ABCB

National Construction Code

Volume One

Building Code of Australia

2019

Contents and Introduction

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Introduction to the National Construction Code (NCC)

About the NCC

The NCC is Australia's primary set of technical design and construction provisions for buildings. As a performance-based code, it sets the minimum required level for the safety, health, amenity, accessibility and sustainability of certain 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 or new plumbing and drainage 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. When determining the content of the NCC, the ABCB seeks to—

- ensure requirements have a rigorously tested rationale; and
- effectively and proportionally address applicable issues; and
- create benefits to society that outweigh costs; and
- consider non-regulatory alternatives; and
- consider the competitive effects of regulation; and
- not be unnecessarily restrictive.

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

Format of the NCC

The NCC is published in three volumes. The Building Code of Australia (BCA) is Volumes One and Two of the NCC and the Plumbing Code of Australia (PCA) is Volume Three of the NCC.

Components of the NCC

The NCC provides 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—

- Governing Requirements; and
- Performance Requirements; and
- compliance options to meet the NCC requirements; and
- State and Territory variations and additions.

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

Legislative arrangements and the NCC

The NCC is given legal effect through State and Territory, or other statutory authority, building and plumbing legislation. These Acts and Regulations set out the legal framework and administration mechanisms for the NCC to support the design and construction of buildings.

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

How to use the NCC

Each volume of 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 provide 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 resources

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

Introduction to NCC Volume One

About NCC Volume One

NCC Volume One contains technical design and construction requirements for all Class 2 to 9 buildings (multi-residential, commercial, industrial, and public assembly buildings) and their associated structures.

NCC 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 One

NCC Volume One contains the following Sections:

- Section A – Governing Requirements
- Section B – Structure
- Section C – Fire resistance
- Section D – Access and egress
- Section E – Services and equipment
- Section F – Health and amenity
- Section G – Ancillary provisions
- Section H – Special use buildings
- Section I – * * * * * (Section I provisions were removed in NCC 2014)
- Section J – Energy efficiency
- Schedules—
  - State and Territory appendices
  - Abbreviations and symbols
  - Definitions
  - Referenced documents
  - Fire-resistance of building elements
  - Fire hazard properties
  - Fire Safety Verification Method

Section A contains the mandatory Governing Requirements for the NCC. Sections B to J contain the mandatory *Performance Requirements* and the pathways that can be used to comply with the NCC.

Section A

Governing Requirements

Section A Governing Requirements

Section A Governing Requirements

Introduction to this Section

The Governing Requirements of the NCC provide the rules and instructions for using and complying with the NCC. They include the following:

- Interpreting the NCC.
- Complying with the NCC.
- Application of the NCC in States and Territories.
- 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 characteristics and intended use.

Part A1 Interpreting the NCC

Introduction to this Part

This Part explains important concepts on how the NCC must 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 terms. This is critical in understanding the intended technical and legal meaning of the NCC. This Part also explains the difference between the mandatory parts of the NCC and parts that are only explanatory or guidance in nature.

A1.0 Interpretation

(1) The following components of the NCC are non-mandatory and informative:

- (a) Content identified as "explanatory information".
- (b) For **Volumes One and Two**, the "Introduction to this Part or Section" information, located at the beginning of each Part or Section.
- (c) For **Volume Three**, the "Introduction to this Section" information, located at the beginning of each Section.

(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.

Note:
For **Volume Three**, if a word is not defined in Schedule 3, the meaning (if any) attributed to it under AS/NZS 3500.0 Glossary of Terms should be used unless the contrary intention appears.

(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).
- (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 "the degree necessary" 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*.
- (d) For **Volume Three** the "Introduction to this Part" information, located at the beginning of each Part, is mandatory and is provided to specify where each Part applies.
- (e) An "Application" statement is mandatory and is provided to specify where and when a requirement or provision applies.
- (f) A "Limitation" statement is mandatory and is provided to specify where and when the application of a requirement or provision is limited to a certain circumstance.
- (g) An "Exemption" statement is mandatory and is provided to specify where or when a requirement or provision does not need to be complied with.
- (h) A "Note" is part of a provision or requirement and provides additional mandatory instructions.
- (i) Figures in the NCC are used to illustrate 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.
- (j) 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) The following sub-classifications apply:

- (a) Classes 1a and 1b are sub-classifications of Class 1.
- (b) Classes 7a and 7b are sub-classifications of Class 7.

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

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

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

Tas A1.0(7)

Explanatory information:

Explanatory information and Introduction to this Section information contained in the NCC or Introduction to this Part information contained in Volumes One and Two of the NCC are non-mandatory and are provided for guidance purposes only. This informative material should be read in conjunction with the technical provisions of the NCC. Any 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 and they do not cover State and Territory variations and additions. Because informative and guidance components of the NCC do not have regulatory force, the ABCB accepts no responsibility for its contents when applied to specific buildings or any liability which may result from its use.

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

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.

Whether a provision applies or not depends on the circumstances of the case and the circumstances in which the reference is made. 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.

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. Therefore any part of the NCC that uses these expressions should be referenced against the requirements of the *appropriate authority*. For example, an *appropriate authority* might judge that an item need not be installed, or a particular level of performance be achieved.

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

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 Classes 9a, 9b and 9c.

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*. Therefore a figure must not be used as an indication of the full construction requirements in a given situation, as the only available option, or a substitute for referencing appropriate construction requirements (in other sources) for a given clause.

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

Compliance with the NCC is achieved by complying with—

(1) the Governing Requirements of the NCC; and

(2) the *Performance Requirements*.

A2.1 Compliance with the Performance Requirements

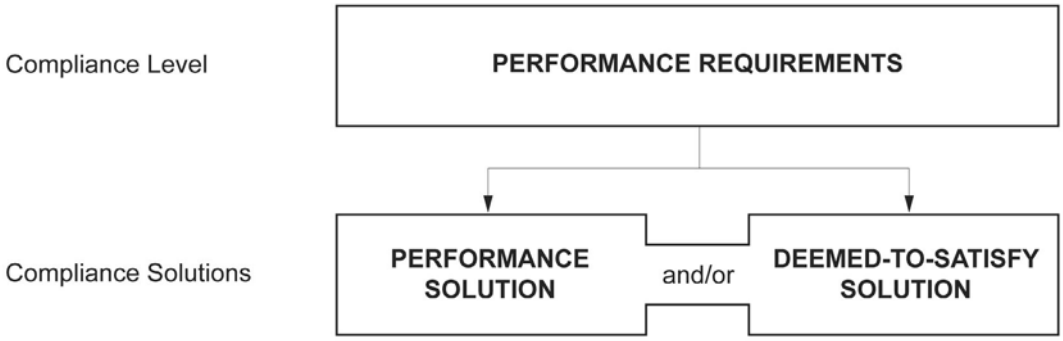
Performance Requirements are satisfied by one of the following, as shown in Figure 1:

(1) A *Performance Solution*.

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

(3) A combination of (1) and (2).

Figure 1: NCC compliance option structure



A2.2 Performance Solution

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

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

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

(2) A *Performance Solution* must be shown to comply with the relevant *Performance Requirements* through one or a combination of the following *Assessment Methods*:

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

(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 relevant *Performance Requirements*.

(c) *Expert Judgement*.

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

(3) Where a *Performance Requirement* is satisfied entirely by a *Performance Solution*, in order to comply with (1) the

following method must be used to determine the *Performance Requirement* or *Performance Requirements* relevant to the *Performance Solution*:

(a) Identify the relevant *Performance Requirements* from the Section or Part to which the *Performance Solution* applies.

(b) 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*.

A2.3 Deemed-to-Satisfy Solution

(1) A solution that 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 *Assessment Methods*:

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

(b) *Expert Judgement*.

(3) For **Volume Two**:

(a) Where 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*, 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.

(b) 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 unless otherwise stated.

A2.4 A combination of solutions

(1) *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, as appropriate:

(a) A2.2 for assessment against the relevant *Performance Requirements*.

(b) A2.3 for assessment against the relevant *Deemed-to-Satisfy Provisions*.

(3) Where a *Performance Requirement* is satisfied by a *Performance Solution* in combination with a *Deemed-to-Satisfy Solution*, in order to comply with (1), the following method must be used to determine the *Performance Requirement* or *Performance Requirements* relevant to the *Performance Solution*:

(a) Identify the relevant *Deemed-to-Satisfy Provisions* of each Section or Part that are to be the subject of the *Performance Solution*.

(b) Identify the *Performance Requirements* from the same Sections or Parts that are relevant to the identified *Deemed-to-Satisfy Provisions*.

(c) 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:

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

Performance Requirements outline the minimum necessary standards different buildings or building elements must attain. The *Performance Requirements* are the only NCC technical provisions that must be satisfied.

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

Requirements.

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.

A2.2(2)(b)(ii) provides for the use of *Verification Methods* that 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*.

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 *Assessment Methods*:

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

For example, building proponents who wish to know what has to be done to satisfy the fire safety *Performance Requirements* for a particular building can either follow the *Deemed-to-Satisfy Provisions* or develop a *Performance Solution*. Guidance on how to develop *Performance Solutions* can be found on the ABCB website at: www.abcb.gov.au. The ABCB Resource Library contains information on the development of *Performance Solutions* for both building and plumbing.

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* may be verified using one or a combination of the following *Assessment Methods*:

- Evidence of suitability.
- *Expert Judgement*.

Some *Performance Requirements* are without *Deemed-to-Satisfy Solutions*. Compliance with these *Performance Requirements* must be achieved by using a *Performance Solution*.

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 practices 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*.

Acceptable construction practices are *Deemed-to-Satisfy Provisions* that are considered to meet the legislative requirements for Class 1 and Class 10 buildings.

There is no obligation to adopt any particular option contained in the acceptable construction practices, if it is preferred to meet the *Performance Requirement* in some other way.

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

When designing a building or *plumbing* or *drainage* system, both *Performance Solutions* and *Deemed-to-Satisfy Solutions* can be used to achieve compliance with *Performance Requirements*. 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 of a building or *plumbing* or *drainage* system.

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*. A2.2(3) and A2.4(3) set out the methods for determining which *Performance Requirements* are relevant.

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

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

Part A3 Application of the NCC in States and Territories

Introduction to this Part

This Part explains applying the NCC in accordance with State or Territory legislation. The NCC 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 comprise inclusively of—

- (a) Sections A to J and associated schedules of Volume One; and
- (b) Sections 1 to 3 and associated schedules of Volume Two; and
- (c) Sections A to E and associated schedules 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) For Volumes One and Three, State and Territory variations, additions and deletions are contained in Schedule 1.

(5) For Volume Two, State and Territory variations, additions and deletions are contained throughout the Volume and in Schedule 1.

(6) State and Territory variations and deletions are identified throughout the NCC.

Explanatory information:

The NCC is given legal effect by building regulatory legislation in each State and Territory. This legislation consists of an Act of Parliament and subordinate legislation which empowers the regulation of certain aspects of building and plumbing, and contains the administrative provisions necessary to give effect to the legislation.

Although the NCC is a national code, in some instances it is necessary for a State or Territory to vary or apply additional requirements specific to their jurisdiction. A3.0(2) highlights that these variations, additions or deletions must be applied in conjunction with the NCC provisions. Typically, these variations, additions or deletions override the requirements contained within the NCC.

Any provision of the NCC may be overridden by, or subject to, State or Territory legislation. The NCC must therefore be read in conjunction with that legislation. Any queries on such matters should be referred to the State or Territory authority responsible for building and plumbing regulatory matters.

Where a requirement or provision of the NCC is subject to a State or Territory variation, addition, or deletion, a reference to the appropriate provision in Schedule 1 is included with that requirement or provision.

Part A4 NCC referenced documents

Introduction to this Part

This Part explains how documents referenced in the NCC are adopted and applied. The NCC itself does not 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 multiple types of referenced documents. A primary referenced document is one referenced in Schedule 4 of the NCC. A secondary referenced document is one referenced in a primary referenced document. Other referenced documents are referenced by secondary and subsequently referenced documents.

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.

Volume Three Tas A4.0(3)

(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 in a primary referenced document 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

The NCC overrules any difference between the NCC and a primary referenced document, including any secondary referenced document.

Exemption 1:

A4.1 does not apply to acceptable construction manuals when used in their entirety to comply with requirements of the NCC unless otherwise stated.

A4.2 Adoption of referenced documents

The NCC does not require compliance with requirements in relation to the following matters where they are prescribed in a referenced document:

(1) The rights, responsibilities or obligations between the manufacturer, supplier or purchaser.

(2) The responsibilities of any trades person or other building operative, architect, engineer, authority, or other person or body.

(3) The submission for approval of 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.

(4) The submission of a material, product, form of construction or design to any person, authority or body for an opinion.

(5) Any 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.

Explanatory information:

Schedule 4 is only mandatory to *Deemed-to-Satisfy Provisions*, *Verification Methods* and Schedules 3, 5 and 6. However, referenced documents are only applicable to the NCC provision that references the document.

A proponent undertaking a *Performance Solution* can use any element or edition of any document, if they help satisfy the *Performance Requirements*. They do not need to use the documents listed in Schedule 4.

Schedule 4 lists the specific edition of the Standard or other document adopted, including any amendments considered appropriate for Schedule 3, the *Deemed-to-Satisfy Provisions* or *Verification Methods*. Other editions of (or amendments to) the referenced document are not adopted and have no standing under the NCC.

A primary referenced document may refer to a secondary referenced document. A4.0(5) stipulates that the secondary referenced document is the edition of the document that existed at the time of publication of the primary referenced document. When another edition of (or amendment to) a secondary referenced document is released, subject to A4.0 Exemption 1, that edition (or amendment) is not adopted for the purposes of the primary referenced document.

A4.2 means that contractual matters or clauses defining responsibilities of various parties, and matters not appropriate for adoption in the NCC are not included when a document is called up in the NCC.

Part A5 Documentation of design and construction

Introduction to this Part

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

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

A5.0 Suitability

(1) A building and *plumbing* or *drainage* installation must be constructed using materials, products, *plumbing products*, forms of construction and designs fit for their intended purpose to achieve the relevant requirements of the NCC.

(2) For the purposes of (1), a material, product, *plumbing product*, form of construction or design is fit for purpose if it is—

(a) supported by evidence of suitability in accordance with—

(i) A5.1; and

(ii) A5.2 or A5.3 as appropriate; and

(b) constructed or installed in an appropriate manner.

A5.1 Evidence of suitability—Volumes One, Two and Three

(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—Volumes One and Two

Application 1:

A5.2 is only applicable to the BCA.

(1) Subject to 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 (a) and (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

(ii) 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 it fulfils specific requirements of the BCA.

(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 it fulfils specific requirements of the BCA.

(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 it fulfils specific requirements of the BCA.

(2) 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—Volume Three

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—

Tas A5.3(1)(a)

(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 (2), if it includes compliance with AS/NZS 4020.

Tas A5.3(1)(c)

(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

Tas A5.3(3)(b)

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

(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 (2) or (3) must be subjected to a risk assessment in accordance with the WaterMark Scheme Rules.

Tas A5.3(401)

(5) Evidence to support that a design or system meets the 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*.

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

(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.

Tas A5.3(5)(b)(iii)

(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.

Tas A5.3(7), (8), (9), (10)

A5.4 Fire-resistance of building elements

Where a *Deemed-to-Satisfy Provision* requires a building element to have an FRL, it must be determined in accordance with Schedule 5.

A5.5 Fire hazard properties

Where a *Deemed-to-Satisfy Provision* requires a building component or assembly to have a *fire hazard property* it must be determined as follows:

(1) For *average specific extinction area*, *critical radiant flux* and *Flammability Index*, as defined in Schedule 3.

(2) For *Smoke-Developed Index* and *Spread-of-Flame Index*, in accordance with Schedule 6.

(3) For a material's *group number* or *smoke growth rate index* ($SMOGRA_{RC}$), in accordance with Clause 4(b) of Specification C1.10.

A5.6 Resistance to the incipient spread of fire

A ceiling is deemed to have a *resistance to the incipient spread of fire* to the space above itself if—

(1) it is identical with a prototype that has been submitted to the *Standard Fire Test* and the *resistance to the incipient spread of fire* achieved by the prototype is confirmed in a report from an *Accredited Testing Laboratory* that—

(a) describes the method and conditions of the test and form of construction of the tested prototype in full; and

(b) certifies that the application of restraint to the prototype complies with the *Standard Fire Test*; or

(2) it differs in only a minor degree from a prototype tested under (1) and the *resistance to the incipient spread of fire* attributed to the ceiling is confirmed in a report from an *Accredited Testing Laboratory* that—

(a) certifies that the ceiling is capable of achieving the *resistance to the incipient spread of fire* despite the minor departures from the tested prototype; and

(b) describes the materials, construction and conditions of restraint that are necessary to achieve the *resistance to the incipient spread of fire*.

ACT Appendix

Explanatory information:

A5.0 relates to the quality of work and materials needed to construct a building to meet NCC requirements.

This means that—

- all people involved with construction must work skillfully in accordance with good trade practice; and
- all materials must be of a quality to fulfil their function/s within the building.

A5.0 only applies to matters normally covered by the NCC.

While A5.0 outlines quality of work and material demands, sometimes additional conditions may be required by—

- other Commonwealth, State or Territory legislation; and
- contracts that include either specific quality requirements, or requirements for specific materials and the like.

Example

Permit authorities would ordinarily not apply A5.0 to such matters as—

- plastering—other than for fire rating, waterproofing of *wet areas*, and sound insulation; or
- painting—other than that *required* for weatherproofing an *external wall*.

When determining which form of evidence will be used, it is important to consider the appropriateness of the evidence, as some forms of evidence may be more suitable to materials and products and others to designs and forms of

construction. The requirement to consider appropriateness of the evidence is specified in A5.1(1).

For further guidance, refer to the ABCB Handbook for Evidence of Suitability.

All copies of documents provided as evidence must be unabridged copies of the originals. No part can be left incomplete.

A5.2 represents the minimum level of documentary evidence needed to show that a material, product, form of construction or design meets the relevant NCC requirements. The evidence can be required by:

- an *appropriate authority*;
- a party to a construction contract; or
- a person certifying compliance with the NCC.

If a building proponent does not produce exactly what is required, the evidence may be rejected.

It should be noted that design may refer to engineering design, architectural design as well as product and material design.

A5.2(1)(f) allows for the use of alternative forms of documentary evidence to those included in A5.2(1)(a) to (e), as long as they comply with certain specified conditions.

An example of this arises when an authority carries out an inspection of a building site. The inspection alone would not be acceptable as evidence. However, if the authority compiled a written report detailing findings and conclusions from the inspection, then it may comply with the requirements of A5.2(1)(f).

A *Product Technical Statement* detailing the characteristics and merits of a particular product or system is also an example of another form of documentary evidence.

There is significant reliance by industry on the use of calculation methods, including software programs, for demonstrating compliance with the NCC. While there is no formal recognition of specific methods, A5.2(2) allows suitable evidence to be submitted to demonstrate that a calculation method (including a software program) complies with a relevant ABCB protocol that establishes the characteristics of a suitable calculation method.

A5.3(1) requires any *product* intended for use in contact with *drinking water* to comply with AS/NZS 4020. Compliance is achieved by passing the relevant tests set out in the Standard. Evidence of compliance must then be provided in accordance with A5.3(1), under which there are two options. The first, at A5.3(1)(a), recognises test reports and certificates that cover compliance with AS/NZS 4020 only. The second, at A5.3(1)(b), recognises *WaterMark Licences* where compliance with AS/NZS 4020 is a requirement of the relevant *product* Standard or WaterMark Technical Specification.

For *products* that are of a type listed on the *WaterMark Schedule of Products*, A5.3(2) requires that these *products* have a *WaterMark Licence*. A *WaterMark Licence* reflects that the *product* has been certified and authorised in accordance with the WaterMark Scheme Rules.

For *products* that are not subject to WaterMark certification (i.e. excluded *products*), evidence that can be used to support that the *product* is fit for its intended purpose is provided in A5.3(3). This may include demonstrating compliance with a *product* specification referenced in the *WaterMark Schedule of Excluded Products*, where one is available.

A5.3(4) provides that any product that is not listed on the *WaterMark Schedule of Products* or the *WaterMark Schedule of Excluded Products* must be subjected to a risk assessment in accordance with the WaterMark Scheme Rules. The risk assessment will determine whether the product in question requires certification and authorisation, or if it should be listed as an “excluded product”. This in turn will determine the form of evidence of suitability applicable to the *product*.

What is WaterMark?

The *WaterMark Certification Scheme* is a mandatory certification scheme for *plumbing* and *drainage products* to ensure that these *products* are fit for purpose and appropriately authorised for use in a *plumbing* or *drainage* system.

The PCA, through Part A5, requires certain *plumbing* and *drainage products* to be certified and authorised for use in a *plumbing* or *drainage* system. These *products* are certified through the *WaterMark Certification Scheme* and listed on the WaterMark Product Database.

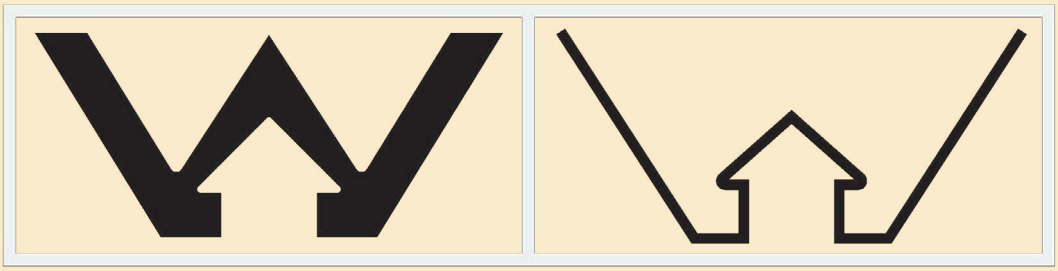
The *WaterMark Certification Scheme* is governed by the WaterMark Scheme Rules, which are available for download from the ABCB website at: www.abcb.gov.au. These rules set out the requirements for risk assessments, evaluation, certification, and the drafting of WaterMark Technical Specifications.

When a *product* is listed on the *WaterMark Schedule of Products* then, for it to be certified and authorised, the *product* must—

- be tested by an *Accredited Testing Laboratory*; and
- comply with an approved *product* specification (either a relevant existing *product* Standard or a WaterMark Technical Specification); and
- be manufactured in accordance with an approved Quality Assurance Program; and

- carry a scope of use.

Products that comply fully with the applicable requirements of the *WaterMark Certification Scheme* are then eligible to be certified by a *WaterMark Conformity Assessment Body* and listed on the WaterMark Product Database. Certified *products* are identifiable by the WaterMark certification trade mark, shown below, that must be displayed on the *product* upon granting of a *WaterMark Licence*.



If under a *Deemed-to-Satisfy Provision* a building element is *required* to have an FRL, then A5.2 may be used to provide evidence to show that the FRL has been determined in accordance with Schedule 5.

In the case of a test report from an *Accredited Testing Laboratory*, the report may be either—

- the test report referred to in clause 2.16.2 of AS 1530.4 (also referred to as a full test report); or
- the regulatory information report referred to in clause 2.16.3 of AS 1530.4 (also referred to as a short-form report).

In both cases the report must be an unabridged copy of the original report. A test certificate referred to in clause 2.16.4 of AS 1530.4 on its own is not suitable for showing compliance with the NCC.

If a proposal uses a *Deemed-to-Satisfy Provision* that requires a building element to have *fire hazard properties*, then A5.2 may be used to provide evidence to support the proposal and show that the *fire hazard properties* have been determined in accordance with A5.5.

Refer to the guidance provided in the Guide to Volume One for further information on *fire hazard properties* which includes—

- *Flammability Index*; and
- *Spread-of-Flame Index*; and
- *Smoke-Developed Index*; and
- a material's *group number*; and
- *smoke growth rate index*.

The *Deemed-to-Satisfy Provisions* of the BCA contain a number of provisions requiring a ceiling to have a *resistance to the incipient spread of fire* to the space above itself. A5.6 sets out the method of determining the incipient spread of fire. The method is based on the method of determining the FRL of a building element and use of the *Standard Fire Test*.

Part A6 Building classification

Introduction to this Part

The NCC groups buildings and structures by the purpose for which they are designed, constructed or adapted to be used, rather than by the function or use they are put to, 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).

The technical building requirements for Class 2 to 9 buildings are mostly covered by Volume One of the NCC and those for Class 1 and 10 buildings are mostly covered by Volume Two of the NCC. Volume Three of the NCC covers *plumbing* and *drainage* requirements for all building classifications.

A building may have parts that have been designed, constructed or adapted for different purposes. In most cases, each of these parts is a separate classification. A building (or part of a building) may also have more than one such purpose 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 according to its purpose and comply with all the appropriate requirements for its classification.

Exemption 1:

For A6.0(1) where a part of a building has been designed, constructed or adapted for a different purpose and is less than 10% of the *floor area* of the *storey* it is situated on, the classification of the other part of the *storey* may apply to the whole *storey*.

Limitation 1:

Exemption 1 does not apply where the minor use of a building is a laboratory or a 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 major part or principal use of the building or *fire compartment* in which it is situated.

Exemption 2:

A6.0(3) does not apply to an *electricity network substation*.

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

A6.1 Class 1 buildings

A Class 1 building includes one or more of the following sub-classifications:

(1) Class 1a is one or more buildings, which together form a single dwelling including the following:

- (a) A detached house.
- (b) 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.

(2) Class 1b is one or more buildings which together constitute—

- (a) a boarding house, guest house, hostel or the like that—
  - (i) would ordinarily accommodate not more than 12 people; and
  - (ii) have a total area of all floors not more than 300 m^2 (measured over the enclosing walls of the building or buildings); or
- (b) 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 1, 2 and 3.

Figure 1: Identification of Class 1 buildings

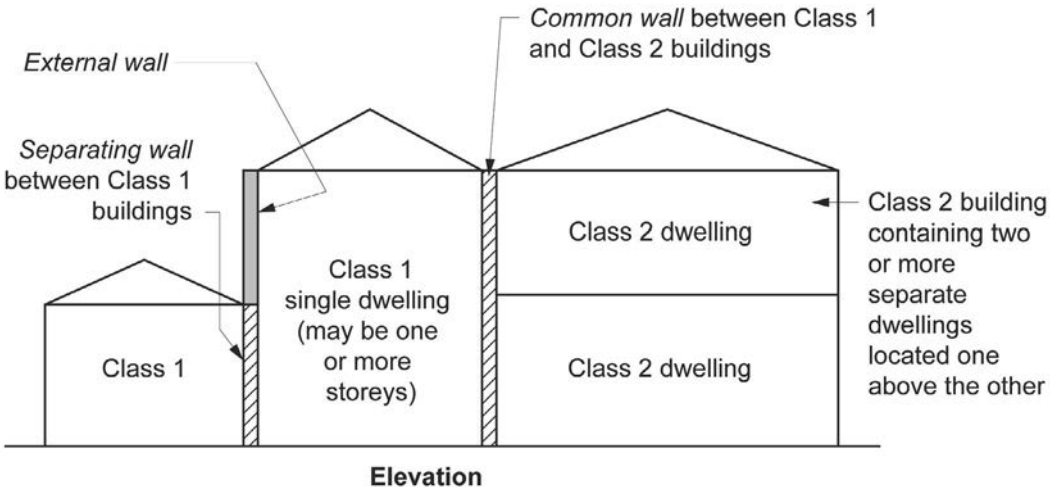
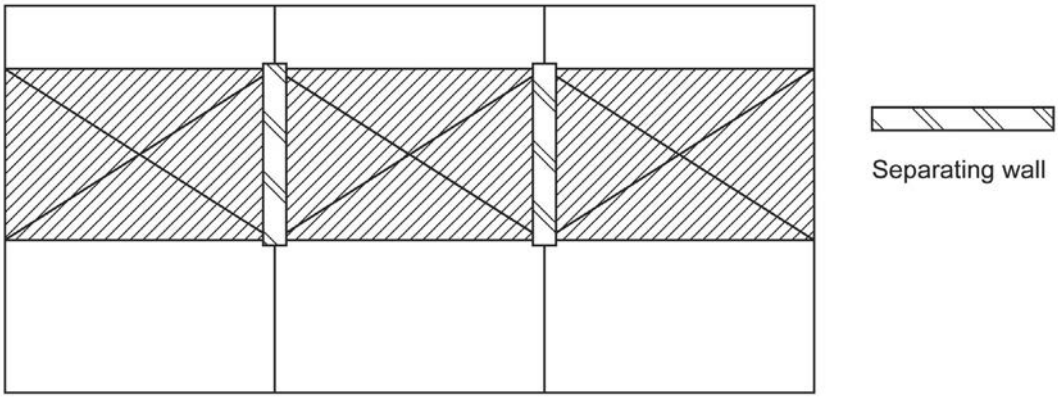
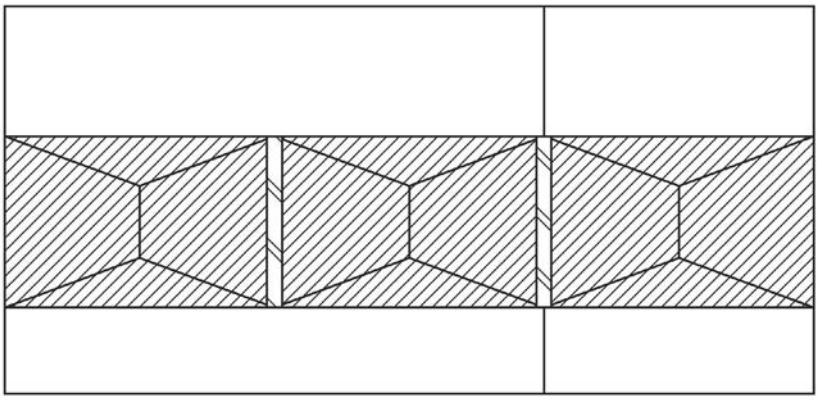


Figure 2: Typical Class 1 building configurations



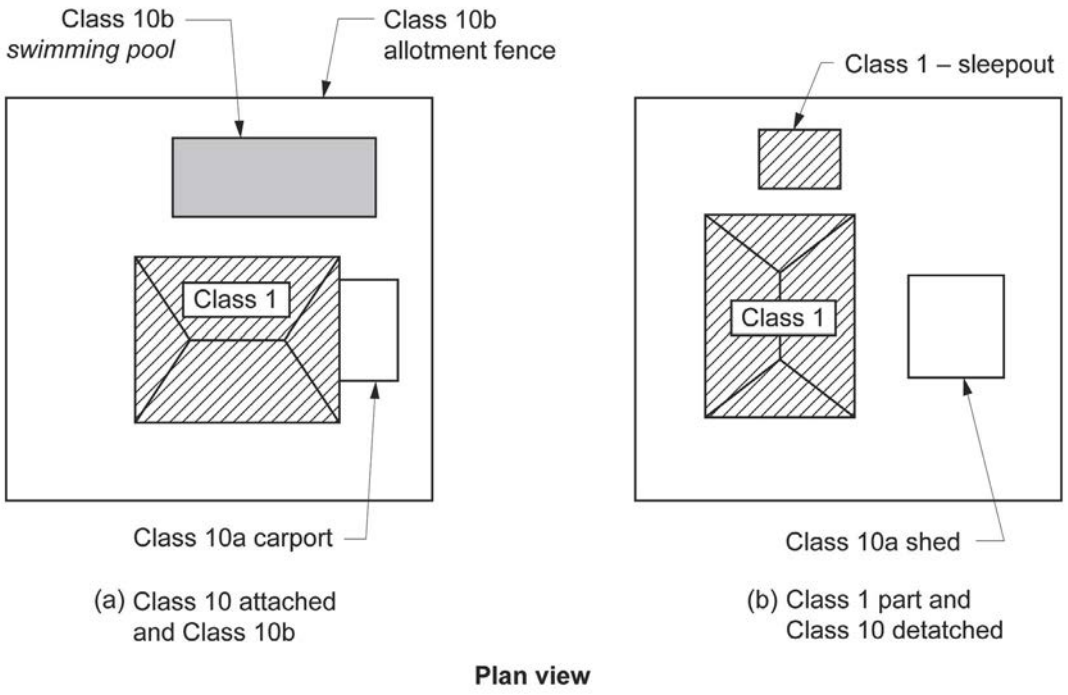
(a) 3 Class 1 buildings
on 3 separate allotments



(b) 3 Class 1 buildings
on 2 separate allotments

Plan view

Figure 3: Domestic allotment – Classification of buildings and structures



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* in a Class 2 building is a separate dwelling.

A6.3 Class 3 buildings

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

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

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

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

(4) Accommodation for the aged, children, or people with disability.

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

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

(7) A *residential care building*.

Limitation 1:

For A6.3, a Class 3 building is not a Class 1 or 2 residential building. However, a building could be a mixture of Class 3 and another Class.

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.

NSW Class 6

SA Class 6

A6.6 Class 6 buildings

A Class 6 building is a shop or other building used for the sale of goods by retail or the supply of services direct to the public, including—

(1) an eating room, café, restaurant, milk or soft-drink bar; or

(2) a dining room, bar area that is not an *assembly building*, shop or kiosk part of a hotel or motel; or

(3) a hairdresser's or barber's shop, public laundry, or undertaker's establishment; or

(4) a market or sale room, showroom, or *service station*.

A6.7 Class 7 buildings

A Class 7 building is a storage-type building that includes one or more of the following sub-classifications:

(1) Class 7a — a *carpark*.

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

A6.8 Class 8 buildings

A Class 8 building is a process-type building that includes the following:

(1) A laboratory.

(2) 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 is a building of a public nature that includes one or more of the following sub-classifications:

(1) Class 9a — 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*.

(2) Class 9b — an *assembly building* including a trade workshop or laboratory in a primary or secondary *school*.

Exemption 1:
A6.9(2) excludes any parts of the building that are of another Class.

(3) Class 9c — a *residential care building*.

A6.10 Class 10 buildings and structures

A Class 10 building includes one or more of the following sub-classifications:

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

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

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

See Figure 3.

A6.11 Multiple classifications

A building (or part of a building) may be designed, constructed or adapted 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 relevant requirements that apply to each of the classifications for that building (or part of a building).

Explanatory information:

Classification is a process for understanding risks in a building or part, according to its use. It must be correctly undertaken to achieve NCC aims as appropriate to each building in each circumstance.

It is possible for a single building to have parts with different classifications. Part of a building can also have more than one classification. Where there is any conflict between what requirements the part should comply with, the more stringent requirement applies.

Where it is unclear which classification should apply, *appropriate authorities* have the discretion to decide. They base their decision on an assessment of the building proposal.

They will look at what classification the building most closely resembles. They will also take into account the likely *fire load*, plus, the likely consequences of any risks to the safety, health and amenity of people using the building.

Appropriate authorities will also look at any relevant court decisions or determinations of the State or Territory body responsible for considering appeals on building classification matters.

It should be noted that appeals body determinations and, in some States and Territories, certain court decisions are usually not precedent creating. Such decisions are determined on a case-by-case basis.

It should also be noted that State and Territory authorities responsible for building regulatory matters may have issued advice, interpretations or guidelines to assist practitioners in applying the correct classification to a building or part. Advice on such matters should be sought from the relevant authority.

Under A6.0 Exemption 1, if 10% or less of the *floor area* of a *storey* is used for a purpose which could be classified differently to the remainder of that *storey*, that part may be classified as being the same as the remainder. Laboratories and *sole-occupancy units* in Class 2, 3 or 4 parts are excluded from this concession. The reason is that laboratories are considered to have a high *fire hazard* potential and classifying them with the remainder of the building could, in a majority of cases, endanger occupants of the other parts of the building which have a lower *fire hazard* potential. Also, the intent is not to allow *sole-occupancy units* in Class 2, 3 or 4 parts to be regarded as another Class such as Class 6 and then not have any fire or sound insulation between the units and any other classification which may have a high *fire load* and could endanger the occupants of the Class 2, 3 or 4 part.

If A6.0 Exemption 1 is used, it should be remembered that it will still be necessary to use the occupant numbers in Volume One Table D1.13 for the particular use of the area. Likewise, the lighting and equipment levels, people occupancy and load profiles for the area of minor use for the purposes of Volume One Section J must be in accordance with the use of the area.

If the *storey* has a very large *floor area*, the 10% or less concession area may also be large, even though the rest of the building is classifiable as a building which ordinarily has a lower risk potential. An example of the application of this area concession could be as follows:

- If a single *storey* factory has an office that takes up 8% of the whole *storey's floor area*, the entire building (including the office) can be classified as being Class 8.
- However if that office area takes up 12% of the *storey's floor area*, that area must be classified as Class 5, and the remainder of the building as Class 8.

Under A6.0(3) a plant room, machinery room, lift motor room or *boiler* room, have the same classification as the part of the building they are in. These kinds of rooms do not need to be ancillary or subordinate to the part of the building they are in, that is, the 10% criterion is not applicable.

There are specific provisions for these kinds of rooms. For example, Volume One Section C requires some of them to be fire separated from the remainder of the building (e.g. see C2.13 with regard to elements of the electricity supply system).

Class 1 buildings are covered in Volumes Two and Three of the NCC. Class 1 buildings are not located above or below another dwelling, or another class of building other than a *private garage*.

A *sole-occupancy unit* used for residential purposes located over another *sole-occupancy unit* used for residential purposes will always be a Class 2 or Class 3 building (depending on the circumstances). It cannot be a Class 1 building.

A single Class 1 dwelling can be made up of more than one building. For example, it may include what is ordinarily called a house, plus one or more habitable 'outbuildings' such as sleepouts. Note that a habitable building such as a sleepout cannot be classified as a Class 10 building.

The height or number of storeys of a Class 1 building makes no difference to its classification.

Class 1b buildings used for short-term holiday accommodation include cabins in caravan parks, tourist parks, farm stay, holiday resorts and similar tourist accommodation. This accommodation itself is typically rented out on a commercial basis for short periods and generally does not require the signing of a lease agreement. Short-term accommodation can also be provided in a boarding house, guest house, hostel, bed and breakfast accommodation or the like.

Unlike a Class 1b building described in A6.1(2)(a), a Class 1b building described in A6.1(2)(b) does not have any *floor area* limitation. Therefore, if 4 or more single dwellings are located on the one allotment and used for short-term holiday accommodation, each single dwelling would be classified as a Class 1b building regardless of the *floor area* of each dwelling or the combined *floor area* of all of the dwellings.

See also Volume One Table D3.1 which contains an explanation of what is considered be “one allotment”.

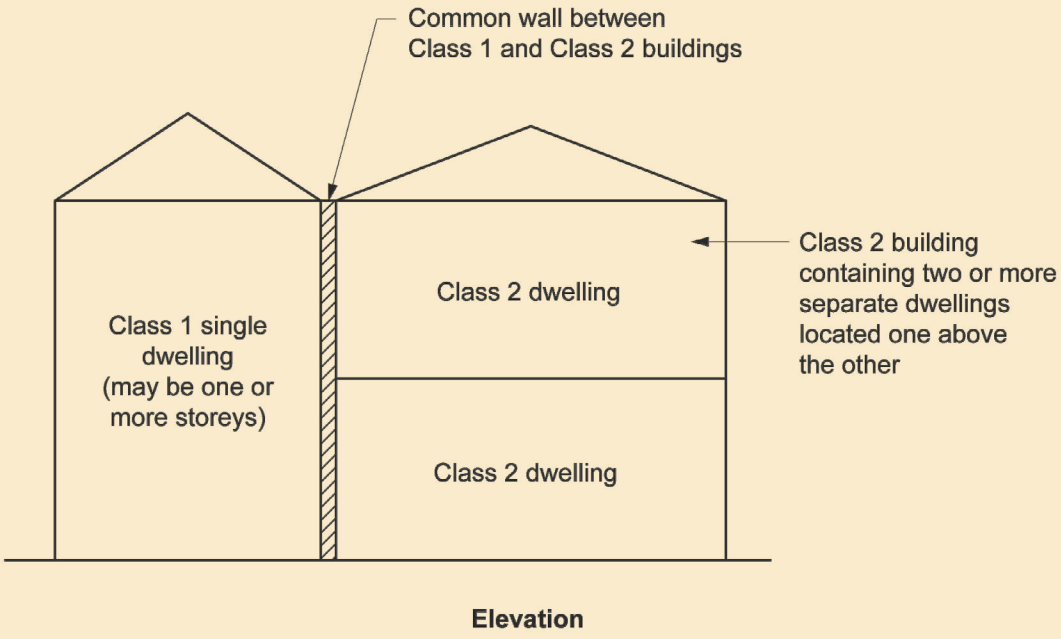
The Class 1b classification can attract concessions applicable to Class 3 buildings. These concessions allow people to rent out rooms in a house, or run a bed and breakfast, without having to comply with the more stringent Class 3 requirements. The reasoning is that the smaller size of the building and its lower number of occupants represents reduced fire risks.

Apart from their use, the primary difference between Class 1a and Class 1b buildings is that the latter is required to have a greater number of smoke alarms and in some circumstances, access and features for people with a disability.

A Class 2 building is one that includes more than one dwelling, each of which is generally solely occupied by one or more people to the exclusion of others.

Such buildings must not be otherwise classified as a Class 1 or Class 3 building or Class 4 part. See Figure 4 for a typical configuration of Class 1 and Class 2 buildings.

Figure 4: Section showing a typical configuration of Class 1 and Class 2 buildings (with non-combustible roof coverings)

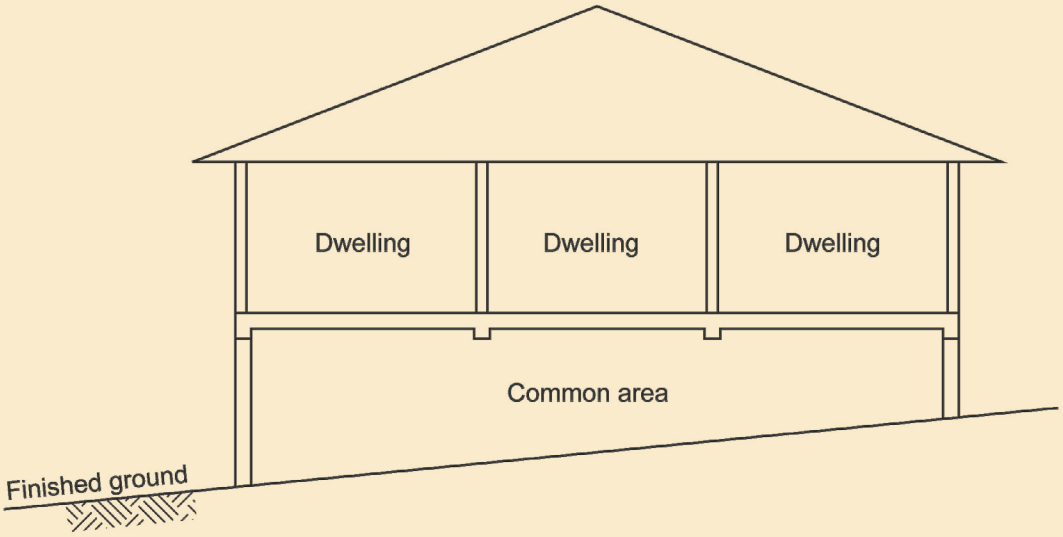


Elevation

Where a sole-occupancy residential unit is located above another sole-occupancy residential unit, the building containing the units can be either a Class 2 or a Class 3 building, depending on the other circumstances of the building proposal.

Class 2 buildings can be single *storey* attached dwellings. Where there is any common space below such dwellings, they are Class 2 (and cannot be Class 1) irrespective of whether the space below is a *storey* or not (see Figure 5).

Figure 5: Elevation showing a single storey of Class 2 with a common area below



Class 2 buildings can be attached to buildings of another Class. The attached Class 2 buildings need not be attached to one another, and need not be more than a single *storey*.

When two or more dwellings are attached to another Class, they cannot be Class 4 parts, as any building can only contain one Class 4 dwelling.

Class 3 buildings provide accommodation for unrelated people. The length of stay is unimportant.

Some exceptions to this classification include: certain bed and breakfast accommodation, boarding houses, guest houses, hostels, or lodging houses and the like which fall within the concession provided for Class 1b buildings.

Also, any sized building can be classified as Class 1 or Class 2 if it is used to house any number of unrelated people who jointly own or rent it, or share it on a non-rental basis with an owner or tenant.

It is not unusual for a manager's, owner's or caretaker's dwelling attached to a Class 3 building to be thought of as a Class 4 part of the Class 3 building. However, a Class 4 part of a building can only be part of a Class 5-9 building.

Accordingly, such dwellings are either classified as Class 1, Class 2 or Class 3, depending on the circumstances of the building proposal. However, a building could be a mixture of Class 3 and another Class.

Class 3 buildings include—

- the residential parts of hotels and motels; and
- hotel or motel caretakers', managers' or owners' flats, noting that under certain circumstances such dwellings could be Class 1, Class 2 or Class 3 buildings; and
- dormitory accommodation, in schools or elsewhere, noting that a dormitory is generally (but not always) considered to be a *sole-occupancy unit*; and
- bed and breakfast accommodation, a boarding house, guest house, hostel, or lodging house; and
- backpackers' accommodation; and
- a building which houses elderly people or other people who require special care. (In some States or Territories it is not acceptable for a Class 1b building to be used to house elderly people or other people who require special care - it is recommended the local building regulatory body be consulted.); and
- workers' quarters, including shearers' or fruit pickers' accommodation, or hotel workers' accommodation.

Class 4 classification applies to some types of accommodation located within a Class 5-9 building. The most common include a caretaker's flat within a building; and accommodation over or otherwise connected to a shop.

A Class 4 part cannot be located within a Class 1, Class 2 or Class 3 building. There can only be one Class 4 dwelling in a building. If there are two or more dwellings, they are Class 1, Class 2, or possibly Class 3. These Class 1, Class 2 or Class 3 parts need not be attached to one another, nor be more than a single *storey*.

Where a Class 4 part of a building is rented out for accommodation purposes, it retains its Class 4 classification. However, if any other part of the principal building is used for accommodation, for example, the attached shop is converted into an additional flat, both flats become classifiable as Class 2 or, depending on their use, possibly Class 3.

Class 5 buildings include professional chambers or suites, lawyers' offices, government offices, advertising agencies and accountants' offices.

A Class 6 building is a building where goods or services are directly sold or supplied to the public. Examples of a Class 6 building may include—

- a place where food or drink may be purchased such as a café or restaurant; or
- a dining room, bar area that is not an *assembly building*, shop or kiosk part of a hotel or motel; or
- a hairdresser's or barber's shop, public laundry, veterinarian; or
- supermarket or sale room, florist, showroom, or *service station*.

Service stations are Class 6 buildings. These are outlets used for the servicing of cars and the selling of fuel or other goods. The expression '*service station*' is not intended to cover buildings where panel beating, auto electrical, muffler replacement, tyre replacement and the like are solely carried out. Such buildings should be classified as Class 6, Class 7 or Class 8 buildings as the *appropriate authority* sees fit.

There are three basic types of Class 7 building. The first is a *carpark* as defined in the NCC. The second is a building used for storage, often referred to as a 'warehouse'. The third is a building used for the display of goods or produce for sale by wholesale. 'Wholesale' means sale to people in the trades or in the business of 'on-selling' goods and services to another party (including the public).

The most common way to describe a Class 8 building is as a 'factory'. However, this can give a simplistic impression of the types of building which can fall within this classification.

For example—

- some laboratories, despite their often small size, have been included as Class 8 buildings principally because of their high *fire hazard*; and
- buildings used for altering or repairing (except *service stations*, which are specifically included in A6.6 as Class 6 buildings); and
- potteries; and
- food manufacturers (but not restaurants, which are specifically included in A6.6 as Class 6 buildings); and
- buildings used for the packing or processing of produce, such as a farm or horticultural building.

Class 9a buildings are *health-care buildings*, including day-care surgeries or procedure units and the like. See definition of *health-care building*. Laboratories that are part of a Class 9a building are Class 9a, despite the general classification of laboratories as Class 8 buildings.

Class 9b buildings are *assembly buildings*. These buildings can include—

- theatres, cinemas and halls, churches, schools, early childhood centres, kindergartens, preschools and child-minding centres; and
- indoor cricket, tennis, basketball centres and sport stadiums; and
- nightclubs, discotheques, bar areas providing live entertainment and/or containing a dance floor, public halls, dance halls and other places of entertainment; and
- snooker halls; and
- bus and railway stations.

Regarding A6.9(2) Exemption 1, a building could be a mixture of Class 9b and another Class, or a Class 9b building could contain parts that are of another Class, but be taken as a Class 9b building because of A6.0 Exemption 1.

Class 9c buildings are *residential care buildings* that may contain residents who have various care level needs.

The Class 9c classification recognises that many residents progress through a continuum of care needs from low to high. Many older people enter residential care with low care needs (typically Class 3 facilities) but, as they age, require higher levels of care. In the past, such progression often necessitated the transfer of a hostel resident (Class 3) to a nursing home (Class 9a). This frequently had negative consequences for the health and well-being of the resident, for whom the hostel accommodation was home. It also led, at times, to the separation of couples with differing care needs.

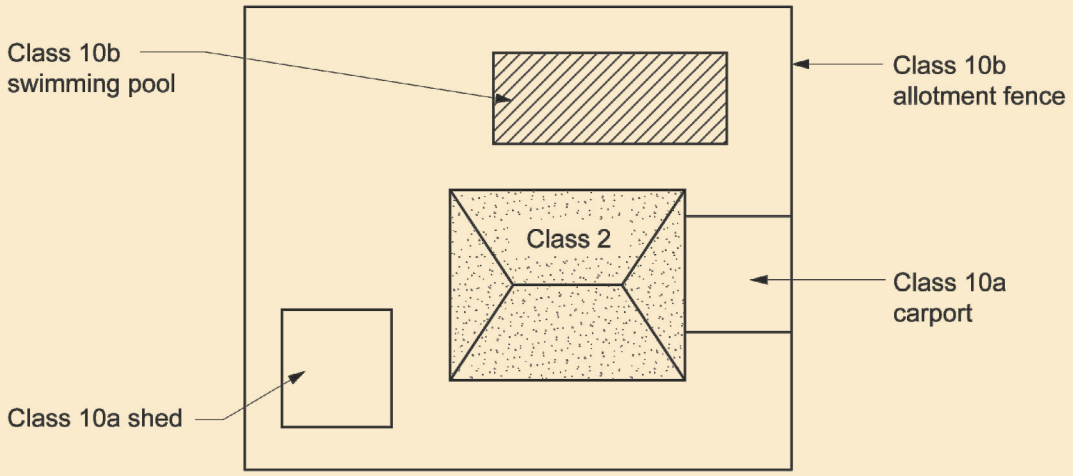
Building designers should note that Class 3 buildings include hostels for the accommodation of the aged, and Class 9a buildings include nursing homes. It is important to be aware, however, that construction of Class 3 or 9a buildings may restrict the options available to the operators of a facility in relation to the profile of the residents they wish to accommodate. Where the potential exists for residents of varying care needs to be accommodated, consideration of the Class 9c provisions may be appropriate. The Class 9c classification allows for any mix of low and high care residents and is intended to allow the mix to change as the residents' care needs change over time, without the need to obtain any further consent or approval from the *appropriate authority*.

Multi-care level facilities are for residents who may require the full range of care services outlined by the Aged Care Act. Hence, it is not intended to restrict the resident type and provides maximum flexibility for service providers, residents and the community.

The NCC provisions for Class 9c buildings are based on minimal on duty on-site staff being available at any time. However, it is recognised that the staff numbers vary throughout the course of any one day, due to the care needs of the residents and the functioning of the facility. It is also recognised that the specific care needs of the residents may result in a greater minimum number of staff.

Class 10a buildings are non-habitable buildings. See Figure 6 for an indication of some Class 10 building configurations.

Figure 6: Examples of Class 10 buildings and structures



Plan view

Class 10b structures are non-habitable structures. There is no requirement for Class 10 buildings to be appurtenant to a building of any other Class, for example, a small shed standing on its own on an allotment and a toilet block in a park.

A habitable 'outbuilding' which is appurtenant to another building is generally part of that building. Again, habitable 'outbuildings' cannot be classified as Class 10 buildings.

Typical outbuilding classifications include the following:

- A sleepout on the same allotment as a Class 1 building is part of the Class 1 building.
- A detached entertainment room on the same allotment as a Class 1 building, perhaps associated with a *swimming pool*, is part of the Class 1 building.
- A small toolshed, used for trade-related hobbies for non-commercial purposes or home repairs, on the same allotment as a Class 1 building, would be classified as a Class 10 building.

Provisions relating to Class 10c structures are only intended to address *private bushfire shelters* associated with a single Class 1a dwelling. These provisions are contained in Volume Two of the NCC.

Some States or Territories may exempt some Class 10 buildings or structures (often on the basis of height or size) from the need to have a building permit. Queries on this matter should be referred to the State or Territory body responsible for regulatory matters.

Difficult classifications

Class 2 or Class 3?

There is a fine line between a Class 2 building containing apartments or flats and a Class 3 motel building with units containing bathroom, laundry and cooking facilities, which may both be made available for short term holiday rental. When does a Class 3 motel unit become a Class 2 holiday flat and vice versa?

In general, an assessment will be based on the most likely use of the building by *appropriate authorities*.

Class 3 buildings, where the occupants are generally unfamiliar with the building and have minimum control over the safety of the building, represent a higher risk level and therefore require higher safety levels. In a case where the classification is unclear, a decision should be made according to the perceived risks inherent in the use of the building.

Class 6 or Class 7?

Class 7 buildings include those used to sell goods on the wholesale market, whereas Class 6 buildings are used to sell goods to the public.

Some establishments claim to sell goods to both the wholesale and retail markets. As a rule, however, if the general public has access to the building, it is considered a 'shop', and therefore a Class 6 building.

Hotel bars – Class 6 or 9b

As can be seen from the definition of a Class 6 building, it includes a hotel bar which is not an *assembly building*. The bar includes the bar area and associated standing and seating areas. This clarifies that the bar extends beyond the serving area to include standing and sitting areas where patrons may drink alcohol or other beverages and consume food. The exclusion of an *assembly building* means that a bar providing live entertainment or containing a dance floor is not considered to be Class 6, it must be considered as Class 9b. However, when that use is minor compared with the remainder of the bar, such as a piano bar or the like where patrons only listen to music and there is no dance floor, the *appropriate authority* should exercise judgement on the predominant use and therefore the appropriate classification of the bar.

A Class 9b building is an *assembly building* which is defined to include a building where people may assemble for entertainment, recreational or sporting purposes.

A building may have more than one classification (see A6.11).

Buildings used for farming purposes

Buildings used for *farming*-type purposes are often very diverse in nature, occupancy, use and size. In some States or Territories, *appropriate authorities* may classify *farm buildings* as Class 10a, which covers non-habitable buildings. They would only make this decision if a classification of Class 7 or Class 8 would not be more appropriate.

When making their decision they consider the building's size, purpose, operations and the extent to which people are employed in the building. For example, it may be appropriate to classify a shed which is used to store a tractor as a Class 10a building.

The NCC has definitions of "*farm building*" and "*farm shed*" which are certain Class 7 and 8 buildings used for *farming* purposes. Concessions to specific *Deemed-to-Satisfy Provisions* apply to *farm buildings* and *farm sheds* in recognition of their often low risk features, and it is recommended that reference is made to the definitions of "*farm building*" and "*farm shed*" for further guidance which may assist determination of an appropriate NCC classification.

For example, if people are likely to be employed to stack materials/produce in a storage building or remove materials/produce from a storage building then a classification of Class 7b may be appropriate. Depending upon whether the criteria in the definition of *farm shed* or *farm building* have been met, the associated *Deemed-to-Satisfy Provisions* in NCC Volume One Part H3 may apply.

Similarly if people are likely to be employed to pack or process materials/produce within a building, or employed to feed, clean or collect produce from animals or plants within a building then a classification of Class 8 may be appropriate. Depending upon whether the criteria in the definition of *farm shed* or *farm building* have been met, the associated *Deemed-to-Satisfy Provisions* in NCC Volume One Part H3 may apply.

However identification of low *fire load*, low occupant risk and low risk of fire spread should not be used as justification for choosing a less stringent building classification for a building under the *Deemed-to-Satisfy Provisions*. For example, if the intended use of a building is to grow or store a large amount of tomatoes, such as a large greenhouse, and there is likely to be only one to two persons in the building at any time, it is considered inappropriate to classify the building as a Class 10a under the *Deemed-to-Satisfy Provisions* and a classification of Class 7 or Class 8 would be more appropriate.

The *Deemed-to-Satisfy Provisions* for a Class 7 or Class 8 *farm building* or *farm shed* do not prevent the ability to consider or develop a *Performance Solution* for a particular building where the requirements may not be considered appropriate or are viewed as too stringent. Similarly if a Class 7 or 8 building used for *farming* purposes does not meet all the criteria to be considered a *farm building* or *farm shed* under the *Deemed-to-Satisfy Provisions*, this would not limit the ability to develop a *Performance Solution* which could contain features similar to those allowed under the *Deemed-to-Satisfy Provisions* for *farm buildings* or *farm sheds*.

For example, if a Class 8 commercial poultry building meets all the criteria to be considered a *farm building* under the *Deemed-to-Satisfy Provisions* other than the maximum *floor area* criteria, a *Performance Solution* could be developed to demonstrate that the concessions for a *farm building* under the *Deemed-to-Satisfy Provisions* are appropriate.

In regards to a *farm building* or *farm shed* where the purpose of the building is to park *farm vehicles* when not in use, as well as perhaps clean or polish the vehicle(s), it may be appropriate that this type of building is classified as a Class 7a.

However, a number of *farm buildings* and *farm sheds* are often not only used for the storage of *farm vehicles*, but to store supplies such as fuel, grain or hay. A Class 7a classification may still be appropriate where the majority of the shed's space is intended to be designated for the parking of vehicles. However, it may be more appropriate to classify

some types of buildings as Class 7b, rather than Class 7a where a mixed use shed is intended.

Under A6.11 each part of a building (including the entire building) may have more than one classification. This means, for example, that it is permissible to classify part of a building as a Class 6/7 building, or a Class 5/6 building, or whatever is appropriate.

It is expected that this approach may be taken by a builder who is uncertain of what the precise use of a building will be after its sale, or to maximise the flexibility of the building's use.

Under A6.11 Application 1 where a building has more than one classification the more stringent Class requirements will apply.

Part A7 United buildings

Introduction to this Part

This Part explains how multiple buildings can be considered as a united building. Where adjacent buildings are joined through openings in walls, they need not meet additional requirements if they jointly comply with the NCC as if a single building.

A7.0 United buildings

Buildings are deemed united when two or more buildings adjoining each other are connected and used as one building.

Application 1:

For A7.0, two or more buildings are a united building if they are 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.

Application 2:

A7.0 only applies to Class 2 to 9 buildings.

A7.1 Alterations in a united building

If, after *alterations* or any other building work, two or more of the buildings in A7.0 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.

Explanatory information:

It is not unusual for authorities to receive plans proposing the connecting of two or more buildings. Connecting buildings could be achieved by breaking openings through walls, or by joining the buildings by a tunnel, bridge or covered walkway.

When connected, if the buildings jointly comply with all the requirements of the NCC applying as if they were a single building, they become a united building.

United buildings are not required to comply with additional NCC provisions. For example, any new openings do not require any form of fire protection not required of a single building.

Note, however, an *external wall*, which as a result of an interconnection becomes an *internal wall*, must comply with the requirements for an *internal wall*.

Interconnected buildings that do not jointly comply with all the requirements applicable to a single building, remain as separate buildings.

This raises the possible need for fire doors, or other forms of protection to be fitted to connecting openings.

Multiple allotments or ownership

The NCC does not concern itself with actually prohibiting or permitting the uniting of buildings in separate ownership or on separate allotments. Such matters are dealt with by the relevant local bodies.

Example of connection by bridge

In this example, Building A is connected to Building B by bridge C. There are four different options for designing such a proposal.

The first is a united building

A, B and C are considered as a single structure and comply with the NCC.

The second is three separate buildings

A, B and C are a fire-source feature to each of the others, and are separated by fire walls with the openings protected at the points of connection. In this case, C may require independent support and separate egress to a road or open space, that is not through Buildings A or B. In this case, attention should also be paid to the length of the bridge, as regards distance of travel to an exit.

The third option is the bridge as a portion of Building A

In this option, A and C are one building, meeting all requirements of the NCC as a single or united building. B is a separate building, with suitable fire separation, including fire-doors at the point of interconnection. Bridge C could be supported off Building A, but not off Building B.

The fourth option is having the bridge as a portion of Building B

In this option, B and C are one building, meeting all requirements of the NCC as a single or united building. A is a separate building, with suitable fire separation, including fire doors at the point of interconnection. Bridge C could be supported off Building B, but not off Building A.

In some cases, C will link A and B across a public road, including laneways and the like. Special approvals may be required from various *appropriate authorities*. However, in such cases—

- if C is supported by means other than off A and B, such support will generally only be permitted if there is no obstruction of the public road; and
- care will need to be taken in calculating the distance of travel to an exit if travel is required to be over C and the road is wide; and
- fire-separation may be necessary at each end of the bridge.

If the last stipulation is the case, the following matters need consideration:

- The bridge would probably need to be of fire-rated construction because *combustible* construction could provide a ready path for the transfer of fire, and *non-combustible* construction could, in a major fire, distort and collapse onto the road.
- The designer needs to take care that the bridge does not negate the fire separation between the *storeys* of the building.

Section **B**

Structure

Part B1 Structural provisions

Section B Structure

Part B1 Structural provisions

Performance Requirements

BP1.1 Structural reliability
BP1.2 Structural resistance
BP1.3 Glass installations at risk of human impact
BP1.4 Buildings in flood areas

Verification Methods

BV1 Structural reliability
BV2 Structural robustness
B1.0 Deemed-to-Satisfy Provisions
B1.1 Resistance to actions
B1.2 Determination of individual actions
B1.3 * * * * *
B1.4 Determination of structural resistance of materials and forms of construction
B1.5 Structural software
B1.6 Construction of buildings in flood hazard areas

Specification B1.2 Design of buildings in cyclonic areas

1. Scope
2. Roof Cladding

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

(a) This *Verification Method* is applicable to components with a resistance coefficient of variation of at least 10% and not more than 40%. For components with a calculated value less than 10%, then a minimum value of 10% must be used.

(b) Compliance with BP1.1 and BP1.2 is verified for the design of a structural component for strength when—

(i) the capacity reduction factor ϕ satisfies—

$\phi \leq$ Average (ϕ_G, ϕ_Q, ϕ_W,…),

where—

ϕ_G, ϕ_Q, ϕ_W,… are capacity reduction factors for all relevant actions and must contain at least permanent (G), imposed (Q) and wind (W) actions; and

(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 Equation 1—

Equation 1

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

where—

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

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

where—

$\frac{\bar{R}}{R_N}$ = ratio of mean resistance to nominal; and

$\frac{\bar{S}}{S_N}$ = ratio of mean action to nominal; and

Cs = correction factor for action; and
C_R = correction factor for resistance; and
V_S = coefficient of variation of the appropriate action as given in Table BV1.1; and
V_R = coefficient of variation of the resistance; and
γ = appropriate load factor for the action as given in AS/NZS 1170.0; and
ϕ = capacity factor for the appropriate action; and

Table BV1.1 Annual action models

Design Action	Ratio of mean action to nominal	Coefficient of variation of the action
Permanent Action (Υ_G = 1.35)	$(\bar{G}/G_N)$ = 1.00	V_G = 0.10
Imposed Action (Υ_Q = 1.50)	$(\bar{Q}/Q_N)$ = 0.50	V_Q = 0.43
Wind Action (Υ_W = 1.00)(Non-cyclonic)	$(\bar{W}/W_N)$ = 0.33	V_W = 0.49
Wind Action (Υ_W = 1.00)(Cyclonic)	$(\bar{W}/W_N)$= 0.16	V_W = 0.71
Snow Action (Υ_S = 1.00)	$(\bar{S}/S_N)$ = 0.29	V_S = 0.57
Earthquake Action (Υ_E = 1.00)	$(\bar{E}/E_N)$ = 0.05	V_E = 1.98

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

(A) For situations where it is appropriate to compare with an equivalent Deemed-to-Satisfy product, a resistance model must be established for the equivalent Deemed-to-Satisfy product and β_{TG}, β_{TQ}, β_{TW} must be calculated for the equivalent Deemed-to-Satisfy product in accordance with Equation 1. The target reliability indices β_{TG}, β_{TQ}, β_{TW},…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 Annual 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 that exhibit brittle failure 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 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 or brittle nature of the material or system are properly accounted for in the design model.
4. The above target reliability indices are also applicable for materials or systems that exhibit ductile failure characteristics.

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

BV2 Structural robustness

Compliance with BP1.1(a)(iii) is verified for structural robustness by—

(a) assessment of the structure such that upon the notional removal in isolation of—

(i) any supporting column; or

(ii) any beam supporting one or more columns; or

(iii) any segment of a load bearing wall of length equal to the height of the wall,

the building remains stable and the resulting collapse does not extend further than the immediately adjacent *storeys*; and

(b) demonstrating that if a supporting structural component is relied upon to carry more than 25% of the total structure a systematic risk assessment of the building is undertaken and critical high risk components are identified and

designed to cope with the identified hazard or protective measures chosen to minimise the risk.

Part B1 Structural provisions

Deemed-to-Satisfy Provisions

B1.0 Deemed-to-Satisfy Provisions

(a) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* BP1.1 to BP1.4 are satisfied by complying with B1.1, B1.2, B1.4, B1.5 and B1.6.

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

B1.1 Resistance to actions

The resistance of a building or structure must be greater than the most critical action effect resulting from different combinations of actions, where—

(a) the most critical action effect on a building or structure is determined in accordance with B1.2 and the general design procedures contained in AS/NZS 1170.0; and

(b) the resistance of a building or structure is determined in accordance with B1.4.

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*.

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 earthquake
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

B1.3 * * * * *

This clause has deliberately been left blank.

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, except—

(i) '(for piers—isolated or engaged)' is removed from Clause 8.5.1(d); and

(ii) where Clause 8.5.1 requires design as for unreinforced masonry in accordance with Section 7, the member must also be designed as unreinforced masonry in accordance with Tables 10.3 and 4.1(a)(i)(C) of 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: AS 5216.

(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/NZS 2327.

(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 1684.2, AS 1684.3 or AS 1684.4.

(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 cyclonic areas):

(i) Terracotta, fibre-cement and timber slates and shingles: AS 4597.

(ii) Roof tiling: 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 (g) for plastic sheeting.

(iv) Metal roofing: AS 1562.1.

(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.

(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-speed 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 and polycarbonate sheet

Application	Lift *shaft* vision panels more than 65 000 mm^2, door panels, and lift *shafts*	Lift *shaft* vision panels less than or equal to 65 000 mm^2
Laminated glass	10 mm (0.76 mm interlayer)	6 mm (0.76 mm interlayer)
Toughened/laminated glass	10 mm (0.76 mm interlayer)	6 mm (0.76 mm interlayer)
Annealed glass with security polyester film coating	10 mm	6 mm
Safety wire glass	Not applicable	Subject to fire test

Deemed-to-Satisfy Provisions

Application	Lift *shaft* vision panels more than 65 000 mm^2, door panels, and lift *shafts*	Lift *shaft* vision panels less than or equal to 65 000 mm^2
Polycarbonate sheet	13 mm	6 mm

B1.5 Structural software

(a) Structural software used in computer aided design of a building or structure, that uses design criteria based on the *Deemed-to-Satisfy Provisions* of the BCA, including its referenced documents, for the design of steel or timber trussed roof and floor systems and framed building systems, must comply with the ABCB Protocol for Structural Software.

(b) Structural software referred to in (a) can only be used for buildings within the following geometrical limits:

(i) The distance from ground level to the underside of eaves must not exceed 6 m.

(ii) The distance from ground level to the highest point of the roof, neglecting chimneys, must not exceed 8.5 m.

(iii) The building width including roofed verandahs, excluding eaves, must not exceed 16 m.

(iv) The building length must not exceed five times the building width.

(v) The roof pitch must not exceed 35 degrees.

(c) The requirements of (a) do not apply to design software for individual frame members such as electronic tables similar to those provided in—

(i) AS 1684; or

(ii) NASH Standard Residential and Low-Rise Steel Framing Part 2.

B1.6 Construction of buildings in flood hazard areas

Qld B1.6

Vic B1.6

SA B1.6

A Class 2 or 3 building, Class 9a *health-care building*, Class 9c building or Class 4 part of a building, in a *flood hazard area* must comply with the ABCB Standard for Construction of Buildings in Flood Hazard Areas.

Specification B1.2 Design of buildings in cyclonic areas

Deemed-to-Satisfy Provisions

1. Scope

This specification contains requirements for the design of buildings in cyclonic areas in addition to the requirements of AS/NZS 1170.2.

For the purposes of Specification B1.2, cyclonic areas are those determined as being located in wind regions C and D in accordance with AS/NZS 1170.2.

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 to Table 1:

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 3 Hz.
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

Section C Fire resistance

Part C3 Protection of openings

C3.0 Deemed-to-Satisfy Provisions
C3.1 Application of Part
C3.2 Protection of openings in external walls
C3.3 Separation of external walls and associated openings in different fire compartments
C3.4 Acceptable methods of protection
C3.5 Doorways in fire walls
C3.6 Sliding fire doors
C3.7 Protection of doorways in horizontal exits
C3.8 Openings in fire-isolated exits
C3.9 Service penetrations in fire-isolated exits
C3.10 Openings in fire-isolated lift shafts
C3.11 Bounding construction: Class 2 and 3 buildings and Class 4 parts
C3.12 Openings in floors and ceilings for services
C3.13 Openings in shafts
C3.14 * * * * *
C3.15 Openings for service installations
C3.16 Construction joints
C3.17 Columns protected with lightweight construction to achieve an FRL

Specification C1.1 Fire-resisting construction

1. Scope
2. General Requirements
3. Type A Fire-Resisting Construction
4. Type B Fire-Resisting Construction
5. Type C Fire-Resisting Construction

Specification C1.8 Structural tests for lightweight construction

1. Scope
2. Application
3. Tests
4. Test specimens
5. Test methods
6. Criteria for compliance

Specification C1.10 Fire hazard properties

1. Scope
2. Application
3. Floor linings and floor coverings
4. Wall and ceiling linings
5. Air-handling ductwork
6. Lift cars
7. Other materials

Specification C1.11 Performance of external walls in fire

1. Scope
2. Application
3. General requirements for external wall panels
4. Additional requirements for vertically spanning external wall panels adjacent to columns

Specification C1.13 Cavity barriers for fire-protected timber

1. Scope
2. Requirements

Specification C1.13a Fire-protected timber

1. Scope
2. Requirements
2.1 General requirements
2.2 Massive timber
3. Determination of time the timber interface temperature exceeds 300°C for timber at least 75 mm thick
3.1 Form of test
3.2 Smaller specimen permitted
3.3 Acceptance criteria

Specification C2.5 Smoke-proof walls in health-care and residential care buildings

1. Scope
2. Class 9a health-care buildings
3. Class 9c buildings
4. Doorways in smoke-proof walls

Specification C3.4 Fire doors, smoke doors, fire windows and shutters

1. Scope
2. Fire Doors
3. Smoke Doors
3.1 General requirements
3.2 Construction Deemed-to-Satisfy
4. Fire Shutters
5. Fire Windows

Specification C3.15 Penetration of walls, floors and ceilings by services

1. Scope
2. Application
3. Metal pipe systems
4. Pipes penetrating sanitary compartments
5. Wires and cables
6. Electrical switches and outlets
7. Fire-stopping

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 in health and residential care buildings

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 Fire protection of 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 Fire protection of 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 Fire protection of 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 Fire spread between buildings on adjoining allotments

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 the location on an adjoining property set out in Column 1 of Table CV1; 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

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

CV2 Fire spread between buildings on the same allotment

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

Column 1 Distance between buildings on the same allotment (m)	Column 2 Heat flux (kW/m^2)
0	80
2	40
6	20
12	10

CV3 Fire spread via external walls

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 (other than a

FPAA101D or FPAA101H 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 stop 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 required by AS 2118.1 for the relevant hazard class on each floor level plus the design area 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 (other than a FPAA101D or FPAA101H 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 Fire Safety Verification Method

Compliance with CP1, CP2, CP3, CP4, CP5, CP6, CP7, CP8 and CP9 is verified when a building is designed in accordance with Schedule 7.

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) for a building containing an *occupiable outdoor area*, Part G6; and

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

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

(b) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2.2(3) and A2.4(3) as applicable.

C1.1 Type of construction required

(a) The minimum Type of *fire-resisting construction* of a building must be determined in accordance with Table C1.1, except as allowed for—

(i) certain Class 2, 3 or 9c buildings in C1.5; and

(ii) a Class 4 part of a building located on the top *storey* in C1.3(b); and

(iii) *open spectator stands* and indoor sports stadiums in C1.7.

SA C1.1(a)(iv) and *(v)*

(b) Each building element must comply with Specification C1.1 as applicable.

Table C1.1 Type of construction required

Rise in storeys	Class of building 2, 3, 9	Class of building 5, 6, 7, 8
4 or more	A	A
3	A	B
2	B	C
1	C	C

SA C1.1(c) and *(d)*

C1.2 Calculation of rise in storeys

(a) The *rise in storeys* is the sum of the greatest number of *storeys* at any part of the *external walls* of the building and any *storeys* within the roof space—

(i) above the finished ground next to that part; or

(ii) if part of the *external wall* is on the boundary of the allotment, above the natural ground level at the relevant part of the boundary.

(b) A *storey* is not counted if—

(i) it is situated at the top of the building and contains only heating, ventilating or lift equipment, water tanks, or similar service units or equipment; or

(ii) it is situated partly below the finished ground and the underside of the ceiling is not more than 1 m above the average finished level of the ground at the *external wall*, or if the *external wall* is more than 12 m long, the average for the 12 m part where the ground is lowest.

(c) In a Class 7 or 8 building, a *storey* that has an average internal height of more than 6 m is counted as—

(i) one *storey* if it is the only *storey* above the ground; or

(ii) 2 *storeys* in any other case.

(d) For the purposes of calculating the *rise in storeys* of a building—

(i) a *mezzanine* is regarded as a *storey* in that part of the building in which it is situated if its *floor area* is more than 200 m^2 or more than 1/3 of the *floor area* of the room, whichever is the lesser; and

(ii) two or more *mezzanines* are regarded as a *storey* in that part of the building in which they are situated if they are at or near the same level and have an aggregate *floor area* more than 200 m^2 or more than 1/3 of the *floor area* of the room, whichever is the lesser.

C1.3 Buildings of multiple classification

(a) In a building of multiple classifications, the Type of construction *required* for the building is the most *fire-resisting* Type resulting from the application of Table C1.1 on the basis that the classification applying to the top *storey* applies to all *storeys*.

(b) In a building containing a Class 4 part on the top *storey*, for the purpose of (a), the classification applying to the top *storey* must be—

(i) when the Class 4 part occupies the whole of the top *storey*, the classification applicable to the next highest *storey*; or

(ii) when the Class 4 part occupies part of the top *storey*, the classification applicable to the adjacent part.

C1.4 Mixed types of construction

A building may be of mixed Types of construction where it is separated in accordance with C2.7 and the Type of construction is determined in accordance with C1.1 or C1.3.

C1.5 Two storey Class 2, 3 or 9c buildings

A building having a *rise in storeys* of 2 may be of Type C construction if—

(a) it is a Class 2 or 3 building or a mixture of these classes and each *sole-occupancy unit* has—

(i) access to at least 2 *exits*; or

(ii) its own direct access to a road or *open space*; or

(b) it is a Class 9c building protected throughout with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 and complies with the maximum compartment size specified in Table C2.2 for Type C construction.

C1.6 Class 4 parts of buildings

For the Type of construction *required* by C1.3, a Class 4 part of a building requires the same FRL for building elements and the same construction separating the Class 4 part from the remainder of the building as a Class 2 part in the same Type of construction.

C1.7 Open spectator stands and indoor sports stadiums

(a) An *open spectator stand* or indoor sports stadium may be of Type C construction and need not comply with the other provisions of this Part if it contains not more than 1 tier of seating, is of *non-combustible* construction, and has only changing rooms, sanitary facilities or the like below the tiered seating.

(b) In (a), one tier of seating means numerous rows of tiered seating incorporating cross-overs but within one viewing level.

C1.8 Lightweight construction

(a) *Lightweight construction* must comply with Specification C1.8 if it is used in a wall system—

(i) that is *required* to have an FRL; or

(ii) for a lift *shaft*, stair *shaft* or service *shaft* or an *external wall* bounding a *public corridor* including a non *fire-isolated passageway* or non *fire-isolated ramp*, in a spectator stand, sports stadium, cinema or theatre, railway station, bus station or airport terminal.

(b) If *lightweight construction* is used for the *fire-resisting* covering of a steel column or the like, and if—

(i) the covering is not in continuous contact with the column, then the void must be filled solid, to a height of not less than 1.2 m above the floor to prevent indenting; and

(ii) the column is liable to be damaged from the movement of vehicles, materials or equipment, then the covering must be protected by steel or other suitable material.

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 the following:

(i) Gaskets.

(ii) Caulking.

(iii) Sealants.

(iv) Termite management systems.

(v) Glass, including laminated glass.

(vi) Thermal breaks associated with glazing systems.

(vii) 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) *Sarking-type materials* that do not exceed 1 mm in thickness and have a *Flammability Index* not greater than 5.

(vii) 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.

(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 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.

C1.11 Performance of external walls in fire

Concrete *external walls* that could collapse as complete panels (e.g. tilt-up and pre-cast concrete), in a building having a *rise in storeys* of not more than 2, must comply with Specification C1.11.

C1.12 * * * * *

This clause has deliberately been left blank.

C1.13 Fire-protected timber: Concession

Fire-protected timber 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 (other than a FPAA101D or FPAA101H 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.

C1.14 Ancillary elements

An *ancillary element* must not be fixed, installed or attached to the internal parts or external face of an *external wall* that is *required* to be *non-combustible* unless it is one of the following:

(a) An *ancillary element* that is *non-combustible*.

(b) A gutter, downpipe or other plumbing fixture or fitting.

(c) A flashing.

(d) A grate or grille not more than 2 m^2 in area associated with a building service.

(e) An electrical switch, socket-outlet, cover plate or the like.

(f) A light fitting.

(g) A *required* sign.

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(h) A sign other than one provided under (a) or (g) that—

(i) achieves a *group number* of 1 or 2; and

(ii) does not extend beyond one *storey*; and

(iii) does not extend beyond one *fire compartment*; and

(iv) is separated vertically from other signs permitted under (h) by at least 2 *storeys*.

(i) An awning, sunshade, canopy, blind or shading hood other than one provided under (a) that—

(i) meets the relevant requirements of Table 4 of Specification C1.10 as for an internal element; and

(ii) serves a *storey*—

(A) at ground level; or

(B) immediately above a *storey* at ground level; and

(iii) does not serve an *exit*, where it would render the *exits* unusable in a fire.

(j) A part of a security, intercom or announcement system.

(k) Wiring.

(l) A paint, lacquer or a similar finish.

(m) A gasket, caulking, sealant or adhesive directly associated with (a) to (k).

SA C1.15

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 A2.2(3) and A2.4(3) as applicable.

C2.1 Application of Part

(a) C2.2, C2.3 and C2.4 do not apply to a *carpark* provided with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5, an *open-deck carpark* or an *open spectator stand*.

(b) C2.12(a)(v) does not apply to a Class 8 *electricity network substation*.

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

Note to Table C2.2: See C2.5 for maximum size of compartments in *patient care areas* in Class 9a *health-care buildings*.

C2.3 Large isolated buildings

The size of a *fire compartment* in a building may exceed that specified in Table C2.2 where—

(a) the building does not exceed 18 000 m^2 in *floor area* nor exceed 108 000 m^3 in volume, if—

(i) the building is Class 7 or 8 and—

(A) contains not more than 2 *storeys*; and

(B) is provided with open space complying with C2.4(a) not less than 18 m wide around the building; or

(ii) the building is Class 5, 6, 7, 8 or 9 and is—

(A) protected throughout with a sprinkler system complying with Specification E1.5; and

(B) provided with a perimeter vehicular access complying with C2.4(b); or

(b) the building is Class 5, 6, 7, 8 or 9 and exceeds 18 000 m^2 in *floor area* or 108 000 m^3 in volume, if it is—

(i) protected throughout with a sprinkler system complying with Specification E1.5; and

(ii) provided with a perimeter vehicular access complying with C2.4(b); or

(c) there is more than one building on the allotment and—

(i) each building complies with (a) or (b); or

(ii) if the buildings are closer than 6 m to each other they are regarded as one building and collectively comply with (a) or (b).

C2.4 Requirements for open spaces and vehicular access

(a) An open space *required* by C2.3 must—

(i) be wholly within the allotment except that any road, river, or public place adjoining the allotment, but not the farthest 6 m of it may be included; and

(ii) include vehicular access in accordance with (b); and

(iii) not be used for the storage or processing of materials; and

(iv) not be built upon, except for guard houses and service structures (such as electricity substations and pump houses) which may encroach upon the width of the space if they do not unduly impede fire-fighting at any part of the perimeter of the allotment or unduly add to the risk of spread of fire to any building on an adjoining allotment.

(b) Vehicular access *required* by this Part—

(i) must be capable of providing continuous access for emergency vehicles to enable travel in a forward direction from a public road around the entire building; and

(ii) must have a minimum unobstructed width of 6 m with no part of its furthest boundary more than 18 m from the building and in no part of the 6 m width be built upon or used for any purpose other than vehicular or pedestrian movement; and

(iii) must provide reasonable pedestrian access from the vehicular access to the building; and

(iv) must have a load bearing capacity and unobstructed height to permit the operation and passage of *fire brigade* vehicles; and

(v) must be wholly within the allotment except that a public road complying with (i), (ii), (iii) and (iv) may serve as the vehicular access or part thereof.

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.

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

C2.6 Vertical separation of openings in external walls

(a) If in a building of Type A construction, any part of a *window* or other opening in an *external wall* is above another opening in the *storey* next below and its vertical projection falls no further than 450 mm outside the lower opening (measured horizontally), the openings must be separated by—

(i) a spandrel which—

(A) is not less than 900 mm in height; and

(B) extends not less than 600 mm above the upper surface of the intervening floor; and

(C) is of *non-combustible* material having an FRL of not less than 60/60/60; or

(ii) part of a *curtain wall* or *panel wall* that complies with (i); or

(iii) construction that complies with (i) behind a *curtain wall* or *panel wall* and has any gaps packed with a *non-combustible* material that will withstand thermal expansion and structural movement of the walling without the loss of seal against fire and smoke; or

(iv) a slab or other horizontal construction that—

(A) projects outwards from the external face of the wall not less than 1100 mm; and

(B) extends along the wall not less than 450 mm beyond the openings concerned; and

(C) is *non-combustible* and has an FRL of not less than 60/60/60.

(b) The requirements of (a) do not apply to—

(i) an *open-deck carpark*; or

(ii) an *open spectator stand*; or

(iii) a building which has a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 installed throughout; or

(iv) openings within the same stairway; or

(v) openings in *external walls* where the floor separating the *storeys* does not require an FRL with respect to *integrity* and *insulation*.

(c) For the purposes of C2.6, *window* or other opening means that part of the *external wall* of a building that does not have an FRL of 60/60/60 or greater.

C2.7 Separation by fire walls

(a) **Construction** — A *fire wall* must be constructed in accordance with the following:

(i) The *fire wall* has the relevant FRL prescribed by Specification C1.1 for each of the adjoining parts, and if these are different, the greater FRL, except where Tables 3.9, 4.2 and 5.2 of Specification C1.1 permit a lower FRL on the *carpark* side.

(ii) Any openings in a *fire wall* must not reduce the FRL *required* by Specification C1.1 for the *fire wall*, except where permitted by the *Deemed-to-Satisfy Provisions* of Part C3.

(iii) Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not pass through or cross the *fire wall* unless the *required fire-resisting* performance of the *fire wall* is maintained.

(b) **Separation of buildings** — A part of a building separated from the remainder of the building by a *fire wall* may be treated as a separate building for the purposes of the *Deemed-to-Satisfy Provisions* of Sections C, D and E if it is constructed in accordance with (a) and the following:

(i) The *fire wall* extends through all *storeys* and spaces in the nature of *storeys* that are common to that part and any adjoining part of the building.

(ii) The *fire wall* is carried through to the underside of the roof covering.

(iii) Where the roof of one of the adjoining parts is lower than the roof of the other part, the *fire wall* extends to the underside of—

(A) the covering of the higher roof, or not less than 6 m above the covering of the lower roof; or

(B) the lower roof if it has an FRL not less than that of the *fire wall* and no openings closer than 3 m to any wall above the lower roof; or

(C) the lower roof if its covering is *non-combustible* and the lower part has a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5.

(c) **Separation of fire compartments** — A part of a building separated from the remainder of the building by a *fire wall* may be treated as a separate *fire compartment* if it is constructed in accordance with (a) and the *fire wall* extends to the underside of—

(i) a floor having an FRL *required* for a *fire wall*; or

(ii) the roof covering.

C2.8 Separation of classifications in the same storey

If a building has parts of different classifications located alongside one another in the same *storey*—

(a) each building element in that *storey* must have the higher FRL prescribed in Specification C1.1 for that element for the classifications concerned; or

(b) the parts must be separated in that *storey* by a *fire wall* having—

(i) the higher FRL prescribed in Table 3 or 4; or

(ii) the FRL prescribed in Table 5, of Specification C1.1 as applicable, for that element for the Type of construction and the classifications concerned; or

(c) where one part is a carpark complying with Table 3.9, 4.2 or 5.2 of Specification C1.1, the parts may be separated by a *fire wall* complying with the appropriate Table.

C2.9 Separation of classifications in different storeys

If parts of different classification are situated one above the other in adjoining *storeys* they must be separated as follows:

(a) Type A construction — The floor between the adjoining parts must have an FRL of not less than that prescribed in Specification C1.1 for the classification of the lower *storey*.

(b) Type B or C construction — If one of the adjoining parts is of Class 2, 3 or 4, the floor separating the part from the *storey* below must—

(i) be 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.

C2.10 Separation of lift shafts

(a) Any lift connecting more than 2 *storeys*, or more than 3 *storeys* if the building is sprinklered, (other than lifts which are wholly within an *atrium*) must be separated from the remainder of the building by enclosure in a *shaft* in which—

(i) in a building *required* to be of Type A construction—the walls have the relevant FRL prescribed by Specification C1.1; and

(ii) in a building *required* to be of Type B construction — the walls—

(A) if *loadbearing*, have the relevant FRL prescribed by Table 4 of Specification C1.1; or

(B) if non-*loadbearing*, be of *non-combustible* construction.

(b) Any lift in a *patient care area* in a Class 9a *health-care building* or a *resident use area* in Class 9c building must be separated from the remainder of the building by a *shaft* having an FRL of not less than—

(i) in a building of Type A or B construction — 120/120/120; or

(ii) in a building of Type C construction — 60/60/60.

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(c) An emergency lift must be contained within a *fire-resisting shaft* having an FRL of not less than 120/120/120.

(d) Openings for lift landing doors and services must be protected in accordance with the *Deemed-to-Satisfy Provisions* of Part C3.

C2.11 Stairways and lifts in one shaft

A stairway and lift must not be in the same *shaft* if either the stairway or the lift is *required* to be in a *fire-resisting shaft*.

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 system* installed in the building that has a total voltage of 12 volts or more and a storage capacity of 200 kWh or more.

(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 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/–/–.

C2.13 Electricity supply system

(a) An electricity substation located within a building must—

(i) be separated from any other part of the building by construction having an FRL of not less than 120/120/120; and

(ii) have any doorway in that construction protected with a *self-closing* fire door having an FRL of not less than –/120/30.

(b) A main switchboard located within the building which sustains emergency equipment operating in the emergency mode must—

(i) be separated from any other part of the building by construction having an FRL of not less than 120/120/120; and

(ii) have any doorway in that construction protected with a *self-closing* fire door having an FRL of not less than –/120/30.

(c) Electrical conductors located within a building that supply—

(i) a substation located within the building which supplies a main switchboard covered by (b); or

(ii) a main switchboard covered by (b),

must—

(iii) have a classification in accordance with AS/NZS 3013 of not less than—

(A) if located in a position that could be subject to damage by motor vehicles — WS53W; or

(B) otherwise — WS52W; or

(iv) be enclosed or otherwise protected by construction having an FRL of not less than 120/120/120.

(d) Where emergency equipment is *required* in a building, all switchboards in the electrical installation, which sustain the electricity supply to the emergency equipment, must be constructed so that emergency equipment switchgear is separated from non-emergency equipment switchgear by metal partitions designed to minimise the spread of a fault from the non-emergency equipment switchgear.

(e) For the purposes of (d), emergency equipment includes but is not limited to the following:

(i) Fire hydrant booster pumps.

(ii) Pumps for *automatic* sprinkler systems, water spray, chemical fluid suppression systems or the like.

(iii) Pumps for fire hose reels where such pumps and fire hose reels form the sole means of fire protection in the building.

(iv) Air handling systems designed to exhaust and control the spread of fire and smoke.

(v) Emergency lifts.

(vi) Control and indicating equipment.

(vii) Emergency warning and intercom systems.

C2.14 Public corridors in Class 2 and 3 buildings

In a Class 2 or 3 building, a *public corridor*, if more than 40 m in length, must be divided at intervals of not more than 40 m with smoke-proof walls complying with Clause 2 of Specification C2.5**.**

SA C2.15 and *SA C2.16*

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 A2.2(3) and A2.4(3) as applicable.

C3.1 Application of Part

(a) The *Deemed-to-Satisfy Provisions* of this Part do not apply to—

(i) control joints, weep holes and the like in *external walls* of masonry construction and joints between panels in *external walls* of pre-cast concrete panel construction if, in all cases they are not larger than necessary for the purpose; and

(ii) *non-combustible* ventilators for subfloor or cavity ventilation, if each does not exceed 45 000 mm^2 in face area and is spaced not less than 2 m from any other ventilator in the same wall; and

(iii) openings in the vertical plane formed between building elements at the construction edge or perimeter of a balcony or verandah, colonnade, terrace, or the like; and

(iv) in a *carpark*—

(A) service penetrations through; and

(B) openings formed by a vehicle ramp in, a floor other than a floor that separates a part not used as a *carpark*, providing the connected floors comply as a single *fire compartment* for the purposes of all other requirements of the *Deemed-to-Satisfy Provisions* of Sections C, D and E.

(b) For the purposes of the *Deemed-to-Satisfy Provisions* of this Part, openings in building elements *required* to be *fire-resisting* include doorways, *windows* (including any associated fanlight), infill panels and fixed or openable glazed areas that do not have the *required* FRL.

(c) For the purposes of the *Deemed-to-Satisfy Provisions* of this Part, openings, other than those covered under (a)(iii), between building elements such as columns, beams and the like, in the plane formed at the construction edge or perimeter of the building, are deemed to be openings in an *external wall*.

C3.2 Protection of openings in external walls

Openings in an *external wall* that is *required* to have an FRL must—

(a) if the distance between the opening and the *fire-source feature* to which it is exposed is less than—

(i) 3 m from a side or rear boundary of the allotment; or

(ii) 6 m from the far boundary of a road, river, lake or the like adjoining the allotment, if not located in a *storey* at or near ground level; or

(iii) 6 m from another building on the allotment that is not Class 10,

be protected in accordance with C3.4 and if wall-wetting sprinklers are used, they are located externally; and

(b) if *required* to be protected under (a), not occupy more than 1/3 of the area of the *external wall* of the *storey* in which it is located unless they are in a Class 9b building used as an *open spectator stand*.

Deemed-to-Satisfy Provisions

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

C3.4 Acceptable methods of protection

(a) Where protection is *required*, doorways, *windows* and other openings must be protected as follows:

(i) Doorways—

(A) internal or external wall-wetting sprinklers as appropriate used with doors that are *self-closing* or *automatic* closing; or

(B) –/60/30 fire doors that are *self-closing* or *automatic* closing.

(ii) *Windows*—

(A) internal or external wall-wetting sprinklers as appropriate used with *windows* that are *automatic* closing or permanently fixed in the closed position; or

(B) –/60/– fire *windows* that are *automatic* closing or permanently fixed in the closed position; or

(C) –/60/– *automatic* closing fire shutters.

(iii) Other openings—

(A) excluding voids — internal or external wall-wetting sprinklers, as appropriate; or

(B) construction having an FRL not less than –/60/–.

(b) Fire doors, fire *windows* and fire shutters must comply with Specification C3.4.

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) A fire door or fire shutter *required* by (a)(i), (ii) or (iii) must be *self-closing*, or *automatic* closing in accordance with (c) and (d).

(c) The *automatic* closing operation *required* by (b) 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.

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(d) Where any other *required* suitable fire alarm system, including a sprinkler system (other than a FPAA101D 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) and (c), 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 (c); 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) The electromagnetic device *required* by (a)(i) 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.

(c) Where any other *required* suitable fire alarm system, including a sprinkler system (other than a FPAA101D 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) 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 (other than a FPAA101D 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) Doorways that open to *fire-isolated stairways*, *fire-isolated passageways* or *fire-isolated ramps*, and are not 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 (b) and (c).

(b) The *automatic*-closing operation *required* by (a) 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.

(c) Where any other *required* suitable fire alarm system, including a sprinkler system (other than a FPAA101D system) complying with Specification E1.5, is installed in the building, activation of the system must also initiate the *automatic*-closing operation.

(d) 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.

C3.9 Service penetrations in fire-isolated exits

Fire-isolated *exits* must not be penetrated by any services other than—

(a) electrical wiring permitted by D2.7(e) to be installed within the *exit*; or

(b) ducting associated with a pressurisation system if it—

(i) is constructed of material having an FRL of not less than –/120/60 where it passes through any other part of the building; and

(ii) does not open into any other part of the building; or

(c) water supply pipes for fire services.

C3.10 Openings in fire-isolated lift shafts

(a) **Doorways** — If a lift *shaft* is *required* to be fire-isolated, an entrance doorway to that *shaft* must be protected by –/60/– fire doors that—

(i) comply with AS 1735.11; and

(ii) are set to remain closed except when discharging or receiving passengers, goods or vehicles.

(b) **Lift indicator panels** — A lift call panel, indicator panel or other panel in the wall of a fire-isolated lift *shaft* must be backed by construction having an FRL of not less than –/60/60 if it exceeds 35 000 mm^2 in area.

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* 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.

Deemed-to-Satisfy Provisions

(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 (other than a FPAA101D 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

(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)

C3.12 Openings in floors and ceilings for services

(a) Where a service passes through—

(i) a floor that is *required* to have an FRL with respect to *integrity* and *insulation*; or

(ii) a ceiling *required* to have a *resistance to the incipient spread of fire*,

the service must be installed in accordance with (b).

(b) A service must be protected—

(i) in a building of Type A construction, by a *shaft* complying with Specification C1.1; or

(ii) in a building of Type B or C construction, by a *shaft* that will not reduce the fire performance of the building elements it penetrates; or

(iii) in accordance with C3.15.

(c) Where a service passes through a floor which is *required* to be protected by a *fire-protective covering*, the penetration must not reduce the fire performance of the covering.

C3.13 Openings in shafts

In a building of Type A construction, an opening in a wall providing access to a ventilating, pipe, garbage or other service *shaft* must be protected by—

(a) if it is in a *sanitary compartment* — a door or panel which, together with its frame, is *non-combustible* or has an FRL of not less than –/30/30; or

(b) a *self-closing* –/60/30 fire door or hopper; or

(c) an access panel having an FRL of not less than –/60/30; or

(d) if the *shaft* is a garbage *shaft* — a door or hopper of *non-combustible* construction.

C3.14 * * * * *

This clause has deliberately been left blank.

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—

(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 Section 4 of 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) The determination of the *required* FRL must be confirmed in a report from an *Accredited Testing Laboratory* in accordance with Schedule 5.

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

C3.16 Construction joints

(a) Construction joints, spaces and the like in and between building elements *required* to be *fire-resisting* with respect to *integrity* and *insulation* must be protected in a manner identical with a prototype tested in accordance with AS 1530.4 to achieve the *required* FRL.

(b) The requirements of (a) do not apply where joints, spaces and the like between *fire-protected timber* elements are provided with cavity barriers in accordance with Specification C1.13.

C3.17 Columns protected with lightweight construction to achieve an FRL

A column protected by *lightweight construction* to achieve an FRL which passes through a building element that is *required* to have an FRL or a *resistance to the incipient spread of fire*, must be installed using a method and materials identical with a prototype assembly of the construction which has achieved the *required* FRL or *resistance to the incipient spread of fire*.

SA C3.18

Specification C1.1 Fire-resisting construction

Deemed-to-Satisfy Provisions

1. Scope

This Specification contains requirements for the *fire-resisting construction* of building elements.

2. General Requirements

2.1 Exposure to fire-source features

(a) A part of a building element is exposed to a *fire-source feature* if any of the horizontal straight lines between that part and the *fire-source feature*, or vertical projection of the feature, is not obstructed by another part of the building that—

(i) has an FRL of not less than 30/–/–; and

(ii) is neither transparent nor translucent.

(b) A part of a building element is not exposed to a *fire-source feature* if the *fire-source feature* is—

(i) an *external wall* of another building that stands on the allotment and the part concerned is more than 15 m above the highest part of that *external wall*; or

(ii) a side or rear boundary of the allotment and the part concerned is below the level of the finished ground at every relevant part of the boundary concerned.

(c) If various distances apply for different parts of a building element—

(i) the entire element must have the FRL applicable to that part having the least distance between itself and the relevant *fire-source feature*; or

(ii) each part of the element must have the FRL applicable according to its individual distance from the relevant *fire-source feature*,

but this provision does not override or permit any exemption from Clause 2.2.

2.2 Fire protection for a support of another part

(a) Where a part of a building *required* to have an FRL depends upon direct vertical or lateral support from another part to maintain its FRL, that supporting part, subject to (b), must—

(i) have an FRL not less than that *required* by other provisions of this Specification; and

(ii) if located within the same *fire compartment* as the part it supports have an FRL in respect of *structural adequacy* the greater of that *required*—

(A) for the supporting part itself; and

(B) for the part it supports; and

(iii) be *non-combustible*—

(A) if *required* by other provisions of this Specification; or

(B) if the part it supports is *required* to be *non-combustible*.

(b) The following building elements need not comply with (a)(ii) and (a)(iii)(B):

(i) An element providing lateral support to an *external wall* complying with Clause 5.1(b) or C1.11.

(ii) An element providing support within a *carpark* and complying with Clause 3.9, 4.2 or 5.2.

(iii) A roof providing lateral support in a building—

(A) of Type A construction if it complies with Clause 3.5(a), (b) or (d); and

(B) of Type B and C construction.

(iv) A column providing lateral support to a wall where the column complies with Clause 2.5(a) and (b).

(v) An element providing lateral support to a *fire wall* or *fire-resisting* wall, provided the wall is supported on both sides and failure of the element on one side does not affect the fire performance of the wall.

2.3 Lintels

A lintel must have the FRL *required* for the part of the building in which it is situated, unless it does not contribute to the support of a fire door, fire *window* or fire shutter, and—

(a) it spans an opening in—

(i) a wall of a building containing only one *storey*; or

(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 Table 3, 4 or 5; and

(ii) in any other case where the column is *required* to have an FRL in accordance with 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 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 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 (mins):
30	60
60	90
90	120
120	180
180	240

Note to Table 2.6: 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 care building: Concession

(a) In a Class 3 building protected with a sprinkler system complying with Specification E1.5 and used as a *residential care building*, any FRL criterion prescribed in 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 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 3; or

(iii) if under Clause 3.5 the roof is not *required* to comply with 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—

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

(C) the building has a sprinkler system (other than a FPAA101D or FPAA101H 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; or

(iv) any combination of (i) to (iii); and

(e) * * * * *

(f) the FRLs specified in 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 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/ 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

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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
ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

3.2 Concessions for floors

A floor need not comply with 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 3.

3.5 Roof: Concession

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

(a) has a sprinkler system (other than a FPAA101D or FPAA101H 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 Roof lights

If a roof is *required* to have an FRL or its covering is *required* to be *non-combustible*, roof lights 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—

(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 roof light or the like are protected in accordance with C3.4; and

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

(iv) any roof light 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; or

(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 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 (other than a FPAA101D or FPAA101H 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 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 like.

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Table 3.9 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 3 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		
	(i)	*loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
	(ii)	supporting only the roof (not used for carparking)	–/–/–
	(iii)	non-*loadbearing*	–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	as *required* by Table 3
Column			
(a)	supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark*		60/–/– or 26 m^2/tonne
(c)	any other column not covered by (a) or (b)		60/–/–
Beam			
(a)	steel floor beam in continuous contact with a concrete floor slab		60/–/– or 30 m^2/tonne
(b)	any other beam		60/–/–
Fire-resisting lift and stair shaft (within the *carpark* only)			60/60/60
Floor slab and vehicle ramp			60/60/60
Roof (not used for carparking)			–/–/–

Notes to Table 3.9:

1. ESA/M means the ratio of exposed surface area to mass per unit length.
2. Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.

3.10 Class 2 and 3 buildings: Concession

(a) A Class 2 or 3 building having a *rise in storeys* of not more than 3 need not comply with Clause 3.1(d) of Specification C1.1 and the requirements of C1.9(a), (b) and C2.6 for *non-combustible* material, if it is constructed using—

(i) timber framing throughout; or

(ii) *non-combustible* material throughout; or

(iii) a combination of (i) and (ii),

provided—

(iv) * * * * *

(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 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 (other than a FPAA101D or FPAA101H system) complying with Specification E1.5, any FRL criterion prescribed in 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 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—

(i) concrete; or

(ii) masonry; or

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

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

(C) the building has a sprinkler system (other than a FPAA101D or FPAA101H 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; or

(iv) any combination of (i) to (iii); and

(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 Table 4; and

(h) * * * * *

(i) in a Class 2 or 3 building, except where within the one *sole-occupancy units*, 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.

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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 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/–
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	–/–/–	–/–/–	–/–/–	–/–/–

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 (other than a FPAA101D or FPAA101H 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 4.2 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 3 m from a *fire-source feature* to which it is exposed:	
Loadbearing	60/60/60
Non-*loadbearing*	–/60/60
(ii) 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) *internal wall*	
(i) *loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
(ii) supporting only the roof (not used for carparking)	–/–/–
(iii) non-*loadbearing*	–/–/–
(c) *fire wall*	
(i) from the direction used as a *carpark*	60/60/60
(ii) from the direction not used as a *carpark*	as *required* by Table 4
Column	
(a) supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) steel column, other than one covered by (a)	60/–/– or 26 m^2/tonne
(c) any other column not covered by (a) or (b)	60/–/–
Beam	
(a) less than 3 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) 3 m or more from a *fire-source feature*	–/–/–
Lift shaft	–/–/–
Fire-resisting stair shaft (within the *carpark* only)	60/60/60
Roof, floor slab and vehicle ramp	–/–/–

Note to Table 4.2: ESA/M means the ratio of exposed surface area to mass per unit length.

4.3 Class 2 and 3 buildings: Concession

(a) A Class 2 or 3 building having a *rise in storeys* of not more than 2 need not comply with Clause 4.1(e) of Specification C1.1 and the requirements of C1.9(a) and (b) for *non-combustible* materials if it is constructed using—

(i) timber framing throughout; or

(ii) *non-combustible* material throughout; or

(iii) a combination of (i) and (ii),

provided—

(iv) * * * * *

(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 (other than a FPAA101D or FPAA101H system) complying with Specification E1.5, any FRL criterion prescribed in 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 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 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 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, 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 within 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	–/–/–	–/–/–	–/–/–	–/–/–

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 (other than a FPAA101D or FPAA101H 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—

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(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 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 to Table 5.2: ESA/M means the ratio of exposed surface area to mass per unit length.

Specification C1.8 Structural tests for lightweight construction

Deemed-to-Satisfy Provisions

1. Scope

This Specification describes tests to be applied to and criteria to be satisfied by a wall system of *lightweight construction*.

2. Application

A wall system need not be tested in accordance with this Specification for static pressure or impact if it is designed and constructed in accordance with the *Deemed-to-Satisfy Provisions* of Section B to resist the appropriate pressures and impacts defined in this Specification.

3. Tests

3.1 Walls of certain Class 9b buildings

Lightweight construction forming—

(a) a wall of a lift *shaft* and stair *shaft*; and

(b) an *external* and *internal wall* bounding a *public corridor*, public lobby or the like, including a *fire-isolated* and non *fire-isolated passageway* or *ramp*, in a spectator stand, sports stadium, cinema or theatre, railway or bus station or airport terminal, must be subjected to the following tests and must fulfil the following criteria:

(i) The materials tests of Clause 5(a) and the criteria of Clause 6(a).

(ii) A static test by the imposition of a uniformly distributed load of 1.0 kPa (or its equivalent) in accordance with Clause 5(b) and the damage and deflection criteria of Clauses 6(b) and (c) respectively.

(iii) A dynamic test by the fall of the impact bag through a height of 350 mm in accordance with Clause 5(c) and the damage and deflection criteria of Clauses 6(b) and (d) respectively.

(iv) The surface indentation test of Clause 5(d) and the surface indentation criterion of Clause 6(e).

3.2 Walls of shafts and fire-isolated exits generally

A wall of *lightweight construction* that is *required* to be *fire-resisting* and which bounds a lift *shaft*, stair *shaft*, or service *shaft*, *fire-isolated passageway* or *fire-isolated ramp* must be subjected to the following tests and must fulfil the following criteria:

(a) The materials tests of Clause 5(a) and the criteria of Clause 6(a).

(b) A static test by the imposition of a uniformly distributed load of 0.35 kPa (or its equivalent) in accordance with Clause 5(b) and the damage and deflection criteria of Clauses 6(b) and (c) respectively.

(c) A dynamic test by the fall of the impact bag through a height of 150 mm in accordance with Clause 5(c) and the damage and deflection criteria of Clauses 6(b) and (d) respectively.

(d) The surface indentation test of Clause 5(d) and the surface indentation criterion of Clause 6(e).

3.3 Additional requirements for lift shafts

(a) In addition to the requirements of Clauses 3.1 and 3.2, a wall system for use in a lift *shaft* that is *required* to be *fire-resisting* must be subjected to dynamic test by the imposition of—

(i) where the lift car speed is 7 m/s or less — 10^6 cycles of a uniformly distributed load between 0 and 0.2 kPa (or its equivalent); or

(ii) where the lift car speed is greater than 7 m/s — 10^6 cycles of a uniformly distributed load between 0 and 0.35 kPa (or its equivalent) in accordance with Clause 5(e) and must fulfil the damage criteria of Clause 6(b).

(b) The wall system must be subjected to the static test in accordance with Clause 3.2(b) after the successful

conclusion of the dynamic test specified in (a).

3.4 Walls generally

An *external* and *internal wall* of *lightweight construction* that is *required* to be *fire-resisting*, other than one covered by Clauses 3.1, 3.2 or 3.3, must be subjected to the following tests and must fulfil the following criteria:

(a) The materials tests of Clause 5(a) and the criteria of Clause 6(a).

(b) A static test by the imposition of a uniformly distributed load of 0.25 kPa (or its equivalent) in accordance with Clause 5(b) and the damage and deflection criteria of Clauses 6(b) and (c) respectively.

(c) A dynamic test by fall of the impact bag through a height of 100 mm in accordance with Clause 5(c) and the damage and deflection criteria of Clauses 6(b) and (d) respectively.

(d) The surface indentation test of Clause 5(d) and the surface indentation criterion of Clause 6(e).

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) height (or length, if the specimen is tested horizontally) must be identical with the height between supports in the actual construction; and

(ii) 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.

5. Test methods

Tests must be carried out in accordance with the following:

(a) **Material tests** — The methods specified for the constituent materials of the construction of the standards adopted by reference in the BCA.

(b) **For resistance to static pressure** — The provisions for testing walls under transverse load in ASTM E72-15, except that—

(i) support conditions must be as specified in Clause 4.3; and

(ii) equivalent load shall mean the quarter-point load that produces the same deflection or central moment as appropriate; and

(iii) the timber species nominated in that standard may be substituted with a different species.

(c) **For resistance to impact** — The provisions for testing wall systems in ASTM E695-03, except that—

(i) the point of impact must be set 1.5 m above finished floor level or 1.5 m above the part of the specimen that corresponds to finished floor level; and

(ii) the impact bag must be not less than 225 mm in diameter and not more than 260 mm in diameter and have a mass of not less than 27.2 or more than 27.3 kg; and

(iii) the mass must be achieved by putting loose, dry sand into the bag and must be adjusted before each series of impact tests; and

(iv) where the impact bag and suspension cannot be vertical at the instant of impact on a curved surface or an inclined surface, the height of drop is the net height at the point of impact.

(d) **For resistance to surface indentation** — The test for resistance to surface indentation must be carried out at three points on the surface of an undamaged sample sheet as follows:

(i) A steel ball of 10 mm diameter with a load of 150 N must be placed gently on the surface of the sheet and allowed to remain in position for 5 minutes.

(ii) The ball and load must then be removed and the diameter of each impression of the ball on the surface measured.

(e) **For resistance of lift shaft construction to repetitive load** — As for 5(b) except that—

(i) it is sufficient to test one specimen with the pressure applied from the side of the construction on which the lift will operate; and

(ii) the load must be applied dynamically at a frequency not less than 1 Hz and not more than 3 Hz; and

(iii) equivalent load shall mean the quarter-point load that produces the same central moment as the distributed load.

6. Criteria for compliance

The wall system or the specimen of it must fulfil the following criteria:

(a) **Materials** — Materials must comply with the applicable standard adopted by reference in the BCA.

(b) **Damage** — There must be no crack, penetration or permanent surface-deformation to a depth of more than 0.5 mm or any other non-elastic deformation or fastener failure.

(c) **Deflection — Static pressure** — Under static pressure the deflection must not be more than—

(i) 1/240th of the height between supports; or

(ii) for construction other than a lift *shaft* — 30 mm; or

(iii) for a lift *shaft* — 20 mm.

(d) **Deflection — Impact** — Under impact the instantaneous deflection must not be more than—

(i) 1/120th of the height of the wall between supports; or

(ii) for construction other than a lift *shaft* — 30 mm; or

(iii) for a lift *shaft* — 20 mm.

(e) **Surface indentation** — No impression must be more than 5 mm in diameter.