

# **C Protection from Fire**

## **Acceptable Solution C/AS1**

**Protection from fire for buildings with  
sleeping (residential) and outbuildings  
(risk group SH)**

**SECOND EDITION AMENDMENT 1 | EFFECTIVE 28 JULY 2025**

## Preface

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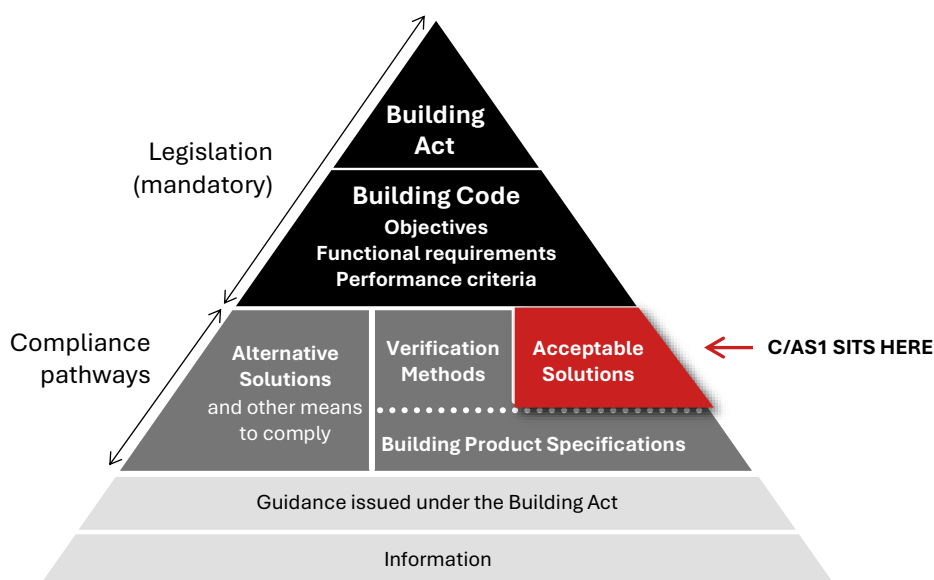
### Document status

This document (C/AS1) is an acceptable solution issued under section 22 (1) of the Building Act 2004 and is effective on 28 July 2025. It does not apply to building consent applications submitted before 28 July 2025. The previous Acceptable Solution C/AS1 Second Edition can be used to show compliance until 31 July 2026 and can be used for building consent applications submitted before 1 August 2026.

### Building Code regulatory system

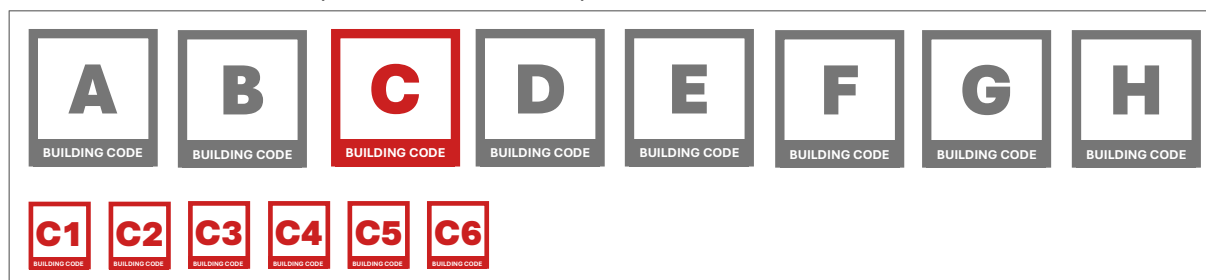
Each acceptable solution outlines the provisions of the Building Code that it relates to. Complying with an acceptable solution or verification method are ways of complying with that part of the Building Code. Other options for establishing compliance are listed in [section 19 of the Building Act](#).

### Schematic of the Building Code system



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

The part of the Building Code that this acceptable solution relates to is clause C1 to C6 Protection from fire. Information on the scope of this document is provided in [Part 1. General](#).



Further information about the Building Code, including objectives, functional requirements, performance criteria, acceptable solutions, and verification methods, is available at [www.building.govt.nz](http://www.building.govt.nz).

## Main changes in this version

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This acceptable solution is amendment 1 of the second edition of C/AS1. The main changes from the first edition are:

- The document has been published in a standalone format and the layout has been revised to improve clarity. C/VM1 has now been split out into its own document.
- Additional information on the document and its scope provided in [Part 1. General](#).
- The minimum fire safety system required in household units is now specified as interconnected smoke alarms complying with NZS 4514:2021 in [Part 2. Firecells, fire safety systems, and fire resistance ratings](#).
- Means of escape requirements have been significantly expanded to clarify the design of these features in [Part 3. Means of escape](#). This includes clarifying that the final exit may be beyond the exit door of the building along with setting requirements for the height and width of escape routes, maximum travel distances when no alarm is installed (such as outbuildings), calculation of open path lengths, location and requirements for external safe paths, and doors in escape routes.
- Fire prevention measures now reference clauses G9 and G11 of the Building Code in [Part 7. Prevention of fire occurring](#).
- References to AS/NZS 5601.1, AS/NZS 60598.2.2, AS1530.2, ISO 5660.2, ISO 9239, and ISO 9705 have been removed from [Appendix A](#).
- References to AS/NZS 3000, AS/NZS 3837, BS EN 13501 and the most recent versions of AS 1668.1, NZS 4512, NZS 4514, NZS 4541 have been added to [Appendix A](#).
- Definitions have been revised to include all defined terms used in this document in [Appendix B](#).
- Descriptions of fire safety systems and modifications to standards have been provided in [Appendix C](#) and [Appendix D](#).

The main changes in amendment 1 are:

- The acceptable solution now refers to the Building Product Specifications for the fire test methods and specification of building products in Paragraphs [2.3.1.2](#), [4.2.2.1](#), and [5.3.1.1](#). As a consequence, references to building product standards have been removed from the acceptable solution. This includes references to NZS/BS 476, AS/NZS 3837, NZS 4520, AS 1366, AS 1530, AS 4072, BS EN 13501, and ISO 5660. Appendix E. Fire test methods has also been removed from the document with the applicable specifications located within the Building Product Specifications.
- Definitions have been revised to reflect the consequential amendments of citing the Building Product Specifications. This includes revisions to the definitions for combustible, Group Number, limited combustible, non-combustible, and standard test; and the removal of the definitions for fire door, fire retardant, fire stop, and smoke control door in [Appendix B](#).
- Minor amendments have been made to correct typos, grammar, cross-references, punctuation, wording, and formatting of the document. This includes changes to headings, paragraphs, tables and figures, table and figure notes, and definitions. These amendments do not affect the level of performance required in the document but may assist in the interpretation of the requirements.
- Minor amendments have been made to relocate the modifications to AS/NZS 2918 and AS 1691 from [Part 7. Prevention of fire occurring](#) to [Appendix D](#).

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

## Features of this document

## Features of this document

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

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

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

<b>H</b> Housing	<b>Com</b> Commercial	<b>Out</b> Outbuildings
<b>CR</b> Communal residential	<b>Ind</b> Industrial	<b>Anc</b> Ancillary
<b>CN</b> Communal non-residential		

- *Risk groups*, as described in this document, are also printed in **bold** in this document. These requirements are also denoted with *risk group* icons for:

<b>SH</b> Buildings with sleeping (residential) and outbuildings	<b>CA</b> Public access and educational facilities	<b>WS</b> High level storage or potential for fast fire growth
<b>SM</b> Sleeping (non-institutional)	<b>WB</b> Business, commercial and low level storage	<b>VP</b> Vehicle storage and parking
<b>SI</b> Care or detention		

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## General

## Part 1. General

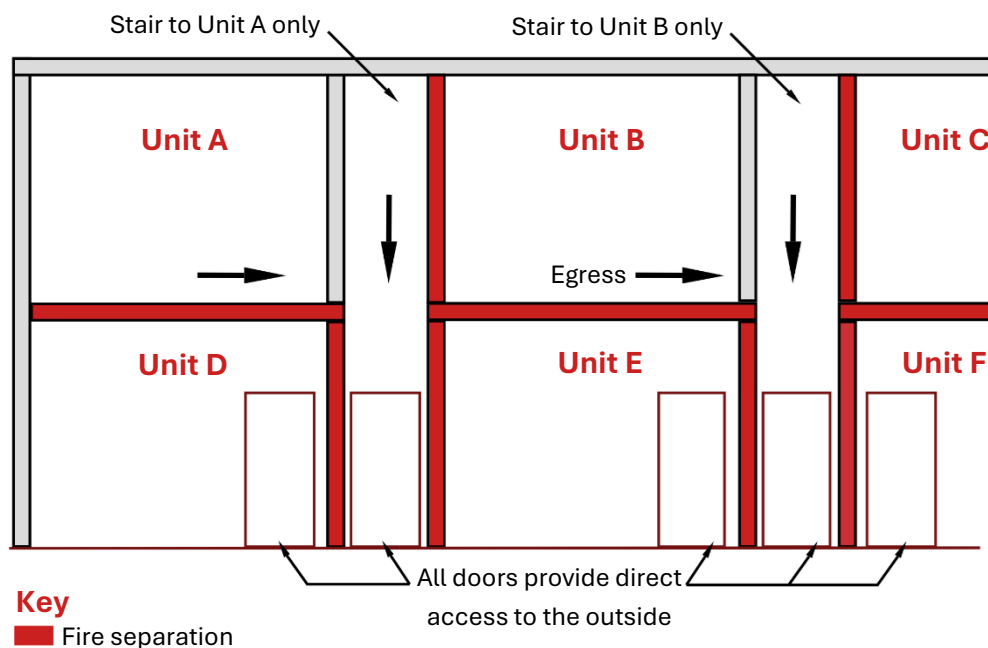
### 1.1 Introduction

#### 1.1.1 Scope of this document

- 1.1.1.1 This acceptable solution applies to **risk group SH** including *buildings* where people sleep and **outbuildings** (refer to [Table 1.1.1.1](#) for a description of *risk groups*). This includes:
- a) detached dwellings with a single *household unit* such as stand-alone houses; and
  - b) attached townhouses; and
  - c) low-rise *multi-unit dwellings* with no more than one *household unit* above another (see [Figure 1.1.1.1](#)) and where each *household unit* has an *escape route* independent of all other *household units*, and including associated garages or carports whether or not they are part of the same *building*. Where there is one *household unit* above another, each *household unit* shall be a single-storey and the *escape height* shall be less than 4.0 m; and
  - d) detached dwellings used as boarding houses for fewer than six people (not including members of the residing family); and
  - e) garages that are part of a *household unit*; and
  - f) garages shared by more than one *household unit* where the garage is *fire separated* from each adjacent *household unit* with *fire rated construction* having an *FRR* of no less than 30/30/30; and
  - g) **outbuildings**.

**Figure 1.1.1.1: Multi-unit dwellings in risk group SH**

Paragraph [1.1.1.1](#)



## General

**Table 1.1.1.1: Scope and limitations of risk groups**Paragraph [1.1.1.1](#) and [1.1.2.1](#)

Column heading	Applies to
<b>SH Building with sleeping (residential) and Outbuildings</b>	<p><b>Detached dwellings with a single <i>household unit</i></b> such as: Stand-alone houses</p> <p><b>Low-rise <i>multi-unit dwellings</i> where each <i>household unit</i> has its own <i>escape route</i> that is independent of all other <i>household units</i></b> such as:</p> <p>a) attached townhouses; and</p> <p>b) stacked <i>household units</i> where there is no more than one <i>household unit</i> above another with each <i>household unit</i> having a single-storey and an <i>escape height</i> less than 4.0 m.</p> <p><b>Detached dwellings where fewer than six people (not including members of the residing family) pay for accommodation</b> such as: boarding houses, homestays, bed and breakfasts.</p> <p><b>Outbuildings</b></p>
<b>SM Sleeping (non-institutional)</b> <sup>(1)</sup>	<p><b>Permanent accommodation</b> such as: Apartment <i>buildings</i> and other <i>buildings</i> which consist of more than one <i>household unit</i> (other than low rise <i>multi-unit dwellings</i> in the scope of <b>risk group SH</b>.)</p> <p><b>Transient accommodation</b> such as: Hotels, motels, serviced apartments, hostels, backpackers, cabins at holiday parks. <i>Buildings</i> where six or more people pay for accommodation (such as boarding houses/homestays/ bed and breakfast). <i>Wharehousi</i> and other community sleeping spaces such as halls (even if used occasionally). Sheltered housing such as refuges, reintegration for prisoners, homeless shelters, and so forth.</p> <p><b>Educational accommodation</b> such as: University halls of residence, school boarding hostels, and so forth</p>
<b>SI Care or detention</b> <sup>(1)</sup>	<p><b>Care activities</b> such as: Institutions, hospitals including outpatients and day procedures (excluding special care facilities such as operating theatres, intensive care units, prisons, delivery and recovery rooms and hyperbaric chambers or other such places that require stay in place strategies). Aged care facilities. Residential care in institutions, hospices. Medical day treatment such as medical centres and dental practices using sedation or treatment rooms where people are unable to self-evacuate without assistance (for example, dialysis or chemotherapy). Care in the community houses and homes.</p> <p><b>Detention facilities (excluding prisons)</b> such as: Police stations, court buildings and hospitals with detention facilities.</p>

**Note:** (1) These *risk groups* are outside the scope of this acceptable solution. Refer to Acceptable Solution C/AS2.

## General

Table 1.1.1.1: Scope and limitations of risk groups (continued)

Paragraph 1.1.1.1 and 1.1.2.1

Column heading	Applies to
<b>CA</b> Public access and educational facilities <sup>(1)</sup>	<p><b>Crowd activities</b> such as: Halls, <i>theatres</i> and cinemas. Recreation and event centres (including tiered seating for up to 2000 people and with any primary egress for more than 100 people at the level of the playing surface). Educational institutions without sleeping including schools and <i>early childhood centres</i>. Churches and other places of worship. Restaurants and cafes, shops and shopping malls. Exhibition, retail areas including car showrooms and trade fair space. Public libraries with less than 2.4 m storage height. Spaces for viewing open air activities (does not include spaces below a grandstand), open grandstands, roofed but unenclosed grandstand, uncovered fixed seating).</p> <p><b>Personal service activities</b> such as: Dentists, doctors (except as included within <i>risk group SI</i>), banks, beautician and hairdressing salons.</p>
<b>WB</b> Business, commercial and low level storage <sup>(1)</sup>	<p><b>Professional activities</b> such as: Offices (including professional services such as law and accountancy practices). Laboratories, workshops (including mechanics workshops). May contain storage with a capable height of storage of less than 3.0 m.</p> <p><b>Industrial activities</b> such as: Factories, processing and manufacturing plants (excluding <i>foamed plastics</i>) with a capable height of storage of less than 3.0 m.</p> <p><b>Storage activities</b> such as: <i>Buildings</i> or parts of <i>buildings</i> capable of storage no more than 5.0 m in height. Warehouses and storage <i>buildings</i> (other than those listed above), capable of storage more than 5.0 m in height, but with a height to the apex no greater than 8.0 m and total floor area of no more than 4200 m<sup>2</sup>. Temperature controlled storage with a capable height of storage of less than 3.0 m, other than some limited areas in processing areas, or up to a maximum area of 500 m<sup>2</sup> with a maximum capable of storage height of 5.0 m.</p> <p><b>Intermittently occupied buildings (other than outbuildings)</b> such as: Light aircraft hangers, <i>buildings</i> containing fixed plant and or fixed machinery and spray-painting operations, whether or not in a spray booth.</p>
<b>WS</b> High level storage or potential for fast fire growth <sup>(1)</sup>	<p><b>Storage activities</b> such as: Warehouses with a capable height of storage of over 5.0 m or over 8.0 m to the apex and total floor area greater than 4200 m<sup>2</sup>. Temperature controlled storage outside of the scope of <i>risk group WB</i>.</p> <p><b>Service activities</b> such as: Trading and bulk retail wholesalers with a storage height greater than 3.0 m. Supermarkets with shelving over 3.0 m in height. Exhibition, retail areas and trade fair space with a storage height greater than 3.0 m.</p>
<b>VP</b> Vehicle storage and parking <sup>(1)</sup>	<p><b>Vehicle parking</b> – within a <i>building</i> or a separate <i>building</i> including: Car parking <i>buildings</i>. Vehicle parking or stacking within <i>buildings</i>. Goods vehicle parking. Service vehicle and unloading areas. Car storage warehouses.</p>

**Note:** (1) These *risk groups* are outside the scope of this acceptable solution. Refer to Acceptable Solution C/AS2.



## General

### 1.1.2 Items outside the scope of this document

- 1.1.2.1 *Buildings* or parts of *buildings* in **risk groups other than SH** are outside the scope of this acceptable solution (refer to [Table 1.1.1.1](#) for descriptions of other *risk groups*).
- 1.1.2.2 This acceptable solution allows for the “all out” evacuation strategy. It does not provide features to facilitate a delayed evacuation strategy.
- 1.1.2.3 The control of hazardous substances is not covered by this acceptable solution and it does not provide for any use, storage or processing of hazardous substances. Compliance with Verification Method F3/VM1 and the Hazardous Substances and New Organisms Act 1996, and the Health and Safety at Work (Hazardous Substances) Regulations 2017 is required where applicable in addition to the requirements of this acceptable solution.

### 1.1.3 Compliance pathway

- 1.1.3.1 This acceptable solution is one option that provides a means of establishing compliance with the functional requirements and performance criteria in Building Code clause C1 to C6 Protection from Fire. It can be used to demonstrate compliance with clauses:
  - a) C1 Objectives of clauses C1 to C6 (protection from fire); and
  - b) C2 Prevention of fire occurring; and
  - c) C3 Fire affecting areas beyond the fire source; and
  - d) C4 Movement to place of safety; and
  - e) C5 Access and safety for firefighting operations; and
  - f) C6 Structural stability.
- 1.1.3.2 Compliance may also be demonstrated using:
  - a) Acceptable Solution BCH/AS1 for *backcountry huts*; or
  - b) Acceptable Solution C/AS2 for *risk groups* other than SH; or
  - c) Verification Method C/VM1 for solid fuel burning appliances; or
  - d) Verification Method C/VM2.
- 1.1.3.3 If this acceptable solution cannot be followed in full, use an alternative means to demonstrate compliance.

## 1.2 Using this acceptable solution

### 1.2.1 Determining the classified use

- 1.2.1.1 Classified uses for *buildings* are described in clause A1 of the Building Code.

### 1.2.2 Determining the risk group

- 1.2.2.1 To use this acceptable solution, determine the *risk group* for each of the activities carried out in the *building* (refer to [Table 1.1.1.1](#)). If the activity is not listed explicitly, choose the nearest suitable *risk group*. If the *building* contains a **risk group other than SH**, use another path to demonstrate compliance.

### 1.2.3 Determining the fire safety requirements

- 1.2.3.1 Apply this acceptable solution for *buildings* only containing **risk group SH** by following Steps 1 and 2:
  - a) Step 1. Establish the relevant *building* measurements (these will include *building height*, floor plans, wall openings and distances to relevant boundaries); and
  - b) Step 2. Satisfy the *fire* safety requirements of this acceptable solution (refer to Parts 2-7), based on the *building's* dimensions and features where required.

## General

### 1.2.4 Alterations and changes of use to buildings

- 1.2.4.1 This acceptable solution may be used to determine the compliance of *building work* (in relation to an existing *building*).

### 1.2.5 Building Product Specifications

- 1.2.5.1 This acceptable solution refers to the Building Product Specifications for *building* product standards and specifications in relation to their manufacture, fabrication, testing, quality control, physical properties, performance, installation, and/or maintenance.
- 1.2.5.2 The Building Product Specifications cannot be used in isolation to demonstrate compliance with any requirements of the Building Code. To comply with C/AS1, *building* products conforming to the Building Product Specifications must be used with the scope, limitations, and other applicable requirements set out in this acceptable solution.

## Firecells, fire safety systems, and fire resistance ratings

## Part 2. Firecells, fire safety systems, and fire resistance ratings

### 2.1 Provisions of firecells

#### 2.1.1 Firecell floor area limits

2.1.1.1 There are no limitations on the *firecell* floor area.

### 2.2 Fire safety systems

#### 2.2.1 Minimum fire safety system

2.2.1.1 *Fire safety systems* specified in this acceptable solution shall be as defined in [Appendix C. Fire safety systems](#).

2.2.1.2 Each *household unit* shall be provided with a minimum of Type 1 domestic smoke alarm system in compliance with NZS 4514.

Out

2.2.1.3 *Fire safety systems* are not required for **outbuildings** where the lengths of *dead end* and *total open paths* do not exceed distances given in Paragraph [3.3.1.1](#).

### 2.3 Fire resistance ratings

#### 2.3.1 FRR values

2.3.1.1 Unless explicitly stated otherwise in this acceptable solution, the *fire resistance ratings (FRRs)* shall be as follows:

- a) *life rating* = 30 minutes; and
- b) *property rating* = 30 minutes.

2.3.1.2 The *fire resistance rating* of *building elements* shall be determined using the *standard tests* and methods specified in Section 8.2 of the Building Product Specifications.

## Means of escape

### Part 3. Means of escape

#### 3.1 General principles

##### 3.1.1 Components of escape routes

- 3.1.1.1 *Escape routes* shall comply with clause D1 of the Building Code. Ramps, stairs, ladders, landings, *handrails*, doors, vision panels, and openings shall comply with Acceptable Solution D1/AS1.
- 3.1.1.2 The components of an *escape route* may be comprised of:
  - a) *open paths*; and
  - b) *exitways*; and
  - c) *final exits*.
- 3.1.1.3 Provided the allowable lengths of *open paths* are not exceeded, an *escape route* may be comprised of only an *open path* and *final exit*.
- 3.1.1.4 The *final exit* is where the *escape route* enters a *safe place*. This might be beyond the exit door from the *building*.

##### 3.1.2 Number of escape routes

- 3.1.2.1 A single *escape route* is permitted provided the *dead end open path* distance specified in Paragraph [3.3.1.1](#) is not exceeded.

#### 3.2 Height and width of escape routes

##### 3.2.1 Height

- 3.2.1.1 Height requirements within *escape routes* shall be as follows:
  - a) the clear height shall be no less than that required by Acceptable Solution D1/AS1; and
  - b) any door opening within, or giving access to, any *escape route* shall have a clear height of no less than 1955 mm for the required width of the opening.

##### 3.2.2 Width

- 3.2.2.1 The minimum width of individual *escape routes* shall be no less than:
  - a) 700 mm for horizontal travel; and
  - b) 850 mm for vertical travel; and
  - c) 1000 mm for the external *safe path*.

##### 3.2.3 Obstructions

- 3.2.3.1 The following minor obstructions are acceptable within the width of an *escape route*:
  - a) *handrails* complying with Acceptable Solution D1/AS1 and projecting no more than 100 mm into the width of an *open path*; and
  - b) door assemblies that project no more than 100 mm into the width of an *open path*.

##### 3.2.4 Doors on escape routes

- 3.2.4.1 Doors on *escape routes* shall satisfy the following requirements:
  - a) provide an unobstructed opening width of no less than 600 mm, and when multi-leaf, have no single leaf less than 500 mm wide; and
  - b) open no less than 90°; and
  - c) when opened, not cause the door swing to obstruct the minimum required width of an *escape route*; and

## Means of escape

- d) manual sliding doors may be used where the space has an *occupant load* of less than 20.
- 3.2.4.2 Door locking mechanisms shall not impede or prevent occupants from moving to a *safe place* in the event of a *fire*.

COMMENT: Locks with a key on one side, while the other side features a knob or turning mechanism of some sort, are permitted. Key operation in the direction of the escape is not permitted.

### 3.3 Length of escape routes

#### 3.3.1 Travel distances

- 3.3.1.1 An *escape route* may be any length, but the lengths of *dead ends* and total *open paths* shall not exceed the distances given in [Table 3.3.1.1](#). If these allowable distances are exceeded, the proposed *building* is outside the scope of this acceptable solution.

**Table 3.3.1.1: Travel distance on escape routes**

Paragraph

Portion of the escape route	Maximum travel distance for outbuildings with no system	Maximum travel distance for household units with a Type 1 system	Maximum travel distance for household units with a Type 1 system and a sprinkler system <sup>(1)</sup>
Dead end open path (DEOP)	20 m	35 m	40 m
Total open path (TOP)	50 m	75 m	100 m

**Note:** (1) The sprinkler system is to comply with either NZS 4515, NZS 4517, or NZS 4541 as modified in [Appendix D](#).

#### 3.3.2 Open path lengths

- 3.3.2.1 When using this acceptable solution to determine *open path* lengths, including any *dead end* the following shall apply:
- start point: the length shall be measured from no more than 1.0 m from the most remote point in a space; and
  - furniture and fittings: allowance shall be made for the *travel distance* around obstructions, such as furniture and fittings located in *open path*. If location of obstructions is unknown, then the allowable *travel distance* shall be measured orthogonally (see [Figure 3.3.2.1](#)); and
  - stairs: occurring in an *open path* shall have their *open path* taken as the plan length measured on the stair centreline, plus the plan length of each landing; and
  - ladders: occurring in an *open path* shall have their *open path* taken as the vertical height; and
  - intermediate floors: when determining *open path* lengths within *household units* or *outbuildings* the *travel distance* shall be taken as an actual length of the *escape route* to the external *safe path* or *final exit*; and
  - termination: an *open path* ends either at the start of the external *safe path* or a *final exit*.

#### 3.3.3 Dead end open paths

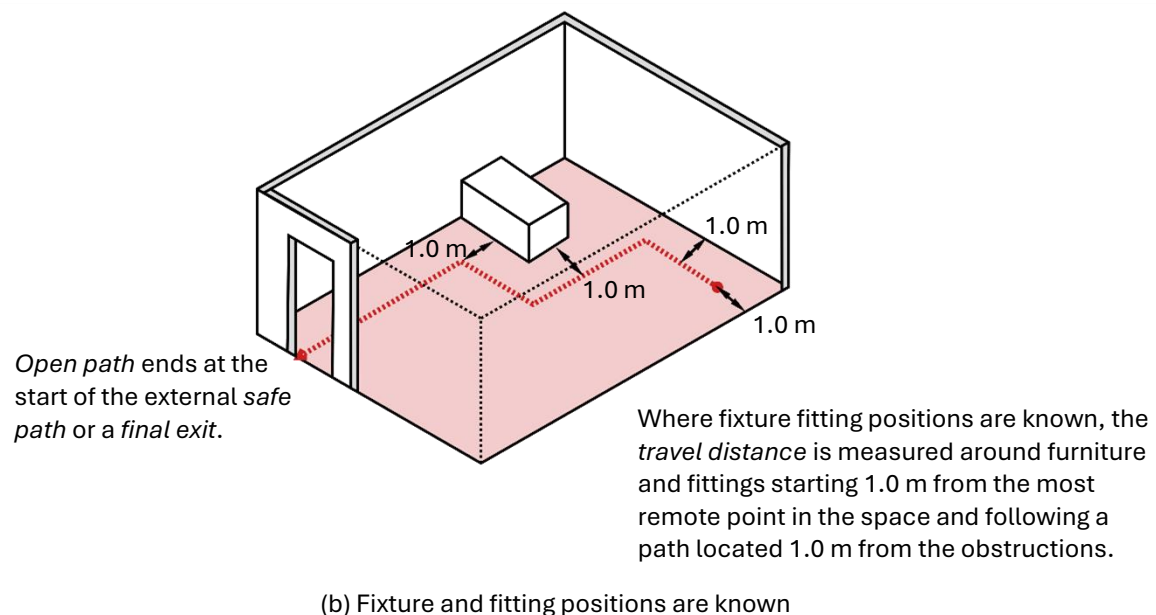
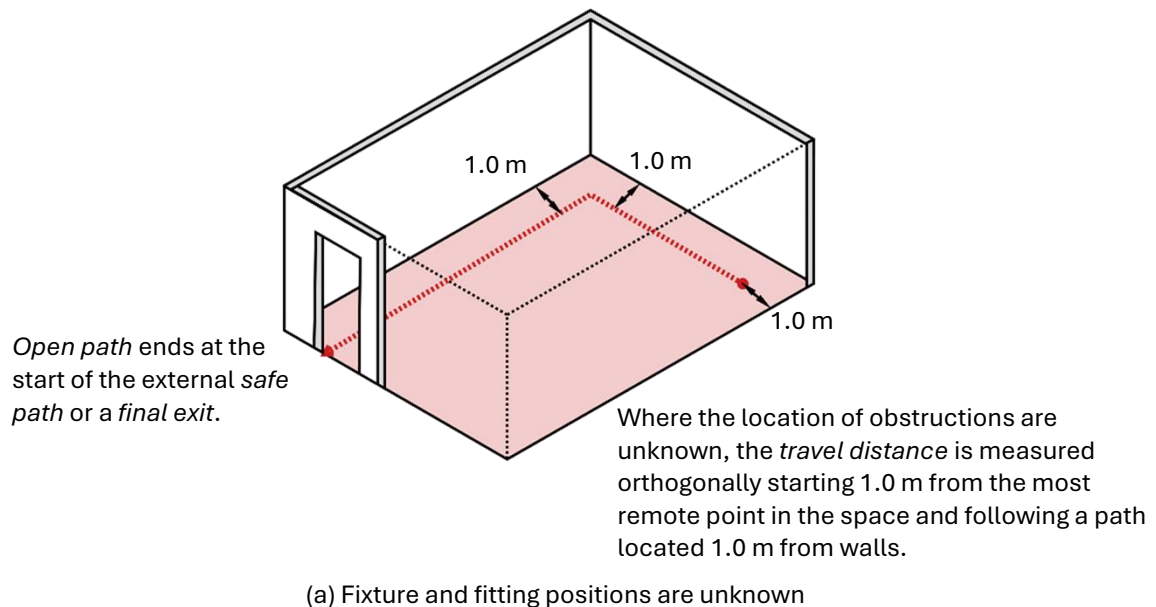
- 3.3.3.1 A *dead end* terminates where the *escape route* reaches:
- a point in the *open path* that offers alternative directions of travel; or
  - a *final exit*; or
  - an *exitway*.

## Means of escape

3.3.3.2 If two or more *open paths* are required, they shall be separated from each other, and remain separated until reaching an *exitway* or *final exit*. Separation shall be achieved by diverging (from the point where two *escape routes* are required), at an angle of no less than 90° until separated by a distance of at least 8.0 m (see [Figure 3.3.3.2](#)).

**Figure 3.3.2.1: Length of open paths**

Paragraph [3.3.2.1](#)

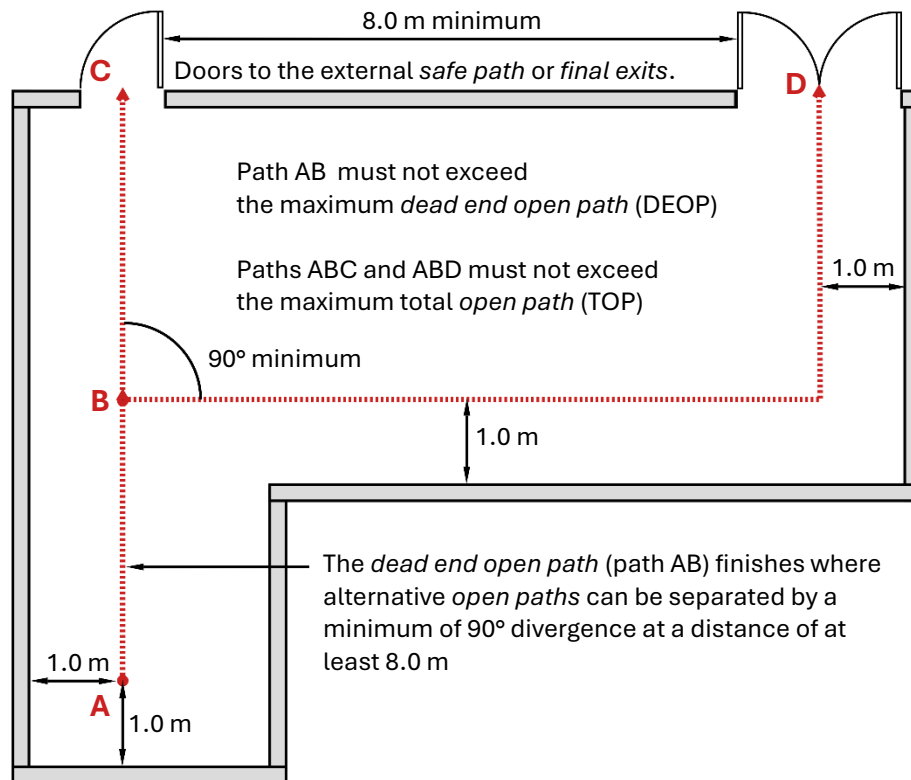


**Note:** In either case, *open path lengths* shall not exceed the lengths in [Table 3.3.1.1](#).

## Means of escape

**Figure 3.3.3.2: Alternate open path separation**

Paragraph [3.3.3.2](#)



**Note:** The lengths of *dead end open paths* and *total open paths* shall not exceed the distances given in [Table 3.3.1.1](#).

### 3.3.4 Safe paths

3.3.4.1 A *safe path* shall terminate at a *final exit*.

3.3.4.2 *Escape routes* from buildings shall enter directly into an external *safe path* or a *final exit*.

### 3.3.5 External escape routes

3.3.5.1 Where an *escape route* enters an *open space* with more than one direction of escape, an external *safe path* is not required.

3.3.5.2 Where an *escape route* enters an *open space* with only one direction of escape, and the buildings along the *escape route* are not provided with a sprinkler system installed to NZS 4515 or NZS 4541, an external *safe path* shall be provided between that point and the *final exit*.

3.3.5.3 External *safe path* protection shall be achieved by providing either:

- separation distance minimum of 1.0 m between the external *safe path* and adjacent *firecells*; or
- separation of the external *safe path* from adjacent *firecells* by *building elements* having a *fire resistance rating* in accordance with Subsection 2.3 and having no *unprotected areas*; or
- adjacent to the external *safe path* *firecells* shall be provided with an automatic *fire sprinkler* system installed to NZS 4515 or NZS 4541 (see [Figure 3.3.5.3](#)).

## Means of escape

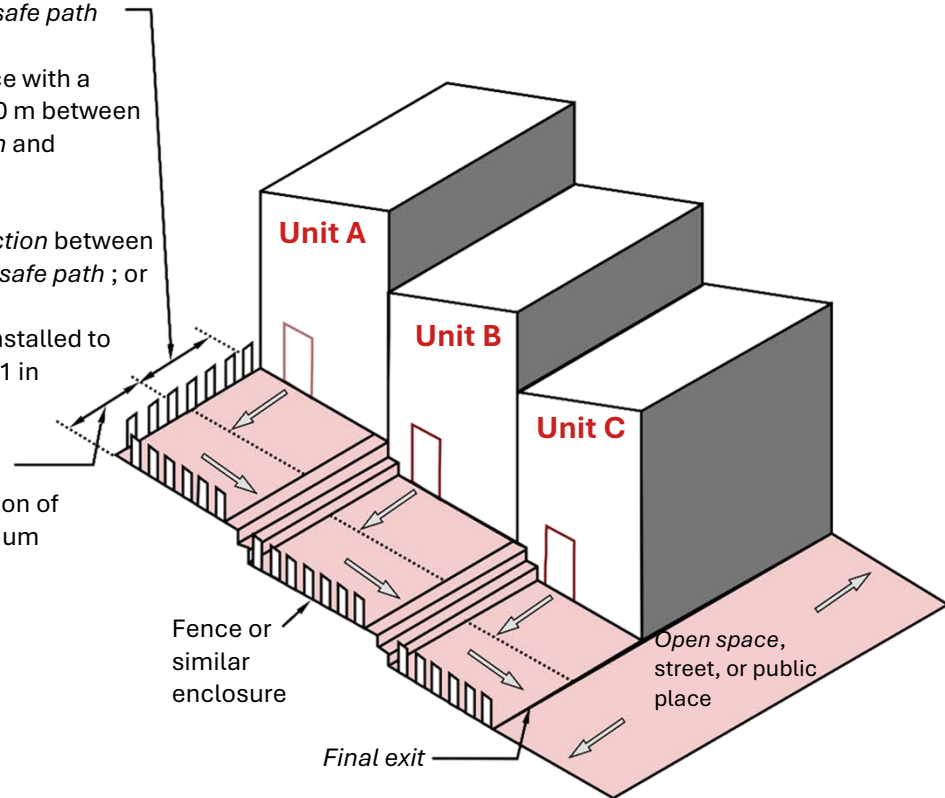
**Figure 3.3.5.3: External safe path protection**

Paragraph [3.3.5.3](#)

Options for external *safe path* protection:

- a) Separation distance with a minimum width of 1.0 m between the external *safe path* and Units A, B, and C; or
- b) *Fire rated construction* between Units A, B, C and the *safe path* ; or
- c) Sprinkler system installed to NZS 4515 or NZS 4541 in Units A, B, and C.

External *safe path* with only one direction of escape and a minimum width of 1.0 m





## Control of internal fire and smoke spread

## Part 4. Control of internal fire and smoke spread

### 4.1 Firecells

#### 4.1.1 Fire separations

- 4.1.1.1 Each *household unit*, including any garage and *escape routes* in *multi-unit dwellings*, shall be *fire separated* from other *household units* and any *escape routes* with *fire separations* having the *FRR* of no less than 30/30/30.
- 4.1.1.2 Where a separate *household unit* is attached to the primary dwelling (such as a sleepout or a self-contained accommodation unit), there must be a *fire separation* between it and the primary dwelling.

### 4.2 Interior surface finishes

#### 4.2.1 Surface finishes

- 4.2.1.1 Except where *foamed plastic building materials* or *combustible insulating materials* are used, there are no *surface finish* requirements in **risk group SH**.

#### 4.2.2 Foamed plastic and combustible insulation materials

- 4.2.2.1 If *foamed plastics building materials* or *combustible insulating materials* form part of a wall or ceiling system, the completed system shall achieve a *Group Number* that is equal or less than 3, and the *foamed plastics* shall comply with the flame propagation criteria as specified in Subsection 8.5.7 of the Building Product Specifications for the material being used. The above requirements do not apply to the following *building elements*:
- a) small areas of non-conforming product within a *firecell* with a total aggregate surface area of not more than 5.0 m<sup>2</sup>; and
  - b) electrical switches, outlets, cover plates and similar small discontinuous areas; and
  - c) pipes and cables used to distribute power or services; and
  - d) *handrails* and general decorative trim of any material such as architraves, skirtings and window components, including reveals, provided these do not exceed 5% of the surface area of the wall or ceiling they are part of; and
  - e) *damp-proof courses*, seals, caulking, flashings, thermal breaks and ground moisture barriers; and
  - f) individual *doorsets*; and
  - g) continuous areas of permanently installed openable wall partitions, having a surface area of not more than 25% of the divided room floor area or 5.0 m<sup>2</sup>, whichever is the greater.

COMMENT: The completed system may or may not include a *surface lining* product enclosing any *insulation material* from any adjacent *occupied space*. If a *surface lining* is not included, then the *foamed plastics* or *combustible insulating materials* when tested alone shall achieve a *Group Number* of 3, otherwise a *surface lining* is also required such that the completed system achieves a *Group Number* of 3. This paragraph applies to *foamed plastics building materials* whether exposed to view from the *occupied space* or enclosed.

## Control of external fire spread

## Part 5. Control of external fire spread

## 5.1 Horizontal fire spread from external walls

## 5.1.1 Fire rating of external walls

5.1.1.1 Where the *building* is protected with a sprinkler system, *external walls* do not need to be *fire* rated.

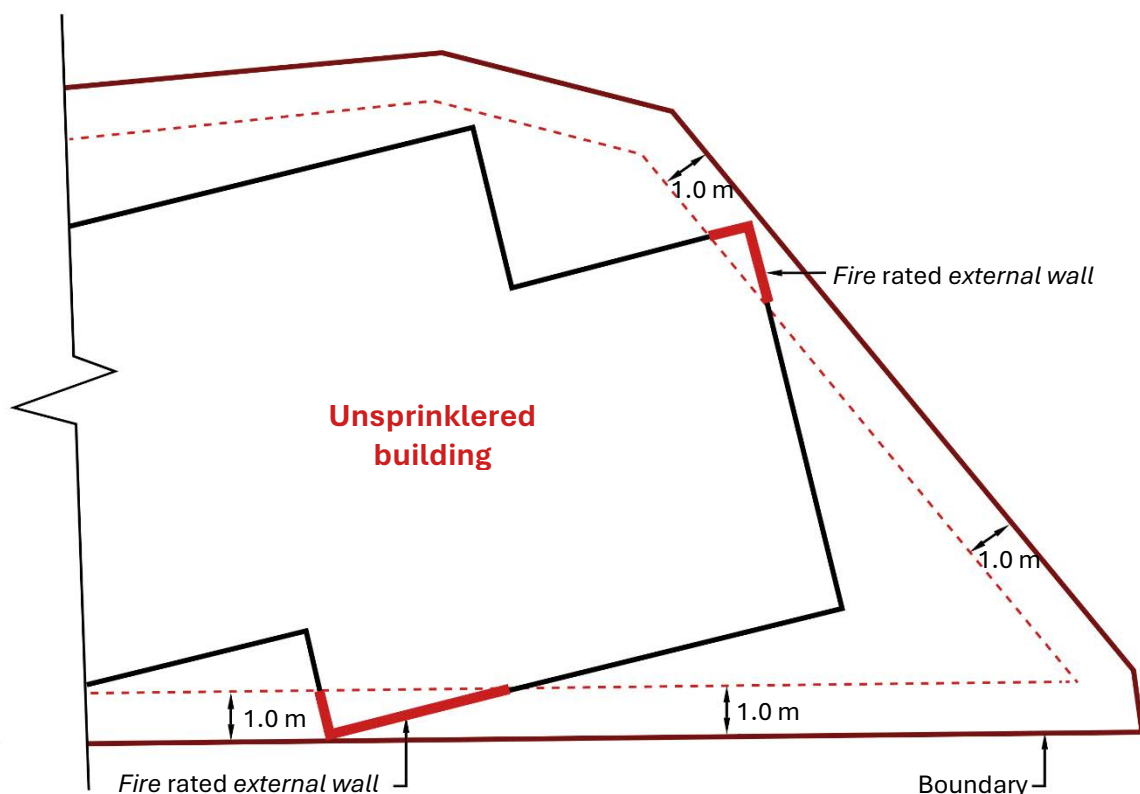
5.1.1.2 Where the *building* is not protected with a sprinkler system, *external walls* shall have an *FRR* of no less than 30/30/30 in the following circumstances:

Out

- a) **outbuildings**, single *household units* and attached side-by-side *multi-unit dwellings* where part of the *external wall* is less than 1.0 m and less than 90° from the *relevant boundary* (see [Figure 5.1.1.2](#)). The wall shall be *fire* rated to protect from both directions; and
- b) *multi-unit dwellings* located one above the other where the *external wall* is less than 5.0 m from the *relevant boundary*. If there are windows more than 1.0 m from the *relevant boundary* in a *household unit* wall requiring the *FRR*, the windows do not need to be *fire* rated.

Figure 5.1.1.2: Fire rating of external walls

Paragraph [5.1.1.2](#)



## 5.1.2 Notional boundary – firecells on the same property

5.1.2.1 For *firecells* containing *household units* under common ownership in the same *building*, or in separate *buildings* on the same property, a *notional boundary* shall be used instead of the *relevant boundary*. The words *relevant boundary* shall be interpreted as *notional boundary*.

## Control of external fire spread

### 5.2 Roofs

#### 5.2.1 Eaves

- 5.2.1.1 Where the *external wall* is required to have an *FRR*, the eaves projections shall either have an *FRR* of 30/30/30 or the wall shall be extended to the underside of the roof.
- 5.2.1.2 Where roof eaves extend from an otherwise unrated *external wall* to within 650 mm of the *relevant boundary*, the total eaves *construction* and the *external wall* from which they project shall have an *FRR* of no less than 30/30/30.

#### 5.2.2 Protection from a lower roof in multi-unit dwellings

- 5.2.2.1 Fire spread from a roof close to and lower than an *external wall* of an attached sleeping unit or attached *building* on *other property* shall be prevented by providing an *FRR* of 30/30/30 to either:
- a) the part of the roof within 5.0 m horizontally of the wall; or
  - b) any part of the wall within 9.0 m vertically of the roof.
- 5.2.2.2 Fire rating of the roof is not required if the *household unit* is protected with a sprinkler system complying with NZS 4515 or NZS 4541.

#### 5.2.3 Carports and similar construction

- 5.2.3.1 A carport is permitted to have walls and roof with 100% *unprotected area* provided that all the following conditions are met:
- a) at least two sides are completely open to the environment; and
  - b) the carport and *adjacent building* are under the same *ownership*; and
  - c) for a roof plan area of no more than 40 m<sup>2</sup>, no part of the roof is closer than 0.3 m to a *relevant boundary*.

### 5.3 External cladding systems

#### 5.3.1 External wall cladding materials

- 5.3.1.1 Cladding materials shall:
- a) be specified in accordance with Subsection 8.4.1 of the Building Product Specifications; and
  - b) comply with the fire performance requirements in [Table 5.3.1.1](#) based on the *building height* and the distance of the *external wall* to the *relevant boundary*.
- 5.3.1.2 [Table 5.3.1.1](#) applies to separate *buildings*. It does not apply to *household units* within the same *building* whether they are side by side or one above the other.

**Table 5.3.1.1: Required fire performance of cladding materials in external wall cladding systems**

Paragraph [5.3.1.1](#)

Building height	Fire performance of cladding materials where the distance to the relevant boundary <sup>(1)</sup> < 1.0 m	Fire performance of cladding materials where the distance to the relevant boundary <sup>(1)</sup> ≥ 1.0 m
0 to ≤ 10 m	Non-combustible, or limited combustible, or Type A	No requirement
> 10 m	Non-combustible, or limited combustible, or Type A	Non-combustible <sup>(2)</sup> , or limited combustible <sup>(2)</sup> , or Type B <sup>(2)</sup>

**Notes:**

(1) Where the angle between the *external wall* and a *boundary* is less than 90°.

(2) There is no requirement where the *building* is sprinklered to NZS 4515 or NZS 4541.

## Firefighting

# Part 6. Firefighting

## 6.1 Fire and Emergency New Zealand vehicular access

### 6.1.1 Multi-unit dwellings

6.1.1.1 If *buildings* that contain *multi-unit dwellings* with more than 2 units are located remotely from the street boundaries of a property, pavements situated on the property and necessary to be used for vehicular access to a hard-standing within:

- a) 75 m of any point in any unit contained in the *building* except if there is a sprinkler system complying with NZS 4515 or NZS 4541; and
- b) 20 m of any inlets to *fire* sprinkler or *building fire* hydrant systems, shall
  - i) be able to withstand a laden weight of up to 25 tonnes with an axle load of 8 tonnes or have a load-bearing capacity of no less than the public roadway serving the property, whichever is the lower, and
  - ii) be trafficable in all weathers, and
  - iii) have a minimum width of 4.0 m, and
  - iv) provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between *buildings*.

COMMENT: Access to *buildings* for fire appliances will be generally via public streets, but provision is needed on multi-building sites to enable appliances to reach the required hard-standing.

## Prevention of fire occurring

# Part 7. Prevention of fire occurring

## 7.1 Heating appliances

### 7.1.1 Solid fuel appliances

7.1.1.1 AS/NZS 2918, as modified in Appendix [D.2.1](#), shall be used for the installation of:

- a) domestic solid fuel burning appliances, installed in either domestic or commercial situations; and
- b) *flue systems*.

7.1.1.2 A normative appendix is an integral part of this standard.

### 7.1.2 Gas burning appliances

7.1.2.1 Gas-burning appliances shall be installed in accordance with Building Code clause G11 Gas as an energy source.

### 7.1.3 Oil-fired appliances

7.1.3.1 AS 1691, as modified in Appendix [D.2.2](#), shall be used for the installation of domestic oil-fired appliances.

7.1.3.2 AS/NZS 2918 Sections 2 and 4 shall be used for the installation of *flues* for domestic oil-fired appliances.

## 7.2 Electrical fire safety

### 7.2.1 Electrical installations

7.2.1.1 Electrical installations in *buildings* shall comply with Building Code clause G9 Electricity.

## 7.3 Open fires

### 7.3.1 Chimneys

7.3.1.1 *Chimneys* shall be constructed in accordance with [Table 7.3.1.1](#) and [Figure 7.3.1.1](#). They shall have:

- a) *fireplaces* lined with fire bricks having a thickness of no less than 50 mm; and
- b) *fireplace* joints of *non-combustible* material and shall be sealed against air leakage; and
- c) *chimney* brickwork of no less than a single skin of brick 90 mm thick plus a 65 mm thick layer of grout; and
- d) an expansion gap provided in chimneys containing *flue liners*. These *flue liners* shall be wrapped in a *combustible* material of thickness no less than 0.25 mm (for example heavy-quality *building paper*) to prevent the grout filling from bonding with the *flue liner*.

**Table 7.3.1.1: Minimum acceptable dimensions of chimneys**

Paragraph [7.3.1.1](#)

Chimney construction	Chimney jamb and chimney back thickness excluding filling and flue liner (mm)	Chimney jamb and chimney back thickness including filling and flue liner (mm)	Chimney breasts and side gathering and chimney wall thickness above the level of the gather, excluding linings (mm)
Concrete	170	255	170
Brickwork	155	230	155
Pre-cast pumice concrete	85	170	85

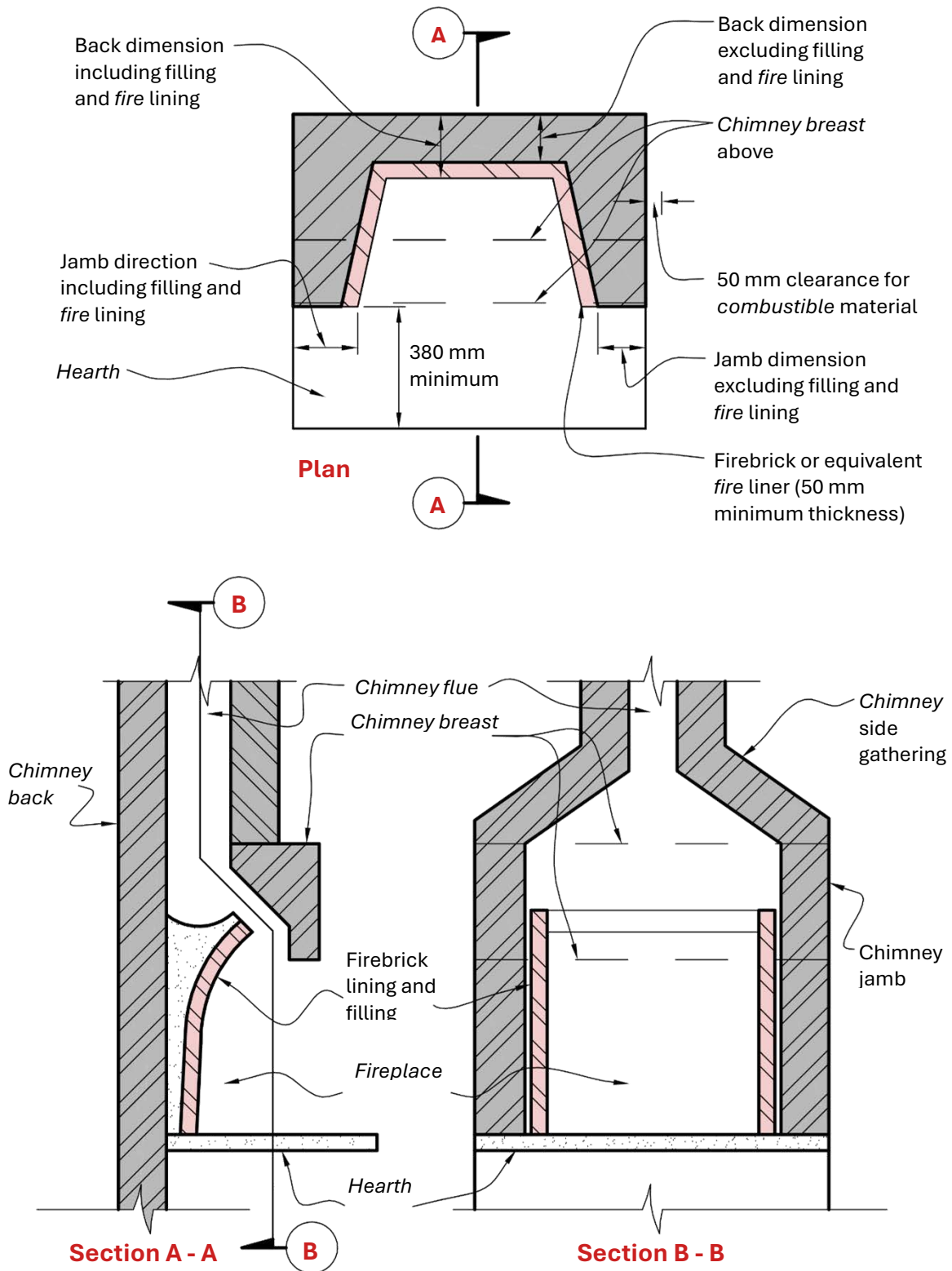
## Prevention of fire occurring

- 7.3.1.2 Cross-sectional areas of *flues* shall be no less than 0.03 m<sup>2</sup> for an open fireplace (see [Figure 7.3.1.2](#)).
- 7.3.1.3 *Flue* linings shall be one of the following types:
- a) clay *flue* liners with rebated or socketed joints; or
  - b) imperforate clay pipes with socketed joints; or
  - c) high alumina cement and kiln-burnt aggregate pipes, with rebated or socketed joints, or steel collars around joints.
- 7.3.1.4 The *flue liners* shall be fitted with the sockets or rebates uppermost to prevent condensate running out, and to prevent any caulking material from being adversely affected. Joints between the *flue liners*, and any space between *flue liners* and the masonry, shall be filled with weak mortar or insulating concrete (see [Figure 7.3.1.2\(a\)](#)).
- 7.3.1.5 *Flue liners* are not required for:
- a) brick *chimneys* if constructed of two 90 mm skins of brickwork with a 65 mm grout-filled gap between (see [Figure 7.3.1.2\(b\)](#)); or
  - b) ordinary concrete *chimneys*; or
  - c) pre-cast pumice concrete *chimneys*.
- 7.3.1.6 Clearance above roofs shall be in accordance with Figure 4.9 of AS/NZS 2918.
- 7.3.1.7 Every *fireplace* shall have a separate *flue*.
- 7.3.1.8 *Flue* joints shall be of *non-combustible* material and sealed against air leakage.
- 7.3.1.9 *Hearths* for *fireplaces* shall:
- a) be *constructed* of fully grouted stones, bricks or concrete of no less than 50 mm total thickness; and
  - b) extend no less than 230 mm on each side of the *fireplace* opening, and no less than 380 mm forward of the *fireplace* opening; and
  - c) have no *combustible* material closer than the clearances given in Paragraph 7.3.1.9b) from the upper and lower surfaces of the *hearth*.
- 7.3.1.10 Clearances between a *chimney* and any *combustible* material (see [Figure 7.3.1.10](#)) shall be no less than:
- a) 200 mm at any opening in the *flue*, or at the *fireplace* opening; and
  - b) 200 mm above or below the upper surface of the *hearth*, and 75 mm from the lower surface of the *hearth*.
- 7.3.1.11 *Hearth* edges are to be separated from *combustible* material with *insulating material* having a minimum service operating temperature of 150°C.
- 7.3.1.12 A ventilated space of no less than 50 mm shall be provided between the outer face of a *fireplace*, *chimney* or *flue* and any *combustible* material.
- 7.3.1.13 AS/NZS 2918 Sections 2 and 4 shall also be used for the installation of *flues* from open *fires*.

## Prevention of fire occurring

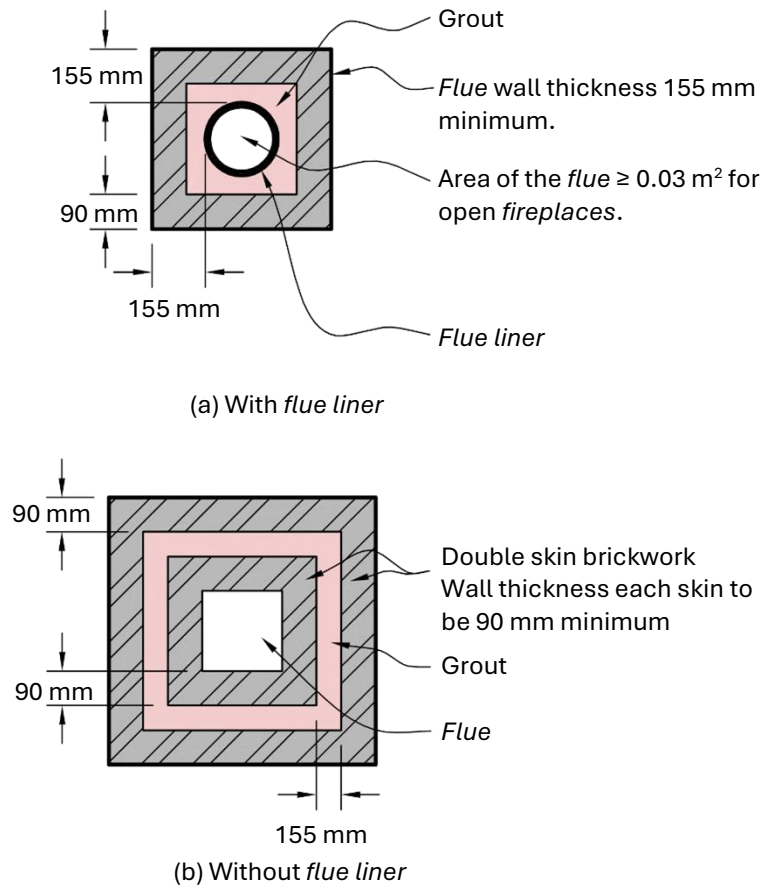
Figure 7.3.1.1: Chimney terms and dimensions

Paragraph 7.3.1.1



## Prevention of fire occurring

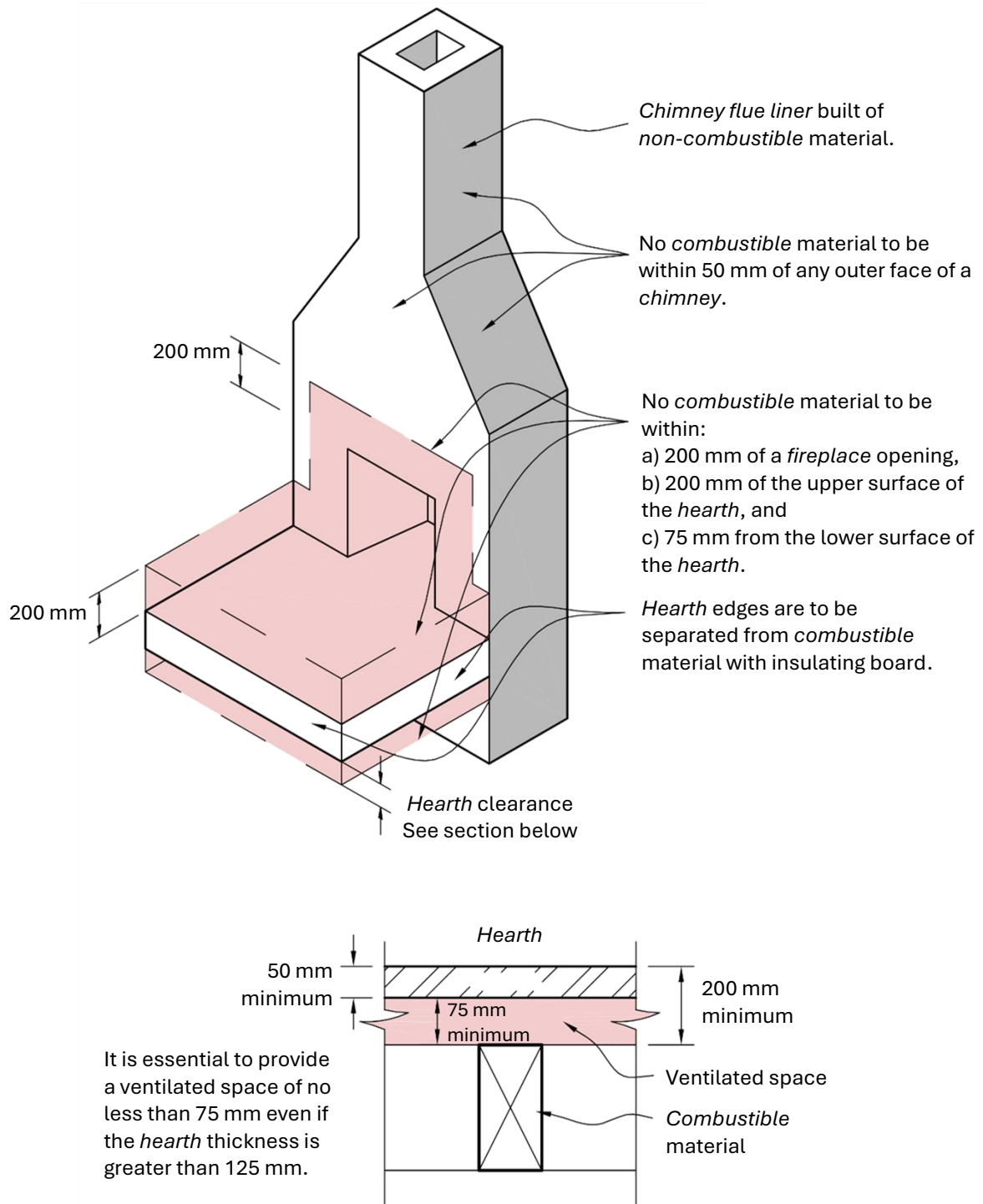
Figure 7.3.1.2: Brick chimney flues – sections

Paragraphs [7.3.1.2](#), [7.3.1.4](#), and [7.3.1.5](#)



## Prevention of fire occurring

Figure 7.3.1.10: Clearances between a chimney and hearth, and combustible materials

Paragraph [7.3.1.10](#)

**Note:** Refer to Paragraph [7.3.1.11](#) for insulating materials for hearth edges.

## References

### Appendix A. References

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

Standards New Zealand		Where quoted
AS/NZS 2918:2001	Domestic solid fuel burning appliances	<a href="#">7.1.1.1</a> , <a href="#">7.1.3.2</a> , <a href="#">7.3.1.6</a> , <a href="#">7.3.1.13</a> , <a href="#">D.2.1.1</a>
AS/NZS 3000:2018	Electrical installations – Known as the Australian/New Zealand Wiring Rules	<a href="#">D.1.3.2</a>
NZS 4510:2008	Fire hydrant systems for buildings, Amendment 1	<a href="#">C.2.10.1</a>
NZS 4512:2021	Fire detection and alarm systems in buildings	<a href="#">C.1.1.2</a> , <a href="#">C.2.1.1</a> , <a href="#">C.2.3.1</a> , <a href="#">C.2.4.1</a> , <a href="#">C.2.4.3</a> , <a href="#">C.2.5.3</a> , <a href="#">C.2.5.4</a> , <a href="#">C.2.8.1</a> , <a href="#">D.1.1.2</a> , <a href="#">D.1.3.2</a> , <a href="#">D.1.3.3</a>
NZS 4514:2021	Interconnected smoke alarms for houses	<a href="#">2.2.1.2</a> , <a href="#">C.1.1.4</a> , <a href="#">C.2.1.1</a> , <a href="#">D.1.1.1</a>
NZS 4515:2009	Fire sprinkler systems for life safety in sleeping occupancies (up to 2000 m <sup>2</sup> )	<a href="#">3.3.5.2</a> , <a href="#">3.3.5.3</a> , <a href="#">5.2.2.2</a> , <a href="#">6.1.1.1</a> , <a href="#">C.1.1.3</a> , <a href="#">D.1.2.3</a> , <a href="#">Definitions</a> , <a href="#">Figure 3.3.5.3</a> , <a href="#">Table 3.3.1.1</a> , <a href="#">Table 5.3.1.1</a>
NZS 4517:2010	Fire sprinkler systems for houses	<a href="#">C.1.1.3</a> , <a href="#">Table 3.3.1.1</a>
NZS 4541:2020	Automatic fire sprinkler systems	<a href="#">3.3.5.2</a> , <a href="#">3.3.5.3</a> , <a href="#">5.2.2.2</a> , <a href="#">6.1.1.1</a> , <a href="#">C.1.1.3</a> , <a href="#">C.2.5.3</a> , <a href="#">C.2.6.1</a> , <a href="#">D.1.2.2</a> , <a href="#">Definitions</a> , <a href="#">Figure 3.3.5.3</a> , <a href="#">Table 3.3.1.1</a> , <a href="#">Table 5.3.1.1</a>

These standards can be accessed from [www.standards.govt.nz](http://www.standards.govt.nz).

Standards Australia		Where quoted
AS 1668.1:2015	The use of ventilation and/or air conditioning in buildings – Part 1: Fire and smoke control in multi-compartment buildings Amendment 1	<a href="#">C.2.8.1</a> , <a href="#">D.1.3.1</a> , <a href="#">D.1.3.2</a>
AS 1691:1985	Domestic oil-fired appliances – installation	<a href="#">7.3.1.1</a> , <a href="#">7.3.1.2</a> , <a href="#">D.2.2.1</a>

These standards can be accessed from [www.standards.org.au](http://www.standards.org.au).

New Zealand Legislation		Where quoted
Conservation Act 1987		<a href="#">Definitions</a>
Hazardous Substances and New Organisms Act 1996		<a href="#">1.1.2.3</a> , <a href="#">Definitions</a>
Health and Safety at Work (Hazardous Substances) Regulations 2017		<a href="#">1.1.2.3</a>
Local Government Act 1974		<a href="#">Definitions</a>
National Park Act 1980		<a href="#">Definitions</a>
Railways Act 2005		<a href="#">Definitions</a>
Reserves Act 1977		<a href="#">Definitions</a>

These documents can be accessed from [www.legislation.govt.nz](http://www.legislation.govt.nz).

## Definitions

### Appendix B. Definitions

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

Term	Definition
<b>Adjacent building</b>	A nearby <i>building</i> , including an adjoining <i>building</i> , whether or not erected on <i>other property</i> .
<b>Allotment</b>	Has the meaning given to it by section 10 of the Building Act 2004.
<b>Backcountry hut</b>	<p>A <i>building</i> that—</p> <ul style="list-style-type: none"> <li>a) is located on land that is administered by the Department of Conservation for conservation, recreational, scientific, or other related purposes, including any land administered under any of the following: <ul style="list-style-type: none"> <li>i) the Conservation Act 1987;</li> <li>ii) the National Parks Act 1980;</li> <li>iii) the Reserves Act 1977; and</li> </ul> </li> <li>b) is intended to provide overnight shelter to any person who may visit and who carries his or her own food, bedding, clothing, and outdoor equipment; and</li> <li>c) contains only basic facilities, which may include (but are not limited to) any or all of the following: <ul style="list-style-type: none"> <li>i) sleeping platforms or bunks;</li> <li>ii) mattresses;</li> <li>iii) food preparation surfaces;</li> <li>iv) appliances for heating;</li> <li>v) appliances for cooking;</li> <li>vi) toilets; and</li> </ul> </li> <li>d) has been certified by the Director-General as being in a location that wheelchair users are unlikely to be able to visit; and</li> <li>e) is intended to be able to sleep— <ul style="list-style-type: none"> <li>i) no more than 20 people in its backcountry hut sleeping area; and</li> <li>ii) no more than 40 people in total; and</li> </ul> </li> <li>f) does not contain any connection, except by radiocommunications, to a network utility operator.</li> </ul>
<b>Boundary</b>	Any <i>boundary</i> that is shown on a survey plan that is approved by the Surveyor-General and deposited with the Registrar-General of Land, whether or not a new title has been issued.
<b>Building</b>	Has the meaning given to it by sections 8 and 9 of the Building Act 2004. For the purposes of this acceptable solution and notwithstanding the definition of <i>building</i> , a number of separated <i>buildings</i> cannot be taken as a single <i>firecell</i> .
<b>Building element</b>	Any structural and non-structural component or assembly incorporated into or associated with a <i>building</i> . Included are <i>fixtures</i> , <i>services</i> , <i>drains</i> , permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports.

## Definitions

Term	Definition
<b>Building height</b>	The vertical distance between the floor level of the lowest <i>occupied space</i> above the ground and the top of the highest occupied floor, but not including spaces located within or on the roof that enclose stairways, lift shafts, or machinery rooms.
<b>Building work</b>	Has the meaning given to it by section 7 of the Building Act 2004.
<b>Chimney</b>	A <i>non-combustible</i> structure which encloses one or more <i>flues</i> , <i>fireplaces</i> or other heating appliances.
<b>Chimney back</b>	The <i>non-combustible</i> wall forming the back of a <i>fireplace</i> .
<b>Chimney breast</b>	The front <i>fireplace</i> wall <i>construction</i> above the <i>fireplace</i> opening.
<b>Chimney jambs</b>	The side walls of a <i>fireplace</i> .
<b>Combustible</b>	Material that is neither <i>non-combustible</i> nor <i>limited combustible</i> .
<b>Construct</b>	In relation to a <i>building</i> , includes to design, build, erect, prefabricate, and relocate the <i>building</i> ; and construction has a corresponding meaning.
<b>Damp-proof course</b>	A strip of durable vapour barrier placed between <i>building elements</i> to prevent the passage of moisture from one element to another.
<b>Dead end</b>	That part of an <i>open path</i> where escape is possible in only one direction.
<b>Doorset</b>	A complete assembly comprising a door leaf or leaves including any glazed or solid panels adjacent to or over the leaves within the door frame including hardware or other inbuilt features; and a door frame, if any, with its fixings to the wall and, for a sliding or tilting door, all guides and their respective fixings to the lintel, wall or sill.
<b>Early childhood centre (ECC)</b>	<p>Premises used regularly for the education or care of three or more children (not being children of the persons providing the education or care, or children enrolled at a school being provided with education or care before or after school) under the age of six years old –</p> <ul style="list-style-type: none"> <li>a) by the day or part of a day; but</li> <li>b) not for any continuous period of more than seven days.</li> </ul> <p>This does not include home based early childhood services.</p>
<b>Escape height</b>	The height between the floor level in the <i>firecell</i> being considered and the floor level of the required <i>final exit</i> which is the greatest vertical distance above or below that <i>firecell</i> . Where the <i>firecell</i> contains <i>intermediate floors</i> , or upper floors within <i>household units</i> the escape height shall be measured from the floor having the greatest vertical separation from the <i>final exit</i> .
<b>Escape route</b>	A continuous unobstructed route from any <i>occupied space</i> in a <i>building</i> to a <i>final exit</i> to enable occupants to reach a <i>safe place</i> , and shall comprise one or more of the following: <i>open paths</i> , and <i>safe paths</i> . Note that doors in an escape route are not considered to be obstructions provided they comply with this acceptable solution and D1/AS1.
<b>Exitway</b>	All parts of an <i>escape route</i> protected by <i>fire</i> or <i>smoke separations</i> , or by distance when exposed to open air, and terminating at a <i>final exit</i> .
<b>External wall</b>	Any exterior face of a <i>building</i> (including a roof) within 30° of vertical, consisting of <i>primary</i> and/or <i>secondary elements</i> intended to provide protection against the outdoor environment, but which may also contain <i>unprotected areas</i> .

## Definitions

Term	Definition
<b>Final exit</b>	The point at which an <i>escape route</i> terminates by giving direct access to a <i>safe place</i> .
<b>Fire</b>	The state of combustion during which flammable materials burn producing heat, toxic gases, or smoke or flame or any combination of these.
<b>Firecell</b>	Any space including a group of contiguous spaces on the same or different levels within a <i>building</i> , which is enclosed by any combination of <i>fire separations</i> , <i>external walls</i> , roofs, and floors. Floors, in this context, include ground floors and those in which the underside is exposed to the external environment (eg when cantilevered). Note that internal floors between <i>firecells</i> are <i>fire separations</i> .
<b>Fire hazard</b>	The danger of potential harm and degree of exposure arising from – a) the start and spread of <i>fire</i> ; and b) the smoke and gases that are generated by the start and spread of <i>fire</i> .
<b>Fireplace</b>	A space formed by the <i>chimney back</i> , the <i>chimney jambs</i> , and the <i>chimney breast</i> in which fuel is burned for the purpose of heating the room into which it opens.
<b>Fire resistance rating (FRR)</b>	The term used to describe the minimum <i>fire</i> resistance required of <i>primary</i> and <i>secondary elements</i> as determined in the <i>standard test</i> for <i>fire</i> resistance, or in accordance with a specific calculation method verified by experimental data from standard <i>fire</i> resistance tests. It comprises three numbers giving the time in minutes for which each of the criteria <i>structural adequacy</i> , <i>integrity</i> and <i>insulation</i> are satisfied, and is presented always in that order. There are two types of <i>FRR</i> : <i>life rating</i> and <i>property rating</i> .
<b>Fire safety systems</b>	The combination of all active and passive protection methods used in a <i>building</i> to— a) warn people of an emergency; and b) provide for safe evacuation; and c) provide for access by, and the safety of, firefighters; and d) restrict the spread of <i>fire</i> ; and e) limit the impact of <i>fire</i> on <i>structural stability</i> .
<b>Fire separation</b>	Any <i>building element</i> that separates <i>firecells</i> or <i>firecells</i> and <i>safe paths</i> , and provides a specific <i>fire resistance rating</i> .
<b>Flue</b>	The passage through which the products of combustion are conveyed to the outside.
<b>Flue liner</b>	Pipes or linings of <i>fire</i> clay, metal or <i>fire</i> brick that surrounds <i>flues</i> .
<b>Flue system</b>	A series of interconnecting <i>flue</i> pipe casings which form a safe passage ( <i>flue</i> ) for conveying products of combustion from within an appliance to the outside of a <i>building</i> or structure.
<b>Foamed plastics</b>	<i>Combustible</i> foamed plastic polymeric materials of low density (typically less than 100 kg/m <sup>3</sup> ) and classified as cellular polymers which are manufactured by creating a multitude of fine void (typically 90 to 98%) distributed more or less uniformly throughout the product. Examples of <i>foamed plastics</i> are latex foams, polyethylene foams, polyvinyl chloride foams, expanded or extruded polystyrene foams, phenolic foams, ureaformaldehyde foams, polyurethane foams and polychloroprene foams.

## Definitions

Term	Definition
<b>Group Number</b>	The classification number for a material used as a finish, surface, lining, or attachment to a wall or ceiling within an <i>occupied space</i> and determined according to the <i>standard test</i> methods for measuring the properties of lining materials. The methods for determining a Group Number are provided in Section 8.5 of the Building Product Specifications.
<b>Handrail</b>	A rail to support to, or assist with the movement of a person.
<b>Hazardous</b>	Creating an unreasonable risk to people of bodily injury or deterioration of health.
<b>Hazardous substance</b>	has the meaning ascribed to it by section 2 of the Hazardous Substances and New Organisms Act 1996.
<b>Hearth</b>	The insulating floor under the <i>fire</i> and in front and at the sides of the <i>fireplace</i> .
<b>Household unit</b>	<p>a) means a <i>building</i> or group of <i>buildings</i>, or part of a <i>building</i> or group of <i>buildings</i>, that is—</p> <ul style="list-style-type: none"> <li>i) used, or intended to be used, only or mainly for residential purposes; and</li> <li>ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but</li> </ul> <p>b) does not include a hostel, boarding house, or other specialised accommodation.</p>
<b>HVAC</b>	An abbreviation for heating, ventilating and air-conditioning.
<b>Insulating material</b>	A material that has a thermal conductivity of less than 0.07 W/mK.
<b>Insulation</b>	In the context of <i>fire</i> protection, the time in minutes for which a prototype specimen of a <i>fire separation</i> , when subjected to the <i>standard test</i> for <i>fire</i> resistance, has limited the transmission of heat through the specimen.
<b>Integrity</b>	In the context of <i>fire</i> protection, the time in minutes for which a prototype specimen of a <i>fire separation</i> , when subjected to the <i>standard test</i> for <i>fire</i> resistance, has prevented the passage of flame or hot gases. The precise meaning of <i>integrity</i> depends on the type of <i>building elements</i> being treated and how it is defined in the <i>standard test</i> being used.
<b>Intended use</b>	<p>In relation to a <i>building</i>—</p> <p>a) includes any or all of the following:</p> <ul style="list-style-type: none"> <li>i) any reasonably foreseeable occasional use that is not incompatible with the intended use;</li> <li>ii) normal maintenance;</li> <li>ii) activities undertaken in response to <i>fire</i> or any other reasonably foreseeable emergency; but</li> </ul> <p>b) does not include any other maintenance and repairs or rebuilding.</p>
<b>Intermediate floor</b>	Any upper floor within a <i>firecell</i> which because of its configuration provides an opening allowing smoke or <i>fire</i> to spread from a lower to an upper level within the <i>firecell</i> .
<b>Life rating</b>	The <i>fire resistance rating</i> to be applied to elements of <i>construction</i> that allows movement of people from their location in a <i>building</i> to a <i>safe place</i> .
<b>Limited combustible</b>	Material that meets the criteria for a limited combustible material in Section 8.1 of the Building Product Specifications.

## Definitions

Term	Definition
<b>Multi-unit dwelling</b>	Applies to a <i>building</i> or use which contains more than one separate household or family.
<b>Non-combustible</b>	Material that meets the criteria for a non-combustible material in Section 8.1 of the Building Product Specifications.
<b>Notional boundary</b>	<p>The <i>boundary</i> which for <i>fire</i> safety purposes, is assumed to exist between two <i>buildings</i> on the same property under a single land title.</p> <p>The <i>notional boundary</i> is not permitted to be located any closer than 1.0 metre to any unprotected areas within the external wall of the <i>buildings</i> that is receiving the radiation where orientated at less than 90°.</p>
<b>Occupant load</b>	<p>The greatest number of people likely to occupy a particular space within a <i>building</i>. It is determined by:</p> <ul style="list-style-type: none"> <li>a) dividing the total floor area by the m<sup>2</sup> per person (occupant density) for the activity being undertaken, or</li> <li>b) for sleeping areas, counting the number of sleeping (or care) spaces, or</li> <li>c) for fixed seating areas, counting the number of seats.</li> </ul>
<b>Occupied space</b>	Any space within a <i>building</i> in which a person will be present from time to time during the <i>intended use</i> of the <i>building</i> .
<b>Open path</b>	That part of an <i>escape route</i> (including <i>dead ends</i> ) within a <i>firecell</i> where occupants may be exposed to <i>fire</i> or smoke while making their escape.
<b>Open space</b>	Land on which there are, and will be, no <i>buildings</i> and which has no roof over any part of it other than overhanging eaves.
<b>Other property</b>	<p>Any land or <i>buildings</i> or part of any land or <i>buildings</i>, that are:</p> <ul style="list-style-type: none"> <li>a) not held under the same <i>allotment</i>; or</li> <li>b) not held under the same <i>ownership</i>;</li> </ul> <p>and includes a road.</p>
<b>Owner</b>	<p>In relation to land and any <i>buildings</i> on the land—</p> <ul style="list-style-type: none"> <li>a) means the person who— <ul style="list-style-type: none"> <li>i) is entitled to the rack rent from the land; or would be so entitled if the land were let to a tenant at a rack rent; and</li> </ul> </li> <li>b) includes— <ul style="list-style-type: none"> <li>i) the <i>owner</i> of the fee simple of the land; and</li> <li>ii) for the purposes of Building Act sections 32, 44, 92, 96, 97, and 176(c), any person who has agreed in writing, whether conditionally or unconditionally, to purchase the land or any leasehold estate or interest in the land, or to take a lease of the land, and who is bound by the agreement because the agreement is still in force.</li> </ul> </li> </ul>
<b>Penetration</b>	A <i>building element</i> passing through an opening in a <i>fire separation</i> . A <i>penetration</i> may include, but is not limited to: pipes, cables, ducts, hoses, drains, cable trays, ropes, data outlets, power outlets, hatches, glazing, structural bracing etc.



## Definitions

Term	Definition
<b>Place of safety</b>	<p>Either:</p> <ul style="list-style-type: none"> <li>a) a <i>safe place</i>; or</li> <li>b) a place that is inside a <i>building</i> and meets the following requirements: <ul style="list-style-type: none"> <li>i) the place is constructed with <i>fire separations</i> that have <i>fire</i> resistance sufficient to withstand burnout at the point of the <i>fire</i> source; and</li> <li>ii) the place is in a <i>building</i> that is protected by an automatic <i>fire</i> sprinkler system that complies with NZS 4541 or NZS 4515 as appropriate to the <i>building's</i> use; and</li> <li>iii) the place is designed to accommodate the intended number of persons; and</li> <li>iv) the place is provided with sufficient means of escape to enable the intended number of persons to escape to a <i>safe place</i> that is outside a <i>building</i>.</li> </ul> </li> </ul>
<b>Primary element</b>	A <i>building element</i> providing the basic loadbearing capacity to the structure, and which if affected by fire may initiate instability or premature structural collapse.
<b>Property rating</b>	The <i>fire resistance rating</i> to be applied to elements of <i>construction</i> that allows for protection of <i>other property</i> .
<b>Railway line</b>	Has the meaning ascribed to it by section 4 of the Railways Act 2005.
<b>Relevant boundary</b>	<p>The boundary of an <i>allotment</i> that is <i>other property</i> in relation to the <i>building</i> in question and from which is measured the separation between the <i>building</i> and that <i>other property</i>; and for the <i>external wall</i> of any <i>building</i>, the <i>relevant boundary</i> is the nearest of—</p> <ul style="list-style-type: none"> <li>a) a <i>boundary</i> of a freehold <i>allotment</i>, except that if the other property is a <i>road</i>, railway line, or public <i>open space</i>, the <i>relevant boundary</i> is the <i>boundary</i> on the far side of that <i>other property</i>; or</li> <li>b) a <i>boundary</i> of a cross-lease or a company lease or a licence, except that if the <i>other property</i> is <i>open space</i> to which the lessee or licensee of the <i>building</i> in question has an exclusive right of access and occupation or to which 2 or more occupiers of the <i>building</i> in question have rights of access and occupation, the <i>relevant boundary</i> is the <i>boundary</i> on the far side of that <i>other property</i>; or</li> <li>c) a <i>boundary</i> shown on a unit plan (but excluding a <i>boundary</i> between a principal unit and its accessory unit), except that if the <i>other property</i> is <i>open space</i> and is common property, the <i>relevant boundary</i> is the <i>boundary</i> on the far side of that <i>other property</i>.</li> </ul> <p>Refer also to <i>notional boundary</i> for <i>buildings</i> on the same property under a single land title.</p>
<b>Remote receiving centre</b>	A <i>fire</i> alarm monitoring centre service provider that transmits <i>fire</i> alarm signals to summon Fire and Emergency New Zealand in case of <i>fire</i> and complies with NZS 4512.
<b>Risk group</b>	The classification of a <i>building</i> or <i>firecells</i> within a <i>building</i> according to the use to which it is intended to be put.
<b>Road</b>	Has the meaning ascribed to it by section 315 of the Local Government Act 1974 and includes a public place and also includes a motorway.



## Definitions

Term	Definition
<b>Safe path</b>	That part of an <i>exitway</i> which is protected from the effects of <i>fire</i> by <i>fire separations</i> , <i>external walls</i> , or by distance when exposed to open air.
<b>Safe place</b>	A place, outside of and in the vicinity of a single <i>building</i> unit, from which people may safely disperse after escaping the effects of a fire. It may be a place such as a street, <i>open space</i> , public space or an <i>adjacent building</i> unit.
<b>Secondary element</b>	A <i>building element</i> not providing load bearing capacity to the structure and if affected by <i>fire</i> , instability or collapse of the <i>building</i> structure will not occur.
<b>Stability</b>	In the context of <i>fire</i> protection is the support provided to a <i>building element</i> having a <i>FRR</i> , intended to avoid premature failure due to structural collapse as a result of applied load, dead and live loads or as a result of any additional loads caused by <i>fire</i> .
<b>Standard test</b>	A test method that is recognised as being appropriate for the <i>fire</i> protection properties being assessed.
<b>Structural adequacy</b>	In the context of the <i>standard test</i> for <i>fire</i> resistance, is the time in minutes for which a prototype specimen has continued to carry its applied load within defined deflection limits. The <i>fire</i> design load should be as specified in B1/VM1.
<b>Suite</b>	A <i>firecell</i> providing residential accommodation for the exclusive use of one person or of several people known to one another. It comprises one or more rooms for sleeping and may include spaces used for associated domestic activities such as hygiene and cooking. A suite may include transient or educational accommodation.
<b>Surface finish</b>	The combination of a surface coating and substrate material on surfaces of <i>building elements</i> exposed to view. It can be an applied decorative coating or the uncoated <i>building element</i> itself. For interior surfaces the requirements are evaluated in terms of a <i>Group Number</i> .
<b>Theatre</b>	A place of assembly intended for the production and viewing of performing arts, and consisting of an auditorium and stage with provision for raising and suspending stage scenery above and clear of the working area.
<b>Travel distance</b>	The length of the <i>escape route</i> as a whole or the individual lengths of its parts, namely: a) <i>open paths</i> , and b) <i>safe paths</i> .
<b>Unprotected area</b>	In relation to an <i>external wall</i> of a <i>building</i> , means: a) any part of the <i>external wall</i> which is not <i>fire</i> rated or has less than the required <i>FRR</i> , and b) any part of the <i>external wall</i> which has <i>combustible</i> material more than 1.0 mm thick attached or applied to its external face, whether for cladding or any other purpose. <i>Unprotected areas</i> include non- <i>fire</i> rated windows, doors, or other openings, and non- <i>fire</i> rated <i>external wall construction</i> .
<b>Wharehenui</b>	A communal meeting house having a large open floor area used for both assembly and sleeping in the traditional Māori manner.

## Fire safety systems

# Appendix C. Fire safety systems

## C.1 Fire alarm and sprinkler systems

### C.1.1 Desing and installation

- C.1.1.1 [Part 2. Firecells, fire safety systems, and fire resistance ratings](#) specifies which type of *fire safety system* shall be installed in **risk group SH**.
- C.1.1.2 *Fire* alarm systems shall be designed and installed in accordance with NZS 4512 where appropriate and the specific requirements of this acceptable solution.
- C.1.1.3 Sprinkler systems shall be designed and installed in accordance with NZS 4541, NZS 4515, or NZS 4517 where appropriate and the specific requirements of this acceptable solution.
- C.1.1.4 Smoke alarms shall be manufactured and installed in accordance with NZS 4514 where appropriate and the specific requirements of this acceptable solution.

## C.2 Fire safety system descriptions

### C.2.1 Type 1 – Domestic smoke alarm system

- C.2.1.1 A Type 1 is a smoke alarm or multiple interconnected smoke alarm devices, each containing a smoke detector and an alarm sounding feature. The system shall comply with NZS 4514. Smoke alarms shall be installed in every *household unit* or *suite* of **risk group SH**, and **risk group SM** where a Type 5 is not required by this Acceptable Solution. Connection to a *remote receiving centre* is not required.

### C.2.2 Type 2 – Manual fire alarm system

- C.2.2.1 A Type 2 is a *fire* alarm system compliant with NZS 4512 with manual call points throughout the *building*. Supplementary heat, smoke, or other detectors may be included in the system.

### C.2.3 Type 3 – Automatic fire alarm system activated by heat detectors and manual call points

- C.2.3.1 A Type 3 is an automatic *fire* alarm system compliant with NZS 4512 with full building coverage of heat detectors and manual call points.
- C.2.3.2 If the *building* area to be protected is not fully covered with heat detectors but is adequately provided with manual call points, it is deemed a Type 2 with supplementary detectors.

### C.2.4 Type 4 – Automatic fire alarm system activated by smoke detectors and manual call points

- C.2.4.1 A Type 4 is an automatic *fire* alarm system compliant with NZS 4512 with full building coverage of smoke detectors and manual call points.
- C.2.4.2 If the *building* area to be protected is not fully covered with smoke detectors but is adequately provided with manual call points, it is deemed a Type 2 with supplementary smoke detectors.
- C.2.4.3 In limited circumstances as described in NZS 4512, where the ambient conditions of a space are not suitable for smoke detectors, heat detectors are allowed to be substituted.

### C.2.5 Type 5 – Automatic fire alarm system with modified smoke detection and manual call points

- C.2.5.1 A Type 5 is a variation of the Type 4 and Type 7 alarm systems requiring part of the smoke detection component to comprise only a local alarm. The local alarm system, activated by the presence of smoke, shall have audible alerting devices to warn only the occupants within the *household unit* or *suite*, and the *building* management (such as in motels, hotels or multi-unit accommodation in retirement villages), where such management exists.

## Fire safety systems

C.2.5.2 The local alarm component of a Type 5 system:

- a) shall be restricted to single *firecells* containing sleeping accommodation, being *household units* or individual *suites* in **risk group SM** and **SI**. The local alarm system shall not be extended to other areas such as *exitways* or common spaces, or other *firecells* in the same *building*. These shall retain a Type 4 smoke detection system; and
- b) shall have the facility to be silenced (muted) by a 'hush' facility located at a level readily able to be reached in accordance with clause D1 of the Building Code.
- c) shall be permitted only where an automatic *fire* alarm system activated by heat detectors (part of the main alarm system) is also installed in *household unit* or *suite* which do not already have an automatic *fire* sprinkler system.

C.2.5.3 Where a Type 5 is required, the Type 4 or Type 7 system required in *exitways*, common spaces, and other *firecells* in the same *building* shall not be modified. The system installation for Type 3, Type 4, and Type 7 components shall comply with NZS 4512. The sprinkler element of the system installation for Type 7 shall also comply with NZS 4541.

C.2.5.4 The Type 5 system installation for the local smoke alarm component shall also comply with NZS 4512.

### C.2.6 Type 6 – Automatic fire sprinkler system with manual call points system

C.2.6.1 A Type 6 system is a combined automatic fire sprinkler system and Type 2 alarm. Activation of the sprinklers shall automatically activate the audible alerting devices of the fire alarm system. Sprinkler installation shall comply with NZS 4541 as appropriate, and as modified by [Appendix D](#).

### C.2.7 Type 7 – Automatic fire sprinkler system with smoke detectors and manual call points

C.2.7.1 A Type 7 system is a combined Type 6 and Type 4 or Type 5 alarm system. Sprinkler installation shall comply with the requirements of a Type 6 system.

### C.2.8 Type 9 – Smoke control in air-handling systems

C.2.8.1 Where smoke control is required in relation to heating, ventilating or air conditioning systems, it shall comply with the requirements of either:

- a) AS 1668.1 for *HVAC* system shutdown and interface with any Type 4 or 7 system; or
- b) NZS 4512 to provide ancillary function output for *HVAC* system shutdown if a Type 4 or 7 alarm system is used as a means of smoke detection.

### C.2.9 Type 15 – Fire and Emergency New Zealand Lift Control

C.2.9.1 The control of lifts under *fire* conditions shall comply with NZS 4332.

### C.2.10 Type 18 – Fire hydrant systems for buildings

C.2.10.1 *Fire* hydrant systems shall comply with NZS 4510.

## Modifications to standards

# Appendix D. Modifications to standards

## D.1 Fire safety systems

### D.1.1 Fire detection and alarm systems in buildings

- D.1.1.1 Where domestic smoke alarm systems are required by this acceptable solution, they shall comply with NZS 4514 without further modification to the standard.
- D.1.1.2 Wherever *fire* alarms are required by this acceptable solution, they shall comply with NZS 4512 without further modification to the standard.

### D.1.2 Automatic fire sprinkler systems

- D.1.2.1 Wherever sprinklers are required by this acceptable solution, they shall comply with the relevant New Zealand Standard as modified by Paragraphs [D.1.2.2](#) and [D.1.2.3](#).
  - D.1.2.2 NZS 4541 is modified as follows:
    - a) Clause 1.3 Definitions
      - Sprinkler system - a system including:
        - (a) to (i) no change.
        - (j) remove.
        - (k) no change; and
    - b) Clause 2.5 remove entire clause; and
    - c) Clause 2.6 remove entire clause; and
    - d) Clause 12.3 Routine inspections; and
    - e) Clause 12.3.1 remove the first two paragraphs and replace with:
      - i) “It is important that a sprinkler system at all times complies with this Standard as modified by Paragraph D.1.2 of Appendix D to C/AS1 in all respects. To ensure that building alterations, changes in process or storage patterns or progressive deterioration of system components do not prejudice system compliance, a comprehensive survey shall be carried out biennially at intervals not exceeding 28 months. Such surveys shall be carried out by an independent qualified person.”
  - D.1.2.3 NZS 4515 is modified as follows:
    - a) Clause 1.5 Definitions
      - Sprinkler system A system including:
        - (a) to (g) no change.
        - (h) remove; and
    - b) Clause 1.11 remove the entire clause; and
    - c) Clause 2.1.2 remove; and
    - d) Clause 2.1.3 remove; and
- ### D.1.3 Smoke control in air-handling systems
- D.1.3.1 Where AS 1668.1 is used as a means to comply with Appendix [C.2.8.1\(a\)](#), AS 1668.1 is modified as follows:
    - a) Clause 7.2.1(b) Delete clause; and
    - b) Clause 7.2.3 Delete clause.

## Modifications to standards

- D.1.3.2 Where AS 1668.1 is used as a means to comply with Appendix C.2.8.1(a), AS 1670.1 as referenced in AS 1668.1 is modified as follows:
- a) Clause 7.1
    - i) remove the first sentence, and
    - ii) replace the last sentence with: “Detection and control shall also be in accordance with NZS 4512 except where varied by this clause.”; and
  - b) Clause 7.4.1 replace “this Standard” with “NZS 4512”; and
  - c) Clause 7.5.1 (c) replace with: “Detectors shall be spaced in accordance with the requirements of NZS 4512”; and
  - d) Clause 7.5.1 (d) replace with: “Optical beam smoke detectors shall be spaced in accordance with the requirements of NZS 4512”; and
  - e) Clause 7.5.1 Note remove; and
  - f) Clause 7.5.2.1 replace “this Standard” with “NZS 4512”; and
  - g) Clause 7.2.5.1(i) replace the first sentence with: “Rooms that have a dimension of 10 m or more in any direction on the horizontal plane shall have detection provided in the room in accordance with NZS 4512”; and
  - h) Figure 7.5.2.2(B) replace “15 m” with “10 m”; and
  - i) Clause 7.15.1 Location replace with “The FFCP shall be incorporated into or located adjacent to the main indicating unit and constructed in accordance with the requirements in NZS 4512. Note: an example is shown in Figure 7.15.1”; and
  - j) Clause 7.17.2 (iii) replace “AS/CA S009” with “AS/NZS 3000”; and
  - k) Clause 7.18 Transmission paths replace the first paragraph with:
 

“Transmission paths to equipment serving more than one smoke control zone shall have a redundant transmission path. Transmission paths to the following equipment forming part of the smoke control system shall meet the requirements of Clause 2.6, Clause 3.13, Clause 3.25, Clause 3.26 and NZS 4512.”; and
  - l) Clause 7.19.1 replace “Clause 1.7.2” with “NZS 4512”.
- D.1.3.3 In addition to meeting the requirements in AS 1670.1 as modified to comply with the requirements for smoke detectors that are part of the smoke control in air-handling systems, further requirements in NZS 4512 will need to be met where a *fire* alarm system is required to be installed.

## D.2 Heating appliances

### D.2.1 Domestic solid fuel burning appliances

D.2.1.1 AS/NZS 2918 is modified as follows:

- a) replace Paragraph 3.8 with the following:
  - i) “3.8 Seismic restraint
 

The appliance and the floor protector shall be mechanically fixed to the floor itself.

The test seismic force shall be taken as the application of a horizontal force equal to 0.40 times the appliance weight acting in any direction at the mid-height of the combustion chamber. The appliance shall not move, tilt or be dislodged from its installed position during the application of the test force.

The weight of the flue system and a wetback, if fitted, shall not be included in the test.”; and

## Modifications to standards

b) replace Section 7 with the following:

i) “7.1 Ventilation

Ventilation shall be in accordance with Acceptable Solution G4/AS1.

7.2 Water heating equipment

Water heating appliances installed in conjunction with the heating appliance shall be vented and shall comply with Acceptable Solution G12/AS1.”

### **D.2.2 Domestic oil-fired appliances**

D.2.2.1 AS 1691 is modified as follows:

a) replace Paragraph 2.2.3 with the following:

i) “2.2.3 Electrical equipment

Electrical equipment shall comply with Acceptable Solution G9/AS1 or Verification Method G9/VM1.”; and

b) replace “CSIRO durability Class 2 or better” from Paragraph 3.1.2 (b) with “H5 treatment”; and

c) remove the Note to Paragraph 3.1.2 (d); and

d) replace Paragraph 3.1.4 with the following:

i) “3.1.4 Stability

The appliance shall be mechanically fixed to the building.

The test seismic force on the fuel tank shall be taken as the application of a horizontal force in kilograms numerically equal to 0.40 times the tank volume in litres acting at the centre of the tank. The test seismic force on the appliance shall be taken as the application of a horizontal force equal to 0.40 times the appliance operating weight acting at the centre of the appliance.

The appliance and the fuel tank shall resist their respective seismic forces with no significant movement.”; and

e) remove the words “without specific approval” from Paragraph 3.2.8 (b); and

f) remove Paragraph 5.1.1; and

g) add the following note to 5.2.2: “Note: Refer to Acceptable Solution G4/AS1 for ventilation requirements.”

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