601~~	~~2004~~	~~Gas Installations~~	~~N/A~~	~~N/A~~	~~E1.2~~
AS 5637 Part 1	2015	Determination of fire hazard properties - Wall and ceiling linings ~~See Note 8~~	Spec C1.10	N/A	N/A
AS ISO 9239 Part 1	2003	Reaction to fire tests for flooring — Determination of the burning behaviour using a radiant heat source	~~A1.1~~Schedule 3	N/A	N/A
AS/NZS ISO 9972	2015	Thermal performance of buildings — Determination of air permeability of buildings	JV4	V2.6.2.3	N/A

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		— Fan pressurization method			
AIRAH-DA09	1998	Air Conditioning Load Estimation	Spec JVc	N/A	N/A
AIRAH-DA28 Appendix B	2011	Building Management and Control Systems — HVAC Control Routines	Spec JVb	N/A	N/A
Australian Institute of Steel Construction (AISC)	1987	Guidelines for assessment of fire resistance of structural steel members	Spec A2.3	N/A	N/A
ANSI/ASHRAE Standard 55	2013	Thermal environmental conditions for human occupancy	Schedule 3	N/A	N/A
ANSI/ASHRAE Standard 140	2014	Standard method of test for the evaluation of building energy analysis computer programs	JV1, JV2, JV3	V2.6.2.2	N/A
ASTM D3018-90	1994	Class A asphalt shingles surfaced with mineral granules	B1.4, F1.5	3.5.1.0	N/A
ASTM E2073-10	2010	Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings	Spec E4.8	N/A	N/A
ASTM E72-80	1981	Standard method of conducting strength tests of panels for building construction	Spec C1.8	N/A	N/A
ASTM E695-79	1985	Standard method of measuring relative resistance of wall, floor and roof construction to impact loading	Spec C1.8	N/A	N/A
AHRI 460	2005	Remote mechanical-draft air-cooled refrigerant condensers	~~Spec J5.2a~~J5.12	N/A	N/A
AHRI ~~550/590~~ 551/591	20015~~3~~	~~Water chilling packages using the vapour compression cycle~~Performance rating of water-chilling and Heating Packages Using the Vapor Compression Cycle	JV3, J5.10~~Spec J5.2e~~/	N/A	N/A
~~BS 7190~~	~~1989~~	~~Assessing thermal performance of low temperature hot water boilers using a test rig~~	~~JV3, Spec J5.2d~~	~~N/A~~	~~N/A~~
ABCB	2019	Fire Safety Verification Method	CV4, DV4, EV1.1, EV2.1, EV3.2, EV4.2, GV4.1	N/A	
~~ABCB~~	~~2006~~	~~Protocol for Building Energy Analysis Software Version 2006.1~~	~~JV2, JV3~~	~~N/A~~	~~N/A~~

ABCB	2011	Protocol for Structural Software, Version 2011.1	B1.5	3.4.0.2	N/A
ABCB	2012	Standard for Construction Buildings in Flood Hazard Areas, Version 2012.2	B1.6	3.10.3.0	N/A
CIBSE Guide A	20~~06~~15	Environmental design	JV3, Spec JVb	N/A	N/A
Disability Standards for Accessible Public Transport	2002		H2.1	N/A	N/A
Education and Care Services National Law Act (Vic)	2010		Schedule 3~~A1.1~~	N/A	N/A
European Union Commission Regulation 622/Annexx II, point 2	2012	Eco-design requirements for glandless standalone circulators and glandless circulators integrated in products	J5.7b	N/A	N/A
ISO 140 Part 6	1998E	Acoustics — Measurement of sound insulation in buildings and of building elements — Laboratory measurements of impact sound insulation of floors	Spec F5.5	N/A	N/A
ISO 540	2008	Hard coal and coke — Determination of ash fusibility	Spec C3.15	N/A	N/A
ISO 8100-32	2018	Lifts and service lifts	J6.7	N/A	N/A
ISO 8336	1993E	Fibre cement flat sheets	~~A1.1~~Schedule 3	~~1.1.1~~Schedule 3, 3.5.3.3, 3.5.3.4, 3.5.3.5	N/A
ISO 25745 Part 2	2012	Energy performance of lifts, escalators and moving walks — Part 2: Energy calculation and classification for lifts (elevators)	J6.7	N/A	N/A
NASH Standard	2014	Steel Framed Construction in Bushfire Areas (incorporating amendment A)	N/A	3.7.4.0	N/A
NASH Standard Part 1	2005	Residential and Low-Rise Steel Framing — Design Criteria (incorporating amendments A, B & C)	B1.4	3.4.2.0, 3.4.2.1, 3.10.1.0, 3.11.6	N/A
NASH Standard Part 2	2014	Residential and Low-Rise Steel Framing — Design Solutions (incorporating amendment A)	B1.4, B1.5, F1.12	3.4.0.2, 3.4.1.2, 3.4.2.0, 3.4.2.1, 3.10.1.0, 3.11.7	N/A
N/A	N/A	Northern Territory Deemed to Comply Standards Manual	N/A	3.10.1.0	N/A
NZS 4214	2006	Methods of determining the total thermal	J1.2	N/A	N/A

No.	Date	Title	Volume One	Volume Two	Volume Three
		resistance of parts of buildings			
SA TS 101	2015	Design of post-installed and cast-in fastenings for use in concrete	B1.4	3.11.6	N/A
TN 61		Cement Concrete and Aggregates Australia — Articulated walling	N/A	3.2.1	N/A

Notes associated with Table 1:

(1) For AS/NZS ~~1276~~ISO 717.1:

(a) Test reports based on AS 1276 — 1979 and issued prior to AS/NZS 1276.1 — 1999 being referenced in the ~~BCA~~ NCC remain valid.

(b) The STC values in reports based on AS 1276 — 1979 shall be considered to be equivalent to Rw values.

(c) Test reports based on AS/NZS 1276.1 prepared after the ~~BCA~~NCC reference date for AS/NZS 1276.1 — 1999 must be based on that version.

(d) Test reports based on AS/NZS ISO 717.1 — 1996 and issued prior to AS/NZS ISO 717.1 — 2004 being referenced in the NCC remain valid.

(e) Reports based on AS/NZS ISO 717.1 relating to tests carried out after the NCC reference date for AS/NZS ISO 717.1 — 2004 must relate to the amended Standard.

~~(2) For AS 1530 Part 4:~~

~~(a) Subject to the note to AS 4072.1, reports relating to tests carried out under earlier editions of AS 1530 Parts 1 to 4 remain valid.~~

~~(b) Reports relating to tests carried out after the date of an amendment to a Standard must relate to the amended Standard.~~

(2) For AS 2047:

(a) Tests carried out under earlier editions of AS 2047 remain valid.

(b) Reports based on AS 2047 relating to tests carried out after the NCC reference date for AS 2047 — 2014 Amendment 2 must relate to the amended Standard.

~~(3) For AS 2118.1, the 1999 edition has been retained for a transitional period ending on 11 March 2019, except Clause 5.6.13 of the 1999 edition is replaced with Clause 5.9.10 of the 2017 edition.~~

~~(4) For AS 3660.1, the 2000 edition has been retained for a transitional period ending on 30 April 2017.~~

~~(5) For AS 3786, the 1993 edition has been retained for a transitional period ending on 30 April 2017.~~

~~(6) For AS 4072.1, systems tested to AS 1530.4 prior to 1 January 1995 need not be retested to comply with the provisions in AS 4072.1.~~

(~~7~~3) For AS 4586:

(a) Test reports based on the 2004 edition of AS/NZS 4586 and issued prior to the 2013 edition of AS 4586 being referenced in the ~~BCA~~ NCC remain valid.

(b) Test reports prepared after the ~~BCA~~NCC reference date of the 2013 edition of AS 4586 must be based on that version.

(c) For the purposes of assessing compliance, the slip-resistance classifications of V, W and X in reports based on the 2004 edition of AS/NZS 4586 may be considered to be equivalent to slip-resistance classifications of P5, P4 and P3 respectively in the 2013 edition of AS 4586.

(d) Test reports based on Appendix D of AS 4586 — 2013 and issued prior to the NCC reference date for AS 4586 — 2013 (incorporating Amendment 1) remain valid.

(e) Test reports based on Appendix D of AS 4586 — 2013 and prepared after the NCC reference date for AS 4586 — 2013 (incorporating Amendment 1) must be based on that version.

~~(8) For AS 5637 Part 1, test reports indicating the *group number* of wall and ceiling linings determined under versions of the BCA applicable prior to 1 May 2016 remain valid until 1 May 2019.~~

State and Territory variations for Volume 1—schedule of referenced documents

ACT, *NSW*, *NT*, *QLD*, *SA*, *Tas*, *Vic Spec A1.3 Table 1*

SCHEDULE 5 FIRE-RESISTANCE OF BUILDING ELEMENTS

1. Scope

This Schedule sets out the procedures for determining the FRL of building elements.

2. Rating

A building element meets the requirements of this Specification if—

(a) it is listed in, and complies with Table 1a-l~~1~~ of this Specification; or

(b) it is identical with a prototype that has been submitted to the *Standard Fire Test*, or an equivalent or more severe test, and the FRL achieved by the prototype without the assistance of an active fire suppression system is confirmed in a report from a *Registered Testing Authority* which—

- (i) describes the method and conditions of the test and the form of construction of the tested prototype in full; and
- (ii) certifies that the application of restraint to the prototype complied with the *Standard Fire Test*; or

(c) it differs in only a minor degree from a prototype tested under (b) and the FRL attributed to the building element is confirmed in a report from a *Registered Testing Authority* which—

- (i) certifies that the building element is capable of achieving the FRL despite the minor departures from the tested prototype; and
- (ii) describes the materials, construction and conditions of restraint which are necessary to achieve the FRL; or

(d) it is designed to achieve the FRL in accordance with—

- (i) AS 2327.1, AS 4100 and AISC Guidelines for Assessment of Fire Resistance of Structural Steel Members if it is a steel or composite structure; or
- (ii) AS 3600 if it is a concrete structure; or
- (iii) AS 1720.4 if it is a timber element other than *fire-protected timber*; or
- (iv) AS 3700 if it is a masonry structure; or

(e) the FRL is determined by calculation based on the performance of a prototype in the *Standard Fire Test* and confirmed in a report in accordance with Clause 3; or

(f) for *fire-protected timber*, it complies with Specification A1.1 where applicable.

3. FRLs determined by calculation

If the FRL of a building element is determined by calculation based on a tested prototype—

(a) the building element may vary from the prototype in relation to—

- (i) length and height if it is a wall; and
- (ii) height if it is a column; and
- (iii) span if it is a floor, roof or beam; and
- (iv) conditions of support; and
- (v) to a minor degree, cross-section and components; and

(b) the report must demonstrate by calculation that the building element would achieve the FRL if it is subjected to the regime of the *Standard Fire Test* in relation to—

- (i) *structural adequacy* (including deflection); and
- (ii) *integrity*; and
- (iii) *insulation*; and

(c) the calculations must take into account—

- (i) the temperature reached by the components of the prototype and their effects on strength and modulus of elasticity; and
- (ii) appropriate features of the building element such as support, restraint, cross-sectional shape, length, height, span, slenderness ratio, reinforcement, ratio of surface area to mass per unit length, and fire protection; and

(iii) features of the prototype that influenced its performance in the *Standard Fire Test* although these features may not have been taken into account in the design for dead and live load; and

(iv) features of the conditions of test, the manner of support and the position of the prototype during the test, that might not be reproduced in the building element if it is exposed to fire; and

(v) the design load of the building element in comparison with the tested prototype.

4. Interchangeable materials

(a) Concrete and plaster — An FRL achieved with any material of Group A, B, C, D or E as an ingredient in concrete or plaster, applies equally when any other material of the same group is used in the same proportions:

Group A: Any portland cement.

Group B: Any lime.

Group C: Any dense sand.

Group D: Any dense calcareous aggregate, including any limestone or any calcareous gravel.

Group E: Any dense siliceous aggregate, including any basalt, diorite, dolerite, granite, granodiorite or trachyte.

(b) Perlite and vermiculite — An FRL achieved with either gypsum-perlite plaster or gypsum-vermiculite plaster applies equally for each plaster.

5. Columns covered with lightweight construction

If the *fire-resisting* covering of a steel column is *lightweight construction*, the construction must comply with C1.8 and C3.17.

6. Non-loadbearing elements

If a non-*loadbearing* element is able to be used for a purpose where the *Deemed-to-Satisfy Provisions* prescribe an FRL for *structural adequacy*, *integrity* and *insulation*, that non-*loadbearing* element need not comply with the *structural adequacy* criteria.

Table 1a Minimum thickness (mm) of principal material for FRLs deemed to be achieved by wall building elements

Building element	**60/60/60**	**90/90/90**	**120/120/120**	**180/180/180**	**240/240/240**	**Annexure reference**
Ashlar masonry	N/A	N/A	N/A	N/A	300 mm	Clauses 1, 2, 5, 6
Calcium silicate masonry	N/A	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	N/A	N/A
Concrete masonry	N/A	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	N/A	N/A
Fired clay (inc terracotta) masonry	N/A	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	see 2(d)(iv) of this Specification	N/A	N/A
No-fines concrete	N/A	N/A	N/A	150 mm	170 mm	Clauses 1, 5, 6
Prestressed concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A
Reinforced concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A
Plain concrete	N/A	N/A	N/A	150 mm	170 mm	Clauses 1, 5, 6
Solid gypsum blocks	75 mm	90 mm	100 mm	110 mm	125 mm	Clauses 1, 5, 6
Gypsum — perlite or Gypsum	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 5, 7

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
vermiculite-plaster on metal lath and channel (non-*loadbearing* walls only)						

Table 1b Minimum thickness (mm) of principal material for FRLs deemed to be achieved by concrete column building elements

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
Prestressed concrete column	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A
Reinforced concrete column	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A

Table 1c Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element inc. a fabricated column exposed on no more than 3 sides (Clause 8)

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
Fire protection of Concrete — Cast in-situ—*loadbearing*	25 mm	30 mm	40 mm	55 mm	75 mm	Clauses 9, 11, 12
Fire protection of Concrete — Cast in-situ—non-*loadbearing* unplastered	25 mm	30 mm	40 mm	50 mm	65 mm	Clauses 9, 11, 12
Fire protection of Concrete — Cast in-situ—non-*loadbearing*—plastered 13 mm—	25 mm	25 mm	30 mm	40 mm	50 mm	Clauses 1, 6, 9, 11, 12
Fire protection of Gypsum—Cast in-situ	N/A	N/A	N/A	N/A	50 mm	Clauses 9, 11, 12
Fire protection of Gypsum—perlite or Gympsum vermiculite plaster sprayed to contour	20 mm	25 mm	35 mm	50 mm	55 mm	Clauses 1, 11
Fire protection of Gypsum—perlite or Gympsum vermiculite plaster sprayed on metal lath	20 mm	20 mm	25 mm	35 mm	45 mm	Clauses 1, 7

Table 1d Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element inc. a fabricated column exposed on no more than 3 sides and with column spaces filled (Clauses 8, 9)

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
Fire protection of—Solid calcium-silicate masonry	50 mm	50 mm	50 mm	50 mm	65 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid clay masonry	50 mm	50 mm	50 mm	65 mm	90 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid concrete masonry	50 mm	50 mm	50 mm	65 mm	90 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid gypsum blocks	50 mm	50 mm	50 mm	50 mm	65 mm	Clauses 1, 3, 11, 12
Fire protection of—Hollow terracotta blocks plastered 13mm	50 mm	50 mm	50 mm	65 mm	90 mm	Clauses 1, 3, 6, 10, 11, 12

Table 1e Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element inc. a fabricated column exposed on no more than 3 sides and with column spaces unfilled (Clause 8)

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
Fire protection of—Solid calcium-silicate masonry	50 mm	50 mm	50 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid clay masonry	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid concrete masonry	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid gypsum blocks	50 mm	50 mm	50 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Hollow terracotta blocks—plastered 13mm	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 6, 10, 11, 12

Table 1f Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element inc. a fabricated column exposed on 4 sides (Clause 8)

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Fire protection	25 mm	40 mm	45 mm	65 mm	90 mm	Clauses 9, 11,

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
of—Concrete—Cast in situ—*loadbearing*						12
Fire protection of—Concrete—Cast in situ—non-*loadbearing*—unplastered	25 mm	30 mm	40 mm	50 mm	65 mm	Clauses 9, 11, 12
Fire protection of—Concrete—Cast in situ—non-*loadbearing*—plastered 13 mm	25 mm	25 mm	30 mm	40 mm	50 mm	Clauses 1, 6, 9, 11, 12
Fire protection of—Gypsum—Cast in situ	N/A	N/A	N/A	N/A	50 mm	Clauses 9, 11, 12
Fire protection of—Gypsum perlite or Gypsum vermiculite plaster sprayed to contour	25 mm	30mm	40 mm	55 mm	65 mm	Clauses 1, 11
Fire protection of—Gypsum perlite or Gypsum vermiculite plaster sprayed on metal lath	20 mm	20 mm	30 mm	40 mm	50 mm	Clauses 1, 7

Table 1g Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element (inc. a fabricated column) exposed on 4 sides and with column spaces filled (Clause 8, 9)

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Fire protection of—Solid calcium silicate masonry	50 mm	50 mm	50 mm	65 mm	75 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid clay masonry	50 mm	50 mm	50 mm	75 mm	100 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid concrete masonry	50 mm	50 mm	50 mm	75 mm	100 mm	Clauses 1, 3, 11, 12
Fire protection of—Solid gypsum blocks	50 mm	50 mm	50 mm	65 mm	75 mm	Clauses 1, 3, 11, 12
Fire protection of—Hollow terracotta blocks—	50 mm	50 mm	50 mm	75 mm	100 mm	Clauses 1, 3, 6, 10, 11, 12

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
plastered 13mm						

Table 1h Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel column building element (inc. a fabricated column) exposed on 4 sides and with column spaces unfilled (Clause 8)

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Fire protection of—Solid calcium silicate masonry	50 mm	50 mm	50 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid clay masonry	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid concrete masonry	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Solid gypsum blocks	50 mm	50 mm	50 mm	N/A	N/A	Clauses 1, 3, 11, 12
Fire protection of—Hollow terracotta blocks—plastered 13 mm	50 mm	50 mm	65 mm	N/A	N/A	Clauses 1, 3, 6, 10, 11, 12

Table 1i Minimum thickness (mm) of principal material for FRLs deemed to be achieved by concrete beam building elements

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Prestressed concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A
Reinforced concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A

Table 1j Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel building element inc. an open-web joist girder truss etc exposed on no more than 3 sides (Clause 8)

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Fire protection of—Concrete—Cast in-situ	25 mm	30 mm	40 mm	50 mm	65 mm	Clauses 11, 12
Fire protection of—Gypsum-perlite or Gypsum-vermiculite plaster sprayed to contour	20 mm	25 mm	35 mm	50 mm	55mm	Clauses 1, 11
Fire protection	20 mm	20 mm	25 mm	35 mm	45 mm	Clauses 1, 7

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
of—Gypsum-perlite or Gypsum-vermiculite plaster sprayed on metal lath						

Table 1k Minimum thickness (mm) of principal material for FRLs deemed to be achieved by a hot-rolled steel building element inc. an open-web joist girder truss etc exposed on 4 sides (Clause 8)

Building element	60/-/-	90/-/-	120/-/-	180/-/-	240/-/-	Annexure reference
Fire protection of—Concrete—Cast in-situ	25 mm	40 mm	45 mm	65 mm	90 mm	Clauses 11, 12
Fire protection of—Gypsum-perlite or Gypsum-vermiculite plaster—sprayed to contour	25 mm	30 mm	40 mm	55 mm	65 mm	Clauses 1, 11
Fire protection of—Gypsum-perlite or Gypsum-vermiculite plaster—sprayed on metal lath	20 mm	20 mm	30 mm	40 mm	50 mm	Clauses 1, 7

Table 1l Minimum thickness (mm) of principal material for FRLs deemed to be achieved by floor, roof or ceiling building elements

Building element	60/60/60	90/90/90	120/120/120	180/180/180	240/240/240	Annexure reference
Prestressed concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A
Reinforced concrete	N/A	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	see 2(d)(ii) of this Specification	N/A	N/A

~~**Table 1 FRLs DEEMED TO BE ACHIEVED BY CERTAIN BUILDING ELEMENT**~~

~~Building element~~	~~Minimum thickness (mm) of principal material for FRL's~~					~~Annexure reference~~
~~WALL~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~**Masonry**~~						
~~Ashlar~~	~~–~~	~~–~~	~~–~~	~~–~~	~~300~~	~~1, 2, 5, 6~~
~~Calcium silicate~~		~~see 2(d)(iv) of this Specification~~				
~~Concrete~~		~~see 2(d)(iv) of this Specification~~				
~~Fired clay (inc terracotta)~~		~~see 2(d)(iv) of this Specification~~				
~~**Concrete**~~						
~~No-fines~~	~~–~~	~~–~~	~~–~~	~~150~~	~~170~~	~~1, 5, 6~~

~~Building element~~	~~Minimum thickness (mm) of principal material for FRL's~~					~~Annexure reference~~
~~Prestressed~~		~~see 2(d)(ii) of this Specification~~				
~~Reinforced~~		~~see 2(d)(ii) of this Specification~~				
~~Plain~~	~~–~~	~~–~~	~~–~~	~~150~~	~~170~~	~~1, 5, 6~~
~~**Solid gypsum blocks**~~	~~75~~	~~90~~	~~100~~	~~110~~	~~125~~	~~1, 5, 6~~
~~**Gypsum — perlite or Gypsum-vermiculite plaster** on metal lath and channel (non *loadbearing* walls only)~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 5, 7~~
~~**CONCRETE COLUMN**~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~Prestressed~~		~~see 2(d)(ii) of this Specification~~				
~~Reinforced~~		~~see 2(d)(ii) of this Specification~~				
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~(inc. a fabricated column) exposed on no more than 3 sides:~~						~~8~~
~~Fire protection of **Concrete** — Cast in situ —~~						
~~*loadbearing*~~	~~25~~	~~30~~	~~40~~	~~55~~	~~75~~	~~9, 11, 12~~
~~non *loadbearing* —~~						
~~unplastered~~	~~25~~	~~30~~	~~40~~	~~50~~	~~65~~	~~9, 11, 12~~
~~plastered 13 mm —~~	~~25~~	~~25~~	~~30~~	~~40~~	~~50~~	~~1, 6, 9, 11, 12~~
~~**Gypsum** — Cast in situ~~	~~–~~	~~–~~	~~–~~	~~–~~	~~50~~	~~9, 11, 12~~
~~**Gypsum — perlite or Gypsum-vermiculite plaster**~~						
~~sprayed to contour~~	~~20~~	~~25~~	~~35~~	~~50~~	~~55~~	~~1, 11~~
~~sprayed on metal lath~~	~~20~~	~~20~~	~~25~~	~~35~~	~~45~~	~~1, 7~~
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~(inc. a fabricated column) exposed on no more than 3 sides and with column spaces filled:~~						~~8, 9~~
~~Fire protection of —~~						
~~**Solid calcium-silicate masonry**~~	~~50~~	~~50~~	~~50~~	~~50~~	~~65~~	~~1, 3, 11, 12~~
~~**Solid clay masonry**~~	~~50~~	~~50~~	~~50~~	~~65~~	~~90~~	~~1, 3, 11, 12~~
~~**Solid concrete masonry**~~	~~50~~	~~50~~	~~50~~	~~65~~	~~90~~	~~1, 3, 11, 12~~
~~**Solid gypsum blocks**~~	~~50~~	~~50~~	~~50~~	~~50~~	~~65~~	~~1, 3, 11, 12~~
~~**Hollow terracotta blocks**~~						
~~plastered 13 mm~~	~~50~~	~~50~~	~~50~~	~~65~~	~~90~~	~~1, 3, 6, 10, 11, 12~~
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~(inc. a fabricated column) exposed on no more than 3 sides and with column spaces unfilled:~~						~~8~~
~~Fire protection of —~~						
~~**Solid calcium- silicate masonry**~~	~~50~~	~~50~~	~~50~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid clay masonry**~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid concrete masonry**~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid gypsum blocks**~~	~~50~~	~~50~~	~~50~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Hollow terracotta blocks** —~~						
~~plastered 13 mm~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 6, 10, 11, 12~~

~~Building element~~	~~Minimum thickness (mm) of principal material for FRL's~~					~~Annexure reference~~
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/-/-~~	~~90/-/-~~	~~120/-/-~~	~~180/-/-~~	~~240/-/-~~	~~Clause~~
~~(inc. a fabricated column) exposed on 4 sides:~~						~~8~~
~~Fire protection of —~~						
~~**Concrete** — Cast in-situ —~~						
~~*loadbearing*~~	~~25~~	~~40~~	~~45~~	~~65~~	~~90~~	~~9, 11, 12~~
~~non-*loadbearing*~~						
~~unplastered~~	~~25~~	~~30~~	~~40~~	~~50~~	~~65~~	~~9, 11, 12~~
~~plastered 13 mm~~	~~25~~	~~25~~	~~30~~	~~40~~	~~50~~	~~1, 6, 9, 11, 12~~
~~**Gypsum** — Cast in-situ~~	~~–~~	~~–~~	~~–~~	~~–~~	~~50~~	~~9, 11, 12~~
~~**Gypsum-perlite or Gypsum-vermiculite plaster**~~						
~~sprayed to contour~~	~~25~~	~~30~~	~~40~~	~~55~~	~~65~~	~~1, 11~~
~~sprayed on metal lath~~	~~20~~	~~20~~	~~30~~	~~40~~	~~50~~	~~1, 7~~
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/-/-~~	~~90/-/-~~	~~120/-/-~~	~~180/-/-~~	~~240/-/-~~	~~Clause~~
~~(inc. a fabricated column) exposed on 4 sides and with column spaces filled:~~						~~8, 9~~
~~Fire protection of —~~						
~~**Solid calcium- silicate masonry**~~	~~50~~	~~50~~	~~50~~	~~65~~	~~75~~	~~1, 3, 11, 12,~~
~~**Solid clay masonry**~~	~~50~~	~~50~~	~~50~~	~~75~~	~~100~~	~~1, 3, 11, 12~~
~~**Solid concrete masonry**~~	~~50~~	~~50~~	~~50~~	~~75~~	~~100~~	~~1, 3, 11, 12~~
~~**Solid gypsum blocks**~~	~~50~~	~~50~~	~~50~~	~~65~~	~~75~~	~~1, 3, 11, 12~~
~~**Hollow terracotta blocks** —~~						
~~plastered 13 mm~~	~~50~~	~~50~~	~~50~~	~~75~~	~~100~~	~~1, 3, 6, 10, 11, 12~~
~~**HOT-ROLLED STEEL COLUMN**~~						
	~~60/-/-~~	~~90/-/-~~	~~120/-/-~~	~~180/-/-~~	~~240/-/-~~	~~Clause~~
~~(inc. a fabricated column) exposed on 4 sides and with column spaces unfilled:~~						~~8~~
~~Fire protection of —~~						
~~**Solid calcium-silicate masonry**~~	~~50~~	~~50~~	~~50~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid clay masonry**~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid concrete masonry**~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Solid gypsum blocks**~~	~~50~~	~~50~~	~~50~~	~~–~~	~~–~~	~~1, 3, 11, 12~~
~~**Hollow terracotta blocks** —~~						
~~plastered 13 mm~~	~~50~~	~~50~~	~~65~~	~~–~~	~~–~~	~~1, 3, 6, 10, 11, 12~~
~~**BEAM**~~						
	~~60/-/-~~	~~90/-/-~~	~~120/-/-~~	~~180/-/-~~	~~240/-/-~~	~~Clause~~
~~**Concrete** —~~						
~~Prestressed~~		~~see 2(d)(ii) of this Specification~~				
~~Reinforced~~		~~see 2(d)(ii) of this Specification~~				
~~**Hot-rolled Steel** (inc. an open-web joist girder truss etc) exposed on no more than 3 sides:~~						~~8~~
~~Fire protection of —~~						
~~**Concrete** — Cast in-situ~~	~~25~~	~~30~~	~~40~~	~~50~~	~~65~~	~~11, 12~~
~~**Gypsum-perlite or Gypsum-vermiculite plaster**~~						
~~sprayed to contour~~	~~20~~	~~25~~	~~35~~	~~50~~	~~55~~	~~1, 11~~
~~sprayed on metal lath~~	~~20~~	~~20~~	~~25~~	~~35~~	~~45~~	~~1, 7~~

~~Building element~~	~~Minimum thickness (mm) of principal material for FRL's~~					~~Annexure reference~~
~~**Hot-rolled Steel** (inc. an open-web joist girder truss etc) exposed on 4 sides:~~						~~8~~
~~Fire protection of —~~						
~~**Concrete** — Cast in-situ~~	~~25~~	~~40~~	~~45~~	~~65~~	~~90~~	~~11, 12~~
~~**Gypsum-perlite or Gypsum-vermiculite plaster** —~~						
~~sprayed to contour~~	~~25~~	~~30~~	~~40~~	~~55~~	~~65~~	~~1, 11~~
~~sprayed on metal lath~~	~~20~~	~~20~~	~~30~~	~~40~~	~~50~~	~~1, 7~~
~~**FLOOR, ROOF OR CEILING**~~						
	~~60/60/60~~	~~90/90/90~~	~~120/120/120~~	~~180/180/180~~	~~240/240/240~~	~~Clause~~
~~**Concrete** —~~						
~~Prestressed~~		~~see 2(d)(ii) of this Specification~~				
~~Reinforced~~		~~see 2(d)(ii) of this Specification~~				

ANNEXURE TO TABLES 1a-l

1. MORTAR, PLASTER AND PLASTER REINFORCEMENT

1.1 Mortar for masonry

Masonry units of ashlar, calcium silicate, concrete or fired clay (including terracotta blocks) must be laid in cement mortar or composition mortar complying with the relevant provisions of AS 3700.

1.2 Gypsum blocks

Gypsum blocks must be laid in gypsum-sand mortar or lime mortar.

1.3 Gypsum-sand mortar and plaster

Gypsum-sand mortar and gypsum-sand plaster must consist of either—

(a) not more than 3 parts by volume of sand to 1 part by volume of gypsum; or

(b) if lime putty is added, not more than 2.5 parts by volume of sand to 1 part by volume of gypsum and not more than 5% of lime putty by volume of the mixed ingredients.

1.4 Gypsum-perlite and gypsum-vermiculite plaster

Gypsum-perlite or gypsum-vermiculite plaster must be applied—

(a) in either one or 2 coats each in the proportions of 1 m^3 of perlite or vermiculite to 640 kg of gypsum if the *required* thickness of the plaster is not more than 25 mm; and

(b) in 2 coats if the *required* thickness is more than 25 mm, the first in the proportions of 1 m^3 of perlite or vermiculite to 800 kg of gypsum and the second in the proportions of 1 m^3 of perlite or vermiculite to 530 kg of gypsum.

1.5 Plaster of cement and sand or cement, lime and sand

Plaster prescribed in Tables 1a-l~~1~~ must consist of—

(a) cement and sand or cement, lime and sand; and

(b) may be finished with gypsum, gypsum-sand, gypsum-perlite or gypsum-vermiculite plaster or with lime putty.

1.6 Plaster reinforcement

If plaster used as fire protection on walls is more than 19 mm thick—

(a) it must be reinforced with expanded metal lath that—

(i) has a mass per unit area of not less than 1.84 kg/m^2; and

(ii) has not fewer than 98 meshes per metre; and

(iii) is protected against corrosion by galvanising or other suitable method; or

(b) it must be reinforced with 13 mm x 13 mm x 0.7 mm galvanised steel wire mesh, and with the reinforcement must be securely fixed at a distance from the face of the wall of not less than 1/3 of the total thickness of the plaster.

2. ASHLAR STONE MASONRY

Ashlar masonry must not be used in a part of the building containing more than 2 *storeys*, and must not be of—

(a) aplite, granite, granodiorite, quartz dacite, quartz diorite, quartz porphyrite or quartz porphyry; or

(b) conglomerate, quartzite or sandstone; or

(c) chert or flint; or

(d) limestone or marble.

3. DIMENSIONS OF MASONRY

The thicknesses of masonry of calcium-silicate, concrete and fired clay are calculated as follows:

3.1 Solid units

For masonry in which the amount of perforation or coring of the units does not exceed 25% by volume (based on the overall rectangular shape of the unit) the thickness of the wall must be calculated from the manufacturing dimensions of the units and the specified thickness of the joints between them as appropriate.

3.2 Hollow units

For masonry in which the amount of perforation or coring of the units exceeds 25% by volume (based on the overall rectangular shape of the unit) the thickness of the wall must be calculated from the equivalent thicknesses of the units and the specified thickness of the joints between them as appropriate.

3.3 Equivalent thickness

The equivalent thickness of a masonry unit is calculated by dividing the net volume by the area of one vertical face.

4. * * * * *

This Clause has deliberately been left blank.

5. HEIGHT-TO-THICKNESS RATIO OF CERTAIN WALLS

The ratio of height between lateral supports to overall thickness of a wall of ashlar, no-fines concrete, unreinforced concrete, solid gypsum blocks, gypsum-perlite or gypsum-vermiculite plaster on metal lath and channel, must not exceed—

(a) 20 for a *loadbearing* wall; or

(b) 27 for a non-*loadbearing* wall.

6. INCREASE IN THICKNESS BY PLASTERING

6.1 Walls

If a wall of ashlar, solid gypsum blocks or concrete is plastered on both sides to an equal thickness, the thickness of the wall for the purposes of Table 1a-l~~1~~ (but not for the purposes of Annexure Clause 5) may be increased by the thickness of the plaster on one side.

6.2 Columns

Where Tables 1a-l~~1~~ indicates that column-protection is to be plastered, the tabulated thicknesses are those of the principal material. They do not include the thickness of plaster which must be additional to the listed thickness of the material to which it is applied.

7. GYPSUM-PERLITE OR GYPSUM-VERMICULITE PLASTER ON METAL LATH

7.1 Walls

In walls fabricated of gypsum-perlite or gypsum-vermiculite plaster on metal lath and channel—

(a) the lath must be securely wired to each side of 19 mm x 0.44 kg/m steel channels (used as studs) spaced at not more than 400 mm centres; and

(b) the gypsum-perlite or gypsum-vermiculite plaster must be applied symmetrically to each exposed side of the lath.

7.2 Columns

For the fire protection of steel columns with gypsum-perlite or gypsum-vermiculite on metal lath—

(a) the lath must be fixed at not more than 600 mm centres vertically to steel furring channels, and—
   (i) if the plaster is to be 35 mm thick or more — at least 12 mm clear of the column; or
   (ii) if the plaster is to be less than 35 mm thick — at least 6 mm clear of the column; or

(b) the plaster may be applied to self-furring lath with furring dimples to hold it not less than 10 mm clear of the column, and

the thickness of the plaster must be measured from the back of the lath.

7.3 Beams

For the fire protection of steel beams with gypsum-perlite or gypsum-vermiculite on metal lath—

(a) the lath must be fixed at not more than 600 mm centres to steel furring channels and at least 20 mm clear of the steel; and

(b) the thickness of the plaster must be measured from the back of the lath.

8. EXPOSURE OF COLUMNS AND BEAMS

8.1 Columns

A column incorporated in or in contact on one or more sides with a wall of solid masonry or concrete at least 100 mm thick may be considered to be exposed to fire on no more than 3 sides.

8.2 Beams

A beam, open-web joist, girder or truss in direct and continuous contact with a concrete slab or a hollow block floor or roof may be considered to be exposed to fire on no more than 3 sides.

9. FILLING OF COLUMN SPACES

(a) The spaces between the fire-protective material and the steel (and any re-entrant parts of the column itself) must be filled solid with a fire-protective material like concrete, gypsum or grout.

(b) The insides of hollow sections, including pipes, need not be filled.

10. HOLLOW TERRACOTTA BLOCKS

The proportion of cored holes or perforations in a hollow terracotta block (based on the overall rectangular volume of the unit) must not exceed the following:

(a) For blocks up to 75 mm thick — 35%.

(b) For blocks more than 75 mm but not more than 100 mm thick — 40%.

(c) For blocks more than 100 mm — 50%.

~~(a)~~	~~For blocks up to 75 mm thick~~	~~35%~~
~~(b)~~	~~For blocks more than 75 mm but not more than 100 mm thick~~	~~40%~~
~~(c)~~	~~For blocks more than 100 mm~~	~~50%~~

11. REINFORCEMENT FOR COLUMN AND BEAM PROTECTION

11.1 Masonry

Masonry of calcium-silicate, fired clay and concrete for the protection of steel columns must have steel-wire or mesh reinforcement in every second course and lapped at the corners.

11.2 Gypsum blocks and hollow terracotta blocks

Gypsum blocks and hollow terracotta blocks for the protection of steel columns must have steel-wire or mesh reinforcement in every course and lapped at corners.

11.3 Structural concrete and poured gypsum

If a steel column or a steel beam is to be protected with structural concrete or poured gypsum~~—~~, the concrete or gypsum must be reinforced with steel-wire mesh or steel-wire binding placed about 20 mm from its outer surface, and—

(a) ~~the concrete or gypsum must be reinforced with steel-wire mesh or steel-wire binding placed about 20 mm from its outer surface, and—~~for concrete or gypsum less than 50 mm thick, the steel wire must be—

(i) at least 3.15 mm in diameter; and

(ii) ~~for concrete or gypsum less than 50 mm thick, the steel wire must be—~~spaced at not more than 100 mm vertically; or~~-~~

~~(A) at least 3.15 mm in diameter; and~~

~~(B) spaced at not more than 100 mm vertically; or~~

~~(ii) for concrete or gypsum not less than 50 mm thick, the steel wire must be either—~~

~~(A) of a diameter and spacing in accordance with (i); or~~

~~(B) at least 5 mm in diameter and spaced at not more than 150 mm vertically.~~

(b) for concrete or gypsum not less than 50 mm thick, the steel wire must be either—

(i) of a diameter and spacing in accordance with (a) ~~(i)~~; or

(ii) at least 5 mm in diameter and spaced at not more than 150 -mm vertically.

11.4 Gypsum-perlite or gypsum-vermiculite plaster sprayed to contour

(a) If a steel column or steel beam is protected with either gypsum-perlite or gypsum-vermiculite plaster sprayed to contour and the construction falls within the limits of Table 11.4~~Table 11.4~~, the plaster must be reinforced with—

(i) expanded metal lath complying with Clause 1.6 of this Annexure; or

(ii) galvanised steel wire mesh complying with Clause 1.6 of this Annexure.

(b) The reinforcement must be placed at a distance from the face of the plaster of at least 1/3 of the thickness of the plaster and must be securely fixed to the column or beam at intervals of not more than the relevant listing in Table 11.4~~Table 11.4~~.

(c) For the purposes of Table 11.4~~Table 11.4~~—

(i) “vertical” includes a surface at not more than 10º to the vertical; and

(ii) “horizontal” includes a surface at not more than 10º to the horizontal; and

(iii) “underside” means the underside of any horizontal or non-vertical surface.

Table 11.4 Reinforcement of gypsum-perlite or gypsum-vermiculite plaster sprayed to contour

Surface to be protected	**Reinforcement required if smaller dimension of surface exceeds (mm)**	**Max spacing of fixings of the mesh to surface (mm)**
Vertical members with H or I cross-section	450 mm	450 mm
Non-vertical members with H or I cross-section	300 mm	300 mm
Underside members with H or I cross section	300 mm	300 mm
Upper sides of horizontal surface members with H or I cross-section	Not required	N/A
Vertical members with other shapes	Any size	450 mm
Non-vertical members with other shapes	Any size	300 mm
Underside members with other shapes	Any size	300 mm
Upper side of horizontal surface members with other shapes	Not required	N/A

~~Table 11.4 REINFORCEMENT OF GYPSUM-PERLITE OR GYPSUM-VERMICULITE PLASTER SPRAYED TO CONTOUR~~

~~Surface to be protected~~	~~Reinforcement required if smaller dimension of surface exceeds (mm)~~	~~Max spacing of fixings of the mesh to surface (mm)~~
~~**Members with H or I cross-section:**~~		
~~Vertical —~~	~~450~~	~~450~~
~~Non-vertical —~~	~~300~~	~~300~~
~~Underside —~~	~~300~~	~~300~~
~~Upper side of a horizontal surface —~~	~~Not required~~	
~~**Members with other shapes:**~~		
~~Vertical —~~	~~Any size~~	~~450~~
~~Non-vertical —~~	~~Any size~~	~~300~~
~~Underside —~~	~~Any size~~	~~300~~
~~Upper side of a horizontal surface —~~	~~Not required~~	

12. THICKNESS OF COLUMN AND BEAM PROTECTION

12.1 Measurement of thickness

The thickness of the fire protection to steel columns and steel beams (other than fire protection of gypsum-perlite or gypsum-vermiculite plaster sprayed on metal lath or sprayed to contour) is to be measured from the face or edge of the steel, from the face of a splice plate or from the outer part of a rivet or bolt, whichever is the closest to the outside of the fire-protective construction, except that—

(a) if the thickness of the fire protection is 40 mm or more, rivet heads may be disregarded; and

(b) if the thickness of the fire protection is 50 mm or more—

  (i) any part of a bolt (other than a high-tensile bolt) may be disregarded; and

  (ii) a column splice plate within 900 mm of the floor may encroach upon the fire protection by up to a 1/4 of the thickness of the fire protection; and

(c) the flange of a column or beam may encroach by up to 12 mm upon the thickness of the fire protection at right angles to the web if—

  (i) the column or beam is intended to have an FRL of 240/240/240 or 240/–/–; and

  (ii) the flange projects 65 mm or more from the web; and

  (iii) the thickness of the edge of the flange (inclusive of any splice plate) is not more than 40 mm.

SCHEDULE 6 FIRE HAZARD PROPERTIES

1. Scope

This Schedule sets out the procedures for determining the *fire hazard properties* of assemblies tested to AS/NZS 1530.3.

2. Assemblies

2.1 General requirement

The *fire hazard properties* of assemblies and their ability to screen their core materials as *required* under Specification C1.10 must be determined by testing in accordance with this Clause.

2.2 Form of test

Tests must be carried out in accordance with—

(a) for the determination of the *Spread-of-Flame Index* and *Smoke-Developed Index* — AS/NZS 1530.3; and

(b) for the determination of the ability to prevent ignition and to screen its core material from free air — AS 1530.4.

2.3 Test specimens

Test specimens must incorporate—

(a) all types of joints; and

(b) all types of perforations, recesses or the like for pipes, light switches or other fittings, which are proposed to be used for the member or assembly of members in the building.

2.4 Concession

Clause 2.3 does not apply to joints, perforations, recesses or the like that are larger than those in the proposed application and have already been tested in the particular form of construction concerned and found to comply with the conditions of the test.

2.5 Smaller specimen permitted

A testing laboratory may carry out the test specified in Clause 2.2(b) at pilot scale if a specimen (which must be not less than 900 mm x 900 mm) will adequately represent the proposed construction in the building, but the results of that test do not apply to construction larger than limits defined by the laboratory conducting the pilot examination.

LIST OF AMENDMENTS - NCC 2019 - VOLUME ONE

This set of notes has been prepared by the Australian Building Codes Board to assist NCC users in identifying changes incorporated in the 2019 edition of Volume One.

The notes provide a description of major changes made from the previous edition of Volume One. If additional information is required to assist in understanding, interpreting or applying the provisions of the 2019 edition of Volume One, reference should be made to the Guide to Volume One.

While the Australian Building Codes Board has attempted to include all major changes made from the previous edition of Volume One, the Board does not give any warranty nor accept any liability in relation to the contents of this list of amendments.

General

Reference	Changes and Commentary
Throughout	Performance Requirements have been provided with headings as a part of the readability initiative.
Throughout	Tables have been amended or replaced with provisions to align with Web Content Accessibility Guidelines (WCAG).

Introduction to the NCC

Reference	Changes and Commentary
Introduction	The introduction to the NCC has been re-written as a part of the readability initiative.

Section A - Governing requirements

Reference	Changes and Commentary
Section A	The General Provisions have been removed and replaced with Section A, the Governing Requirements of the NCC, as a part of the readability initiative. A1.1 Definitions and Specification A1.3 Documents Adopted by Reference have been removed and replaced with Schedules 3 and 4 respectively. The other specifications of Section A have been relocated.

Section B - Structure

Reference	Changes and Commentary
BV1	Verification Method BV1 has been amended to reflect the outcome of technical review. BV1 is a means of verifying the reliability of a structural component.

Section C - Fire resistance

Reference	Changes and Commentary
CV4	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements CP1, CP2, CP3, CP4, CP5, CP6, CP7, CP8 and CP9.
C1.9(e)(vi)	The concession permitting certain combustible bonded laminated materials to be used wherever a non-combustible material is required has been removed.
C1.10(c)(v)	Amended to include allowances for timber-faced hollow-core doors.
C1.13	The provision has been amended to permit the concession for fire-protected timber to apply to all building classifications. Similar amendments have been made to Clause 3.1(d) and Clause 4.1(e) of Specification C1.1.
C2.5	A new sub-clause has been inserted to clarify requirements that apply when fire-protected timber is used in a Class 9a or Class 9c building.
C2.12(v)	The parameters for which batteries require separation have been amended.
C3.15(a)	Amended to permit use of test reports where the tested system differs from the subject system in accordance with AS 4072.1. Also, a new sub-clause has been inserted to clarify that tests must be reported in accordance with Clause 2 of Specification A2.3.
Spec C1.13, Table 1	Table 1 has been amended to include cavity barrier requirements for higher FRLs as a consequence of the concession for fire-protected timber applying to all building classifications.

Section D - Access and egress

Reference	Changes and Commentary
DV2	A new Verification Method has been inserted as an option to verify compliance with Performance Requirements DP1, DP2, DP6, EP3.4 and/or FP2.1 (as applicable). DV2 is a means for verifying access for people with a disability.
DV3	A new Verification Method has been inserted as an option to verify compliance in part with Performance Requirement DP2. DV3 is a means for verifying the design of a ramp for people with a disability.
DV4	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements DP4, DP5, DP6 and DP7.
D1.15(e)	Amended to clarify that the maximum distance between required alternative exits must be measured through the point at which travel in different directions is available as determined under D1.4.
D2.21(b)	Amended to clarify that a door which automatically unlocks must be readily openable.
D2.21(d)	A new provision has been included to require D2.21(a)(ii) push button devices to be installed within a certain distance of the door opening with accompanying identifying signage.
D3.5(d)	To clarify the intent, ‘need not be designated’ has been replaced with ‘need not be identified with signage’ in respect of identification of accessible carparking spaces.
D3.6(a)(i)(A)	The concession to not provide sanitary facility signage has been extended to also apply to SOUs in Class 9c buildings. The reference to a SOU in a Class 1b building has been corrected to refer to a bedroom instead.
D3.9(b)(iii)	The sub-clause requiring cinema wheelchair seating spaces to be representative of the seating provided has been removed because the representative nature of wheelchair seating spaces is covered in Table D3.9.
Spec D3.6, 3(a)	‘Sentence case’ has been corrected to ‘title case’ when referring to the format to be used for tactile characters on Braille and tactile signs.

Section E - Services and equipment

Reference	Changes and Commentary
EV1.1	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements EP1.1, EP1.2, EP1.4, EP1.4 and EP1.6.
E1.3(a)(ii)	Amended to quantify where a fire brigade is available to attend a building fire.
E1.3(b)(i)	Alternative means for the protection of a booster assembly have been introduced.
E1.4(a)(i)	Amended to exempt Class 5 buildings from the requirements of E1.4.
E1.3(a)(ii)	Amended to quantify where a fire brigade is available to attend a building fire.
E1.4(a)(i)	Amended to include Class 5 buildings among those that do not require fire hose reels.
Table E1.5	A new item has been inserted requiring sprinkler protection for Class 2 or 3 buildings and Class 4 parts of a building with a rise in storeys of 4 or more and an effective height not more than 25 m. Specification E1.5 has also been amended to specify requirements and concessions for these buildings.
Table E1.5	Amended to refer to a new defined term ‘residential care building’ so that sprinkler protection is required for Class 3 buildings with residents who require assistance, such as children and people with a disability as well as the aged.
E1.6(a)(ii)	Amended to require portable fire extinguishers for certain Class 5 buildings as a result of fire-hose reels no longer being required for Class 5 buildings.
Spec E1.5 Clause 13	Clause 13 has been amended to remove the requirement for a dry-pipe system for lift installations and specify other requirements instead.
Spec E1.5 Clause 14	A new clause has been included to outline sprinkler requirements and associated concessions for Class 2 and 3 buildings not more than 25 m effective height with a rise in storeys of three or more.
EV2.1	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements EP2.1 and EP2.2.
E2.2(d)	The term ‘zone smoke control’ has been replaced with ‘zone pressurisation’ to maintain consistency with AS 1668.1. This amendment has occurred throughout Part E2.
Table E2.2(a)	Under ‘Fire-isolated exits’ a new sub-clause, (a)(vi), has been inserted to require pressurisation, or open access ramps or balconies to certain Class 3 buildings with residents who require assistance, such as children, people with a disability and the aged.

Reference	Changes and Commentary
Table E2.2(a)	Amendment has been made throughout to clarify that zone pressurisation applies to vertical compartments only.
Spec E2.2a	Specification E2.2a has been restructured and amended to simplify provisions and improve usability. Clarity has been provided regarding concessions for smoke alarms and detectors where a building is protected with a sprinkler system complying with Specification E1. Cross references in Table E2.2(a) have been amended to reflect these amendments.
Spec E2.2a, 4(a)(i)(A)	The exclusion of AS 1670.1 Clause 3.26(f) has been removed to reflect the changes in the new edition of AS 1670.1-2015. The revised standard indicates heat detectors are not required in areas that are sprinkler protected.
Spec E2.2b	Amended to include consideration of fire load when determining smoke exhaust rates.
Spec E2.2d	A new specification is included to accompany the mandatory automatic fire sprinkler system requirement for Class 2 and 3 buildings of E1.5(d).
EV3.1	A new Verification Method has been inserted as an option to verify compliance with EP3.3. EV3.1 is a means for verifying the alerting of occupants as to the use of lifts during an emergency.
EV3.2	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirement EP3.2.
EV4.2	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements EP4.1, EP4.2 and EP4.3.
E4.9	'Sound systems and intercom systems for emergency purposes' has been amended to 'Emergency warning and intercom systems' to reflect terminology in AS 1670.4.
E4.9(b)	The sub-clause has been amended to limit application in schools for emergency warning and intercom systems to primary and secondary schools only.

Section F - Health and amenity

Reference	Changes and Commentary
Part F	The cross-volume consideration explanatory information has been updated to reflect amendments to Volume Three.
FV1.2	A new Verification Method has been inserted as an option to verify compliance with Performance Requirement FP1.6. FV1.2 is a means for verifying the prevention of overflow in a bathroom, laundry or the like from entering a space in the storey below.
Table F1.7b	The requirement for the wall / floor junction for concrete and compressed fibre-cement sheet flooring has been changed from waterproof to water resistant.
Table F1.7d	The requirement for the wall / floor junction for laundries and WCs has been changed from waterproof to water resistant.
F1.12(e)(iii)	Durability requirements for in-ground subfloor timber framing have been inserted.
FV2.1	A new Verification Method has been inserted as an option to verify compliance with Performance Requirement FP2.1. FV2.1 is a means for verifying the adequate number and location of sanitary facilities.
Part F2	The term 'sanitary towels' has been replaced with 'sanitary products'.
F2.1(d)	(Previously Table F2.1, Class 2). The requirement to provide sanitary facilities for employees when a Class 2 building or group of Class 2 buildings contains more than 10 sole-occupancy units has been removed.
F2.4(j)	A new sub-cause has been inserted to require the provision of specific accessible change facilities in certain Class 6 and 9b buildings. F3.1(f) is also amended to require 2.4 m ceiling height in these facilities.
Spec F2.4	A new specification is included to accompany the requirements of F2.4(j).
FV3.1	A new Verification Method, FV3.1, has been inserted as an option to verify compliance with Performance Requirement FP2.1. FV3.1 is a means for verifying the provision of sufficient height for a room or space.
FP4.1	Performance Requirement FP4.1 has been amended to quantify that openings providing natural light must achieve an average daylight factor of not less than 2%.
FP4.2	Performance Requirement FP4.2 has been amended to quantify that artificial lighting must provide illuminance of at least 20 lux.
FV4.3	A new Verification Method has been inserted as an option to verify compliance with FP4.1. FV4.3 is

Reference	Changes and Commentary
	a means for verifying the suitable provision of natural light.
FV5.3	A new Verification Method has been inserted as an option to verify compliance with Performance Requirements FP5.4 and FP5.6. FV5.3 is a means for verifying appropriate avoidance of transmission of airborne and impact generated sound through floors in Class 9c buildings.
FV5.4	A new Verification Method has been has been inserted as an option to verify compliance with Performance Requirements FP5.5(a) and FP5.6. FV5.4 is a means for verifying appropriate avoidance of transmission of airborne and impact generated sound through walls in Class 9c buildings.
FP6.1	A new Performance Requirement, FP1.6, has been inserted. FP1.6 contains requirements for the prevention of condensation.
Part F6	New provisions have been included for condensation management including provisions for the installation of water control membranes, ventilation of roof spaces and the discharge of exhaust systems. This has occurred to minimise the impacts of risks associated with water vapour and condensation.

Section G - Ancillary provisions

Reference	Changes and Commentary
GV2	A new Verification Method has been inserted as an option to verify compliance with Performance Requirements GP2.1(a) and GP2.1(b). GV2 is a means for verifying the robustness of combustion appliances.
Spec G3.8	Reference to ‘heat collector plates’ has been removed from Clauses 2.3 and 2.4.1 of Specification G3.8.
GV4.1	A new Verification Method, the Fire Safety Verification Method, has been inserted as an option to verify compliance with Performance Requirements GP4.1, GP4.2, GP4.3 and GP4.4.
GV5	A new Verification Method has been inserted as an option to verify compliance with Performance Requirements GP5.1. GV5 is a means for verifying the probability of fire initiation within a building exposed to bushfire.
Part G6	A new Part has been inserted containing provisions for buildings containing occupiable outdoor areas.

Section H - Special use buildings

Reference	Changes and Commentary
H2.8	Amended to require the provision of specific accessible change facilities in public transport buildings that require accessible sanitary facilities.
H3.9(a)(ii)	The sub-provision has been amended to quantify where a fire brigade is available to attend a building fire.
H3.15	Amendments have been made as a consequence of the deletion of the defined term ‘non-illuminated exit sign.’

Section J - Energy efficiency

Reference	Changes and Commentary
JP1	Has been amended and now contains a quantified level of performance for buildings with a conditioned space.
JP3	Performance Requirement JP3 has been deleted.
JV1	A new Verification Method has been inserted as an option for Class 5 buildings to demonstrate compliance with Performance Requirement JP1. JV1 is a means of verifying the energy efficiency of office buildings by way of NABERS.
JV2	A new Verification Method has been inserted as an option for Class 3, 5, 6, 7, 8 and 9 buildings to demonstrate compliance with Performance Requirement JP1. JV2 is a means of verifying the energy efficiency of office buildings by way of Green Star.
JV3	Amended to replace measurement of energy consumption with measurement of annual greenhouse gas emissions. Modelling parameters and profiles have been relocated to new specifications.
JV4	A new Verification Method has been inserted as an option for certain buildings to demonstrate

Reference	Changes and Commentary
	compliance with Performance Requirement JP1 for building sealing. JV4 is a means of verifying the sealing of buildings by air leakage testing.
Spec JVa	A new specification has been inserted to set out requirements for Verification Methods JV1, JV2 and JV3.
Spec JVb	A new specification has been inserted to set out modelling parameters for Verification Methods JV1, JV2 and JV3.
Spec JVc	Specification JV has been amended and contains modelling profiles for Verification Methods JV1, JV2 and JV3.
J0.2(a)	Amended to clarify that star ratings must include separate heating and cooling loads.
J0.2(c),(d)	The sub-clauses have been deleted.
J1.2(e)	A new sub-clause has been inserted to outline how Total R-Value must be determined.
J1.3	Insulation and solar absorptance requirements have been simplified.
J1.4	Amendments have been made to improve the performance of roof lights and simplify the provisions.
J1.5	The glazing provisions of Part J2 have been incorporated into J1.5. A minimum Total U-Value and SHGC must be achieved for the whole façade instead of separate targets for glazing and walls. Minimum Total R-Values have also been specified for walls.
J1.6	Amendments have been made to improve the performance of floors and simplify the provisions.
Spec J1.2b	A new specification has been inserted to describe the thermal performance of metal framed roof and ceiling construction.
Spec J1.2c	A new specification has been inserted to describe the thermal performance of metal framed wall construction.
Spec J1.2d	A new specification has been inserted to provide the means of determining the Total System R-Value of a spandrel panel.
Spec J1.3	Deleted on account of new provisions for the determination of R-Values.
Part J2	Deleted on account of new provisions for the determination of glazing performance.
J3.3	Amended to improve the performance of roof lights.
J3.4	Amended to improve the performance of building sealing.
J3.5	Amended to improve the performance of sealing of mechanical exhaust systems.
J3.6	Amended to improve the performance of building sealing.
J3.7	Amended to extend the requirement of sealing evaporative coolers.
J5.2(a)	Additional requirements for the control of air-conditioning systems have been included.
J5.2(a)(iii)	The requirements for an economy cycle have been limited to larger air-conditioning systems in cooler climate zones.
J5.3	Amended to extend the requirements for energy reclaiming systems and demand control, and incorporate the requirements for miscellaneous exhaust systems and time switches from J5.4 and Specification J6.
J5.4	A new provision has been inserted to group and increase the stringency for the requirements for fan systems.
J5.5	Requirements for ductwork insulation have been relocated from Specification J5.2b to a new provision, J5.5.
J5.6	Requirements for ductwork sealing have been relocated from Specification J5.2b to a new provision, J5.6.
J5.7	A new provision has been inserted to group and improve requirements for air-conditioning pumps.
J5.8	Requirements for pipework insulation have been relocated from Specification J5.2d to a new provision, J5.8. The minimum R-Values have also been increased.
J5.9	Requirements for space heating have been relocated from Specification J5.2e to a new provision, J5.9. The gross thermal efficiency of gas water heaters (boilers) has also been increased.
J5.10	Requirements for chillers have been relocated from Specification J5.2d to a new provision, J5.10. The requirements have been made more stringent.
J5.11	Requirements for packaged air-conditioning equipment have been relocated from Specification J5.2e to a new provision, J5.11. The requirements have been made more stringent.
J5.12	Requirements for heat rejection equipment have been relocated from Specification J5.2a to a new provision, J5.12. The methodology for calculating fan motor power has been aligned to the provisions

Reference	Changes and Commentary
	for fan systems in J5.4.
Spec J5.2a	Deleted on account of relocation of requirements.
Spec J5.2b	Deleted on account of relocation of requirements.
Spec J5.2c	Deleted on account of relocation of requirements.
Spec J5.2d	Deleted on account of relocation of requirements.
Spec J5.2e	Deleted on account of relocation of requirements.
Table J6.2a	Maximum illumination power density figures have been reduced.
Table J6.2b	Illumination power density adjustment factors have been adjusted.
J6.7	A new provision has been inserted for the energy efficiency of lifts.
J6.8	A new provision has been inserted for the energy efficiency of escalators and moving walkways.
Spec J6	The timing requirements for lighting and power control devices have been amended.
J7.3(a)(iii)	Geothermal heating has been inserted as a permitted heating source for swimming pools.
J7.3(a)(iv)	Efficiency requirements have been introduced for gas heating for pools.
J7.3(b)(i)	A minimum R-Value for pool covers has been introduced.
J7.3(e)	Time switch requirements have been re-located from Specification J6 to J7.3.
J7.3(f)	Insulation requirements have been inserted for pipework for heated pools.
J7.4(a)(iii)	Geothermal heating has been inserted as a permitted heating source for swimming pools.
J7.4(a)(iv)	Efficiency requirements have been introduced for gas heating for pools.
J7.4(b)(i)	A minimum R-Value for spa covers has been introduced.
J7.4(d)	Time switch requirements have been re-located from Specification J6 to J7.4.
J7.4(e)	Insulation requirements have been inserted for pipework for heated spas.
J8.3	Amended to clarify that an energy meter must be used to record energy use, and that time-of-use data must be collected.
J8.3(c)	A new provision has been inserted to require certain separate energy meters to be linked to a single interface.

Schedule 2 - Abbreviations and symbols

Reference	Changes and Commentary
Schedule 2	Schedule 2 has been inserted as part of the readability initiative. Schedule 2 replaces Abbreviations and Symbols and includes all abbreviations and symbols used throughout the NCC.
Abbreviations	Correlated Colour Temperature (CCT) has been added.
Abbreviations	Critical Heat Flux (CHF) has been added.
Abbreviations	Critical Radiant Flux (CRF) has been added.
Abbreviations	Colour Rendition Index (CRI) has been added.
Abbreviations	National Australian Built Environment Rating System (NABERS) has been added.
Symbols	km has been added.
Symbols	m^2.K/W has been added.

Schedule 3 - Defined terms

Reference	Changes and Commentary
Schedule 3	Schedule 3 has been inserted as part of the readability initiative. Schedule 3 replaces A1.1 Definitions and includes all defined terms used throughout the NCC.
Activity traits	A new defined term has been inserted as a consequence of including a Verification Method for sufficient height.
Activity support level	A new defined term has been inserted as a consequence of including a Verification Method for sufficient height.
Atrium	Amended to replace the concept of ‘wholly or substantially’ with ‘greater than 50%’.
Annual energy consumption	The defined term has been deleted as a consequence of introducing the new defined term ‘annual greenhouse gas emissions’.
Annual greenhouse gas	A new defined term has been inserted to replace ‘annual energy consumption’. Annual greenhouse gas emissions account for the theoretical amount of greenhouse gas emissions attributable to the

Reference	Changes and Commentary
emissions	energy used by building services.
Characteristic	A new defined term has been inserted as a consequence of including a Verification Method for access.
Circulation space	A new defined term has been inserted as a consequence of including a Verification Method for access.
Condensation	A new defined term has been inserted as a consequence of including new provisions for condensation management.
Critical radiant flux	The defined term for critical radiant flux has been amended to include abbreviation and unit.
Daytime operating building	A new defined term has been inserted as a consequence of amendments to Section J.
Fire brigade station	A new defined term has been inserted to clarify when a building is required to have fire hydrants.
Green Star	A new defined term has been inserted. Green Star is a building sustainability rating scheme managed by the Green Building Council of Australia.
Interstitial condensation	A new defined term has been inserted as a consequence of including new provisions for condensation management.
Light source efficacy	The defined term has been deleted as a consequence of introducing the new defined term 'luminaire efficacy'.
Luminaire efficacy	A new defined term has been inserted to replace 'light source efficacy'.
Massive timber	The defined term has been amended to allow the use of physically laminated timber.
MEPS	A new defined term has been inserted as a consequence of amendments to Section J.
Mould	A new defined term has been inserted as a consequence of including new provisions for condensation management.
NABERS Energy for Offices	A new defined term has been inserted. NABERS Energy for Offices is National Australian Built Environment Rating System for office energy efficiency.
Occupant traits	A new defined term has been inserted as a consequence of including a Verification Method for sufficient height.
Occupiable outdoor area	A new defined term has been inserted as a consequence of including new provisions for occupiable outdoor areas.
Overnight operating building	A new defined term has been inserted as a consequence of amendments to Section J.
Predicted Mean Vote (PMV)	A new defined term has been inserted as a consequence of amendments to Section J.
Professional engineer	The defined term has been amended to reflect current names for the Institution of Engineers Australia and the National Engineering Register.
R-Value (m^2.K/W)	The defined term has been updated to include reference to NZS 4214.
Reference building	The defined term has been amended as a consequence of amendments to Section J.
Residential care building	A new defined term has been inserted as a consequence of introducing requirements for certain Class 3 buildings with residents who require assistance, such as children, people with a disability and the aged.
Retail display glazing	A new defined term has been inserted as a consequence of amendments to Section J.
Spandrel panel	A new defined term has been inserted as a consequence of amendments to Section J.
Thermal comfort level	A new defined term has been inserted as a consequence of amendments to Section J.
Total R-Value	The defined term has been amended to include unit.
Total system Solar Heat Gain Coefficient (SHGC)	The defined term has been amended as a consequence of amendments to Section J.
Total system U-Value	The defined term has been amended as a consequence of amendments to Section J.
Vapour pressure	A new defined term has been inserted as a consequence of including new provisions for condensation management.
Wall-glazing	A new defined term has been inserted as a consequence of amendments to Section J.

Reference	Changes and Commentary
construction	
Water control layer	A new defined term has been inserted as a consequence of including new provisions for condensation management.
Water control membrane	A new defined term has been inserted as a consequence of including new provisions for condensation management.
Water sensitive materials	A new defined term has been inserted as a consequence of including new provisions for condensation management.

Schedule 4 - Documents adopted by reference

Reference	Changes and Commentary
AS/NZS ISO 717 Part 1	The 2004 edition of AS/NZS ISO 717 Part 1 'Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation' has been referenced. A note has been included to outline transitional arrangements.
AS/NZS 1158.3.1	The 2005 edition of 'Lighting for roads and public spaces' has been referenced.
AS/NZS 1170.2	Amdts 4 and 5 of the 2011 edition of AS/NZS 1170.2 'Structural design actions — Wind actions' have been referenced.
AS/NZS 1170.3	Amdt 2 of the 2003 edition of AS/NZS 1170.3 'Structural design actions — Snow and ice actions' has been referenced.
AS/NZS 1276.1	The 1999 edition of AS/NZS 1276.1 'Acoustics — Rating of sound insulation in buildings and of building elements — Airborne sound insulation' has been deleted. A note has been included to outline transitional arrangements.
AS 1288	Amdts 2 and 3 of the 2006 edition of AS 1288 'Glass in buildings — Selection and installation' have been referenced.
AS 1428.1	Amdt 2 of the 2009 edition of AS 1428.1 'Design for access and mobility — General requirements for access — New building work' has been referenced.
AS 1530	The note to AS 1530 permitting use of reports relating to tests carried out under earlier editions of AS 1530 Parts 1 to 4 has been deleted.
AS 1657	Amdt 1 of the 2013 edition of AS 1657 'Fixed platforms, walkways, stairways and ladders — Design, construction and installation' has been referenced.
AS 1668.1	The title has been amended to reflect the re-named standard.
AS 1668.2	The title has been amended to reflect the re-named standard and Amdt 2 of AS 1668.2 'The use of ventilation and air-conditioning in buildings — Mechanical ventilation in buildings' has been referenced.
AS 1670.1	Amdt 1 of the 2015 edition of 'Fire detection, warning, control and intercom systems — Systems design, installation and commissioning' has been referenced.
AS 1670.4	The title has been amended to reflect the re-named standard.
AS 2047	Amdts 1 and 2 of the 2014 edition of AS 2047 'Windows and external glazed doors in buildings' have been referenced. A note has been included to outline transitional arrangements.
AS 1905.1	Amdt 1 of the 2015 edition of AS 1905.1 'Components for the protection of openings in fire-resistant walls — Fire-resistant doorsets' has been referenced.
AS 2118.1	The 1999 edition of AS 2118.1 'Automatic fire sprinkler system — General requirements' has been deleted.
AS 2293.3	The 2005 edition of AS 2293.3 'Emergency escape luminaires and exit signs' has been deleted.
AS 3660.1	The 2000 edition of AS 3660.1 'Termite management — New building work' has been deleted.
AS 3700	Amdt 2 of the 2011 edition of AS 3700 'Masonry structures' has been referenced.
AS 3786	The 1993 edition of AS 3786 'Smoke alarms' has been deleted.
AS 4072.1	The note to AS 4072.1 permitting use of tests carried out under AS 1530.4 prior to 1 January 1995 has been deleted.
AS 4200.1	The 2017 edition of AS 4200.1 'Pliable building membranes and underlays — Materials' has been referenced.
AS 4200.2	The 2017 edition of AS 4200.2 'Pliable building membranes and underlays — Installation requirements' has been referenced.
AS 4586	Amdt 1 of AS 4586 'Slip resistance classification of new pedestrian surface materials' has been

Reference	Changes and Commentary
	referenced. A note has been included to outline transitional arrangements.
AS/NZS 5263.1.2	The 2016 edition of AS/NZS 5263.1.2 'Gas appliances — fired water heaters for hot water supply and/or central heating' has been referenced.
AS/NZS ISO 9972	The 2015 edition of AS/NZS ISO 9972 'Thermal performance of buildings — Determination of air permeability of buildings — Fan pressurization method' has been referenced.
AIRAH-D28 Appendix B	The 2011 edition of AIRAH-D28 Appendix B 'Building Management and Control Systems — HVAC Control Routines' has been referenced.
ANSI/ASHRAE Standard 55	The 2013 edition of ANSI/ASHRAE Standard 55 'Thermal environmental conditions for human occupancy' has been referenced.
ANSI/ASHRAE Standard 140	The 2014 edition of ANSI/ASHRAE Standard 140 'Standard method of test for the evaluation of building energy analysis computer programs' has been referenced.
BS 7190	Reference to BS 7190 'Assessing thermal performance of low temperature hot water boilers using a test rig' has been deleted.
ABCB	The ABCB 'Fire Safety Verification Method' has been referenced.
ABCB	Reference to 'Protocol for Building Energy Analysis Software Version 2006.1' has been deleted.
CIBSE Guide A	The 2015 edition of CIBSE Guide A 'Environmental design' has been referenced.
European Union Commission Regulation 622/Annexx II, point 2	Point 2 of Annexx II of European Union Commission Regulation 622 'Eco-design requirements for glandless standalone circulators and glandless circulators integrated in products' has been referenced.
ISO 8100-32	The 2018 edition of ISO 8100-32 'Lifts and service lifts' has been referenced.
ISO 25745-2	The 2012 edition of ISO 25745-2 'Energy performance of lifts, escalators and moving walks — Part 2: Energy calculation and classification for lifts (elevators)' has been referenced.
NZS 4214	The 2006 edition of NZS 4214 'Methods of determining the total thermal resistance of parts of buildings' has been referenced.

NCC FIRE SAFETY VERIFICATION METHOD

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Preface

The Fire Safety Verification Method provides a process for engineering the design of *fire safety Performance Solutions.* The document provides the flexibility required to develop *Performance Solutions* while still maintaining the level of safety required by the NCC.

This *Verification Method* forms part of NCC Volume One.

Section 1 of this document provides an introduction to the *Verification Method* and its application. **Section 2** describes the *design fire* scenarios.

Contents

1 Introduction

1.1 Purpose

This *Verification Method* presents specific *design scenarios* that must be considered in order to demonstrate that the fire safety aspects of a building design comply with the NCC Volume One *fire safety Performance Requirements* set out in **Table 1.1**. It must only to be used by fire safety engineers who are suitably qualified, experienced and deemed by the relevant regulatory authority in the relevant jurisdiction as:

- having demonstrated competency in *fire safety engineering*; and
- being proficient in the use of fire engineering modelling methods; and
- being familiar with fire testing and validation of computational data.

This Verification Method is not a comprehensive guide to fire safety. The International Fire Engineering Guidelines (2005), provides more comprehensive guidelines on fire safety calculation procedures. The ABCB Fire Safety Verification Method Handbook provides specific guidance on the following as relevant to this *Verification Method*:

- Occupant charateritsics
- Rules and parameters of *design scenarios*
- Guidelines on modelling
- Documentation.

Reminder:

This *Verification Method* is one way, but not the only way, to demonstrate compliance with the *Performance Requirements* set out in **Table 1.1**. *Performance Solutions* developed from first principles, or meeting the relevant *Deemed-to-Satisfy Solutions*, remain acceptable ways to demonstrate compliance.

Also, other *Performance Requirements* not covered by this *Verification Method* may need to be considered in order to comply with NCC Volume One A0.7.

1.2 How to use this Verification Method

This *Verification Method* sets out twelve *design scenarios* that must be considered in order to demonstrate that a building incorporating one or more *Performance Solutions* satisfies the *Performance Requirements* set out in **Table 1.1**.

Each *design scenario* must consider one or more locations in the building that capture the range of reasonable possibilities in relation to the threat to life safety.

All *design scenarios* applicable to a *Performance Requirement* must be assessed to show compliance with that *Performance Requirement*.

Comment:

In many cases the location that is the most challenging for a particular *design scenario* (for the purpose of checking *ASET* against *RSET* – see definitions below) will be easily determined. Where it is not easily determined, the particular *design scenario* should be run in multiple locations to ensure the most challenging location is modelled.

1.3 Performance Based Design

1.3.1 Performance Based Design Brief (PBDB)

When using this *Verification Method*, the fire safety engineer must undertake a *Performance Based Design Brief* (*PBDB)* that must involve all stakeholders relevant to the building design. The *PBDB* must also outline the fire strategy to be adopted.

While full agreement on all aspects of the *PBDB* is the preferred outcome, it is acknowledged that in some instances this may not be possible to obtain. In the event that full agreement cannot be achieved through the *PBDB*, dissenting views must be appropriately recorded and carried throughout the process and considered as part of the due processes of the *appropriate authority* when determining compliance and providing approval.

Consideration of whether a peer review (by an independent *fire safety engineer*) of some or all of the proposed *Performance Solutions* and the supporting analysis is required or not, must be undertaken at this *PBDB* stage.

Comment:

When developing a *Performance Solution*, a *PBDB* is an important step in the process. It allows all relevant stakeholders to be involved in the development of the building design and its *fire safety system*.

A *PBDB* is a documented process that defines the scope of work for the fire engineering analysis. Its purpose is to set down the basis, as agreed by the relevant stakeholders, on which the fire safety analysis of the proposed building and its *Performance Solutions* will be undertaken.

Relevant stakeholders will vary from design to design. However, some examples of relevant stakeholders are: a fire safety engineer, architect, developer, client, *appropriate* *authority* (some state legislation prevents *appropriate authorities* from being involved in the design process), fire authority and other stakeholders that fire safety design may affect such as insurers. Further information on the relevant stakeholders is provided in Section 1.3.1.2.

Guidance on the development of a *PBDB* is presented in the International Fire Engineering Guidelines (2005) and referred to as a Fire Engineering Brief in that document.

1.3.1.1 Fire strategy

The *PBDB* must cover the fire safety strategy for the building, outlining the philosophy and approach that will be adopted to achieve the required level of performance. The fire safety strategy must pay particular attention to the evacuation strategy to be used and the management regimes necessary.

1.3.1.2 Stakeholder involvement

The *PBDB* must be developed collaboratively by the relevant stakeholders in the particular project. The following parties must be involved:

- Client or client's representative (such as project manager)
- Fire engineer
- Architect or designer
- Regulations consultant
- Various specialist consultants
- Fire service (public or private)
- *Appropriate authority* (Authority Having Jurisdiction – subject to state legislation)
- Tenants or tenants representative for the proposed building
- Building operations management.

Conducting a simple stakeholder analysis can be used to determine who must be involved in the *PBDB* process. This analysis must identify stakeholders with a high level of interest in the design process, and/or likely to be affected by the consequences of a fire should it occur in the building.

1.3.2 Final report

Once the analysis of all relevant *design scenarios* for all the required *Performance Solutions* has been completed, the *fire safety engineer* must prepare a final report that includes the following:

- The agreed *PBDB*
- All the modelling and analysis
- Any other information required to clearly demonstrate that the building and its *fire safety system* satisfies the relevant NCC *Performance Requirements* as set out in **Figure 1.1**.

1.4 Definitions

Defined terms used in this *Verification Method* are printed in italics. The modifications to the NCC's definitions are in square brackets. These modifications are essential to provide clarity of terminology for the specific application of the relevant term in this *Verification Method*. For NCC defiintions see NCC Volume One.

For the purpose of this *Verification Method* the following definitions apply:

1.4.1 Modified NCC definitions

Appropriate authority means the relevant authority with the statutory responsibility to determine the particular matter [satisfies the relevant *Performance Requirement*s. (Note: This is typically the building surveyor or building certifier charged with the statutory responsibility to determine building compliance and issue the building permit / approval and occupancy certificate / approval)]

1.4.2 Other defined terms

Available safe egress time (ASET) means the time between ignition of a fire and the onset of untenable conditions in a specific part of a building. This is the calculated interval between the time of ignition of a fire and the time at which conditions become such that the occupant is unable to take effective action to escape to a place of safety.

Burnout means exposure to fire for a time that includes *fire growth*, full development, and decay in the absence of intervention or automatic suppression, beyond which the fire is no longer a threat to building elements intended to perform *loadbearing* or fire separation functions, or both.

Design fire means the quantitative description of a representation of a fire within the *design scenario*.

Design scenario means the specific scenario of which the sequence of events is quantified and a *fire safety engineering* analysis is conducted against.

Fire growth means the stage of fire development during which the *heat release rate* and the temperature of the fire are generally increasing.

Fire safety engineering means application of engineering principles, rules and expert judgement based on a scientific appreciation of the fire phenomenon, often using specific *design scenarios*, of the effects of fire and of the reaction and behaviour of people in order to:

- save life, protect property and preserve the environment and heritage from destructive fire;
- quantify the hazards and risk of fire and its effects;
- mitigate fire damage by proper design, construction, arrangement and use of buildings, materials, structures, industrial processes and transportation systems;
- evaluate analytically the optimum protective and preventive measures, including design, installation and maintenance of active and passive fire and life safety systems, necessary to limit, within prescribed levels, the consequences of fire.

Fractional effective dose (FED) means the fraction of the dose (of thermal effects) that would render a person of average susceptibility incapable of escape.

Comment:

The definition for *FED* has been modified from the ISO definition to be made specific for this *Verification Method*. The use of CO or CO_2 as part of *FED* is not part of this *Verification Method*. This is because the ability to measure CO in a repeatable test varies by two orders of magnitude for common cellosic fuel.

Fully developed fire means the state of total involvement of the majority of available combustible materials in a fire.

Heat release means the thermal energy produced by combustion (kJ).

Heat release rate (HRR) means the rate of thermal energy production generated by combustion (kW (preferred) or MW).

Performance-based design brief (PBDB) means the process and the associated report that defines the scope of work for the performance-based *fire safety engineering* analysis and the technical basis for analysis as agreed by stakeholders.

Required safe egress time (RSET) means the time required for escape. This is the time required for safe evacuation of occupants to a place of safety prior to the onset of untenable conditions.

Separating element means a barrier that exhibits fire *integrity*, *structural adequacy*, *insulation*, or a combination of these for a period of time under specified conditions (often in accordance with AS 1530.4).

Visibility means the maximum distance at which an object of defined size, brightness and contrast can be seen and recognised.

Yield means the mass of a combustion product generated during combustion divided by the mass loss of the test specimen as specified in the *design fire*.

1.5 Design scenarios: NCC Performance Requirements

This *Verification Method* presents specific *design scenarios* that must be considered in order to demonstrate that the fire safety aspects of a building design comply with the NCC Volume One *fire safety Performance Requirements* set out in **Table 1.1**.

The *design scenarios* specified in **Section 2** are summarised in **Table 1.1**.

Table 1.1 Key features of *design scenarios*

Design scenario		*Performance Requirement*[1]	*Expected method*	*Outcome required*
BE	Fire blocks *exit* (**2.1**) [A fire is located in an escape route and blocks an *exit*]	CP1, CP2, CP3, CP8, DP4, DP5, DP6, DP7*, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	Demonstrate that a viable escape route (or multiple routes where necessary) has been provided for building occupants.	Demonstrate that a viable escape route (or multiple routes where necessary) has been provided for building occupants.
UT	Fire in a normally unoccupied room threatens occupants of other rooms (**2.2**) [A fire starts in a normally unoccupied room and can potentially endanger a large number of occupants in another room]	CP1, CP2, CP3, CP8,DP4, DP5, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	*ASET* / *RSET* analysis or provide separating construction or fire suppression complying with a specified Standard.	Demonstrate *ASET* > *RSET* for any rooms or spaces that can hold more than 50 people[2] given a fire occurs in the normally unoccupied space. Solutions might include the use of *separating elements* or fire suppression to confine the fire to the room of origin.

[1] Not all of these requirements will always be applicable to this *design scenario*. The project specific *Performance Requirements* must be determined as part of the Performance Based Design Brief process.
[2] 50 people may or may not be a critical number. The appropriate number must be determined by the *Performance Based Design Brief* process.

Design scenario		Performance Requirement[1]	Expected method	Outcome required
CS	Fire starts in concealed space (**2.3**) [A fire starts in a concealed space that can facilitate fire spread and potentially endanger a large number of people in a room]	CP1, CP2, CP3, CP6, CP8, DP4, DP5, DP6, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	Provide separating construction or fire suppression or *automatic* detection complying with a specified Standard	Demonstrate that fire spread via concealed spaces will not endanger occupants located in rooms / spaces holding more than 50[3] people. This *design scenario* is deemed to be satisfied by the use of *separating elements*, *automatic* detection or suppression.
SF	Smouldering fire (**2.4**) [A fire is smouldering in close proximity to a sleeping area]	CP2, CP3, CP8, DP4, DP5, DP6, EP1.1, EP1.2, EP1.3, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	Provide *automatic* detection and alarm system complying with a recognised Standard.	Provide an *automatic* smoke detection and alarm system that has been designed and installed to a specified Standard.
IS	Fire spread involving internal finishes (**2.7**) [Interior surfaces are exposed to a growing fire that potentially endangers occupants].	CP2, CP4, DP4, DP5, DP6, EP1.1, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	Suitable materials used (proven by testing).	Demonstrate that surface finishes comply with BCA Volume One *Performance Requirements*.
CF	Challenging fire (**2.10**) [Worst credible fire]	CP1, CP2, CP3, CP8, DP4, DP5, DP6, EP1.1, EP1.2, EP1.3, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	*ASET* / *RSET* analysis.	Demonstrate *ASET* > *RSET* for *design fires* in various locations within the building. Such fires must not be analysed as if they were occurring simultaneously.

Design scenario		Performance Requirement[1]	Expected method	Outcome required
RC	Robustness check (**2.11**) [Failure of a critical part of the *fire safety systems* will not result in the design not meeting the Objectives of the BCA]	CP1, CP2, CP3, CP8, DP4, DP5, DP7*, EP1.1, EP1.2, EP1.3, EP1.4, EP2.1, EP2.2, EP4.1, EP4.2, EP4.3	Modified *ASET / RSET* analysis.	Demonstrate that if a key component of the *fire safety system* fails, the design is sufficiently robust that a disproportionate spread of fire does not occur (e.g. *ASET / RSET* for the remaining floors or *fire compartments* is satisfied).
SS	Structural Stability and other properties (**2.12**) [Building does not present risk to other properties in a fire event]	CP1, CP5	Undertake analysis of structure and *fire safety systems*	Demonstrate that the building does not present a risk to *other property* in a full *burnout design fire*.
HS	Horizontal fire spread (**2.5**) [A *fully developed fire* in a building exposes the *external walls* of a neighbouring building]	CP2	CV1. CV2.	Demonstrate that fire will not spread to and from adjacent buildings.
VS	Vertical fire spread involving cladding or arrangement of openings in walls (**2.6**) [A fire source exposes a wall and leads to significant vertical fire spread]	CP2, CP4, CP7,CP8 and EP2.2	CV3	Demonstrate that the building's *external wall* make up and penetrations, including the cladding material does not contribute to excessive vertical fire spread.
FI	*Fire brigade* intervention (**2.8**) [Consider *fire brigade* intervention]	CP1, CP2, CP5, CP7, CP9, DP5, EP1.3, EP1.6, EP2.2, EP3.2	Facilitate *fire brigade* intervention to the degree necessary.	Demonstrate consideration of potential *fire brigade* intervention.

Design scenario		Performance Requirement[1]	Expected method	Outcome required
UF	Unexpected Catastrophic Failure (**2.9**) [A building must not unexpectedly collapse during a fire event]	CP1, CP2, CP9	Undertake review or risk assessment of critical elements within a building to determine unexpected catastrophic failure is unlikely.	Demonstrate that the building, its critical elements and the *fire safety system* provide sufficient robustness such that unexpected catastrophic failure is unlikely.
* appropriate analysis of DP7 is also required where a lift is intended to be used to assist occupants to evacuate.				

Table 1.2 List of *Performance Requirements* and relevant *design scenarios*

Performance Requirement	Design Scenario
CP1	BE, UT, CS, FI, UF, CF, RC, SS
CP2	BE, UT, CS, SF, HS, IS, FI, CF, RC, UF, VS
CP3	BE, UT, CS, SF, CF, RC
CP4	IS, VS
CP5	FI, SS
CP6	CS
CP7	FI, VS
CP8	BE, UT, CS, SF, CF, RC, VS
CP9	FI, UF
DP4	BE, UT, CS, SF, IS, CF, RC
DP5	BE, UT, CS, SF, IS, FI, CF, RC
DP6	BE, CS, SF, IS, CF, RC
DP7	BE, RC
EP1.1	SF, CF, RC
EP1.2	SF, CF, RC
EP1.3	SF, FI, CF, RC
EP1.4	BE, UT, CS, SF, IS, CF, RC
EP1.6	FI
EP2.1	BE, UT, CS, SF, IS, CF, RC
EP2.2	BE, UT, CS, SF, IS, FI, CF, RC,VS
EP3.2	FI
EP4.1	BE, UT, CS, SF, IS, CF, RC
EP4.2	BE, UT, C, SF, IS, CF, RC
EP4.3	BE, UT, CS, SF, IF, CF, RC

1.6 Fire modelling to determine ASET

For particular *design scenarios*, the designer must demonstrate that the occupants have sufficient time to evacuate the building before being overcome by the effects of fire.

In *fire safety engineering* terms, the *ASET* must be greater than the *RSET*.

ASET is defined as the time between ignition of the *design fire* and the time when the first tenability criterion is exceeded in a specified room within the building. The tenability parameters measured at a height of 2 m above floor level, are:

(a) a *FED* of thermal effects greater than 0.3:
(b) conditions where, due to smoke obscuration, *visibility* is less than 10 m except in rooms of less than 100 m^2 or where the distance to an *exit* is 5 m or less, where *visibility* may fall to 5 m.

Comment:

Visibility is generally the first tenability criterion exceeded in calculations unless any exception is applied.

Calculate the *ASET* by modelling the fire using the *design fire* as specified. In most cases there will be a number of locations for the fire that could produce the lowest *ASET* for a given escape route. Check a number of rooms to determine the limiting case.

2 Design Scenarios

2.1 Design scenario (BE): Fire blocks exit

Design scenario in brief	A fire starts in an escape route and can potentially block an *exit*
Required outcome	Demonstrate that a viable escape route (or multiple routes where necessary) has been provided for building occupants.

2.1.1 Design scenario description

This *design scenario* addresses the concern that an escape route may be blocked due to proximity of the fire source. In this event, the number of *exits* and total *exit* width must be sufficient for occupants to escape before *ASET* is reached.

This *design scenario* applies to escape routes serving more than 50 people.

For each room/space within the building (accommodating more than 50 people), assume that the fire source is located near the primary escape route or *exit* and that it prevents occupants from leaving the building by that route. Fire in escape routes can be the result of a accidental or deliberately lit fire. Fire originating within an escape route is a severe fire applicable to the particular building use as described in the *design scenario*: CF Challenging fire (see **2.10**).

In order to be regarded as alternative escape routes, the routes must be separated from each other and must remain separated until reaching a final *exit* in accordance with NCC Volume One Part D1.5, or a demonstrated equivalent through analysis.

Active and passive *fire safety systems* in the building must be assumed to perform as intended by the design.

Comment:

The fire safety engineer needs to consider fire source locations that prevent the use of *exits* in escape routes.

Fire characteristics (e.g. HRR) and analysis need not be considered in this *design scenario* as the fire is assumed to physically block the *exit*. It may be assumed that occupant tenability criteria cannot be met where fire plumes and flames block an *exit*.

2.1.2 Method

The requirements of this *design scenario* can be demonstrated by analysis that checks whether or not a second *exit* is required.

2.2 Design scenario (UT) Fire in normally unoccupied room threatening occupants of other rooms

Design scenario in brief	A fire starts in a normally unoccupied room and can potentially endanger a large number of occupants in another room.
Required outcome	Demonstrate *ASET > RSET* for any rooms or spaces that can hold more than 50 people given a fire occurs in the normally unoccupied space. Design solutions may include the use of *separating elements* or fire suppression to confine the fire to the room of origin.

2.2.1 Design scenario description

This *design scenario* only applies to buildings with rooms or spaces that can hold more than 50 occupants, or rooms or spaces with less than 50 occupants but requiring extended evacuation times, that could be threatened by a fire occurring in another normally unoccupied space. Such rooms or spaces must include those rooms or spaces physically adjacent to the unoccupied room as well as rooms or spaces that are a farther distance and are not fire separated; or rooms or spaces from which over 50 occupants or slower evacuees have to pass through a potentially threatened room or space adjacent to the unoccupied room. It does not need to be satisfied for any other rooms or spaces in the building.

A fire starting in an unoccupied space can grow to a significant size undetected and then spread to other areas where large numbers of people may be present or where people are young, elderly or disabled and will take longer to evacuate. This *design scenario* is intended to address concern regarding fire starting in a normally unoccupied room and then migrating into space(s) potentially holding large numbers of occupants, or smaller numbers of potentially vulnerable occupants who may be slower to evacuate.

The analysis must assume that the target space containing occupants is filled to capacity under normal use or otherwise contains occupants with longer evacuation times.

For analysis, select a *design fire* as described in Section 2 for the applicable occupancy. Active and passive *fire safety systems* in the building must be assumed to perform as intended by the design.

2.2.2 Method

Either:

(a) carry out *ASET / RSET* analysis to show that the occupants within target spaces are not exposed to untenable conditions, or

(b) include *separating elements* or fire suppression to confine the fire to the room of origin. If *separating elements* are used, their design criteria must be determined based on the following design criteria:

   a. If no *automatic* fire detection is installed in the space of fire origin, *separating elements* must be designed to withstand a full *burnout* fire.

   b. If *automatic* fire detection is installed in the space of fire origin, *separating elements* must be shown to be effective for the period from ignition to the time when the occupied space (target space) is evacuated. An FRL equal to or greater than -/60/60 is assumed to be effective for this purpose.

2.3 Design scenario (CS) Fire starts in a concealed space

Design scenario in brief	A fire starts in a concealed space that can potentially endanger a large number of people in another room or in the room of fire origin.
Required outcome	Demonstrate that fire spread via concealed spaces will not endanger occupants located in rooms / spaces holding more than 50 people.

2.3.1 Design scenario description

This *design scenario* only applies to buildings with rooms or spaces that can hold more than 50 occupants, or rooms or spaces with less than 50 occupants but requiring extended evacuation times, that could be threatened by a fire occurring in a concealed space. Such rooms or spaces must include those rooms or spaces physically adjacent to the concealed space as well as rooms or spaces that are a farther distance and are not fire separated; or rooms or spaces from which over 50 occupants or slower evacuees have to pass through a potentially threatened room or space adjacent to the concealed space. It does not need to be satisfied for any other rooms or spaces in the building.

It does not apply if the concealed space has no combustibles (other than timber framing) and no more than two dimensions (length, width or depth) greater than 0.8 m.

A fire starting in a concealed space can develop undetected and spread to endanger a large number of occupants in another room. This *design scenario* addresses concern that a fire originating in a non-separated concealed space without either a detection system or suppression system could spread into a room within the building potentially holding a large number of occupants.

Assume that active and passive *fire safety systems* in the building perform as intended by the design.

Comment:

Fire spreading in concealed spaces may also compromise the ability of firefighters to assess the threat to themselves whilst undertaking rescue and firefighting operations.

2.3.2 Method

Modelling a fire in a concealed space is challenging but can be done, albeit it requires an extensive effort. Often it may be simplest to use the Deemed-to-Satisfy approach.

However, if a calculation approach using this *Verification Method* is used, the expected solution will most likely be to either:

(a) use *separating elements* or suppression to confine fire to the concealed space, or
(b) include *automatic* detection of heat or smoke to provide early warning of fire within the concealed space, or
(c) a combination of (a) and (b).

2.4 Design scenario (SF): Smouldering fire

Design scenario in brief	A fire is smouldering in close proximity to a sleeping area.
Required outcome	Provide a safe sleeping area.

2.4.1 Design scenario description

This *design scenario* addresses the concern regarding a slow, smouldering fire that causes a threat to sleeping occupants. Assume that active and passive *fire safety systems* in the building perform as intended by the design.

2.4.2 Method

The expected methodology is to either:

(a) use *separating elements* to confine the fire to the space of origin (assuming it is a separate space from the sleeping area), or

(b) include *automatic* detection of smoke in adjacent spaces to provide early warning of fire within an adjoining space.

The *separating elements* must prevent all smoke ingress which, for almost all situations requires a pressure differential between the two spaces in addition to a physical barrier. The pressure differential will have to be sufficient to prevent smoke ingress to the sleeping area.

If the *automatic* detection methodology is chosen, then an *automatic* smoke detection and alarm system must be installed throughout the sleeping and adjoining spaces, designed and installed to AS 1670.1.

2.5 Design scenario (HS): Horizontal fire spread

Design scenario in brief	A *fully developed fire* in a building exposes the *external walls* of a neighbouring building or *fire compartment* and a *fully developed fire* in the neighbouring building exposing the opening in the *external walls* of the building.
Required outcome	Demonstrate that the building satisfies the heat flux requirements for spread of fire

2.5.1 Design scenario description

This *design scenario* describes the requirements for a building to prevent horizontal fire spread to and from an adjacent building.

2.5.2 Method

Demonstrate compliance with CV1 and CV2.

2.6 Design scenario (VS): Vertical fire spread involving external cladding or external openings

Design scenario in brief	A fire source exposes the *external wall* or arrangement of openings in a building and leads to significant vertical fire spread.
Required outcome	Demonstrate that the building's external cladding / facade and arrangement of openings in the building do not contribute to excessive vertical fire spread.

2.6.1 Design scenario description

This *design scenario* applies to all buildings where there is a risk of vertical fire spread.

Comment:

This *design scenario* is not concerned with building-to-building fire spread across a relevant boundary, as this is addressed in the *design scenario*: HS (see **4.5**).

2.6.2 Method

Demonstrate compliance with CV3.

2.7 Design scenario (IS): Rapid fire spread involving internal surface linings

Design scenario in brief	Interior surfaces are exposed to a growing fire that potentially endangers building occupants.
Required outcome	Incorporation of appropriate lining materials to prevent rapid fire spread.

2.7.1 Design scenario description

The performance criteria required for lining materials will depend on their location within a building, and the use of the building.

2.7.2 Method

Linings, materials and assemblies in Class 2 to 9 buildings must comply with the appropriate provisions in EN13501 or as described inTable 4.5 (NCC Volume One Specification C1.10 Table 1).

2.8 Design scenario (FI): Fire brigade intervention

Design scenario in brief	This *design scenario* allows for *fire brigade* intervention.
Required outcome	Demonstrate that the *fire brigade* can undertake *fire brigade* intervention until completion of search and rescue activities.

2.8.1 Design scenario description

The purpose of this *design scenario* is to describe –

(a) the fire event the *fire brigade* is expected to face at its estimated time of arrival; and
(b) the scope of available fire-fighting facilities relative to the risk to building occupant safety and adjacent buildings; and
(c) The ability for the *fire brigade* to complete search and rescue activities relevant to the available firefighting activities.

Comment:

This *design scenario* is intended to be used in conjunction with the UF *design scenario* (See **2.9**). These two *design scenarios* will demonstrate that facilities for *fire brigade* intervention are appropriately incorporated.

2.8.2 Method

This *design scenario* only applies to buildings located within 50 km road travel of a fire station.

Compliance with this *design scenario* is demonstrated via application of the Australasian Fire and Emergency Service Authorities Council's (AFAC) Fire Brigade Intervention Model and modelling the fire and smoke development, in accordance with the CF *design scenario* (**2.10**).

Facilities for firefighting must be provided in accordance with **Table 2.8**, appropriate to the fire and smoke development at the estimated time of suppression activities.

Table 2.8 Facilities for fire brigade intervention

Facilities for fire brigade intervention	Building with sprinkler protection	Building without sprinkler protection
Fire brigade external access	Yes	Yes

Facilities for fire brigade intervention	Building with sprinkler protection	Building without sprinkler protection
Tenability to enable identification and access to seat of fire	Yes	Yes
Fire hydrants – internal required	Yes if > than 100 m to all points, and / or > 3 levels.	Yes if > than 70 m to all points, and / or > 3 levels.
Fire hydrants – external required	Yes	Yes
Command and control provisions	Yes if > 3 levels	Yes
Access to normally occupied areas for search and rescue	Yes if more than 50 persons occupy building	Yes

2.9 Design scenario (UF): Unexpected catastrophic failure

Design scenario in brief	The design will be suitably robust to prevent catastrophic structural failure in a fire.
Required outcome	Demonstrate that disproportionate failure does not occur for the duration of the fire event.

2.9.1 Design scenario description

The fundamental principles of the UF *design scenario* are that the building structure and/or critical elements should not suffer unexpected disproportionate failure during a fire event. This *design scenario* for the prevention of unexpected catastrophic failure aligns with the principles of structural robustness.

The unexpected catastrophic failure *design scenario* is intended to prevent unexpected catastrophic failure of a building component as a result of a fire event.

This *design scenario* assessment must be undertaken in conjunction with the structural engineer, to ensure that unexpected catastrophic failure should not occur for all critical elements. Ductility of the structure must also be considered so that visual cues that act as a warning occur prior to collapse.

Comment:

This *design scenario* is intended to be used in conjunction with the Fire Brigade Intervention (FI) *design scenario*. These two *design scenarios* will ensure that facilities for *fire brigade* intervention are appropriately incorporated.

2.9.2 Method

Compliance with this *design scenario* is achieved by demonstrating that the building structure and components have considered the following elements during a fire event:

(a) Assessment of the building structure and critical components such that upon the notional removal, in isolation, due to the fire event unexpected catastrophic failure of the entire element, or a significant proportion, is unlikely to occur.

(b) Demonstrating that if a component of the building is relied upon to carry a significant portion of the total structure, a systematic risk assessment of the building is undertaken and critical high risk components are identified. High risk components are designed to cope with the identified hazard or protective measures chosen to minimise the risk during a fire event. The proportion of the structure that triggers this analysis will have a range that the designer will have to identify and justify.

2.10 Design scenario (CF): Challenging fire

Design scenario in brief	A fire starts in a normally occupied space and presents a challenge to the building's *fire safety systems*, threating the safety of occupants.
Required outcome	Demonstrate *ASET > RSET* for *design fires* in various locations within the building.

2.10.1 Design scenario description

The challenging fires are intended to represent the credible worst case *design scenario* in normally occupied spaces that will challenge the fire protection features of the building.

This *design scenario* requires the use of *design fires* in various locations within the building. *ASET* must not be determined for occupants of the enclosure of fire origin for the following fire locations:

(a) Any room with a floor area less than 2.0 m²
(b) Sanitary facilities adjoining the path of travel for a *required exit*
(c) Any room or space of fire origin, other than sleeping areas, where care or detention is provided, which has:
- a total floor area, including mezzanine, of less than 500 m², and
- more than one direction of travel to an *exit* or a single direction of travel to an *exit* that is less than 20 m, and
- an occupant load of less than 150 people for the room or less than 100 people for any intermediate floor.

For (c), the designer does not have to demonstrate that tenability is maintained for occupants within the enclosure of origin; however, they must demonstrate that the challenging fire in this space does not threaten occupants in the rest of the building. The *design fires* must be characterised with a steady state fire, or a power law HRR, peak HRR and FLED. Design values for *yields* are specified for soot/smoke.

The *design fires* must be modified during an analysis (depending on the methodology used) to account for building ventilation and the effects of *automatic* fire suppression systems (if any) on the fire. The *design scenario* RC (**2.11**) will require the overall robustness of the design to be examined separately.

The designer must:

(a) for each location of the challenging fire, use a single fire source to evaluate the building's protection measures; and

(b) consider the impact on occupants who may be using escape routes external to the building as well as internal routes; and

(c) assume that active and passive *fire safety systems* in the building will perform as intended by the design.

Note:

Both CF and SS *design scenarios* refer to credible worst case *design fires*. These may not necessarily be the same *design fire*, as they relate to different safety systems of the building.

2.10.2 Method

This *design scenario* requires the *ASET / RSET* analysis of the impact on all building occupants with *design fires* located in various locations within the building, except for those rooms or spaces excluded in the *design scenario* described above.

The designer must to calculate the fire environment in the escape routes over the period of time the occupants require to escape. Assess the fire environment based on the *FED* and *visibility* at the location of the occupants.

The designer mustselect a fire calculation model appropriate to the complexity and size of the building/space that allows the *FED* and *visibility* to be determined.

2.11 Design scenario (RC): Robustness check

Design scenario in brief	The fire design will be checked to ensure that the failure of a critical part of the *fire safety system* will not result in the design not meeting the *Performance Requirements*.
Required outcome	Demonstrate that if a single *fire safety system* fails, the design is sufficiently robust that disproportionate spread of the fire does not occur (e.g. *ASET* / *RSET* for the remaining floors or *fire compartments* is satisfied).

2.11.1 Design scenario description

This *design scenario* applies where failure of a key *fire safety system* could expose the following to untenable conditions:

(a) More than 150 people, or

(b) More than 50 people in a sleeping occupancy *fire compartment* where the occupants are neither detained or undergoing some treatment or care, or

(c) People detained or undergoing treatment or care.

The number of people listed in (a) and (b) must be adjusted downward for the elderly, young or disabled. This particular *design scenario* focuses on the *ASET* / *RSET* life safety calculations performed as part of the *design scenario* CF Challenging Fire (**2.10**). The robustness of the design must be tested by considering the *design fire* with each key *fire safety system* rendered ineffective in turn.

Comment:

Ideally, a comprehensive quantitative probabilistic risk assessment would be used to assess the safety of a design. However, the risk assessment tools and supporting data are currently not suitable for inclusion in this *Verification Method*. Therefore, the framework currently requires a deterministic *ASET* / *RSET* approach with additional checks and balances.

As a general rule, when calculating *ASET* times, *fire safety systems* may be assumed to operate as designed, provided they are manufactured and installed in accordance with recognised national or international standards. However, in the situations designed above, additional *fire safety systems* are required to provide redundancy and robustness to fire safety designs.

2.11.2 Method

In the circumstances described in the *design scenario*, assume the failure of each key *fire safety system* in turn as determined by the *PBDB*. If *ASET* cannot be shown to be greater than *RSET* for the building, apart from the room of fire origin, then the design must be altered until the requirements for *ASET* and *RSET* are achieved.

If a design does not require a key *fire safety system* for *ASET*>*RSET*, there is no system to fail and the further robustness test is not required.

2.12 Design Scenario (SS): Structural stability and other property

Design scenario in brief	The fire design is used to demonstrate that the structural response of a building in a credible worst case *design scenario* does not present a risk to *other property*
Required outcome	Demonstrate that the building does not present a risk to *other property* in a full *burnout design scenario*.

2.12.1 Design scenario description

Comment

A fundamental requirement of NCC Volume One CP1 and CP2 is that a building should not present a risk to *other property* in a fire event. The purpose of this *design scenario* is to demonstrate that a building does not present a risk to *other property* during a fire event that has the potential to impact on the building's structure.

Unlike the CF *design scenario*, the worst credible case fire for this *design scenario* must be located within any space of the building rather than only within an occupied space. It is likely that several different fire design locations will be required to be tested to determine the location of the worst credible case fire.

The designer must:

(a) for each location of the *design fire*, use a single fire source to evaluate the building's protection measures; and

(b) consider the impact on occupants who may be using escape routes external to the building as well as internal routes.

Occupant egress is not required to be assessed in this *design scenario* as it is dealt with in the CF *design scenario*, and others.

Note

Both CF and SS *design scenarios* refer to credible worst case *design fires*. These may not necessarily be the same *design fire*, as they relate to different safety systems of the building.

2.12.2 Method

This *design scenario* requires the fire safety engineer to assess a full *burnout design fire* in the credible worst case location for the structural stability of the building.

The fire safety engineer, with the assistance of a structural engineer, must demonstrate that appropriate features have been incorporated into the building which either:

(a) prevent the building structure from failing within the *design scenario*; or
(b) ensure that the building will collapse inwards if failure occurs within the *design scenario*.